

THE FOURTH NATIONAL REPORT OF THE RUSSIAN FEDERATION

**ON COMPLIANCE WITH THE OBLIGATIONS
OF THE JOINT CONVENTION ON THE SAFETY
OF SPENT FUEL MANAGEMENT AND THE SAFETY
OF RADIOACTIVE WASTE MANAGEMENT**

Prepared for the fifth Review Meeting
in frames of the Joint Convention on
the Safety of Spent Fuel Management
and the Safety of Radioactive Waste
Management

Moscow 2014

The fourth National Report of the Russian Federation has been drafted in accordance with Article 32 of the Joint Convention on the Safety of Spent Fuel Management and the Safety of Radioactive Waste Management.

The Report describes in detail the obligations arising from the Joint Convention on the Safety of Spent Fuel Management and the Safety of Radioactive Waste Management and compliance with them by the Russian Federation.

The Report has been prepared by the State Atomic Energy Corporation «Rosatom» and the Federal Environmental, Industrial and Nuclear Supervision Service with the involvement of:

- Nuclear Safety Institute of the Russian Academy of Sciences (IBRAE RAN);
- Federal Budgetary Institution «Scientific and Engineering Center for Nuclear and Radiation Safety» (FBI «SEC NRS»).

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List of abbreviations

- AMB — Atomic Peaceful Large (abbreviation for water-cooled graphite-moderated channel-type thermal neutron reactor)
- ASA — acceptable specific activity
- BN — fast breeder reactor
- CMP — open-type joint stock company «Chemical and Metallurgical Plant» (JSC «CMP»)
- DWIF — deep-well injection facility for liquid radioactive waste
- EGP — loop-type graphite power reactor
- EIA — environmental impact assessment
- FA — fuel assembly
- FMB — floating maintenance base
- FMBA — Federal Medical and Biological Agency
- FR — fuel rod
- FSUE — federal state unitary enterprise
- FTP — federal target program
- FZ — federal law
- GD — guideline document
- GRW — gaseous radioactive waste
- GSP NFCF — General Safety Provisions for Nuclear Fuel Cycle Facilities
- HLW — high-level waste
- IAEA — International Atomic Energy Agency
- ICRP — International Commission on Radiological Protection
- ILW — intermediate-level waste
- IPPE — Federal state unitary enterprise «State Scientific Centre of the Russian Federation — Institute of Physics and Power Engineering Named after A.I. Leipunsky» (FSUE «SRC IPPE»)
- IRS — ionizing radiation source
- LLW — low-level waste
- LRW — liquid radioactive waste
- MCC — Federal state unitary enterprise «Mining and Chemical Combine» (FSUE «MCC»)
- EMERCOM — Ministry of the Russian Federation for Civil Defense, Emergencies and Elimination of the Consequence of Natural Disasters
- MSSA — minimum significant specific activity
- NF — nuclear facility
- NFC — nuclear fuel cycle
- NI — nuclear installation
- NIIP — Federal state unitary enterprise «Scientific Research Institute for Instruments» (FSUE «NIIP»)
- NM — nuclear material
- NP — norms and rules
- NPGC — nuclear power generation complex

- NPP — nuclear power plant
- NRC «KI» — National Research Centre «Kurchatov Institute»
- NRS — nuclear and radiation safety
- OJSC — open-type joint stock company
- OSPORB — Basic Sanitary Rules of Radiation Safety
- PA «Mayak» — Federal state unitary enterprise «Production Association «Mayak» (FSUE «PA «Mayak»)
- PDC — pilot demonstration centre
- PIMCU — Open-type joint stock company «Priargunsky Industrial Mining and Chemical Union»
- RBMK — high power graphite moderated channel-type reactor
- RF — the Russian Federation
- RIAR — Open-type joint stock company «State Research Centre of the Russian Federation — Research Institute of Atomic Reactors» (JSC «SRC RIAR»)
- RM — radioactive material
- Rosatom — State Atomic Energy Corporation «Rosatom»
- Rostekhnadzor — Federal Environmental, Industrial and Nuclear Supervision Service
- RR — research reactor
- RS — radiation source
- NRB — radiation safety standards
- RTG — radioisotope thermoelectric generator
- RW DF — disposal facility for radioactive waste
- RW — radioactive waste
- SAR — safety analysis report
- SCC — open-type joint stock company «Siberian Chemical Combine» (JSC «SCC»)
- SCR — self-sustaining chain reaction
- SEP — special environmental program
- SF — storage facility
- SFA — spent¹ fuel assembly
- SNF — spent¹ nuclear fuel
- SNF SF — storage facility for spent nuclear fuel
- SPORO — Sanitary Rules for Radioactive Waste Management
- SPZ — sanitary protection zone
- SRS — sealed radiation source
- SRW — solid radioactive waste
- TUK — transportation cask
- UECC — Open-type joint stock company «Ural Electrochemical Combine» (JSC «UECC»)
- USS — Unified State System
- WWER — water-cooled water-moderated power reactor

¹ termed «irradiated» in a number of regulations of the Russian Federation

Section A. Introduction

A.1. Purpose of the report

The present fourth National Report of the Russian Federation on compliance with the obligations of the Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management (hereinafter Convention) covers the period from January 2012 to September 2014.

The purpose of the National Report is to provide information on the compliance with obligations for the safety of RW and SNF management, assumed by the Russian Federation under the Convention.

This National Report focuses on issues and challenges highlighted by the Contracting Parties in the course of the review and discussion of national reports at the fourth Review Meeting held in the IAEA Headquarters (Vienna, Austria) on May 14-23, 2012.

A.2. Structure of the report

The report has been prepared in keeping with the requirements of the «Guidelines regarding the form and structure of National Reports» (INFCIRC/604/rev.2) for the Convention.

The Report demonstrates article-by-article how the Russian Federation continues to meet every obligation arising from the Convention.

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A.3. Conclusions drawn from the discussion of the third National Report of the Russian Federation presented at the fourth Review Meeting

A number of particular features and positive aspects of SNF and RW management practices existing in the Russian Federation have been pointed out during the final plenary session of the fourth Review Meeting, including:

- further improvement of the existing legal and regulatory framework in the field of SNF and RW management, as well as of the state regulatory system in the field of atomic energy use in keeping with the international recommendations;
- efficient implementation of the Federal Target Program «Nuclear and Radiation Safety in 2008 and until 2015» (hereinafter FTP NRS) having for its primary purpose comprehensive solution of nuclear and radiation safety issues associated with SNF and RW management, decommissioning of nuclear and radiation hazardous facilities, improvement of systems necessary for NRS assurance and control;
- adoption of the Federal Law № 190-FZ «On the Management of Radioactive Waste and Amendments to Certain Legislative Acts of the Russian Federation» of July 11, 2011 establishing the legal basis for the Unified State System for RW Management in the Russian Federation (USS RW) which provides for transition to mandatory disposal of all RW inventory — both newly-generated and already existing waste;
- establishment of the National Operator for RW management responsible for RW disposal and other RW management activities;
- delineation of responsibilities between management and regulatory authorities in the field of atomic energy use;
- considerable progress and international cooperation on return of the spent nuclear fuel of foreign research reactors built to Russian designs;
- development and implementation of long-term plans to ensure safety of «nuclear legacy» facilities;
- plans for establishing a pilot demonstration center (PDC) for SNF reprocessing;
- commissioning and operation of a centralized dry storage facility for SNF.

During the Review Meeting it was also noted that the Russian Federation adhered to a comprehensive approach in SNF and RW management: «Long-Term Action Program for the State Atomic Energy Corporation «Rosatom» (2009-2015) was being carried out; the Federal Law № 190-FZ «On the Management of Radioactive Waste and Amendments to Certain Legislative Acts of the Russian Federation» of July 11, 2011 was adopted, the Russian Federation was actively involved in international cooperation on comprehensive solution of the existing nuclear fuel cycle (NFC) safety issues.

The discussion of the third National Report of the Russian Federation and its results highlighted the need of implementing the already planned arrangements to improve the safety of SNF and RW management, including:

- establishment of the Unified State System for RW Management (USS RW);
- improvement of the regulatory framework in the field of SNF management;
- completion of the bulk import of highly-enriched fuel from foreign research reactors in accordance with the Global Threat Reduction Initiative;
- follow-up of the FTP «Nuclear and Radiation Safety in 2008 and until 2015»;
- implementation of measures to improve SNF and RW management safety at MCC:
 - 1) to complete the construction of a centralized «dry» SNF storage facility;
 - 2) to reconstruct and upgrade the «wet» SNF storage facility;
 - 3) to develop the design and construct PDC for SNF reprocessing.

- to establish RW management facilities at PA «Mayak»;
- to upgrade and improve the system of federal norms and rules in the field of SNF and RW management.

It was particularly noted that the Russian Federation will have to address great challenges, including the nuclear legacy issues, and to lead ambitious efforts to improve the safety of SNF and RW management, such as:

- to follow-up decommissioning and remediation activities at PA «Mayak», MCC, SCC etc.;
- to make decisions on surface water reservoirs for LRW storage (conservation of industrial water reservoirs, including the *Karachai* water reservoir, ensuring safety of the Techa cascade of water reservoirs and etc.);
- to establish new RW processing facilities;
- to construct an underground research laboratory and explore the HLW disposal concept;
- to develop a system for RW classification relying on the disposal routes;
- to perform additional safety assessments for wet SNF storage offsite NPPs.

Actions taken to comply with the recommendations, as well as planned and already implemented efforts aimed to improve SNF and RW management safety, the necessity of which was highlighted in the findings of the Review Meeting on the third National Report of the Russian Federation, are presented in the relevant sections of this Report.

A.4. The main topics of the report and near-term initiatives for the safety of SNF and RW management

A.4.1. National policies of the Russian Federation in nuclear power development and nuclear and radiation safety

The State Program of the Russian Federation «Development of the Russian Nuclear Power Generation Complex» approved by the Resolution of the Government of the Russian Federation № 516-12 of June 2, 2014 (hereinafter Development Program) provides for continued construction of nuclear power units and commissioning of at least 10 new nuclear power units until 2020.

«State Policy Fundamentals of the Russian Federation in the Field of Nuclear and Radiation Safety up to 2025» approved by the Presidential Decree № Pr-593 of March 1, 2012 (hereinafter State Policy Fundamentals) specifies the long-term aim, basic objectives, fundamental principles and crucial tasks of the state nuclear and radiation safety policy of the Russian Federation.

In accordance with the State Policy Fundamentals, the major factors governing the state policy in the field of nuclear and radiation safety are as follows:

- a) increasing role of nuclear energy and nuclear technologies in sustainable development of the Russian Federation in the foreseeable future, as well as in assuring its national interests and sovereignty;
- b) high sensitivity of major nuclear powers' policies to nuclear accidents and issues associated with SNF and RW management;
- c) stepping up the international safety requirements for nuclear facilities;
- d) the growing number of nuclear facilities to be decommissioned;
- e) stepping up the requirements to the personnel of nuclear and radiation hazardous facilities, management authorities in the field of atomic energy use and the state safety regulatory authorities in the field of atomic energy use concerning nuclear and radiation safety, prevention and elimination of accidents and emergencies, physical protection and

protection of information on nuclear and radiation hazardous facilities and material, nonproliferation of nuclear weapons and nuclear material;

- f) continuing threat posed by radical terrorist organizations, including the international ones, to nuclear and radiation hazardous facilities and materials.

The main objective of the State policy is to provide the gradual reduction of man-induced impacts on the population and the environment associated with the use of atomic energy and their mitigation to the socially acceptable level, as well as prevention of emergencies and accidents at nuclear and radiation hazardous facilities.

The basic objectives of the nuclear and radiation safety state policy involve:

- a) to improve state management and coordination of efforts with regard to safe use of atomic energy, as well as to ensure the development of safety culture in reliance on the best international practices;
- b) to upgrade the state safety regulatory system in the field of atomic energy use covering the regulatory framework, state control and supervision over nuclear and radiation safety, the increased efficiency of licensing and safety reviews in this domain, and the establishment of mechanisms for comprehensive expert evaluation of safety of nuclear and radiation hazardous facilities;
- c) to improve protection of nuclear and radiation hazardous facilities and materials from harmful effects of human, technogenic and ecological factors, and terrorist threats;
- d) to provide personnel support for all kinds of safety-related activities associated with atomic energy use;
- e) to ensure dismantlement of nuclear and radiation hazardous facilities, SNF and RW management, remediation of radioactively contaminated sites on the territory of the Russian Federation;
- f) to upgrade emergency prevention systems at nuclear and radiation hazardous facilities and the response systems for radiation accidents;
- g) to ensure further development of international cooperation in the field of nuclear and radiation safety, emergency prevention, preparedness and response.

The fundamental principles of the State policy in the field of nuclear and radiation safety are as follows:

- a) compliance with the legislation of the Russian Federation, as well as with the international treaties, agreements and conventions which the Russian Federation is Party to;
- b) harmonization of Russian legal and regulatory framework in the field of atomic energy use with relevant international standards;
- c) overriding priority of nuclear and radiation safety assurance acting as the essential condition for all activities in the field of atomic energy use;
- d) maintaining balance between the state interests and rights and interests of individuals and organizations, involved in atomic energy use, protected by law, mutual responsibility of an individual, society and the state for nuclear and radiation safety assurance, personification of officials' responsibility;
- e) implementation of the socially acceptable risk concept aimed at mitigation of nuclear and radiation risks (acting as components of the overall technogenic risk), thus, providing that individual personnel exposure and the number of exposed individuals are kept to the minimum practicable (with account of economic and social aspects);
- f) prohibition of any activities in the field of atomic energy use the beneficial effects from which do not offset the risk of possible damage;
- g) concentration of efforts and resources of federal and regional state authorities, local authorities, authorized management body in the field of atomic energy use, owners of

- nuclear and radiation hazardous facilities and their operators on basic objectives of nuclear and radiation safety assurance;
- h) training and retraining of personnel for nuclear and radiation hazardous facilities, management authorities in the field of atomic energy use and state safety regulatory authorities in the field of atomic energy use based on the latest scientific and technical advances under higher, postgraduate and continuing vocational education programs;
 - i) comprehensive protection of nuclear and radiation hazardous facilities from possible adverse environmental, technogenic and man-induced impacts, including the terrorist threats;
 - j) providing permissive nature of activities in the field of atomic energy use through licensing, accreditation, certification and other similar arrangements;
 - k) efficient delineation of the current powers and functions between state safety regulatory authorities in the field of atomic energy use, federal executive authorities carrying out state management of activities in the field of atomic energy use, the authorized management authority and organizations operating nuclear and radiation hazardous facilities;
 - l) availability and openness of information on nuclear and radiation safety in compliance with the legislation of the Russian Federation on the protection of state secrets;
 - m) maintaining continuous availability of resources and forces to mitigate the consequences of possible emergencies associated with atomic energy use;
 - n) financial liability of operating organizations for possible nuclear and radiation damage caused to the public and organizations in accordance with the legislation of the Russian Federation.

Most important tasks for the implementation of the State Policy Fundamentals with regard to the improvement of SNF and RW management safety are as follows:

- a) with regard to the development of state management, regulation and coordination of efforts for the safe use of atomic energy:
 - ◆ follow-up the development of the USS RW in order to arrange for and ensure safe and cost-effective RW management, also covering RW disposal;
 - ◆ establishment of a unified system for SNF management;
 - ◆ upgrading and elaborating the state system for accounting and control of radioactive substances and RW;
 - ◆ to increase the efficiency of scientific, methodological, regulatory, material, technical, and administrative support of activities involving the management of nuclear material, radioactive substances, RW and SNF;
- b) with regard to the improvement of safety level at nuclear and radiation hazardous facilities, protection of personnel, public and the environment:
 - ◆ development and introduction of advanced facilities, equipment, operational procedures characterized by higher safety level, including the use of nuclear and radiation safe, and blast and flameproof technologies, modern technologies ensuring safety of nuclear material, radioactive substances, RW and SNF management;
- c) with regard to the dismantlement of nuclear and radiation hazardous facilities which currently are not used for their functional purposes, SNF and RW management, remediation of radioactively contaminated sites:
 - ◆ control over nuclear and radiation hazardous facilities which currently are not used for their functional purposes, SNF and RW, radioactively contaminated sites on the territory of the Russian Federation;
 - ◆ assured transportation of SNF from the operators' sites, its reprocessing and long-term storage;

- ◆ development and implementation of a set of arrangements to commission SNF management facilities being part of a centralized infrastructure to ensure its safe transportation, long-term storage and reprocessing;
- ◆ construction of near-surface disposal facilities for low-level and intermediate-level RW and a deep disposal facility for long-lived and high-level RW;
- ◆ development of cutting-edge technologies for SNF and RW reprocessing, and decommissioning of nuclear and radiation hazardous facilities;
- ◆ mitigation of environmental damage and remediation of radioactively contaminated sites;
- ◆ safe industrial-scale dismantlement of nuclear submarines, nuclear-powered surface ships and nuclear maintenance vessels withdrawn from naval service, as well as of the decommissioned ships of the Russian icebreaker fleet;
- ◆ disposition of decommissioned equipment and materials used in the development of nuclear weapons complex, involving the arrangements for reprocessing and transportation of such items to the work sites.

The State Policy Fundamentals recognize nuclear and radiation safety assurance objective as one of the top priority tasks of socio-economic development and a key element of the national security and safety of the Russian Federation.

The Federal Target Program «Nuclear and Radiation Safety in 2008 and until 2030» (hereinafter FTP «NRS») approved by the resolution of the Government of the Russian Federation № 444 on 13 July, 2007 was developed in order to address the most urgent NRS issues facing the Russian Federation. FTP NRS's aim is put in place conditions required to ensure long-term nuclear and radiation safety. Implementation of this program is currently underway.

Pursuant to the Government Order (№ DM-P7-4107r of June 2, 2014), efforts are underway to develop a concept for the Federal Target Program «Nuclear and Radiation Safety in 2016-2020 and until 2025» (NRS-2).

A.4.2. Procedural and legal alterations in the nuclear industry and the regulation of safety in the field of atomic energy use

The Government and the Federal Assembly of the Russian Federation are continuing to improve the legislation to ensure stable and effective regulation of nuclear and radiation safety in the field of atomic energy use.

In the reporting period, certain amendments were introduced to legislative acts on atomic energy use to improve the legal framework for the state regulation of nuclear and radiation safety.

The Federal Law № 347-FZ «On Amendments to Certain Legislative Acts of the Russian Federation for the Purposes of Regulating Safety in the Field of Atomic Energy Use» of November 30, 2011 introduced some conceptual amendments to the existing legislation, and most notably to the Federal Law № 170-FZ «On the Use of Atomic Energy» of November 21, 1995, which provide for:

- elimination of duplications and contradictions in the legislative provisions for atomic energy use and development of a unified regulatory and technical basis for the regulation of safety in the field of atomic energy use;
- recognition of supremacy of atomic energy use legislation over legal requirements effective in other domains (industrial safety, safety of hydraulic engineering structures, fire safety, technical regulations);
- updated list of activities in the field of atomic energy use that are subjected to licensing;
- a fixed time limit for periodic safety assessments of nuclear and storage facilities (every 10 years);

- identification of the main tasks for scientific and technical support organizations providing their services to the state regulatory authority;
- independency of state safety regulatory authorities was declared as a core principle of legal regulation in the field of atomic energy use;
- certain aspects of the licensing procedure have been elaborated;
- special aspects concerning the regulation of activities that involve radiation sources containing radionuclide sources have been specified;
- legal basis for expert reviews of safety and their funding has been established.

Furthermore, the Federal Law № 347-FZ introduced certain amendments concerning technical regulation of safety in the field of atomic energy use, in particular, to the Federal Law № 184-FZ «On Technical Regulation» of December 27, 2002, according to which:

- the Government of the Russian Federation shall specify the process of development, adoption and application of legal instruments on standardization of products (operations and services) in the field of atomic energy use;
- compliance assessment (including state controls (supervision) with mandatory requirements applied to products (operations and services)) shall be carried out in keeping with the procedure established by the Government of the Russian Federation.

The Resolution of the Government of the Russian Federation № 173 «On the Approval of Regulations Concerning Particular Aspects of the Standardization Process for Products (Operations, Services) Subject to the Safety Requirements in the Field of Atomic Energy Use...» has been adopted to help the implementation of paragraph 3 article 5 of the Federal Law «On Technical Regulation» and introduced the need to develop an appropriate list of standardization documents having mandatory application.

Thereby a mechanism has emerged enabling to establish specific characteristics and criteria for safety-important products and not to include such safety requirements into federal norms and rules in the field of atomic energy use which considerably facilitate the regulation of safety requirements in the field of atomic energy use, as well as the design (including the research efforts), production, construction, installation, setup, operation, storage, transportation, dismantlement and disposition of above mentioned products.

The Government of the Russian Federation made certain efforts to improve the existing legislation and to eliminate restrictions on frequency and duration of reviews conducted by regulatory authorities. In particular, the Federal Law № 242-FZ «On Amendments to Certain Legislative Acts of the Russian Federation Concerning State Control (Supervision) and Municipal Control» of July 18, 2011 added Article 24.1 to the Federal Law «On the Use of Atomic Energy» specifying particular aspects of the federal state supervision in the field of atomic energy use, such as:

- legal status «authorized authority of state regulation» has been formalized;
- the term «state supervision in the field of atomic energy use» has been defined;
- the procedure for scheduled and unscheduled inspections at nuclear facilities has been set;
- the responsibility for violating norms and rules in the field of atomic energy use has been strengthened.

The Resolution of the Government of the Russian Federation № 1044 «On the Federal State Supervision in the Field of Atomic Energy Use» of October 15, 2012 (along with the «Regulation on the Federal State Supervision in the Field of Atomic Energy Use») also includes some provisions specifying particular aspects of and the procedure for the state supervision in the field of atomic energy use.

In accordance with the recently adopted Federal Law № 188-FZ «On Amendments to the Federal Law «On the State Atomic Energy Corporation «Rosatom» and Certain Legislative Acts of the Russian Federation» of July 2, 2013, the Corporation exercises the functions of chief public funds controller, public funds recipient, chief public funds administrator, public revenue administrator and state contracting authority for long-term target programs, R&D and investment programs and projects, special environmental programs for the remediation of radioactively contaminated sites, multinational programs, the federal targeted investment program; it also places orders, concludes state contracts for goods, services and works, execution of scientific-technical, research and development, design and survey, and engineering activities for state needs, as well as other civil-law contracts according to the procedure established by the Russian legislation.

A.4.3. Near-term initiatives to improve the safety of SNF and RW management

The Federal Law № 190-FZ «On Radioactive Waste Management and Amendments to Certain Legislative Acts of the Russian Federation» of July 11, 2011 came into force on July 15, 2011. In the reporting period, the crucial initiatives assuring the safety of SNF and RW management were aimed at the establishment of a Unified State System for RW management (hereinafter USS RW) also involving the development of an appropriate legal framework.

For the purposes of the law enforcement a list of government decrees and resolutions was developed and approved, including:

- the Resolution of the Government of the Russian Federation № 1185 «On the Procedure and Timeframes for the Establishment of a Unified State System for RW Management» of November 19, 2012;
- the Decree of the Government of the Russian Federation № 384-r «On the National Operator for Radioactive Waste Management» of March 20, 2012;
- the Resolution of the Government of the Russian Federation № 1249 «On the Procedure for the State Regulation of Radioactive Waste Disposal Tariffs» of December 3, 2012, setting up the procedure for the state regulation of RW disposal tariffs including the appropriate basic pricing principles and rules for state regulation and control;
- the Resolution of the Government of the Russian Federation № 1187 «On the Approval of the Regulation Governing Contributions of the National Operator for Radioactive Waste Management... to the RW Disposal Fund» of November 19, 2012, establishing the procedure the national RW operator shall follow to contribute its funds gained from RW reception to the RW disposal fund;
- the Resolution of the Government of the Russian Federation № 767 «On the Initial Registration of Radioactive Waste» of July 25, 2012, establishing the procedure for the initial registration of RW generated prior to the enactment of the Federal Law № 190-FZ to identify RW distribution and their amounts, as well as the conditions at sites where they are kept;
- the Resolution of the Government of the Russian Federation № 1186 «On the Approval of the Regulation Concerning the Return of Spent Sealed Radiation Sources of Russian Production to the Russian Federation, and the Return of Spent Sealed Radiation Sources to the Country of Origin» of November 19, 2012 establishing the procedure for the return of Russian-produced SSRs, defined as RW, including for the purposes of their reprocessing and disposal, as well as the procedure for SSRs return to the country of origin;
- the Resolution of the Government of the Russian Federation № 1069 «On Criteria Used to Define Solid, Liquid and Gaseous Waste as Radioactive Waste, Criteria Used to Define Radioactive Waste as Special Radioactive Waste and Removable Radioactive Waste, Cri-

teria for the Classification of Removable Radioactive Waste» of October 19, 2012 (hereinafter, PP-1069);

- the Resolution of the Government of the Russian Federation № 1188 «On the procedure for the state accounting and control of radioactive waste, including the registration of radioactive waste and storage facilities for radioactive waste by the state management authority in the field of radioactive waste management» of November 19, 2012, specifying the legal procedure for state accounting and control of RW, as well as for collecting and logging the information on the amount, qualitative composition and transportation of waste; RW registration; registration of RW storage facilities; maintenance of RW inventory and registry of RW storage facilities; drafting of RW passports and etc.

USS RW is aimed at arranging and ensuring safe and cost-effective RW management covering also RW disposal. USS RW is made of several RW management entities, infrastructure facilities for RW management, and appropriate RW management requirements established in the Federal Law «On Radioactive Waste Management ...» and other by-laws of the Russian Federation.

A more detailed presentation of plans for USS RW establishment in the Russian Federation is given in Section B.4 of this Report.

The current system of federal norms and rules is an integrated part of the legal framework in the field of SNF and RW management. Its development is primarily fostered by its elaboration in light of legal changes with due consideration to the past applications. Adoption of the Federal Law «On Radioactive Waste Management...» introduced the need for certain amendments to a number of federal norms and rules in the field of RW management, and, in the first place, to those regulating RW management activities, in particular:

- Safety in RW Management. General Provisions (NP-058-04);
- Collection, Processing, Storage and Conditioning of LRW. Safety Requirements (NP-019-2000);
- Collection, Processing, Storage and Conditioning of SRW. Safety Requirements (NP-020-2000);
- Management of Gaseous radioactive Waste. Safety Requirements (NP-021-2000);
- Rules for the Safe Management of Radioactive Waste from Nuclear Power Plants (NP-002-04);
- Disposal of radioactive waste. Principles, criteria and general safety requirements (NP-055-04);
- Near-surface disposal of radioactive waste. Safety requirements (NP-069-06).

Federal norms and rules in the field of atomic energy use «Acceptance criteria for radioactive waste disposal» are currently on their final stage of development. Approval of the abovementioned revised and new federal norms and rules and regulatory documents is expected in 2014.

Section B. Policies and practices (Article 32)

Article 32. Presentation of reports

1. According to the provisions of article 30 each Contracting Part presents a national report to each review meeting of Contracting Parts. In this report are reviewed the measures, assumed to fulfill every obligation fixed in the Convention. The report of each Contracting Part presents also its:

- i) policy in the field of SNF management;
- ii) practices of SNF management;
- iii) policy in the field of RW management;
- iv) practices of RW management;
- v) criteria used for definition and classification of radioactive wastes.

B.1. Policy in the field of SNF management

The basic concept determining the policy of the Russian Federation in the field of SNF management is that SNF is not considered to be radioactive waste.

Main principles of SNF management in Russia are established in the Concept for Spent Nuclear Fuel Management of the State Atomic Energy Corporation «Rosatom» approved by decree № 721 of December 29, 2008.

Priority tasks for managing the accumulated SNF inventory are discussed in the FTP «NRS».

The core principle of the state policy of the Russian Federation in the field of SNF management involves SNF reprocessing to ensure ecologically sound management of fission products and to recycle the recovered nuclear material into nuclear fuel cycle.

B.2. Practices of SNF management

At present, Russian national practices of SNF management involve controlled storage and reprocessing of SNF and provide for addressing the priority tasks enabling to ensure safe management of the accumulated SNF inventory under the FTP «NRS»

B.2.1. Spent nuclear fuel from NPPs

As of January 1, 2014, Russia operates 33 nuclear power units with the overall installed capacity of 25.2 GW. Data on accumulation of SNF from different reactor types are summarized in the Annex B1.

Until recently, SNF generated from nuclear reactor operations was managed in the following ways:

- after interim storage in reactor pools (usually during 3 years), SNF generated from WWER-440 and BN-600 was transported to the reprocessing plant (RT-1, PA «Mayak») for further reprocessing;
- after interim storage in reactor pools or on-site pools (usually for 3 or more years), SNF generated from WWER-1000 was transported to the centralized storage facility at MCC;
- after interim storage in reactor pools, SNF generated from RBMK-1000 was placed into wet storage facilities located in the vicinity of NPPs (storage);
- after storage in reactor pools, EPG-6 SNF was placed into on-site wet and dry storage facilities;
- AMB SNF was discharged from reactors, partially taken away from the site, packaged in canisters and placed in the wet storage facility at PA «Mayak», partially — in reactor pools.

The practice cited above is currently either under revision or the appropriate conditions for its alteration are being established which requires the following efforts:

- RBMK-1000 SNF is being sent from on-site storage facilities to the cutting complex. If SNF is suitable for storage, it is transported to the centralized dry storage facility at MCC. SNF not being suitable for dry storage is planned to be reprocessed at RT-1. Pilot and regular shipments of leaky SFAs has been carried out from the Leningrad NPP.
- design solutions for AMB SNF reprocessing at RT-1 have been developed and are being implemented;
- design solutions providing the opportunity for WWER-1000 SNF transfer from «wet» storage to dry storage at MCC have been developed and are being implemented.

B.2.2. SNF from marine nuclear propulsion units

At present, Russia operates six nuclear-powered icebreakers — «Rossiya (*Russia*)» (1985), «Taimyr» (1988), «Sovetskiy Soyuz» (*Soviet Union*) (1989), «Vaigach» (1990), «Yamal» (1992), «50 Let Pobedy» (*50 years of Victory*) (2007) and a nuclear light container carrier «Sevmorput» (1988). Three icebreakers are currently out of operation, namely: «Lenin» ceased its operation in 1989, «Sibir» (*Siberia*) in 1992, and «Arktika» (*Arctic*) in 2008.

SNF from icebreakers is temporarily stored on floating maintenance bases and in onshore facilities at FSUE «Atomflot». Part of the icebreakers SNF has been discharged from storage facilities at FMB «Lotta», packaged into TUK-120 containers and placed at the accumulation storage site of FSUE «Atomflot». Icebreakers SNF are currently transported to the PA «Mayak» for reprocessing.

B.2.3. SNF from research reactors (RR)

Currently, there are 21 operating RR in Russia, 1 RR is undergoing refurbishment, 3 RR are mothballed, 11 RR are in the process of being decommissioned, and 2 RR are under construction.

RR SNF is generally reprocessed at RT-1 (PA «Mayak»); SNF of certain types is temporarily stored in reactor storage facilities and at their generation sites. Efforts on the removal of this SNF from temporary storage facilities and its transportation to PA «Mayak» for reprocessing have been considerably intensified under the FTP «NRS». In the reporting period, the aggregate number of 3 289 SFAs from IPPE and RIAR research reactors has been taken away for reprocessing.

B.2.4. SNF from foreign reactors

A number of NPPs with reactor units WWER-1000 and WWER-440, as well as research reactors operating on nuclear fuel of Russian production have been in operation outside the borders of the Russian Federation.

At present time, the Russian Federation is engaged in international cooperation with Bulgaria and Ukraine providing its management services for SNF from their power reactors.

SNF from WWER-1000 reactors is taken to the MCC storage facility and SNF from WWER-440 reactors — for reprocessing to PA «Mayak».

Highly enriched SNF from Russian-built (Soviet-built) research reactors has been returned to Russia for reprocessing. RR SNF return from Uzbekistan (2005-2006, 2012), the Czech Republic (2007, 2013), Latvia (2008), Bulgaria (2008-2009), Hungary (2008, 2013), Kazakhstan (2009), Romania (2009), Libya (2009), Poland (2009-2010, 2012), Belarus (2010), Ukraine (2010, 2012), Serbia (2010), and Vietnam (2013) to Russia has been completed.

B.2.5. SNF reprocessing and storage at specially designated enterprises

Two enterprises of the State Corporation «Rosatom», namely MCC and PA «Mayak», have appropriate facilities for reprocessing and centralized storage of SNF (see Section D.1).

B.3. Policy in the field of radioactive waste management

Safety assurance in RW management is considered to be, on the one hand, a key element of the national security and safety of the State, and, on the other hand, an essential condition for present and future use of atomic energy.

Enforcement of the Federal Law «On the Management of Radioactive Waste and Amendments to Certain Legislative Acts of the Russian Federation» has become the key element of the State policy in this field. The law provides for RW disposal requirements, requirements to the management of the accumulated RW inventory and storage facilities; it also sets up financial fundamentals for all RW management activities. In addition, adoption of this law codified the transition from RW storage practice to RW disposal.

According to the Federal Law, a Unified State System for RW management has been established in order to arrange for and ensure safe and cost-effective management of waste.

USS RW also provides for cooperation between the state management authority in the field of RW management, the state management authorities in the field of atomic energy use, the state safety regulatory authorities in the field of atomic energy use, the national operator for RW management, specialized RW management organizations, as well as organizations generating RW.

The National Operator for RW management (hereinafter national operator) is a legal body authorized to perform RW disposal, as well as other RW management activities. In 2012, by the Decree of the Government of the Russian Federation № 384-r «On the National Operator for Radioactive Waste Management» of March 20, 2012 the national operator was established — FSUE «National Operator for Radioactive Waste Management» (hereinafter FSUE «NO RW»). The corresponding investment and work programs were adopted and are currently underway.

Specialized RW management organizations are legal entities performing activities and providing their services on collection, segregation, processing, conditioning, transportation, storage of RW, as well as operation, decommissioning or closure of RW storage (disposal) facilities. At present time, the largest specialized RW management organization in the Russian Federation is FSUE «Enterprise for Radioactive Waste Management «RosRAO» (hereinafter RosRAO) with 8 branches controlling activities of 21 divisions that manage sites throughout the territory of the Russian Federation.

USS RW development is to be performed in several stages (Resolution of the Government of the Russian Federation № 1185 of November 19, 2012). Efforts are currently underway to complete the first stage of USS RW development.

At the first stage (2011-2015), the USS RW regulatory and procedural framework is being developed, including the initial registration of RW and identification of their distribution under the established procedures.

By the end of 2013, the key documents accounting for the USS RW regulatory and procedural framework have been approved (see Sections A 4.3 and E 2.5). Criteria used to define waste as RW, established by the Government of the Russian Federation, is a new element of the State policy (see Section B.5). The initial registration of RW and their distribution carried

out within the first stage of USS RW development was initiated in 2013 and shall be completed in early 2015.

The second stage (2015-2018) provides for the establishment of LLW and ILW disposal system, involving:

- decisions on the construction of disposal facilities in accordance with the area planning scheme for allocation of RW disposal facilities approved at the first stage;
- design, construction and commissioning of top-priority LLW and ILW disposal facilities.

The third stage (2018-2021) provides for the establishment of HLW disposal system, status alteration of certain facilities holding special RW to conservation facilities for special RW and of certain special RW conservation facilities to RW disposal facilities, involving:

- commissioning of an underground research laboratory to carry out investigations and to demonstrate safety of deep HLW disposal;
- commissioning of disposal facilities for low-level and intermediate-level RW and disposing of such waste;
- performing activities aimed at transformation of facilities holding special RW into conservation facilities for special RW.

Transition of a facility holding special RW into conservation facility for special RW means conversion of the RW storage facility status upon the completion of safety barriers emplacement at the facility holding special RW provided for by the design. Transition of a conservation facility for special RW into RW disposal facility means conversion of the special RW conservation facility status permitted in case if the facility is fitted with appropriate safety barriers isolating the RW from the environment during the whole period of its potential hazard. Such decisions shall be made by the Government of the Russian Federation upon recommendation of the state management authority in the field of RW management (SC «Rosatom») given that the safety of such facilities is adequately demonstrated.

So far, financing of operations for collection, processing, recycling or storage of RW (including spent radiation sources) from federal state institutions and federal state-owned enterprises has been effected at the expense of public subsidies on a free-of-charge basis to partially recover the costs associated with such activities (Resolution of the Government of the Russian Federation № 1193 of December 31, 2009).

Pursuant to the resolution, the State Corporation «Rosatom» by its decree № 89 of February 4, 2011 established «Methodological guidelines for legal entities on calculating subsidy rates from the federal budget for collection, processing, recycling and storage of radioactive waste».

B.4. Practices of radioactive waste management

Current RW management practices in the Russian Federation are characterized by the following alterations.

Generally, NPPs and large NFC enterprises performed collection, partial processing and further storage of RW at their sites.

This practice is currently under revision — organizations are now responsible for RW conditioning (in accordance with the waste acceptance criteria for disposal) and its further transfer to the national operator for disposal. RW conditioning shall be performed before expiration of the interim storage period established by the state management authority in the field of RW management. At present time, in accordance with the transitive regulation, interim storage life for unconditioned RW is limited to 10 years for organizations operating particularly haz-

ardous nuclear and radiation facilities. For other organizations this period, in accordance with the FZ-190, is limited to 5 years.

Practices of RW management have been brought in line with the requirements of the Unified State System for RW Management (USS RW) which is currently being developed. It should be noted, that USS RW establishment is a priority task for the State Corporation «Rosatom» acting as the state management authority in the field of RW management. Certain components of the system have already been established.

RW disposal tariffs (depending on waste classes) and standards for fees charged from enterprises to the RW disposal fund in 2013 were established. Pursuant to the provisions of the Federal Law «On the Management of Radioactive Waste...», the Rosatom's special reserve fund № 5 designed to cover RW disposal costs, as well as the National Operator's investment and industrial program, has started accumulating its assets.

The main task for the FSUE «NO RW» consists in establishing a system of disposal facilities intended for RW of different classes.

So far, geological disposal of low-level and intermediate-level LRW has been performed by injecting them into deep-seated reservoir beds (deep well injection facilities) located at three sites. Currently, FSUE «NO RW» is responsible for the operation of these facilities.

Pursuant to the provisions of the Federal Law «On the Management of Radioactive Waste...», two LRW deep well injection facilities — «Experimental and Industrial Test Site» (the Ulyanovsk Region, Dimitrovgrad-10) and «Test ground: sites 18 and 18a» (the Tomsk Region, Seversk) are now owned by the state management authority in the field of RW management — the State Corporation «Rosatom»; and the test site «Severny» (Zheleznogorsk, Krasnoyarsk Territory) is now under federal ownership and was transferred to the FSUE «NO RW» pursuant to the right of economic management or the right of use without consideration.

FSUE «RosRAO» sites generally receive low- and intermediate-level RW from organizations using IRS and RM. FSUE «RosRAO» has 8 branches controlling activities of 21 divisions that manage sites throughout the territory of the Russian Federation. In 2013, FSUE «Radon», performing similar activities, became part of the State Corporation «Rosatom». FSUE «RosRAO» and FSUE «Radon» enterprises perform processing and long-term storage of RW. Certain NFC enterprises and some NPPs also deliver their RW for reprocessing to FSUE «RosRAO» and FSUE «Radon».

RW management practices have been adjusted according to the provisions of the Unified State System for RW Management (USS RW) which is currently under development. USS RW establishment is considered to be a priority task for the State Corporation «Rosatom» acting as the state management authority in the field of RW management.

The initial registration of RW generated in the Russian Federation until July 15, 2011 was initiated on January 15, 2013 and shall be completed on January 1, 2015.

The initial registration of RW and identification of their distribution (hereinafter initial registration) is provided for by the Federal Law «On the Management of Radioactive Waste...» and is an element of the USS RW development process. The initial registration will provide *reliable* and well-grounded data on quantitative characteristics of waste (amounts, specific activity and etc.), RW types (removable and special), types of RW storage facilities (temporary storage facility, long-term storage facility, facility holding special RW, conservation facility for special RW, RW disposal facility). Further practical RW management activities are to be performed with due regard to the data obtained. The initial registration will also provide for establishing the lists of RW disposal facilities, long-term storage facilities for RW, special RW

facilities and special RW conservation facilities approved by the Government of the Russian Federation.

Results of the initial registration will enable ownership separation — RW generated prior to the enactment of the Federal Law «On the Management of Radioactive Waste...» will be legally recognized as federally owned accumulated waste.

In 2013, all organizations of the State Corporation «Rosatom» developed local RW management strategies specifying the transformation procedures for the currently existing RW management systems in accordance with the USS RW provisions. For these purposes, such schemes, in particular, involve data on accumulated amounts of RW and the predicted inventory of operational RW; scheduled time for the transfer of conditioned RW to the National Operator and commissioning of new processing and conditioning facilities, opportunities for providing RW conditioning services and other baseline information promoting the establishment of an effective RW management system.

B.5. Criteria used for definition and classification of radioactive wastes

In accordance with the Federal Law «On the Use of Atomic Energy», RW is defined as material and substances for which no future use is foreseen, as well as equipment, goods (including spent ionizing radiation sources) containing radionuclides at concentrations greater than clearance levels established by the criteria set up by the Government of the Russian Federation.

Since the presentation of the third National Report, some important changes have come about, particularly, concerning criteria used to define waste containing or contaminated with radionuclides as radioactive waste and RW classification according to provisions of the Federal Law «On the Management of Radioactive Waste...»

Until 2012, criteria used to define waste as radioactive waste and RW classification based on relevant activity levels (LLW, ILW, HLW) were specified in the «Basic Sanitary Rules of Radiation Safety» (OSPORB-99/2010). The current criteria used for RW definition and RW classification for disposal were set by the Resolution of the Government of the Russian Federation № 1069 of October 19, 2012. As provided by the resolution, solid, liquid and gaseous waste containing radionuclides, except for waste generated during non-atomic energy use activities, namely, mining and reprocessing of mineral and organic raw materials with high concentrations of naturally occurring radionuclides, are defined as RW if the sum of ratios of specific (for solid and liquid waste) or volumetric (for gaseous waste) activities of the radionuclides contained in the RW to the relevant limits set in the supplement to the resolution is greater than 1.

Specific activity limits for radionuclides contained in solid waste overrunning which such waste shall be defined as RW are equal to the minimum significant specific activity levels (MSSA) established in the supplement 4 of NRB-99/2009, that is if the specific activity of an IRS located indoors or at work place is greater than such minimum specific activity level, a special handling authorization from the State Sanitary and Epidemiological Board is required.

Specific activity limits for radionuclides contained in liquid waste overrunning which such waste shall be defined as RW are equal to values that are hundred times greater than intervention levels (IL) for drinking water, specified in the supplement 2a of NRB-99/2009.

Volumetric activity limits for radionuclides contained in gaseous waste overrunning which such waste shall be defined as RW are equal to acceptable annual volumetric activity of ra-

dionuclides contained in the air inhaled by a critical group, specified in the supplement 2a of NRB-99/2009.

Specific definition criteria are set for waste generated during operations that are not associated with atomic energy use, namely, mining and reprocessing of mineral and organic raw materials with high concentrations of naturally occurring radionuclides. Such criteria account for the high content of naturally occurring radionuclides in this waste, for instance, ^{226}Ra , ^{232}Th , ^{40}K , uranium and their fission products.

RW classification system has also suffered certain changes. The Federal Law «On the Management of Radioactive Waste...» established new RW classification system according to which all radioactive wastes are divided into two groups: special and removable. Resolution of the Government of the Russian Federation №1069 specifies the criteria used to define waste as special or removable. According to the resolution, RW can be defined as special RW if it meets the following criteria:

- collective effective dose for the whole period of RW potential hazard and the risk of potential exposure associated with operations on RW removal are greater than the collective effective dose for the whole period of RW potential hazard and the risk of potential exposure associated with in situ disposal of such waste;
- costs of RW removal (including the costs for RW discharge, processing, conditioning, transportation to the disposal site and disposal itself) are greater than the aggregate possible damage inflicted to the environment in case of such waste disposal in situ and the costs for the RW disposal in situ (including the costs associated with transition of the RW storage facility to RW disposal facility, its operation and closure, as well as safety provision for the whole period of RW potential hazard);
- RW disposal facility and its sanitary-protection zone are located outside the borders of settlements, designated conservation areas, coastal buffer zones and water conservation zones, as well as other exclusive and protected areas established under the Russian legislation.

Resolution of the Government of the Russian Federation №1069 established classification criteria for removable RW based on appropriate disposal concepts. All radioactive waste defined as removable RW are divided into 6 classes:

Class 1 covers solid high-level RW requiring final disposal in deep disposal facilities after prior storage to reduce heat generation.

Class 2 covers solid high-level RW and intermediate-level long-lived RW containing radionuclides with half-lives greater than 30 years that require final disposal in deep disposal facilities and not subjected to prior storage to reduce heat generation.

Class 3 covers solid intermediate-level RW and low-level long-lived RW containing radionuclides with half-lives greater than 30 years that require final disposal in near-surface disposal facilities at a depth of up to 100 m.

Class 4 covers solid low-level RW and very low-level RW requiring final disposal in near-surface disposal facilities located at the ground level.

Class 5 covers liquid intermediate-level and low-level RW requiring final disposal in deep well injection facilities constructed and operated at the time the Federal Law «On the Management of Radioactive Waste and Amendments to Certain Legislative Acts of the Russian Federation» came into force.

Class 6 covers RW generated in mining and processing of uranium ores or during operations that are not associated with atomic energy use, namely, mining and reprocessing of mineral

and organic raw materials with high concentrations of naturally occurring radionuclides that require final disposal in near-surface disposal facilities.

Numerical thresholds for the specific activity levels of radionuclides contained in RW provide distinction between classes 1-5 based on the period of RW potential hazard.

OSPORB-99/2010 establishes RW classification based on RW specific activity (with account of Amendment №1 to OSPROB-99/2010 introduced by the resolution of the Chief Public Health Official of the Russian Federation № 43 of September 16, 2013). Numerical values for these criteria are presented in Table B1.

Based on specific activity levels, solid radioactive waste containing man-made radionuclides, except for spent sealed radionuclide sources are divided into 4 categories: very low-level, low-level, intermediate-level and high-level waste, whereas liquid waste are divided into 3 categories: low-level, intermediate-level and high-level waste. If, according to the radionuclide characteristics, radioactive waste can be attributed to different categories, such waste shall be attributed to the highest possible category.

Table B1. Classification of Solid and Liquid Radioactive Waste

Wastes category	Specific activity, Bq/kg (Bq/l)			
	tritium	β -and γ -emitters (excluding tritium)	α -emitters (excluding transuranic)	transuranic elements
Solid Waste				
Very low-level	less than 10^7	less than 10^3	less than 10^2	less than 10^1
Low-level	from 10^7 to 10^8	from 10^3 to 10^4	from 10^2 to 10^3	from 10^1 to 10^2
Intermediate-level	from 10^8 to 10^{11}	from 10^4 to 10^7	from 10^3 to 10^6	from 10^2 to 10^5
High-level	more than 10^{11}	more than 10^7	more than 10^6	more than 10^5
Liquid Waste				
Low-level	less than 10^4	less than 10^3	less than 10^2	less than 10^1
Intermediate-level	from 10^4 to 10^8	from 10^3 to 10^7	from 10^2 to 10^6	from 10^1 to 10^5
High-level	more than 10^8	more than 10^7	more than 10^6	more than 10^5

Section C. Scope of application (Article 3)

Article 3. Scope of application

- 1. This Convention shall apply to the safety of spent fuel management when the spent fuel results from the operation of civilian nuclear reactors. Spent fuel held at reprocessing facilities as part of a reprocessing activity is not in the scope of this Convention unless the Contracting Party declares reprocessing to be part of spent fuel management.*
- 2. This Convention shall also apply to the safety of radioactive waste management when the radioactive waste results from civilian applications. However, this Convention shall not apply to waste that contains only naturally occurring radioactive substances and that does not originate from the nuclear fuel cycle, unless it constitutes a disused sealed source or if it is declared as radioactive waste for the purposes of this Convention by the Contracting Party.*
- 3. This Convention shall not apply to the safety of management of spent fuel or radioactive waste within military or defense programs, unless declared as spent fuel or radioactive waste for the purposes of this Convention by the Contracting Party. However, this Convention shall apply to the safety of management of spent fuel and radioactive waste from military or defense programs if and when such materials are transferred permanently to and managed within exclusively civilian programs.*
- 4. This Convention shall also apply also to the discharges as is envisaged in the articles 4, 7, 11, 14, 24 and 26.*

C.1. The Russian Federation declares that:

It shall provide information on the safety of SNF management when the spent fuel results from the operation of civilian nuclear reactors, as well as on the safety of the spent fuel management that is held at reprocessing facilities, declaring SNF reprocessing to be part of SNF management in terms of Article 3 (1) of the Convention.

C.2. The Russian Federation declares that:

It shall apply the Convention to the safety of RW management when the radioactive waste results from civilian applications. This report shall not discuss waste that contains only naturally occurring radionuclides, unless RW results from atomic energy uses envisaged in the article 4 «Types of activities in the field of atomic energy use» of the Federal Law «On the Use of Atomic Energy.»

C.3. The Russian Federation declares that:

It shall discuss discharges/releases as envisaged in the Articles 4, 7, 11, 14, 24 and 26 of the Convention.

Explanations

This Section contains confirmation of compliance with obligations arising from Article 3 of the Convention.

Section D. Inventories and lists (Article 32)

Article 32. Reporting

32-2. This report shall also include:

- i) a list of the spent fuel management facilities subject to this Convention, their location, main purpose and essential features;
- ii) an inventory of spent fuel that is subject to this Convention and that is being held in storage and of that which has been disposed of. This inventory shall contain a description of the material and, if available, give information on its mass and its total activity;
- iii) a list of the radioactive waste management facilities subject to this Convention, their location, main purpose and essential features;
- iv) an inventory of radioactive waste that is subject to this Convention that:
 - a) is being held in storage at radioactive waste management and nuclear fuel cycle facilities;
 - b) has been disposed of; or
 - c) has resulted from past practices.

This inventory shall contain a description of the material and other appropriate information available, such as volume or mass, activity and specific radionuclides;

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

D.1. SNF management facilities (Article 32 (i))

For the purposes of this Report, the following facilities are considered to be SNF management facilities:

- reactor SNF pools, detached storage facilities and centralized storage facilities;
- SNF reprocessing facilities;
- other infrastructure facilities.

List of SNF storage and reprocessing facilities is given in Table B.1.1 of Annex B1.

Major SNF management facilities are discussed below.

D.1.1. SNF storage facilities

Each NPP unit is fitted with a separate reactor SNF storage pool. SNF is usually held in such storage facilities for 3 years. If necessary, storage time can be increased to reduce SNF heat generation. Research reactors are also fitted with similar storage pools. SNF is removed from such facilities including from the RR storage pools in accordance with an established schedule.

NPP with RBMK-1000 power units, Novovoronezh NPP and research centers (IPPE, RIAR) are fitted with detached SNF storage facilities (SNF SF).

Centralized SNF storage is provided at two sites: MCC and PA «Mayak».

Centralized «wet» storage facility at MCC receiving SNF generated at WWER-1000 units has been operational since 1986. Its reconstruction was completed in 2011 providing enhanced seismic resistance, increased productivity and capacity of the facility, and more robust cooling systems.

The first stage of the centralized dry storage facility at MCC was commissioned in 2012 (dry storage of RBMK-1000 SNF). During 2012, this facility received 1 266 SFAs from RBMK-1000 units, and in 2013 the number of SFAs delivered for storage totaled 1 701; it is projected that more than 3 400 SFAs will be delivered to the facility in 2014. Construction of the second stage of the storage facility for SFN from WWER-1000 and RBMK-1000 is currently underway.

The centralized «wet» SNF storage facility at PA «Mayak» provides:

- interim storage for such types of spent fuel that are subjected to reprocessing (WWER-400, BN, RR and etc.);
- storage for such types of spent fuel that currently are not subjected to reprocessing pending the appearance of appropriate reprocessing technologies (AMD and others).

FSUE «Atomflot» provides storage of SNF from civilian nuclear-powered ships at three service ships (FMB «Lepse», «Lotta» and «Imandra») and a costal container-type storage facility receives SNF from icebreakers fleet (uranium-zirconium SNF).

D.1.2. SNF reprocessing facilities

Industrial reprocessing of SNF is performed at RT-1 (PA «Mayak»). RT-1 mission involves receiving, temporary storage and reprocessing of SNF which results from WWER-400, BN-600 and RR operation

The reprocessing flow chart at RT-1 is based on water-extraction technologies similar to the PUREX-process.

At present time, several projects are being implemented at RT-1: construction of an AMB SNF cutting and packaging complex that will enable further reprocessing of such fuel, modernization of the receiving unit for leaky RBMK-1000 SNF and improvement of RW management systems.

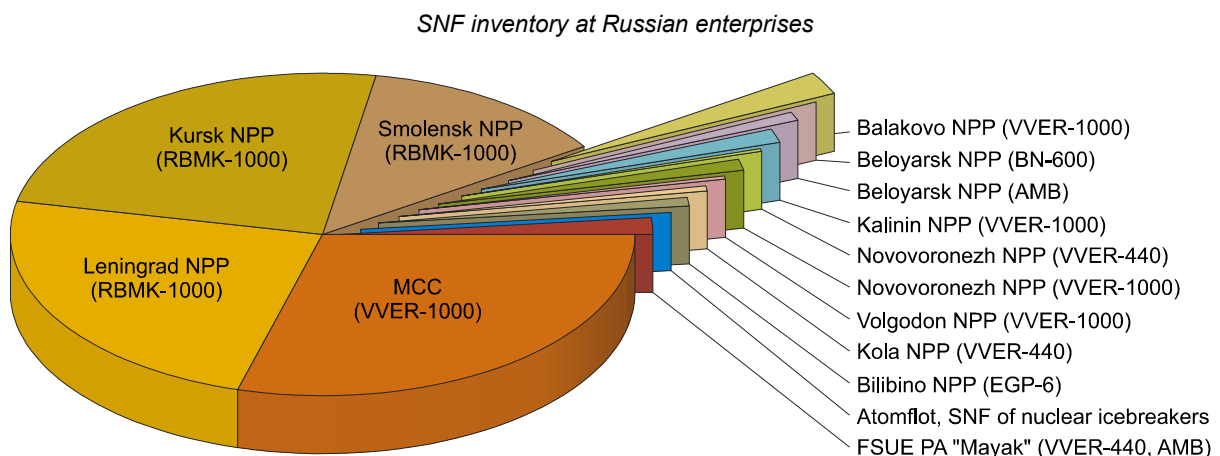
Efforts are underway at MCC for the creation of a «Pilot Demonstration Center for SNF Advanced Reprocessing» (PDC): construction license has been granted and construction has been initiated.

D.1.3. Other infrastructure facilities for SNF management

RBMK SFAs cutting complex at Leningrad NPP was commissioned in 2012, whereas in 2013 a similar facility became operational at Kursk NPP. Another facility at Smolensk NPPs is expected to be commissioned in 2016.

D.2. SNF inventories (Article 32 (ii))

In the reporting period, no important changes in SNF inventories occurred. The launched program for transportation of RBMK and RR SNF slowed down the growth rates of SNF accumulation in reactor storage facilities. SNF inventories are presented in Table B1.2 of Annex B1.



D.3. RW management facilities (Article 32 (iii))

For the purposes of this Report, the following facilities are considered to be RW management facilities:

- RW processing facilities (complexes);
- RW storage facilities, including RW disposal facilities;
- other infrastructure facilities associated with RW management systems.

This Section provides information on RW processing facilities (complexes). Information on RW storage facilities and other infrastructure facilities associated with RW management systems is presented in Section D.4.2.

RW processing facilities (complexes). Special nature of engineering processes resulting in waste generation, as well as provisions for waste minimization and manufacturing of RW packages suitable for safe long-term storage and disposal require appropriate types of RW processing facilities that are operated at Russian enterprises. Different treatment and pre-treatment techniques are used depending on phase and morphological composition of generated and accumulated RW: strong evaporation, ion-selective purification (low-level and intermediate-level LRW), compaction, melting, incineration (low-level and intermediate-level SRW), cementation (LRW, SRW, LLW, ILW), vitrification (high-level LRW).

The following NPPs have the most multifunctional complexes providing RW treatment and pre-treatment:

- Balakovo NPP — facilities for RW segregation, compaction, incineration, cementation, strong evaporation of distillation residue providing salt conversion into fusion cake (SRW);
- Rostov NPP — facilities for RW segregation, compaction, incineration, cementation of ash residues, cementation of distillation residues and ion exchange resins;
- Kola NPP — facilities for RW segregation, compaction, incineration, ion-selective purification of distillation residues, cementation of sludge and ion exchange resins;
- Leningrad NPP — new facilities for RW segregation, compaction, incineration were commissioned in 2013; a new ion-selective purification facility is currently on its final stage of construction.

Near-term plan provides for commissioning of SRW processing complexes at Smolensk and Kursk NPPs which will enable comprehensive treatment of generated and accumulated RW inventory (2015), as well as of new processing facilities for ion exchange resins at Kola NPP (2015), ion-selective purification at Smolensk NPP and plasma incineration at Novovoronezh NPP.

All NPPs that are currently under construction are fitted with RW processing facilities.

In 2011-2013, the following projects providing for new RW processing facilities at Russian NFC enterprises were underway under the FTP «NRS»:

- construction of a cementation complex for liquid and heterogeneous ILW at PA «Mayak» also comprising a storage facility for radioactive waste (construction is scheduled to be completed in 2014);
- commissioning of a new electric furnace EP-500/5 at PA «Mayak» for HLW vitrification with an increased design life and vitrification capacity of up to $3 \cdot 10^{18}$ Bq per year and expansion of the existing storage facility for vitrified waste (project completion is scheduled for 2014);
- construction of a purification facility providing treatment of water from the special sewage system and of waters containing intermediate-level waste generated at chemical and metallurgical production works of PA «Mayak» (2012);
- construction of a treatment facility for low-level LRW at PA «Mayak»;
- construction of an incineration facility for organic LRW at SCC (incineration of spent oils) (2011).

D.4. RW inventories (Article 32 (iv))

D.4.1. RW generation and processing

The following activities result in RW generation:

- mining and treatment of radioactive ores;
- isotope and chemical separation, nuclear fuel fabrication;
- NPPs, research nuclear facilities, nuclear fuel cycle (NFC) facilities, ships with nuclear power units and their maintenance bases;
- SNF reprocessing;
- uses of NM, RS and ionizing radiation sources (IRS) in industry, medicine, research and etc.;
- decommissioning of nuclear facilities and remediation of radioactively contaminated areas.

SRW generation. The total amount of SRW generated in 2013 was about 1.2 million m³ with a total activity of $4.0 \cdot 10^{18}$ Bq (13% reduction by volume and 2.4 times reduction in activity as compared to the 2010 inventory). Uranium mining (PIMCU) was the principle source of SRW generation in 2013. In 2013, PIMCU generated a total of 1.18 million tons of RW accounting for more than 98% of the total waste generation by volume (minor variation as compared to the 2010 inventory). The total activity of this waste was about $8.9 \cdot 10^{13}$ Bq (44% variation as compared to the 2010 inventory) which accounts for less than 0.001% of the total activity of all waste generated during this period.

PA «Mayak». SNF reprocessing represents the main source of high-level SRW generation. In 2013, the enterprise generated some 1.25 thousand tons of high-level, intermediate-level and low-level SRW with a total activity of about $4 \cdot 10^{18}$ Bq.

Other enterprises:

Atomic energy sector (NPPs). In 2013, Russian NPPs generated over 3 thousand tons of SRW (23% of the total amount of generated SRW aside from PIMCU; more than 30% variation by mass as compared to the 2010 inventory) with a total activity of $8.0 \cdot 10^{15}$ Bq (more than 500 times lower than in 2010).

Uranium treatment and enrichment, fabrication of nuclear fuel. Waste generated in this sector accounts for some 45% of the SRW total volume (except for PIMCU). In 2013, these facilities generated 30% (by mass) more SRW than in 2010. Its total activity was about $6.3 \cdot 10^{15}$ Bq (more than hundred-fold reduction).

The remaining amount of SRW with a total activity of about $0.5 \cdot 10^{18}$ Bq resulted from other activities.

LRW generation. More than 1.7 million m³ of LRW with a total activity of $1.7 \cdot 10^{18}$ Bq were generated in 2013. Industrial activities at three enterprises (MCC, SCC, PA «Mayak») constituted the main sources of LRW generation in this period (both by volume and activity). In 2013, the total amount of LRW generation accounting for these three enterprises equaled 1.6 million m³ and their total activity amounted to more than $1.55 \cdot 10^{18}$ Bq (minor variation by volume and 10% reduction in activity as compared to 2010).

In 2013, Russian NPPs generated the total of 3.5 thousand m³ of LRW with a total activity of $7.5 \cdot 10^{13}$ Bq (5-fold reduction by volume and 65% reduction in activity as compared to 2010).

In 2013, RIAR contributed to some 61.7 thousand m³ of LRW with a total activity of $4.2 \cdot 10^{14}$ Bq (15% increase by volume as compared to 2010).

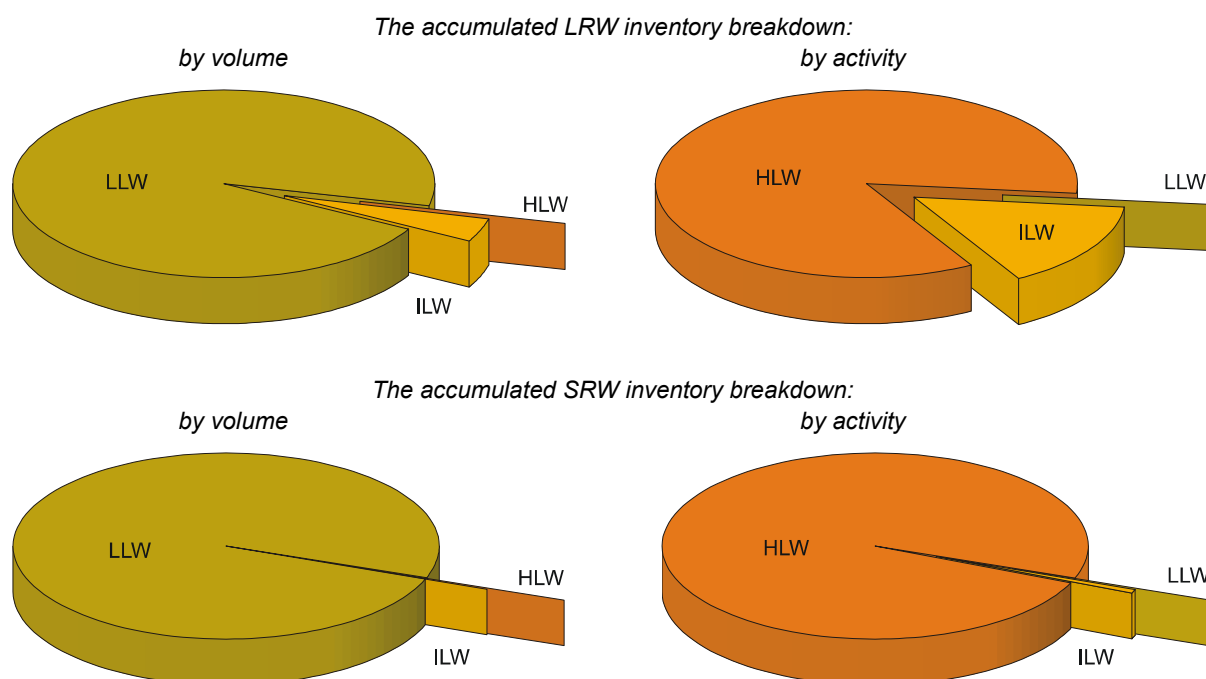
It should be noted, that now we can observe a general trend for the decrease in RW generation (except for the mining and milling sector) which is due to the reduction of

LRW generation and better separation of SRW from other industrial waste. It is anticipated that this trend will continue to evolve.

The total amount of LRW processed in 2013 equals to 413.8 thousand m³ (with no account of 1.6 million m³ of LRW that were subjected to predisposal treatment and sent to DWIF) and some 6.7 thousand tons accounts for SRW processed in this period. **It is anticipated that this trend will continue to evolve.**

D.4.2. RW Distribution and Storage

As of the end of 2013, sites of the nuclear sector were holding some 489.6 million m³ ($4.2 \cdot 10^{19}$ Bq) of LRW and 90.4 million tons ($4.7 \cdot 10^{19}$ Bq) of SRW.



High-level LRW processing at PA «Mayak» resulted in 6 195 tones of vitrified SRW with a total activity of $1.48 \cdot 10^{19}$ Bq.

In general, the total RW inventory is distributed among 120 enterprises located in 44 regions of the Russian Federation owning in total 830 RW storage facilities, including sites for collection and/or temporary storage (RW which volume is greater than 1 thousand tone for SRW and/or 1 thousand m³ for LRW are held at 45 enterprises in 239 storage facilities) and 3 deep well injection facilities for LRW disposal. Under the initial RW registration project, decisions have been made on consolidation of particular storage facilities into unified complexes. For this reason and due to the start of RW removal from a number of temporary storage facilities, it is projected that in the future the number of storage facilities will continue to decrease.

The major portion of LRW that are held at nuclear enterprises represents low-level RW (98%) with a total activity of $8.4 \cdot 10^{15}$ Bq (which accounts for some 0.03% of the inventory's total activity), 98% of which are held in near-surface water-reservoirs at PA «Mayak».

Most intermediate-level LRW are kept at SCC, MCC and RIAR and are isolated from the environment in deep geological formations.

High-level LRW represent less than 0.02% of the total LRW inventory by volume, whereas its activity accounts for some 63% of the inventory's total activity. All high-level LRW are kept in purpose-designed structures and are isolated from the environment.

About 94% of the total SRW inventory is low-level RW. Most of this waste is kept at PIMCU (uranium mining enterprise). 91% of the SRW activity accounts for high-level SRW.

Construction of new storage facilities and modernization of already existing facilities is currently underway under the FTP «NRS», including:

- construction of new facilities:
 - ◆ storage facility for immobilized RW in underground mines at MCC with a total capacity of 28 thousand m³ (completion is expected in 2014);
 - ◆ RW storage facility with a total capacity of 20.2 thousand m³ (PA «Mayak», RosRAO);
- reconstruction activities at five RW storage facilities (MCC, SRC RIAR, ship-repairing centre «Zvezdochka»).
- construction of the first section of a near-surface disposal for SRW with a total capacity of 23.5 thousand m³ at UECC (Novouralsk, Sverdlovsk Region, 2013) is nearing completion.
- development of design documentation for a facility designed for RW disposal of classes 1 and 2 (Nizhnekanskiy Massif, Krasnoyarsk territory).

The main efforts are aimed at LRW conversion into environmentally sound condition.

Cease of operation and conservation of near-surface LRW storage facilities is viewed as a principal task in this area. Conservation of a near-surface LRW storage facility B-9 at PA «Mayak» is nearly completed. In 2011-2013, cover was emplaced over some 670 thousand m² of B-9 water surface. Conservation of an open storage basin B354 at MCC and basins B-1 and B-2 at SCC was completed.

The Techa Cascade of water reservoirs (PA «Mayak») was put into safe condition providing for the construction of controlling lips at bypass channels of reservoirs B-10 and B-11, the first unit of a combined sewer system that enabled to drain treated water into bypass channels was completed in 2010, its second unit is now under construction and its completion is scheduled for 2015, construction of treatment facilities for contaminated water from the separate sewer system and intermediate-level waste from chemical and metallurgical production facilities is nearing its completion (PA «Mayak»). Development of conservation programs and pre-decommissioning activities are carried out at the remaining near-surface LRW storage facilities.

Moreover, reconstruction of safety barriers or preparation for RW removal with the view of its further disposal is performed at more than 10 SRW storage facilities.

D.4.3. SRS and RTGs

Disused SRSs constitute an additional source of RW generation. According to the state system for accounting and control of radioactive materials and radioactive waste, almost 40 000 spent SRSs are generated annually.

To date, funding of operations on collection, processing, recycling or storage of spent ionizing radiation sources from federal state institutions and federal state-owned enterprises has been effected at the expense of public subsidies on a free-of-charge basis to partially recover the costs of such activities (Resolution of the Government of the Russian Federation № 1193 of December 31, 2009).

Dismantlement and disposition of radioisotope thermoelectric generators (RTGs) applied at navigational facilities constitute an important area of activities aimed at elimination of potential radiological threats associated with the use of insecure self-contained RTGs.

RTG decommissioning project is nearly completed.

As of the end of 2013, 16 RTGs out of 1007 were still operating: 12 RTGs were operated by the Defense Ministry (Kamchatka), and 4 RTGs owned by Rosgidromet are located on Antarctic Continent.

Transportation of RTGs from Antarctic is scheduled for 2015.

D.5. Decommissioning of nuclear facilities (Article 32 (v))

Pre-decommissioning activities at 160 nuclear facilities (according to Russian terminology — nuclear installations, radiation sources and storage facilities), including more than 40 research complexes and facilities, nuclear power plants (Beloyarsk and Novovoronezh NPPs), over 50 NFC facilities (PA «Mayak», MCC, TVEL), storage facilities and nuclear icebreaker fleet facilities are currently underway.

The following projects were completed in 2011-2013:

- critical test facilities at IPPE (RF-GS), VNIIEKhT (PKS SO-2M) and RR RBT-10/1 (RIAR) were decommissioned;
- conservation of storage water-reservoir Б-2 at SCC was completed;
- experimental facilities at IFVE and radiochemical unit at VNIIEKhT were decommissioned;
- decommissioning and conversion of engineering buildings at PA Sever was completed;
- facilities for production of uranium tetrafluoride and uranium hexafluoride at KChKhK (RosRAO) were decommissioned;
- RW storage facility owned by FMBA was decommissioned;
- efforts are still underway to provide safe decommissioning of production reactors UGPR (uranium-graphite production reactor) at PA «Mayak», MCC and SCC;
- more than 180 thousand m² of radioactively contaminated territories were remediated.

12 nuclear and radiation hazardous facilities were decommissioned in 2011-2013. 77 facilities are scheduled for decommissioning by 2025.

Section E. Legislative and regulatory System

E.1. Implementing measures (Article 18)

Article 18. Implementing Measures

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

With the adoption of the Federal Law № 139-FZ «On the Ratification of the Joint Convention on the Safety of Spent Fuel Management and the Safety of Radioactive Waste Management» of November 4, 2005, provisions of the Convention became binding for all executive authorities and organizations involved in SNF and RW management.

Current legislation of the Russian Federation in the field of SNF and RW management provides compliance with the obligations arising from the Convention.

The Convention provides a background for further improvement of Russian regulatory and legal instruments governing the safe management of spent nuclear fuel and radioactive waste in compliance with the obligations the Russian Federation.

E.2. Legislative and regulatory system (Article 19)

Article 19. Legislative and Regulatory Framework

19-1 Each Contracting Party establishes and maintains a legislative and regulatory framework to ensure the safety of spent fuel and radioactive waste management.

19-2 This legislative and regulatory framework provides for:

- i) the establishment of appropriate national safety requirements and regulations for the radiation safety;*
- ii) a system of licensing the activities of spent fuel and radioactive waste management;*
- iii) a system of prohibition of the operation of a spent fuel or radioactive waste management facility without a license;*
- iv) a system of appropriate administrative and regulating control, documentation and reporting;*
- v) the enforcement measures to comply with valid regulations and license conditions;*
- vi) a distinct distribution of responsibilities of the authorities involved in the different steps of spent fuel and of radioactive waste management.*

19-3 When considering whether to regulate radioactive materials as radioactive waste, Contracting Parties shall duly take into account the objectives of this Convention.

E.2.1. Legislative, legal and normative regulation

The following instruments govern relations in the field of SNF and RW management: the Constitution of the Russian Federation, international agreements and conventions (including the Joint Convention on the Safety of Spent Fuel Management and the Safety of Radioactive Waste Management, the Convention on Nuclear Safety, the Vienna Convention on Civil Liability for Nuclear Damage, the Convention on Early Notification of a Nuclear Accident, the Convention on the Physical Protection of Nuclear Material and others), federal laws of the Russian Federation, normative legal acts approved by the President of the Russian Federation and the Government of the Russian Federation, federal norms and rules in the field of atomic energy use, sanitary rules and radiation safety standards, regulatory provi-

sions of state safety authorities and state management authorities in the field of atomic energy use, state and industry-wide standards, and technical regulations.

According to Article 1 of the Federal Law «On the Use of Atomic Energy», the legislation of the Russian Federation in the field of atomic energy use is based on the Constitution of the Russian Federation, generally recognized principles and norms of international law, and international agreements of the Russian Federation governing the use of atomic energy for peaceful and defense purposes.

Paragraph 4, Article 15 of the Constitution of the Russian Federation stipulates that generally recognized principles and norms of international law which include the above-mentioned Conventions and international agreements of the Russian Federation form an integral part of its legal framework and shall have greater legal effect than the federal laws.

The following Federal laws form the legislative framework for safety regulation in the field of atomic energy use in the Russian Federation:

- Federal Law № 170-FZ «On the Use of Atomic Energy» of November 21, 1995;
- Federal Law № 3-FZ «On the Radiation Safety of Population» of January 9, 1996;
- Federal Law № 7-FZ «On the Environmental Protection» of January 10, 2002;
- Federal Law № 190-FZ «On the Management of Radioactive Waste and Amendments to Certain Legislative Acts of the Russian Federation» of July 11, 2011;

To elaborate provisions of the federal laws, the President of the Russian Federation and the Government of the Russian Federation adopt normative legal acts (by-laws) in form of Presidential decrees and resolutions of the Government of the Russian Federation.

Normative regulation of safety in the field of atomic energy use is effectuated through federal norms and rules in the field of atomic energy use, in accordance with the Federal Law № 170-FZ «On the Use of Atomic Energy» of November 21, 1995 (Article 6), and sanitary norms and rules, in accordance with the Federal Law № 3-FZ «On the Radiation Safety of Population» of January 9, 1996 (Article 9). Provisions of these norms and rules have binding nature.

According to the Federal Law «On the Use of Atomic Energy» (Article 6), federal norms and rules in the field of atomic energy use specify the requirements for the safe use of atomic energy, including safety requirements for nuclear facilities and activities in the field of atomic energy, involving safety objectives, principles and criteria that shall be observed when performing any activity in the field of atomic energy use. Federal norms and rules in the field of atomic energy use are developed and approved according to the procedure established by the Government of the Russian Federation.

Requirements of the federal norms and rules shall be abided by all legal entities and private persons performing activities in the field of atomic energy use and are valid throughout the territory of the Russian Federation.

According to the Federal Law «On the Radiation Safety of Population», state regulation of radiation safety is effectuated through the establishment of sanitary rules, standards, hygienic standards, radiation safety rules, codes of rules, occupational safety rules and other regulations governing radiation safety. Sanitary rules, standards and hygienic standards for radiation safety are approved in accordance with the procedure established by the Russian legislation.

Safety guides and guideline documents developed by state safety regulatory authorities, as well as instruments developed by state management authorities in the field of atomic energy use (institutional documents), state and industry-wide standards regulate the safety of SNF and RW management in the Russian Federation.

Since the presentation of the third National Report, some important amendments have been introduced to the legal and regulatory instruments, including federal norms and rules, as well as regulatory technical documents in the field of atomic energy use. The most important of these are discussed in Section E2.1.3.

E.2.1.1. Federal laws

Federal Law № 170-FZ «On the Use of Atomic Energy» of November 21, 1995 is the fundamental document governing relations in the field of atomic energy use to ensure environmental protection, protection of human health and life when using atomic energy and specifies the legal framework for safety regulation, including:

- principles of legal regulation in the field of atomic energy use;
- competences, rights and powers of entities being involved in legal regulation in the field of atomic energy use (the President and the Government of the Russian Federation, state federal and local authorities, organizations and public, state management authorities and state safety regulatory authorities in the field of atomic energy use);
- legal status of organizations involved in the field of atomic energy use, responsibilities of operating organizations for ensuring safety of nuclear installations, radiation sources and storage facilities;
- principles of state regulation of safety in the field of atomic energy use;
- the established procedure for making decisions on siting and construction of nuclear installations, radiation sources and storage facilities, as well as their decommissioning;
- state policy for management of nuclear materials, radioactive substances and radioactive waste; basic provisions concerning the management of nuclear materials, radioactive substances and RW;
- responsibility for damage and costs associated with radiation impacts on legal entities, individual persons, and public health, as well as liability for violating the legislation of the Russian Federation in the field of atomic energy use;
- principles and procedures for export and import of nuclear installations, equipment, technologies, nuclear material, radioactive substances, special non-nuclear material, and services in the field of atomic energy use;
- provisions on compliance with international obligations of the Russian Federation in the field of atomic energy use, information exchange with foreign countries in the field of atomic energy use.

According to the law (Article 44), the state policy governing the management of nuclear material, radioactive material and RW shall comprehensively address all issues regarding regulation of their production, generation, application, physical protection, collection, registration and accounting, transportation, storage and disposal.

Articles 45-48 of the law stipulate that effective protection of personnel working at nuclear facilities, population and the environment from unacceptable radiation impacts and radioactive contamination shall be ensured for the processes of transportation, storage and reprocessing of nuclear material (including SNF) and RW, as well as disposal of RW, in accordance with valid norms and rules in the field of atomic energy use and the environmental legislation of the Russian Federation.

Article 5 of the law stipulates that nuclear material (including RW containing nuclear material) and nuclear facilities can be owned both by the Federal State and by legal entities. The list of Russian legal entities which can own nuclear material (including RW containing nuclear material) or nuclear facilities is approved by the President of the Russian Federation. Owners of nuclear facilities and nuclear material exercise control over their security and proper use.

Nuclear material, irrespectively of the ownership form, is subject to the state accounting and control of nuclear materials.

The following amendments were introduced to the Federal Law «On the Use of Atomic Energy» to upgrade the safety regulation system:

- elimination of duplications and contradictions in the legislative provisions for atomic energy use and development of a unified regulatory and technical basis for the regulation of safety in the field of atomic energy use;
- recognition of supremacy of atomic energy use legislation over legal requirements effective in other domains (industrial safety, safety of hydraulic engineering structures, fire safety, technical regulation);
- updated list of activities in the field of atomic energy use subjected to licensing;
- a fixed time limit for periodic safety assessments at nuclear and storage facilities (every 10 years);
- identification of main tasks for scientific and technical support organizations providing their services to the state regulatory authority;
- independence of state safety regulatory authorities declared as a core principle of legal regulation in the field of atomic energy use;
- certain aspects of the licensing procedure have been elaborated;
- special aspects concerning the regulation of activities that involve radiation sources containing radionuclide sources have been specified;
- legal basis for expert reviews of safety and their funding has been established.

Federal Law № 190-FZ «On the Management of Radioactive Waste and Amendments to Certain Legislative Acts of the Russian Federation» of July 11, 2011 governs relations arising from management of generated and accumulated RW inventory, specifies operating principles and the structure of a Unified State System for RW management, establishes administrative and legal framework for RW management.

The law provides for the establishment of the Unified State System (USS) for RW Management in order to arrange for and ensure safe and cost-effective RW management, also covering RW disposal activities. Main operating principles of the USS RW are as follows:

- protection of human life and health, present and future generations, and the environment from the adverse impacts associated with radioactive waste is considered to be of the highest priority;
- RW import to and export from the Russian Federation for storage, reprocessing and disposal shall be prohibited except for the cases envisaged in the Article 31 of the law;
- responsibility of organizations generating radioactive waste for the safe management of RW until this waste is handled over to the National Operator;
- funding of RW management activities including waste disposal shall be performed at the expense of organizations generating such waste;
- interdependencies with the predisposal management of radioactive waste shall be taken into account;
- availability of information concerning safety assurance and prevention of nuclear accidents, as well as other relevant information on RW management to the general public and public entities in case if such information contains no data associated with state secrets.

Article 4 of the law introduces new waste classification system providing for RW division into two categories — special and removable. The relevant definition criteria are specified in the Resolution of the Government of the Russian Federation PP-1069.

Article 9 of the law sets up ownership right for RW and RW disposal facilities.

RW containing nuclear material being exclusively under the federal ownership or generated prior to the enactment of the 190-FZ shall be brought under the federal ownership. RW generated after 190-FZ enactment shall be the property of the RW generators.

RW disposal facilities shall be either under federal ownership or under the ownership of the State Corporation «Rosatom».

Article 18 of the law specifies powers and responsibilities of the state management authority in the field of RW management.

Article 20 of the law provides for the establishment of a national operator for RW management — approved by the Government of the Russian Federation at the suggestion of the state management authority in the field of RW management — that shall perform planning, management and implementation of RW disposal activities.

General requirements for organizations generating RW are also specified in the law.

According to the law, funding of RW management activities shall be carried out from a special reserve fund made of regular payments by RW generators. The corresponding fees are established in accordance with the amounts of RW generation on the basis RW disposal tariffs set up by the Ministry of natural resources of the Russian Federation.

Article 30 of the law stipulates that disposal of liquid low-level and intermediate-level RW in subsoil within the boundaries of mining allotments is allowed only in deep well injection facilities constructed and operated prior to the enactment of the law.

Federal Law № 3-FZ «On the Radiation Safety of Population» of January 9, 1996 specifies legal framework to ensure radiation safety of population and to protect human health.

The law (article 3) establishes the following fundamental principles of radiation safety:

- limitation principle — individual exposure limits set for public and covering all types of ionizing radiation sources shall be not exceeded;
- justification principle — any activity involving ionizing radiation sources public and individual benefits from which do not outweigh the radiation risks, associated with possible damage caused by additional exposure above natural background radiation levels, to which it gives rise shall be prohibited;
- optimization principle — individual doses and the number of exposed individuals due to the use of any radiation source shall be kept to the minimum practicable with due account of economic and social aspects.

The same article specifies administrative aspects of the system for radiation safety of population covering radiation accidents:

- benefits associated with the proposed measures to eliminate the consequences of a radiation accident shall outweigh relevant damages;
- types and scope of activities to eliminate the consequences of a radiation accident shall be performed in such a way that benefits from the associated dose reduction apart from damage caused by these activities is maximal.

Article 9 specifies state regulatory standards for radiation safety. The following fundamental hygienic standards (acceptable dose limits) for radiation exposure, resulting from the use of IRS in the territory of the Russian Federation, were established:

- for the public — annual effective dose limit equals to 0.001 Sv, whereas the lifetime effective dose limit (70 years) is equal to 0.07 Sv; higher annual effective dose values are acceptable in certain years only if the average annual effective dose during five subsequent years does not exceed 0.001 Sv;
- for the employees — annual effective dose limit equals to 0.02 Sv, whereas the effective dose limit for the employment period (50 years) is equal to 1 Sv; annual effective dose

value up to 0.05 Sv is considered to be acceptable only if the average annual effective dose during five subsequent years does not exceed 0.02 Sv.

The base dose limits do not involve doses due to natural radiation and man-induced radiation background.

In the event of radiation accidents, exposure above limits set up by hygienic standards (acceptable dose limits) is considered acceptable during the period of time and the margin specified in sanitary norms and rules.

Article 10 stipulates that appropriate permits (licenses) are required to perform activities involving ionizing radiation sources.

Article 10.1 stipulates that state supervision over radiation safety shall be implemented by federal executive authorities and federal state sanitary and epidemiologic supervisory board in accordance with their competences in keeping with the legislation of the Russian Federation and according to the procedure established by the Government of the Russian Federation.

Federal Law № 52-FZ «On the Sanitary and Epidemiological Welfare of Population» of March 30, 1999 specifies the legal framework for sanitary and epidemiological welfare of the population. The law establishes sanitary and epidemiological requirements covering industrial and technical goods, industrial premises, working conditions during operations that involve sources of physical impact on public, water bodies, outdoor air and soil.

According to the Article 27 of the law, storage and disposal of radioactive substances, material and waste is allowed only on condition that appropriate sanitary and epidemiological statements confirm the compliance of working environment during operations that involve sources of physical impact on human (ionizing radiation) with the sanitary rules.

Federal Law № 7-FZ «On the Environmental Protection» of January 10, 2002 specifies the legal framework for the state policy governing the environmental protection. The law establishes fundamental principles of the environmental protection and recognizes the need of establishing regulatory limits of acceptable impacts on the environmental.

The law provides for the following provisions regarding RW and SNF:

- RW import from foreign countries for storage, disposal or decontamination, as well as with the view of its disposal in seas or in the outer space, is prohibited (Articles 48, 51);
- discharges of production and consumption wastes, including RW, into surface and ground water facilities, catchment areas, subsoil and soil are prohibited (Article 51);
- keeping RW at certain territories where it is likely to endanger the environment, natural ecological systems and human health is prohibited (Article 51);
- import of SNF to the Russian Federation from foreign states for temporary technological storage and (or) its reprocessing is allowed if the general risk reduction associated with the radiation impact and improvement of the environmental safety due to the relevant project can be demonstrated, recognizing the priority of the right for the return of RW resulting from reprocessing to the state of origin or to ensure such return (Article 48);
- it declares the binding nature of state environmental assessments and specifies the subjects of such reviews.

Federal Law № 174-FZ «On Environmental Assessment» of November 23, 1995 regulates relations in the field of state and public environmental assessment. The law specifies the subjects and the procedure for mandatory state environmental assessments performed at various levels, as well as subjects and requirements for public environmental assessment.

According to the law, environmental assessment shall enable to identify the compliance of planned economic and other activities with the environmental requirements and to evaluate if

the implementation of such activities is admissible in order to prevent possible adverse impacts of these activities on the environment, as well as social, economic and other adverse impacts associated with relevant activities.

Federal Law № 68-FZ «On the Protection of Population and Territories from Natural and Man-Induced Emergencies» of December 21, 1994 establishes procedural and legal framework for the protection of the environment, public, as well as facilities designed for industrial and social needs against natural and man-induced emergencies. The law establishes the fundamental principles for the protection of population and territories from emergencies, the procedure for emergency preparedness and response.

The Urban Development Code of the Russian Federation № 190-FZ December 29, 2004 establishes fundamental principles of the urban development legislation, regulates relations associated with construction, reconstruction and overhaul of capital facilities, including nuclear facilities. The law also recognizes the need for state building supervision during construction, reconstruction and overhaul of nuclear facilities.

The Water Code of the Russian Federation № 74-FZ of June 3, 2006 regulates relations arising from the use and protection of water bodies (surface and underground) being under state, municipal or private ownership.

The following restrictions on the use of water bodies, as well as on siting of storage and disposal facilities are specified in the law:

- discharges of production and consumption wastes into water bodies and waste disposal are prohibited;
- disposal of nuclear material, radioactive substances in water bodies is prohibited;
- discharges of sewage waters containing radioactive substances and other hazardous substances in concentrations greater than the limits for maximum acceptable exposure established for water bodies are prohibited;
- siting of RW storage and disposal facilities within flooding and under-flooding areas is prohibited.

Therefore, the law prohibits RW disposal in water bodies, but none the less allows discharges of radioactive substances and establishes provisions requiring that concentrations of radioactive substances in discharge waters shall not exceed the established acceptable limits.

Until 2010, water bodies at a number of NFC enterprises, that had been established in the period of urgent defense program implementation, had the status of so-called «industrial water reservoirs». Their operation was regulated by special decrees of the Government of the Russian Federation and conditions of licenses issued by Rostekhnadzor.

In late 2010, «industrial water reservoirs» at FSUE PA «Mayak» changed their status to nuclear facilities. As far as waters of these facilities are contaminated with radioactive substances, their management is performed in accordance with the conditions of relevant operating licenses. Limits for discharges of radioactive substances contained in these facilities to the environment are established in relevant standards for permissible discharges.

The Law of the Russian Federation No 2395-1 «On Subsoil» of February 21, 1992 involves a standard explicitly regulating deep disposal of RW (including deep well injection of LRW). Article 10 of the law stipulates that a decision made by the Government of the Russian Federation in coordination with executive authorities of the RF constituent entities may provide a legal basis for subsoil use with the view of deep RW disposal in geological formations ensuring containment of the disposed waste.

The Criminal Code of the Russian Federation No 63-FZ of June 13, 1996 and **The Code of Administrative Violations** No 195-FZ of December 30, 2001 establish criminal responsibility and liability for violating the legislation in the field atomic energy use.

The Criminal Code of the Russian Federation specifies the responsibility for violating safety rules at nuclear facilities that could have caused or has caused death of an individual or radioactive contamination of the environment (Article 215), as well as for violating RW and SNF management rules (Article 247).

In 2009, the Federal Law № 377-FZ of December 27, 2009 «On Amendments to Certain Legislative Acts of the Russian Federation Associated with the Enactment of Provisions of the Criminal Code of the Russian Federation and the Penal code of the Russian Federation Concerning the Custodial Sentence» introduced an amendment to Article 215 of the Criminal code providing for increased penalties for violating safety rules at nuclear facilities that could have caused or has caused death of an individual or radioactive contamination of the environment.

In 2011, the Federal Law № 26-FZ «On Amendments to the Criminal Code of the Russian Federation» of March 7, 2011 introduced an amendment to Article 247 that excluded the lower limit of punishment for violating rules when handling environmentally hazardous substances and waste and resulting in involuntary manslaughter or mass poisoning of individuals.

The Code of the Russian Federation on Administrative Violations establishes liability for violating rules in the field of atomic energy use and accounting of nuclear materials and radioactive substances (Article 9.6); performing entrepreneurial activities without appropriate licenses (Article 14.1); failure to comply on-time with legal prescriptions issued by state supervision authorities (or by a relevant official) (Article 19.5); as well as failure to comply with environmental, sanitary and hygienic requirements established for the management of wastes and other hazardous substances (Article 8.2); for misstatement and non-disclosure of information on environmental setting and radiation environment (Article 8.5). Moreover, the Code specifies the powers of regulator's officials exercising legal proceedings of such administrative violations.

Federal Law № 92-FZ «On Special Environmental Programs for the Remediation of Radioactively Contaminated Territories» of July 10, 2001 specifies particular aspects of state regulation of relations associated with the development and implementation of special environmental programs for the remediation of radioactively contaminated sites. The law stipulates that special environmental programs are funded from currency resources that result from foreign trade operations involving SNF. SNF-related foreign deals are concluded by the organization specially authorized by the Government of the Russian Federation given that the findings of the state environmental assessment are positive.

Federal Law № 29-FZ «On Financing Particularly Hazardous Nuclear and Radiation Productions and Facilities» of April 3, 1996 involves a standard for assured budget funding of activities to ensure safe and sustainable operation of particularly hazardous nuclear and radiation productions and facilities. Article 3 of the law involves a standard that binds the organizations operating particularly hazardous nuclear and radiation productions and facilities to establish centralized funds covering the costs of activities aimed to develop relevant technologies and improve the operational safety.

In 2013, the **Federal Law № 184-FZ «On Technical Regulation»** of December 27, 2002 was amended and henceforth does not regulate relations associated with development, adoption, implementation and compliance with requirements for the safe use of atomic en-

ergy, including safety requirements for nuclear facilities and safety requirements for activities associated with atomic energy use. Evaluation of compliance (including state control (supervision) over the compliance) with mandatory requirements applied to products (activities and services) in the field of atomic energy use is performed according to the procedure established by the Government of the Russian Federation (p.3, article 5).

List of main legal acts on RW management including those that were adopted in the reporting period is presented in Annex E of the Report.

E.2.1.2. Normative legal acts (by-laws) of the President of the Russian Federation and the Government of the Russian Federation

To elaborate certain provisions of the Federal Law «On the Use of Atomic Energy» and other federal laws associated with atomic energy use, the President of the Russian Federation and the Government of the Russian Federation adopt normative legal acts (by-laws) in form of presidential decrees and resolutions of the Government of the Russian Federation.

Since the presentation of the third National Report, a number of new by-laws governing atomic energy use has been issued and a number of amendments has been introduced to already existing presidential decrees and government resolutions:

In 2012, two Governmental decrees were adopted:

- № 384-r «On the National Operator for Radioactive Waste Management» of March 20, 2012 which identified the organization responsible for RW management;
- № 610-r «On the Approval of the List of Nuclear Facilities Subject to Continuous State Control» of April 23, 2012 which established the list of NFs that henceforth are subjected to continuous state control.

In 2012, the following resolutions of the Government of the Russian Federation were adopted:

- «On the Approval of the Regulation on Continuous State Supervision at Nuclear Facilities» № 373 of April 23, 2012 establishing the procedure for continuous state supervision (including inspections and certain control arrangements) at nuclear facilities;
- «On the Initial Registration of RW» № 767 of July 25, 2012 establishing the procedure for the initial registration of generated RW to identify RW distribution and its amounts, as well as the conditions at sites where the waste is held;
- «On the Approval of the Regulation on the Transfer of Radioactive Waste for Disposal, Including Waste Resulting from Development, Manufacturing, Testing, Operation and Disposition of Nuclear Weapons and Military Nuclear Power Units» № 899 of September 10, 2012 establishing the procedure for RW handover for disposal including RW resulting from development, manufacturing, testing, use and disposition of nuclear weapons and military nuclear power units;
- «On the Federal State Supervision in the Field of Atomic Energy Use» № 1044 of October 15, 2012 approving the Regulation that establishes the procedure for federal state supervision in the field of atomic energy use;
- «On Criteria Used to Define Solid, Liquid and Gaseous Waste as Radioactive Waste, Criteria Used to Define RW as Special and Removable RW, Criteria for the Classification of Removable Waste» № 1069 of October 19, 2012 establishing the abovementioned criteria;
- «On the Registration of Organisations Operating Radiation Sources Containing Exclusively Radionuclide Sources of the Fourth and the Fifth Categories of Radiation Hazard» № 1184 of November 19, 2012;
- «On the Procedure and Timeframes for the Establishment of the Unified State System for RW Management» № 1185 of November 19, 2012 specifying the procedure and the timeframes for USS RW establishment;

- «On the Approval of the Regulation Concerning the Return of Spent Sealed Radiation Sources of Russian Production to the Russian Federation, and the Return of Spent Sealed Radiation Sources to the Country of Origin» № 1186 of November 19, 2012;
- «On the Approval of the Regulation Governing National Operator's Contributions, Being Part of Costs Paid by RW Generating Organizations that Do Not Operate Particularly Hazardous Nuclear and Radiation Facilities, to the RW Disposal Fund» № 1187 of November 19, 2012;
- «On the Procedure for State Accounting and Control of RW, Including the Registration of RW and RW Storage Facilities by the State Management Authority in the Field of RW Management» № 1188 of November 19, 2012, stipulating that state RW accounting and shall be part of the state RM and RW accounting system;
- «On the Procedure for the State Regulation of RW Disposal Tariffs» № 1249 of December 3, 2012, setting up the procedure for the state regulation of RW disposal tariffs including relevant basic pricing principles and rules for state regulation and control;
- «On Federal Norms and Rules in the Field of Atomic Energy Use» № 1265 of December 6, 2012 altering the procedure for the development and approval of federal norms and rules in the field of atomic energy use;
- «On the Approval of the Regulation Concerning Particular Aspects of the Standardization Process for Products (operations and services) Subject to Safety Requirements in the Field of Atomic Energy Use, as well as Design (Including Research Efforts), Production, Construction, Installation, Setup, Operation, Storage, Transportation, Dismantlement and Disposal of Above Mentioned products» № 173 of March 1, 2013 specifying particular aspects of the standardization process in the field of atomic energy use;
- «On Licensing Activities in the Field of Atomic Energy Use» № 280 of March 29, 2013 establishing the licensing procedure for activities in the field of atomic energy use;
- «On the Special Aspects of Technical Regulation... in the Field of Atomic Energy Use» № 362 of April 23, 2013 specifying particular aspects of the technical regulation concerning the development and approval of mandatory requirements for products and services associated with safety assurance in the field of atomic energy use;
- «On the Approval of the Regulation on Assigning a Legal Entity to a Scientific and Technical Support Organization Providing its Services to the State Safety Regulatory Authority in the Field of Atomic Energy Use» № 387 of April 30, 2013 establishing the procedure for assigning a legal entity to a scientific and technical support organization providing its services to the state safety regulatory authority in the field of atomic energy use;
- «On Amendments to the Regulation on the Ministry of Natural Resources and the Environment of the Russian Federation» № 1288 of December 12, 2012 according to which the Ministry of natural resources and the environment became the federal authority authorized to establish RW disposal tariffs.

List of main by-laws valid in the relevant field is presented in Annex E of the Report.

E.2.1.3. Federal norms and rules in the field atomic energy use, sanitary rules and radiation safety standards

Main federal norms and rules, sanitary rules and radiation safety standards specifying safety requirements for SNF and RW management, and the amendments introduced to them in the reporting period are discussed below.

List of main federal norms and rules, sanitary rules and radiation safety standards valid in the relevant field is presented in Annex E of the Report.

E.2.1.3.1. State sanitary rules and radiation safety standards

Article 9 of the Federal Law «On the Radiation Safety of Population» stipulates that state regulatory standardization in the field of radiation safety is provided through the establishment of sanitary rules, standards, hygienic standards, radiation safety rules, codes of rules, occupational safety and health rules and other regulations addressing radiation safety.

Pursuant to the Federal Law «On the Sanitary and Epidemiologic Welfare of Population», Federal supervision agency for customer protection and human welfare is authorized to develop and approve sanitary rules. Sanitary rules are binding for individuals, individual entrepreneurs and legal entities. By-laws concerning sanitary and epidemiologic welfare of population approved by federal executive authorities, executive authorities of constituent entities of the Russian Federation and local authorities, as well as relevant decisions made by legal authorities, state standards, building standards and rules, occupational safety and health rules, veterinary and phytosanitary rules shall not contravene the sanitary rules.

State sanitary and epidemiological rules, standards and hygienic regulations approved by the RF chief public health official specify criteria that discuss safety and (or) harmlessness of environmental factors for public and the mandatory requirements non-compliance with which is likely to endanger human life or health.

In general, in the Russian Federation, there are four fundamental sanitary regulations discussing radiation safety of the population:

- Radiation Safety Standards (NRB-99/2009);
- Basic Sanitary Rules of Radiation Safety (OSPORB-99/2010);
- Sanitary Rules for Radioactive Waste Management (SPORO-2002);
- Sanitary Rules for Radiation Safety of Personnel and Public During Transportation of Radioactive Material (substances).

Radiation Safety Standards (NRB-99/2009) have been developed with due regard of ICRP and WHO recommendations and the IAEA safety standards and establish basic radiation protection standards: basic exposure limits for different categories of exposed individuals, acceptable levels for multiple-factor impacts (annual limit on intake (ALI), acceptable annual volumetric activities, annual specific activities and other).

Under normal operation involving sources of ionizing radiation, exposure limits during the year are derived based on the following individual lifetime risk values: for personnel — $1,0 \cdot 10^{-3}$, for public — $5,0 \cdot 10^{-5}$. The negligible risk level is the equivalent of 10^{-6} .

The following values of cumulative risk (product of the probability of an event resulting in the exposure and the probability of death due to the exposure) are used in justifying protection against sources of potential exposure during the year:

- personnel — $2,0 \cdot 10^{-4}$, year⁻¹;
- public — $1,0 \cdot 10^{-5}$, year⁻¹.

Basic Sanitary Rules of Radiation Safety (OSPORB-99/2010) (with account of the Amendment №1 to OSPORB-99/2010 introduced by the resolution of the Chief Public Health Official of the Russian Federation № 43 of September 16, 2013) establish requirements ensuring protection of public against harmful radiation exposure under all IRS exposure conditions covered by NRB-99/2009.

Basic sanitary rules establish conditions and the procedure for the exemption of a radiation source from regulatory control (control, accounting, licensing), classification of radiation facilities according to the level of potential hazard, requirements to siting, design, operation and decommissioning of radiation facilities.

These rules involve requirements to the arrangement of operations with radiation sources, conditions for their supply, accounting, storage and transportation, as well as the requirements to operations involving sealed and unsealed radionuclide sources (radioactive substances); they also specify requirements to the management of materials and goods contaminated with or containing radionuclides and RW, as well as radiation control of operations involving man-made radiation sources.

Sanitary Rules for Radioactive Waste Management (SPORO-2002) set forth the requirements for radiation safety of personnel and public and cover all types of RW management activities. The rules are binding for organizations generating RW, those performing RW collection, storage, transportation, processing and disposal, as well as organizations responsible for design development and construction of facilities where such waste are stored, processed and disposed of. Amendments to SPORO-2002 cover criteria used for definition of RW that have been introduced by OSPORB-99/2010.

Amendments introduced to OSPORB-99/2010 and SPORO-2002 in 2013 by the Resolution of the Chief Public Health Official, reflect the changes that occurred in legal and regulatory environment governing RW management during the reporting period due to the adoption of the Federal Law «On the Management of Radioactive Waste...» and a number of Resolutions of the Government of the Russian Federation for the law enforcement.

Hygienic Design Requirements for Enterprises and Nuclear Facilities (SPP PUAP-03) set forth sanitary and hygienic requirements for the protection of personnel and public against harmful exposure due to the use of radioactive materials and other IRS at production enterprises and nuclear facilities. The rules cover nuclear enterprises involved in mining, production, processing, reprocessing, application, storage, transportation, decontamination and disposal of radioactive substances and nuclear materials, and other sources of ionizing radiation.

Sanitary Rules and Technical Standards for Operation and Conservation of Deep Well Injection Facilities for Liquid Radioactive and Chemical Waste Disposal at Nuclear Fuel Cycle Enterprises (SP and TU EKKh-93) specify the legal framework for and the uses of deep well injection in RW management practices, set forth technical standards for construction, operation and closure of deep injection wells in accordance with appropriate sanitary and radiation safety requirements, establish a set of sanitary arrangements aimed at protection of personnel, public and the environment against harmful effects associated with deep well LRW disposal, and set up the requirements for control arrangements during operation and closure of such facilities, as well as monitoring of the environment.

E.2.1.3.2. Federal norms and rules in the field of atomic energy use

Federal norms and rules in the field of atomic energy are by-laws that specify the requirements for the safe use of atomic energy, involving the safety requirements for NF, as well as safety requirements covering activities in the field of atomic energy use, including safety objectives, principles and criteria that are binding for those who perform any activity in the field of atomic energy use.

Federal norms and rules in the field of atomic energy use shall be developed and approved according to the procedure established by the Government of the Russian Federation.

Federal norms and rules are developed on the basis of other by-laws of the Russian Federation, the Convention on nuclear safety, the Joint Convention on the safety of spent fuel management and on the safety of radioactive waste management and in keeping with the recommendations of international agencies involved in the field of atomic energy use the Russian Federation being Party to which.

In 2011, Article 6 of the Federal Law «On the Use of Atomic Energy» was amended and thereupon federal norms and rules shall account for the recommendations of international agencies involved in the field of atomic energy use the Russian Federation being Party to which.

Since 2010, Rostekhnadzor has been authorized to approve on its own initiative by-laws covering the appropriate range of activities, including federal norms and rules, in keeping with the legislation of the Russian Federation.

According to the resolution of the Government of the Russian Federation № 1511 «On the Approval the Regulation on the Procedure for the Development of Federal Norms and Rules in the Field of Atomic Energy Use» of December 1, 1997, their drafting shall be carried out by state safety regulatory authorities and/or management authorities in the field of atomic energy use in accordance with their competences.

The relevant development procedure provides for preliminary and final draft publication of the above-mentioned norms and rules in official press organs (unless these norms and rules in the field of atomic energy use constitute a state secret) and opportunities for their further discussion.

Norms and rules, upon their enactment, are binding for any entity performing activities in the field of atomic energy use and are valid throughout the territory of the Russian Federation.

According to the Rostekhnadzor's decree № 27 «On the Approval of the Development Procedure for Federal Norms and Rules in the Field of Atomic Energy Use by the Federal Environmental, Industrial and Nuclear Supervision Service and the Requirements to their Layout and Representation» of January 24, 2011, valid federal norms and rules in the field of atomic energy use shall be reviewed every 5 years.

Federal norms and rules specifying safety requirements applied to nuclear facilities and activities in the field of atomic energy use, also covering the safety of SNF and RW management, were developed and implemented for different NF (NPP, NFC facilities, ship nuclear power units, research reactors, national economic enterprises, including scientific and medical institutions).

Federal norms and rules are developed in form of general provisions, standards and rules (requirements). General safety provisions specify principles, criteria and general requirements for the nuclear and radiation safety of NF, whereas norms and rules (requirements) set forth appropriate requirements either concerning certain types of activities or certain NF components, systems and elements.

General Provisions on NF Safety (NP-001-97, NP-016-05, NP-038-11, NP-033-011) set forth principles, criteria and general requirements for the nuclear and radiation safety of nuclear facilities (NPP, NFC facilities, radiation sources, RM and RW storage facilities, research installations and etc.) at all stages of NF life cycle (siting, construction, commissioning, operation, decommissioning, including accidents, elimination of their consequences, as well as SNF and RW management).

Safety issues specific for SNF reprocessing facilities are regulated by federal norms and rules «**Facilities for Spent Nuclear Fuel Reprocessing. Safety Requirements**» (NP-013-99). NP-013-99 establishes safety principles, criteria and requirements for the design, construction and operation of SNF reprocessing facilities (SNF from power and research reactors, propulsion transport installations).

Safety issues specific for dry SNF storage facilities are regulated by the FNR «**Dry Storage Facilities for Spent Nuclear Fuel. Safety Requirements**» (NP-035-02). NP-035-02 establishes safety requirements to the design, construction, commissioning, operation and decommissioning of dry SNF storage facilities at NFC sites.

FNП «On Accounting External Natural and Man-Induced Impacts on Nuclear Facilities» (NP-064-05) involve the requirements for taking due account of external natural and man-induced impacts during siting, design, construction, operation and decommissioning of nuclear facilities. NP-064-05 involves a list of natural and man-induced features, events and processes that shall be identified during investigations and research within the area and the site of a proposed nuclear facility and shall be accounted for to demonstrate its safety and stability.

Currently NP-064-05 is being reviewed based on the findings from the Fukushima-1 accident analysis. Approval of the reviewed document is expected in 2014.

Requirements to the quality assurance program NP-090-11 «Requirements to Quality Assurance Programs for Nuclear Facilities» establish requirements regarding the structure and the contents of quality assurance programs for nuclear installations, radiation sources, SNF and RW storage and processing facilities at all stages of NF life cycle.

Provisions on procedures for investigating and accounting violations (NP-004-08, NP-047-11 and etc.) specify the procedure for investigating and accounting NF operational disorders, categories of such violations, information content and the procedure for its communication, as well as the requirements to the relevant accounting system.

Requirements to the contents of action plans for personnel protection in the event of an accident (NP-015-2012, NP-077-06 and etc.) specify general requirements to the development of action plans aimed at personnel protection in the event of an accident, the procedure for their implementation, relevant arrangements for personnel protection in the event of an accident, human actions (personnel and administration) under abnormal operation and the response management covering different nuclear installations, radiation sources and storage facilities.

Requirements to the justification of NF design lifetime extension (NP-024-2000, NP-017-2000) set forth main criteria and safety requirements that shall be met to extend NF operating lifetime and to obtain relevant operating license.

Rules for the safe decommissioning of nuclear facilities (NP-057-04, NP-012-99, NP-028-01 and etc.) specify safety requirements for NF decommissioning, the relevant decommissioning programs, integrated engineering and radiation investigations, and the decommissioning projects.

Safety of RW management is regulated by a *system* of federal norms and rules drafted with due consideration of the IAEA safety standards in the field of RW management, as well as the recommendations of ICRP and OECD.

«Safety in RW Management. General Provisions» (NP-058-04) specify safety objectives and principles in RW management, as well as general safety requirements.

At present time, NP-058-04 is under revision due to the adoption of the Federal Law «On the Management of Radioactive Waste...» and a number of Governmental resolutions for the law enforcement. Approval of this document is expected in 2014.

Safety requirements for predisposal management of RW (NP-002-04, NP-019-2000, NP-020-2000, NP-021-2000) specify safety requirements to collection, processing, storage and conditioning of liquid, solid and gaseous RW at NPPs and other NFs.

At present time, NP-058-04 is under revision due to the adoption of the Federal Law «On the Management of Radioactive Waste...» and a number of Governmental resolutions for the law enforcement. Approval of this document is expected in 2014.

«Disposal of Radioactive Waste. Principles, Criteria and General Safety Requirements» (NP-055-04) sets forth principles, criteria and general safety requirements for near-surface and deep geological disposal of RW.

At present time, NP-055-04 is under revision due to the adoption of the Federal Law «On the Management of Radioactive Waste...» and a number of Governmental resolutions for the law enforcement. The FNP approval is expected 2014.

«Near-Surface Disposal of Radioactive Waste. Safety Requirements» (NP-069-06) elaborates the requirements of federal norms and rules NP-058-04 and NP-055-04 regarding safety of near-surface RW disposal.

At present time, NP-058-04 is under revision due to the adoption of the Federal Law «On the Management of Radioactive Waste...» and a number of Governmental resolutions for the law enforcement. Approval of this document is expected in 2014.

«Basic Rules for Accounting and Control of Nuclear Material and Radioactive Waste in Organizations» (NP-067-11) sets forth the requirements for accounting and control of RM, special non-nuclear material, NM, unless the NM is subject to accounting exclusively under the state system for NM accounting and control, and RW in organizations managing RM and RW.

«Rules under which Nuclear Material Can Be Defined as Radioactive Material or Radioactive Waste» (NP-072-13) specifies the requirements that have to be met to define nuclear material existing in the form of elementary substances or compounds, alloys, items, accounting units containing nuclear materials registered under the state system for accounting and control of nuclear material, as radioactive material or RW.

Rules for the safe transportation of radioactive material (NP-053-04) establishes safety requirements to the transportation of radioactive materials (including radioactive waste and spent nuclear fuel), the requirements to operations and conditions that are associated with RW relocation and constitute the process (design, manufacturing, maintenance and repair of transportation packages; preparation, loading, forwarding, transport, including temporary (transit) storage; unloading and receipt of radioactive material and packages at the terminal destination). The rules were developed on the basis of international codes on transportation of dangerous goods (IMDG, ICAO, RID, ADR).

Safety requirements for transportation and storage of radioactive material (NP-053-04 and NP-061-05) specify basic technical and administrative requirements to NM, RM, RW and SNF storage and transportation systems that ensure safety during storage and transportation of NM, RM and RW at NFs.

Requirements to the contents of NF safety analysis reports (NP-006-98, NP-018-05, NP-049-03, NP-051-04, NP-023-2000, NP-066-05) set forth the requirements to the development of safety analysis reports for different types of nuclear facilities, its layout, typical structure of systems description, as well as the contents of the report's sections.

Draft federal norms and rules «Requirements for the Safe Decommissioning of RW Storage Facilities» have already been developed; their approval is expected in 2014.

Current system of federal norms and rules enabled the development of a national program for Russian NPPs safety evaluation («stress-tests») following the «Fukushima-1» accident.

The Integrated Regulatory Review Service IAEA Mission (IRRS) that took place in 2009 has expressed its positive attitude towards the extensive use of the IAEA safety standards in the development of federal norms and rules and safety guidelines in the Russian Federation. In 2013, a follow-up IRRS review was carried out to evaluate the national regulatory system for

nuclear and radiation safety, as well as the measures implemented in response to IRRS-2009 recommendations and proposals. The follow-up mission has noted the considerable progress achieved by Rostekhnadzor since 2009 in upgrading the legislative and regulatory framework in line with the provisions of the IAEA safety standards, enforcement of powers and independence of Rostekhnadzor acting as the state safety regulatory authority and provided its assessment of Rostekhnadzor activities covering such aspects as emergency preparedness and response, and the lessons learned for the «Fukushima-1» accident.

The following documents are taken into account in the revision of the above-mentioned papers: SF-1 «Fundamental Safety Principles» (2007), GSR. Part 4 «Safety Assessment for Facilities and Activities. General Safety Requirements. Part 4» (2009) and GSR. Part 5 «Predisposal Management of Radioactive Waste. General Safety Requirements» (2009), SSR-5 «Disposal of Radioactive Waste. Specific Safety Requirements» (2011) and etc.

Main amendments and proposals generally deal with RW classification for disposal and specification of RW acceptance criteria for disposal.

Exhaustive list of valid and new federal norms and rules is presented in the Annex E of the Report.

E.2.1.4. Guideline documents and safety guides in the field of atomic energy use

Safety guides for atomic energy use (hereinafter safety guides) are developed, approved and enacted by Rostekhnadzor and promote compliance with the requirements set forth in federal norms and rules in the field of atomic energy use. Safety guides involve Rostekhnadzor's recommendations concerning the compliance with the requirements of federal norms and rules in the field of atomic energy use, including guides on:

- techniques for performing certain activities;
- methodologies;
- performance of expert reviews and safety assessments;
- clarifications and other recommendations on how to meet safety requirements in the field of atomic energy use.

Safety guides shall take into account the experience of FNP application, as well as the recommendations of international agencies involved in the field of atomic energy use the Russian Federation being Party to which.

List of safety guides involving recommendations on SNF and RW safe management is presented in the Annex E.

Guideline documents involve procedural standards establishing rules and procedures for performing operations in different fields of activities being under the Rostekhnadzor jurisdiction.

Guideline documents and administrative regulations, in particular, specify a set of requirements to the set of documents required to demonstrate the safety of nuclear installations, radiation sources and SNF and RW storage facilities, requirements regarding their contents, the procedure for verification of data presented in license application, as well as the procedure for NRS expert review.

Administrative regulations of Rostekhnadzor are developed and approved in accordance with rules specified in the resolution of the Government of the Russian Federation № 373 «On the Development and Approval of Administrative Regulations on Carrying Out the State Functions and Administrative Regulations on the Supply of State Services» of May 16, 2011 (as amended on January 23, 2014).

List of Rostekhnadzor guideline documents is presented in the Annex E of the Report.

E.2.2. Licensing in the field spent nuclear fuel and radioactive waste management (Article 19-2(ii, iii))

Article 26 of the Federal Law «On the Use of Atomic Energy» stipulates that any activity in the field of atomic energy use subject to licensing by state safety regulatory authorities is prohibited if carried out without an appropriate license.

Article 14.1 of the Code of the Russian Federation on administrative violations № 195-FZ of December 30, 2001 declares that implementation of activities without an appropriate license, if such license is mandatory, shall result in a fine imposed under the administrative law.

Article 171 of the Criminal code of the Russian Federation provides for criminal punishment for implementing activities without an appropriate license, if such license is mandatory.

The procedure and conditions for licensing activities in the field of atomic energy use are specified in the «Regulation on Licensing Activities in the Field of Atomic Energy Use» № 280 (approved by the resolution of the Government of the Russian Federation on March 29, 2013).

The following activities fall under the scope of the Convention:

- siting, construction, operation and decommissioning of nuclear installations, radiation sources, NM, RM and RW storage facilities;
- management of nuclear materials and radioactive substances, including milling and mining of uranium ores, production, use, processing, transportation and storage of nuclear and radioactive material;
- management of radioactive waste during their storage, processing, transportation and disposal;
- the use of nuclear material and/or radioactive material in R&D;
- design and construction of nuclear installations, radiation sources and NM, RM and RW storage facilities;
- construction and manufacturing equipment for nuclear installations, radiation sources, NM, RM and RW storage facilities;
- expert examination of design documentation, engineering and process flow documentation and documents demonstrating nuclear and radiation safety of nuclear installations, radiation sources, NM, RM and RW storage facilities, as well as NM, RM and RW management activities.

According to the resolution «On the Federal Environmental, Industrial and Nuclear Supervision Service» № 401 (approved by the resolution of the Government of the Russian Federation on July 30, 2004), licensing activities in the field of atomic energy use shall be executed by the Federal Environmental, Industrial and Nuclear Supervision Service (Rostechнадзор).

«Administrative Regulations for the Federal Environmental, Industrial and Nuclear Supervision Service Regarding the Implementation of its State Function Associated with Licensing Activities in the Field of Atomic Energy Use», approved by the decree of the Ministry of National Resources and the Environment of the Russian Federation № 262 on October 16, 2008 (hereinafter administrative regulations) specify the relevant licensing procedure that Rostechнадзор shall follow.

Administrative regulations specify requirements to the procedure that Rostechнадзор shall follow in order to implement its function of state licensor, administrative procedures, distribution of responsibilities between Rostechнадзор's central and territorial bodies in carrying out its function of state licensor, maximum terms for expert examination of license applications and all relevant documents, as well as the requirements concerning the structure of submitted sets of document demonstrating nuclear and radiation safety during siting, construction, operation and decommissioning (closure) of NI, RS and SF.

During the review of a license application, Rostechnadzor arranges for and performs inspections that shall confirm whether the applicant is ready to implement the declared activities and whether the information presented in the license application and relevant documents can be relied upon. Decision on issuance or non-issuance of a license shall be made with due account of the inspection findings.

The following aspects shall be evaluated by Rostechnadzor during the review of license application demonstrating nuclear and radiation safety of NI, RS, SF and/or declared activity:

- compliance of design and engineering solutions with the provisions of federal norms and rules in the field of atomic energy use, compliance of personnel skills with the established requirements and opportunities for their maintenance at the appropriate level, as well as availability of appropriate RW collection, storage, processing and disposal systems and their compliance with the established requirements;
- provision of comprehensive technical and administrative measures to ensure nuclear and radiation safety during the implementation of the declared activity;
- availability of adequate conditions for storage and arrangements for accounting and control of nuclear material, radioactive substances and RW, physical protection of NI, RS, as well as NM, RM and RW storage facilities;
- availability of action plans to protect NF personnel and public in the event of an accident and preparedness to their implementation, as well as of a quality assurance system and all engineering and technical support required for the declared activity;
- ability of the applicant to ensure safe completion of the declared activity and the NF decommissioning, as well as availability of appropriate design materials.

Pursuant to the supplement to the administrative regulations, licenses for siting, construction, operation and decommissioning of structures having regional importance and designed for RW storage, as well as for RW management, shall be issued by interregional territorial authorities of Rostechnadzor. Licensing of siting, construction, operation and decommissioning of SNF storage facilities, as well as structures designed for RW storage of interregional importance, and RW disposal facilities (irrespective of DF status) shall be carried out by Rostechnadzor's central authorities.

Positive statement of the state environmental assessment, as well as availability of an appropriate sanitary and epidemiologic statement issued by sanitary and epidemiologic supervision board is an essential condition for acquiring SNF and RW management licenses.

If previously unknown circumstances associated with the safety of already licensed activities are revealed due to the adoption of new federal norms and rules in the field of atomic energy use, Rostechnadzor may require from the applicant some additional documents to demonstrate the adequate safety level of these activities and make a decision on amending the conditions of already issued licenses.

E.2.3. System of institutional and regulating controls, documentation and reporting (Article 19-2 (iv))

E.2.3.1. Institutional control

Institutional control over SNF and RW management, documentation maintenance and relevant reporting activities are performed in accordance with the distribution of responsibilities between state executive authorities and the operating organization.

The following functions are common both for state executive authorities and the operator:

- planning, arranging and implementing inspections;
- development of industry-wide standards, rules and safety requirements;

- evaluation of plans, non-conformities and violations; development of recommendations;
- participation in the process of issuing permits and its administration;
- arranging for trainings and personnel certification;
- R&D and implementation of relevant findings.

Article 35 of the Federal Law «On the Use of Atomic Energy» stipulates that the operating organization shall develop and implement control measures over the safety of NI, RS or SF.

Conditions of licenses issued by state safety regulatory authority require that the operating organization take appropriate steps to ensure that control, inspections and testing of safety-important equipment and systems are carried out in accordance with established procedures and schedules.

If the operating organization fails to ensure safety, a competent federal management authority in the field of atomic energy use will become responsible for the safe and proper management of such activities until a new operating organization is approved.

E.2.3.2. Regulating control

State safety supervision in the field of atomic energy use involves efforts of state safety regulatory authorities and their regional bodies aimed at acquisition and analysis of safety-important information, arranging for and performing inspections, decision-making, and imposing sanctions if non-compliances with safety requirements in the field of atomic energy use are revealed. By virtue of its authority, Rostechndzor approved and enacted «Administrative Regulations for the Federal Environmental, Industrial and Nuclear Supervision Service Regarding the Implementation of its State Function Associated with Federal State Supervision in the Field of Atomic Energy Use» (Rostechndzor's decree № 248 of June 7, 2013), as well as other guiding Rostechndzor's documents specifying inspection procedures and the issues that are to be reviewed.

Resolution of the Government of the Russian Federation № 401 of July 30, 2004 stipulates that Rostechndzor shall provide control and supervision over:

- the compliance with norms and rules in the field of atomic energy use;
- the conditions of licenses authorizing certain activities in the field of atomic energy use;
- nuclear, radiation, occupational and fire safety (at NFs);
- physical protection of NI, RS, SF, NM and RM; state systems for accounting and control of NM, RM and RW.

Rostechndzor's territorial authorities involve inspection divisions supervising organizations and nuclear industry enterprises in the field of atomic energy use. These departments are staffed with inspectors qualified in the appropriate areas of expertise and authorized by the state to supervise, on a regular basis, the safety of all nuclear installations, radiation sources and SNF and RW storage facilities.

Rostechndzor draws up inspection plans on a yearly basis. This work is performed both by representatives of its territorial authorities (special-purpose, short-time plans) and its central authorities (overall and special-purpose plans).

In 2011, the Federal Law № 242-FZ «On Amendments to Certain Legislative Acts of the Russian Federation concerning state control (supervision) and municipal control» of July 18, 2011 added Article 24.1 to the Federal Law «On the Use of Atomic Energy» specifying particular aspects of federal state supervision in the field of atomic energy use. The Article:

- specifies subject matter of inspections, and, in particular, mandatory requirements and conditions of permits (licenses) that legal entities shall comply with to ensure safety in the field of atomic energy use;
- establishes types of inspections (scheduled, unscheduled and field (on-site) inspections);

- specifies grounds for inspections, specifically:
 - ◆ expiration of an order issued to rectify the identified violations;
 - ◆ application for issuance, reissuance or termination of a license, introduction of amendments to the conditions of a license;
 - ◆ new data obtained from the state radiation monitoring;
 - ◆ claims from public, legal entities and individual entrepreneurs and information from state authorities regarding violations of mandatory requirements in the field of atomic energy use;
 - ◆ order (instruction) to perform an unscheduled inspection issued by the head (deputy administrator) of the state safety regulatory authority.
- reduced the frequency of scheduled inspections to once in a year;
- provides for continuous state supervision over certain nuclear facilities;
- specifies responsibilities of state officials exercising federal state supervision:
 - ◆ to request and receive documents required for the review (inspection);
 - ◆ to have unrestricted access (upon presentation of official ID and inspection order) to NF for the purposes of investigation, research or safety review;
 - ◆ to issue orders to rectify the identified violations of mandatory requirements;
 - ◆ to draw up protocols on administrative violations if non-compliance with mandatory requirements is identified;
 - ◆ to submit materials on violations of mandatory requirements to authorized bodies that shall make decisions on opening a criminal investigation according to the evidence of crime.

Sanitary and epidemiologic supervision board supervises the compliance of activities with sanitary and hygienic standards and rules, including those relevant to radiation safety. These authorities issue statements on compliance of SNF and RW management facilities or conveyances with the requirements of sanitary standards and rules.

Article 3 of the Federal Law «On the Use of Atomic Energy» stipulates that items containing or applying nuclear materials and radioactive substances in quantities and with activity and /or emitting ionizing radiation with the intensity and energy less than the values established in federal norms and rules effective in the field of atomic energy use are not covered by the law, thus, they are exempted from the safety regulations in the field of atomic energy use.

The procedure and criteria for exempting activities from regulatory control are set forth in radiation safety standards NRB-99/2009 and basic sanitary rules of radiation safety OSPORB 99/2010.

In addition, basic sanitary rules do not cover radiation sources (as well as associated activities) that under any management conditions meet the following requirements:

- individual annual effective dose is less than 10 μ Sv;
- collective annual effective dose is either less than 1 man·Sv or greater than 1 man·Sv if its further reduction is considered to be inappropriate in accordance with the optimization principle;
- individual annual equivalent skin dose is less than 50 mSv and in the lens of the eye is less than 15 mSv.

Basic sanitary rules OSPORB-99/2010 specify criteria for the exemption of solid materials from regulatory control. According to paragraph 3.11.3 of OSPORB-99/2010, no restrictions are imposed on the use of any material, raw material and item in the economic sector if the corresponding specific activity of man-made radionuclides is less than the values provided in Annex 3 of OSPORB-99/2010.

E.2.3.3. Documentation and reporting

According to the Federal Law «On the Use of Atomic Energy» and federal norms and rules in the field of atomic energy use, the operating organization shall prepare periodic reports discussing NF safety and submit them for the review to state safety regulatory authorities and state management authorities in the field of atomic energy use. These reports shall provide information on:

- nuclear and radiation safety; discharges and releases of radioactive substances, SNF and RW management;
- training and issued work permits;
- emergency preparedness;
- abnormal operation and its consequences.

Information concerning any violation shall involve an evaluation that will identify why and how the safety requirements were breached, the efficiency of arrangements made by the operating organizations to prevent such violations, causes and conditions of these violations.

Rostekhnadzor is responsible for establishing the procedure for the submittal of information on operational disorders and NF safety reports to the Rostekhnadzor and its territorial authorities.

All information submitted and NF safety reports shall be registered and reviewed by authorized departments of the Rostekhnadzor's central office and its territorial authorities.

Categories of violations, the contents and the procedure for communicating relevant information, the procedure for investigating and accounting such violations, as well as relevant reporting requirements are established in federal norms and rules and the Rostekhnadzor's safety guides.

The operating organization shall keep design documents and all relevant records on construction, maintenance and repair of safety-important systems (components), and investigation files providing information on all violations identified during NF operating lifetime.

If some amendments that are likely to have effect on nuclear and radiation safety are introduced to design, engineering, process flow and operational documents, relevant materials on introduced amendments that may require alteration of license conditions, together with the reviewed documents demonstrating safety (reports, supplements to reports and etc.) shall be submitted by the license holder (operating organization) to Rostekhnadzor for further review; following the review Rostekhnadzor will decide whether the conditions of the license are to be altered or not.

E.2.4. Enforcement of regulations and license conditions (Article 19-2(v))

The Federal Law «On the Use of Atomic Energy» stipulates that state safety regulatory authorities are entitled to apply administrative enforcement within their competence according to the procedure established by the legislation of the Russian Federation.

According to the resolution of the Government of the Russian Federation № 280 of March 29, 2013, Rostekhnadzor shall exercise state supervision over the compliance of license conditions, and if the license holder fails to do so, it shall impose sanctions in accordance with the legislation of the Russian Federation.

According to the current legislation of the Russian Federation and the Regulation on the Federal Environmental, Industrial and Nuclear Supervision Service, its officials are authorized to implement the following measures of administrative enforcement (sanctions):

- to suspend or terminate licenses issued by Rostekhnadzor and its territorial authorities to organizations (legal entities) for the declared types of activities in the field of atomic energy

use, if they breach nuclear and radiation safety requirements or license conditions during the execution of relevant activities;

- to prohibit the use of equipment and technologies not complying with nuclear and radiation safety requirements;
- to issue orders on corrective actions if certain provisions of federal norms and rules are breached, and to disqualify personnel according to the Code of administrative violations;
- to impose administrative penalties in form of warnings and fines on organizations (legal entities) and NF officials for violating norms and rules in the field of atomic energy use;
- to submit to law enforcement authorities materials concerning violations of Russian legislation in the field of atomic energy use, provisions of federal norms and rules in the field of atomic energy use, conditions of issued licenses (permits), containing evidence of crime according to the criminal legislation of the Russian Federation.

Rostekhnadzor may suspend or cancel already issued licenses in the following cases:

- the license holder had committed a gross violation of license conditions that was revealed during the inspection performed under federal state supervision in the field of atomic energy use;
- the license holder failed to present or presented out-of-time the findings of periodic safety assessment after the expiration of a 10-year term for NI or SF operation;
- findings of a periodic safety assessment performed for an NI or SF revealed that the safety of the licensed activity, NI, SF and (or) conducted operations are not adequately demonstrated and justified in written form;
- the license holder failed to comply with the order issued to rectify the identified violations of license conditions;
- the document recognizing the organization able to operate a nuclear installation, radiation source or storage facility and to perform siting, design, construction, operation and decommissioning of NI, RS or SF, as well as management of NM and RM using its own resources or subcontracting other organizations, was terminated.

The Code of administrative violations of the Russian Federation stipulates that an administrative fine shall be imposed on individuals, officials and legal entities if they fail to carry out legal orders or claims of officials representing state supervision authorities or obstruct them from performing their duties, as well as if the relevant activity is carried out in violation of license conditions. The Code also envisages administrative suspension of relevant activities for the time up to 90 days either if there's a threat to human life or health or it may result in a radiation accident, man-induced disaster or cause substantial damage to the environment.

E.2.5. Distribution of responsibilities between authorities involved in different steps of spent nuclear fuel and radioactive waste management (Article 19-2 (vi))

The Federal Law «On the Use of Atomic Energy» establishes principles of legal regulation in the field of atomic energy use. The law specifies powers, rights and responsibilities of different parties involved in legal regulation in the field of atomic energy use; it also specifies responsibilities and obligations of the operating organization to ensure NI, RS and SF safety.

According to provisions of the Federal Law «On the Use of Atomic Energy», management authorities in the field of atomic energy use are authorized:

- to implement state scientific, technical, investment and structural policy in the field of atomic energy use;
- to develop measures to ensure safety in the field of atomic energy use;
- to establish and implement RW management programs.

Pursuant to the resolution of the Government of the Russian Federation № 412 «On Federal Executive Authorities and Authorized Organizations Exercising State Management in the Field of Atomic Energy Use and State Regulation of Safety in the Field of Atomic Energy Use» of July 3, 2006, the following institutions are recognized as state management authorities in the field of atomic energy use:

- State Atomic Energy Corporation «Rosatom» (Rosatom);
- Ministry of Industry and Trade of the Russian Federation (Minpromtorg of Russia);
- Ministry of Healthcare and Social Development of the Russian Federation (Minzdravsocrazvitiya of Russia);
- Ministry of Regional Development of the Russian Federation (Minregion of Russia) (deals exclusively with LLW and ILW and sources of ionizing radiation that do not pertain to nuclear, power and military complexes of the country);
- Ministry of Energy of the Russian Federation (Minenergo of Russia);
- Ministry of Education and Science of the Russian Federation (Minobrnauki of Russia);
- Federal Agency for Subsoil Use (Rosnedra);
- Federal Agency for Technical Regulation and Metrology (Rosstandart);
- Federal Agency for Marine and River Transport (Rosmorrechflot);
- Federal Medical and Biological Agency (FMBA of Russia).

The Federal Law «On the Management of Radioactive Waste...» regulates the status and powers of different parties involved in RW management, specifies the ownership right on RW and RW storage facilities, as well as the procedure for cession of rights from one party to another.

The law sets forth:

- powers of the Government of the Russian Federation in the field of RW management;
- powers of federal executive authorities;
- powers of state authorities representing constituent territories of the Russian Federation, powers of local authorities;
- powers and function of the state management authority in the field of RW management;
- powers and functions of state safety regulatory authorities in the field of atomic energy use;
- powers of the national operator for RW management;
- general requirements to organizations generating RW.

By the decree of the Government of the Russian Federation № 384-r «On the National Operator for Radioactive Waste Management» of March 20, 2012, the federal state unitary enterprise «National Operator for RW Management» (Moscow) — FSUE «NO RW» became the national operator for RW management.

According to the law, the national operator:

- ensures safe management of RW that it receives for disposal;
- ensures operation and closure of RW disposal facilities;
- places orders for design development and construction of RW disposal facilities;
- forecasts the amounts of RW subjected to disposal and the development of RW management infrastructure;
- provides technical and information support to the state RM and RW accounting and control and etc.

The national operator is responsible for:

- nuclear, radiation, occupational and fire safety, environmental protection, compliance with legal provisions regarding sanitary and epidemiologic welfare of public during operation, closure and post-closure of RW disposal facilities;
- radiation control at RW disposal sites, including the post-closure radiation monitoring;

- informing public, state authorities and other state bodies, local authorities on RW management safety and radiation environment at RW storage and disposal sites.

Article 20 of the Federal Law «On the Management of Radioactive Waste...» stipulates that FSUE «NO RW» is responsible for RW receipt for disposal. Currently FSUE «NO RW» consists of a central office and three branches located in the regions with operating deep well injection facilities for RW disposal:

- «Zheleznogorsk» (Zheleznogorsk, the Krasnoyarsk Territory);
- «Seversk» (Seversk, the Tomsk region);
- «Dimitrovgrad» (Dimitrovgrad-10, the Ulyanovsk Region).

There are plans for the establishment of a fourth branch «Novouralsk» (Novouralsk, the Sverdlovsk Region) in 2014.

According to the Article 22 of the Federal Law «On the Use of Atomic Energy», state system for accounting and control of radioactive material and radioactive waste has been established and operates in the Russian Federation (SGUK RV and RAO).

The system is aimed at identification of stocked amounts of radioactive material and RW kept at industrial sites, in storage facilities and repositories, prevention of losses, unauthorized use and thefts, provision of information concerning RM and RW stocks, their transportation, export and import to state authorities, state management authorities in the field of atomic energy use and state safety regulatory authorities.

Within the system, the State Corporation «Rosatom» exercises its functions of management body both at federal and institutional levels.

SGUK RV and RAO shall:

- ensure RM and RW accounting and control at the federal level;
- provide collection and evaluation of information concerning RM and RW accounting and control at the regional and institutional levels;
- ensure creation of data basis on state RW inventory, storage and disposal facilities, radioactively contaminated territories located within the areas supervised by organizations;
- promote information exchange between SGUK management authorities of federal, regional and institutional levels;
- perform scientific, guidance, software and hardware developments to establish, operate and upgrade the SGUK and to communicate relevant findings to organizations performing RM and RW accounting and control at all levels;
- ensure co-development with concerned federal executive authorities of normative documents (reference forms for accounting and control of radioactive materials and RW, methods for identifying their amounts and radionuclide contents and etc.), unified information support and compatible software for the data basis;
- ensure coordination of efforts at the federal level;
- provide sufficient amount of information to state authorities, state management authorities in the field of atomic energy use, and other executive authorities on RM and RW inventory, their transport, export and import; its amount shall be sufficient so that these authorities were able to execute their powers;
- ensure operation of information and research organizations and the center for collection and transfer of information (Central analytical center for state accounting and control of radioactive material and radioactive waste) to ensure functioning of the system at federal level;
- cooperation in the matter of RM and RW accounting and control with other countries under international agreements and programs (projects).

Rostekhnadzor supervises the performance of the system, it also licenses relevant types of activities, exercises control over compliance with the established norms and rules covering RM and RW management.

E.3. State regulation of safety in the field of atomic energy use (Article 20)

Article 20. Regulatory Authorities

20-1 Each Contracting Party shall establish or designate a regulatory authority entrusted with the implementation of the legislative and regulatory framework referred to in Article 19, and provided with adequate authority, competence and financial and human resources to fulfill the responsibilities assigned to it.

20-2 Each Contracting Party, in accordance with its legislative and regulatory framework, shall take the appropriate steps to ensure the effective independence of the regulatory functions from other functions in the cases when organizations are involved in both spent fuel or radioactive waste management and in their regulation.

E.3.1. Regulatory authorities (Article 20.1)

The Federal Law «On the Use of Atomic Energy» stipulates that state regulation of safety in the field of atomic energy provides for efforts of federal executive authorities to manage the following activities: development, approval and implementation of norms and rules in the field of atomic energy use, issuance of permits (licenses) authorizing particular activities in the field of atomic energy use, accreditation, standardization, compliance assessment, safety supervision, expert examination and inspection, control over development and implementation of measures for the protection of NF personnel, public and the environment in the event of an accident due to atomic energy use.

Article 24 of the law stipulates that state regulation of safety in the field of atomic energy use shall be carried out by federal executive authorities — state safety regulatory authorities.

In accordance with the Government resolution № 412 of July 3, 2006, the following authorities shall exercise state regulation of safety in the Russian Federation:

- Federal Environmental, Industrial and Nuclear Supervision Service (Rostekhnadzor);
- Ministry of the Russian Federation for Civil Defense, Emergencies and Elimination of Consequences of Natural Disasters (EMERCOM of Russia);
- Ministry of Natural Resources and the Environment of the Russian Federation (Minprirody);
- Federal Service for Supervision of Natural Resources (Rosprirodnadzor);
- Federal Supervisory Service for Consumers Rights and Health Protection (Rospotrebnadzor)
- Federal Medical and Biological Agency (FMBA of Russia).

In 2007, following the adoption of the Federal Law «On the State Atomic Energy Corporation «Rosatom», amendments were introduced to Article 23 of the Federal Law «On the Use of Atomic Energy», according to which state regulation of safety in the field of atomic energy use also involves efforts of Rosatom on promoting the development of norms and rules in the field of atomic energy use, accreditation, standardization, compliance assessment, control over development and implementation of measures to protect NF personnel, public and the environment in the event of an accident due to atomic energy use.

Powers of state safety regulatory authorities are specified in Article 25 of the Federal Law «On the Use of Atomic Energy».

Competence, structure and human resources of state safety regulatory authorities are specified in relevant resolutions of the Government of the Russian Federation.

The State Duma of the Russian Federation and the Federation Council of the Russian Federation approve allocation of funds to state safety regulatory authorities under the annual approval of the national budget.

In 2011, amendment to the Federal Law «On the Use of Atomic Energy» introduced the following principles of legal regulation: delineation of responsibilities and functions of state safety regulatory authorities, state management authorities in the field of atomic energy use, authorized management agency for atomic energy use and the organizations performing activities in this field.

Another amendment stipulates that measures implemented by state safety regulatory authorities under their scope of duties shall be appropriate to the potential hazard associated with NF and activities in the field of atomic energy use.

Discussed below are the efforts by Rostekhnadzor in the reporting period to establish and develop collaborative relationships with FMBA and Rospotrebnadzor in the matter of state regulation of safety in the field of atomic energy use.

Rostekhnadzor and FMBA signed an Agreement «On Cooperation in the Field of State Regulation of Radiation Safety in the Field of Atomic Energy Use» of December 28, 2010; and the joint decree № 52/169 of March 19, 2012 «On the Approval of the Administrative Regulation for the Cooperation of the Federal Medical and Biological Agency and the Federal Environmental, Industrial and Nuclear Supervision Service When Performing Joint Scheduled Audits of Legal Entities and Individual Entrepreneurs» has been approved.

These two instruments are aimed at:

- improvement of activities to ensure radiation safety of personnel working at radiation hazardous facilities of the State Corporation «Rosatom»; public residing in the areas supervised by the abovementioned organizations and the protection of the environment;
- elimination of duplications of functions;
- improvement of collaborative relationships in the following areas: licensing activities in the field of atomic energy use, joint inspections at radiation hazardous facilities; state accounting and control of radioactive material and RW, evaluations and expert reviews in the field of radiation safety; establishing regulatory standards for acceptable limits of releases and discharges of radioactive substances to the atmosphere and water bodies.

Joint Decree of Rostekhnadzor and Rospotrebnadzor № 315-588 «On Establishing Administrative Regulation for the Cooperation of the Federal Environmental, Industrial and Nuclear Supervision Service and the Federal Supervisory Service for Consumers Rights and Health Protection Concerning Federal State Sanitary and Epidemiological Supervision of Construction Activities» of May 30, 2012 has been approved.

The document provide for cooperation on the following matters:

- provision of information on regulations and guideline documents discussing the arrangements for and implementation of federal state supervision;
- identification of goals and scope of inspections and the relevant timeframes;
- provision of information on the findings of performed inspections, compliance with the legislation of the Russian Federation concerning the defined types of activities, the effectiveness of federal state supervision;
- making proposals on the improvement of the legislation of the Russian Federation in part of management activities associated with federal state supervision and supervision itself.

Administrative regulation on collaboration of EMERCOM of Russia is currently being drafted. «Agreement on Cooperation between the Ministry of the Russian Federation for Civil Defense, Emergencies and Elimination of Consequences of Natural Disasters and the Federal Environmental, Industrial and Nuclear Supervision Service Concerning the Regulation of NPP Safety» № 2-4-38-2/КП-32/203 of February 28, 2008 shall regulate relations between EMERCOM and Rostekhnadzor. Feedback from the implementation of agreements concluded with Rospotrebnadzor and FMBA was evaluated and relied on in the development of this administrative regulation.

Federal Environmental, Industrial and Nuclear Supervision Service (Rostekhnadzor) is a federal executive authority exercising functions of a state safety regulatory authority in the field of atomic energy use and a regulatory authority pursuant to provisions of the Convention on nuclear safety and the Joint Convention on safety of SNF and RW management. Furthermore, according to the Amendment to the Convention on the Physical Protection of Nuclear Material, Rostekhnadzor is also a competent authority of the Russian Federation. Relevant amendments have been introduced to the «Regulation on the Federal Environmental, Industrial and Nuclear Supervision Service» № 401 of July 30, 2004 (hereinafter Regulation) following the adoption of two resolutions of the Government of the Russian Federation — № 717 of September 13, 2010 and № 1037 of October 11, 2012.

According to the Regulation, Rostekhnadzor is responsible for the following activities in the field of atomic energy use:

- moves drafts of federal laws, regulations of the President of the Russian Federation and the Government of the Russian Federation to the Government of the Russian Federation;
- on its own initiative approves the following by-laws:
 - ◆ federal norms and rules in the field of atomic energy use in accordance with the legislation of the Russian Federation;
 - ◆ safety guides in the field of atomic energy use (within its competence)²;
 - ◆ procedure for issuing work permits to personnel involved in the field of atomic energy use and working at NF;
 - ◆ requirements to the structure and the contents of documents demonstrating safety of NI, RS, SF and (or) activities in the field of atomic energy use, required for licensing of relevant activities; as well as the review procedure for the above-mentioned documents;
 - ◆ procedure for arranging for and performing supervision over the state system for accounting and control of nuclear material;
 - ◆ procedure for compilation and running files during the state supervision over construction activities, as well as the requirements regarding the documents that are included in such files;
 - ◆ codes of rules in accordance with the legislation of the Russian Federation concerning technical regulation;
 - ◆ methodologies for the development and introduction of regulatory standards specifying acceptable limits of releases and discharges of radioactive substances into the atmosphere and water bodies;
 - ◆ procedure for issuing permits for releases and discharges of radioactive substances and their reference forms;
 - ◆ specific aspects of compliance assessments performed for products falling under the safety requirements valid in the field of atomic energy use, as well as the relevant design processes (involving research activities), production, construction, installation, setup, operation,

² *Introduced by the resolution of Government of the Russian Federation № 1037 «On Amending the Regulation on the Federal Environmental, Industrial and Nuclear Supervision Service» of October 11, 2012*

storage, transportation, sales, recycling and disposal; making decisions on inclusion of certain documents into the consolidated listing of standardization documents:

- national standards;
 - industry-wide standards prior to their cancellation due to the adoption of relevant national standards (prestandards);
 - international and regional standards, regional codes of rules, foreign standards and codes of rules;
 - national standards for restricted use.
- ◆ procedure that operating organizations shall follow when they submit documents involving the results of safety assessments performed for nuclear installations and NM, RM and RW storage facilities, and demonstrating their operational safety to the authorized state safety authority in the field of atomic energy use, as well as the requirements to the contents and structure of such documents³;
 - ◆ procedure for expert reviews of safety (evaluation of safety cases) for nuclear facilities and (or) certain types of activities in the field of atomic energy use⁴;
- exercises control and supervision over:
 - ◆ the compliance with norms and rules in the field of atomic energy use, conditions of licenses (permits) authorizing certain activities in the field of atomic energy use;
 - ◆ nuclear, radiation, occupational and fire safety (at nuclear facilities);
 - ◆ physical protection of NI, RS, SF, NM and RM, as well as of systems for the integrated state accounting and control of nuclear and radioactive material and radioactive waste;
 - ◆ the compliance with the international obligations of the Russian Federation concerning the safety in the field of atomic energy use;
 - ◆ the compliance with the legal requirements of the Russian Federation in the field of RW management (within Rostekhnadzor's competence);
 - ◆ on-schedule return of irradiated nuclear reactor fuel assemblies, as well as the reprocessing by-products to the country of origin that entered into international agreement with the Russian Federation;
 - ◆ the compliance with the requirements of technical regulations covering relevant types of activities;
 - licenses activities in the field of atomic energy use in accordance with the legislation of the Russian Federation;
 - arranges for the review of the set of documents demonstrating the safety of a nuclear facility and (or) licensed activity; the licensing authority verifies the data presented in the submitted documents via an expert safety assessment (safety case review) of a nuclear facility and (or) licensed activity;
 - issues the following types of permits:
 - ◆ permits for individuals (personnel of NF) to carry out certain activities in the field of atomic energy use;
 - ◆ permits for releases and discharges of radioactive substances into the environment;
 - establishes standards for maximum allowable limits of discharges and releases of radioactive substances to the atmosphere and water bodies;
 - performs inspections of certain types of activities carried out by legal entities and individuals on their compliance with legal requirements of the Russian Federation, by-laws, norms and rules;

³ Introduced by the resolution of the Government of the Russian Federation № 1037 «On Amending the Regulation on the Federal Environmental, Industrial and Nuclear Supervision Service» of October 11, 2012

⁴ Introduced by the resolution of the Government of the Russian Federation № 1037 «On Amending the Regulation on the Federal Environmental, Industrial and Nuclear Supervision Service» of October 11, 2012

- harmonizes:
 - ◆ managers, specialists and workforce qualification reference guides containing job specifications for employees granted with permits to perform certain activities in the field of atomic energy use;
 - ◆ lists of isotope products requiring special import and export licenses;
- ensures functioning of the system for control over NF in the event of an accident and provides all necessary administrative arrangements;
- is involved in certification of activities in the field of atomic energy use;
- establishes, develops and maintains the operation of an automated system of information and analytical service, inter alia the unified state automated system for radiation control on the territory of the Russian Federation;
- issues statements on compliance of constructed, reconstructed or refurbished capital facilities with the requirements of technical regulations and design documentation.

Rostekhnadzor's quality assurance system meets the requirements of the «Regulation on the Quality Management System of the Federal Environmental, Industrial and Nuclear Supervision Service Covering State Regulation of Safety in the Field of Atomic Energy Use» (approved by the Rostekhnadzor's decree №80 of February 3, 2012). The system enables Rostekhnadzor to perform its functions of a state safety regulatory authority in the field of atomic energy use qualitatively and effectively. The introduced quality assurance system is in line with the provisions of international ISO standards, safety requirements of the IAEA GS-R-3, reflects the present administrative structure and provides for clear description of processes associated with the expert review of regulatory activities, procedure for inspection and evaluation of registered events.

Rostekhnadzor's central office and its interregional territorial authorities supervising nuclear and radiation safety execute the functions entrusted to the Federal Environmental, Industrial and Nuclear Supervision Service.

Rostekhnadzor's central office and its interregional territorial authorities supervising nuclear and radiation are staffed with personnel having required qualifications that meet the requirements of the Federal Law № 79-FZ «On State Civil Service» of July 27, 2004 and the decree of the President of the Russian Federation № 1131 of September 27, 2005 and other relevant regulations.

Provisions concerning occupational training program for Rostekhnadzor's staff are specified in RD-20-06-2008 «Regulation on Occupational Training Program for the Federal Environmental, Industrial and Nuclear Supervision Service».

The existing system of advanced training provides for scheduled trainings to maintain the competence of Rostekhnadzor's public officers. The system involves:

- supplementary vocational training programs, advanced training;
- educational institutions assuring the required contents and quality of supplementary vocational training programs;
- Rostekhnadzor's subdivisions which are responsible for managing the advanced training system.

Every year, Rostekhnadzor publishes its progress reports involving information on control, supervisory, licensing and permitting activities, safety evaluations and assessments of emergency vulnerability of NFs and enterprises supervised by Rostekhnadzor, including analysis of adverse man-induced impacts on the environment and findings of expert reviews and evaluations. These reports also contain information on operational disorders at NF supervised by Rostekhnadzor including RW and SNF management facilities. The reports are

available to the general public at Rostekhnadzor's website and in quarterly issued research magazine «Nuclear and Radiation Safety» (published since 1998).

Rostekhnadzor's public relations office is involved in cooperation with mass media promoting unbiased coverage of the existing issues in the field of industrial and nuclear supervision. Press releases communicating information on Rostekhnadzor's activities are published on its website (www.gosnadzor.ru) updated on a weekly basis. All applications filed by mass media are reviewed within the time specified by the Russian legislation. In addition to this, Rostekhnadzor continuously cooperates with journalists providing its comments to news agencies, print media, radio and television. A pool of specialized journalists was established to cover the activities performed by Rostekhnadzor officials and its management team. Monitoring of publications is carried out on a daily basis.

In 2009, a full-scale IAEA mission on integrated review of regulatory authorities (IRRS) took place under the agreement between the IAEA and the Government of the Russian Federation. During the mission IAEA experts evaluated the performance efficiency of state safety regulatory authorities, including Rostekhnadzor, involved in the field of atomic energy use and compliance with the requirements of international conventions and obligations assumed by the Government of Russian Federation. Following the IRRS findings, Rostekhnadzor developed and approved the «Action Plan for the Implementation of Recommendations and Proposals of the IAEA Mission» specifying particular steps to improve the state regulating system in the field of atomic energy use. According to the schedule, these arrangements were due to be completed in 2011-2012.

In 2013, a follow up IRRS mission was performed in Russia following another application of the Government of the Russian Federation. The goal of the follow-up review was to evaluate the national NRS regulatory system and the outcomes of measures taken in response to recommendations and proposals of the IRRS-2009 mission.

The follow-up mission for the evaluation of performance efficiency of the Federal Environmental, Industrial and Nuclear Supervision Service (Rostekhnadzor) being the authorized state safety regulatory authority took place in Moscow from November 11th to 19th, 2013. It involved an analysis of accomplishments on carrying out IRRS-2009 recommendations, as well as an assessment of Rostekhnadzor's activities in the following areas:

- emergency preparedness and response;
- lessons learned by regulators from the «Fukushima-1» accident.

The follow-up IAEA mission enabled to develop a number of recommendations and proposals on further improvement of regulatory activities performed by Rostekhnadzor and to identify the best Russian practices that may be recommended to safety regulatory authorities in other IAEA member countries involved in the field of atomic energy use.

During the review, the Russian legal framework regulating safety was compared against the IAEA safety standards acting as the international safety standard. The mission was also aimed to promote an exchange of information and experience between the IAEA and Russian experts in the areas falling under the scope of the IRRS mission.

The IRRS peer review group came up with a conclusion that the IRRS-2009 recommendations and proposals had been incorporated throughout the integrated action plan. Significant advances had been made in a number of areas, whereas the implementation of the action plan enabled much advancement.

IRRS experts noted a number of positive practices and provided recommendations and proposals covering the areas where further advancements are necessary or desirable in order to

increase the efficiency of regulatory functions and bring them into conformity with the IAEA safety standards.

The final report summarizing the findings of the IAEA follow-up mission was published in May 2014. The report sets forth the expert findings and is considered to be an official paper that the IAEA submitted to the Government of the Russian Federation. The report was uploaded to the Rostechnadzor's website.

Rostechnadzor will develop another plan of actions addressing the findings of the report and thus enabling the implementation of proposals and recommendations of the follow-up mission aimed at further improvement of regulatory efforts in the field of atomic energy use in Russia.

There are two NRS technical support organizations being under the authority of the Rostechnadzor and providing their scientific and technical support in the field of NRS regulation, namely, the Federal state-funded institution «Scientific and Engineering Center for Nuclear and Radiation Safety» (FSFI «SEC NRS») (www.secnrs.ru) and Federal state unitary enterprise «VO «Safety»» (www.vosafety.ru).

Pursuant to the Article 37.1 of the Federal Law «On the Use of Atomic Energy», the resolution of the Government of the Russian Federation №387 «On the Approval of the Regulation on Assigning a Legal Entity to a Scientific and Technical Support Organization Providing its Services to the State Safety Regulatory Authority in the Field of Atomic Energy Use» of April 30, 2013 was enacted. A legal entity is considered to be a technical support organization if the following criteria are met:

- it is licensed to carry out safety expert reviews (safety case reviews) for nuclear facilities and (or) certain types of activities in the field of atomic energy use;
- performs research and development to provide scientific and technical support for state regulation of safety in the field of atomic energy use;
- performs research, testing, evaluations and (or) other safety assessments of nuclear facilities and (or) relevant types of activities.

At present time, there are two institutions that are the technical support organizations of the state safety regulatory authority involved in the field of atomic energy use, namely, FSFI «SEC NRS» and «VO «Safety»» (for more details see Section E.3.1 of the Report).

Pursuant to the abovementioned regulations, Rostechnadzor adopted the decision of June 10, 2013, according to which FSFI «SEC NRS» has become Rostechnadzor's technical support organization.

Technical support organization efforts are aimed at:

- providing scientific and technical support to the system of state regulation of safety in the field of atomic energy use, involving R&D and all relevant management activities, different types of expert reviews including safety evaluations;
- developing and upgrading the legal and regulatory framework in the field of atomic energy use and performing other activities to improve the system of state regulation of safety in the field of atomic energy use.

In order to provide effective development of scientific and technical NRS support, FSFI «SEC NRS» is actively engaged in international cooperation with foreign organizations, including foreign technical support organizations. In 2012, FSFI «SEC NRS» became an allied member of the European Technical Safety Organizations Network (ETSON).

Development and improvement of the system enabling to inform the public through mass media and other information channels, authorized by federal executive bodies, on emergencies at nuclear facilities, including those that has already happened and the projected ones, is considered to be a most important challenge for the state NRS policy.

In accordance with the resolution the Government of the Russian Federation № 322 of June 30, 2004, **Federal Supervisory Service for Consumers Rights and Health Protection** (Rospotrebnadzor) is a federal executive authority responsible for state sanitary and epidemiological supervision over compliance with sanitary legislation.

Rospotrebnadzor is a federal executive authority performing the state functions related to the development and implementation of the state policy and the legal and regulatory framework in the field of consumers rights protection, development and approval of state sanitary and epidemiological rules and hygienic standards, as well as arranging for and exercising federal state sanitary and epidemiological supervision and federal state supervision for consumers rights protection.

Rospotrebnadzor implements its functions via its territorial authorities that are present in all constituent entities, regions and large settlements of the Russian Federation.

The following efforts of Rospotrebnadzor are aimed to ensure radiation safety of the population of the Russian Federation:

- development and approval of sanitary rules covering radiation safety of the population and personnel under all types of management of radiation sources, as well as guidelines explaining how the requirements of sanitary rules can be met in practice;
- licensing activities associated with management of generating sources of ionizing radiation;
- compliance assessment of conditions, under which man-made sources of ionizing radiation are managed, with the provisions of sanitary rules the findings of which shall be incorporated to relevant sanitary and epidemiologic statements that are required to obtain work permits;
- exercises federal state sanitary and epidemiological supervision over radiation safety of population covering all uses of ionizing radiation sources and remedial efforts at radioactively contaminated territories.

Federal Medical and Biological Agency (FMBA of Russia) was established by the decree of the President of the Russian Federation № 1304 «On the Federal Medical and Biological Agency» of October 11, 2004 with the aim to develop a system of specialized sanitary and epidemiological supervision and to provide medical and sanitary service support to the employees working in certain industrial sectors that involve particularly hazardous working environment.

Authorities of the Federal medical and biological agency are set forth in the resolution of the Government of the Russian Federation № 206 of April 11, 2005, according to which one of the FMBA's priority tasks involves control and supervision in the field of sanitary and epidemiologic welfare of employees working at enterprises with particularly hazardous working environment and the population residing in particular territories.

State regulation of safety in the field of atomic energy use is considered to be a fundamental NRS objective of FMBA. FMBA executes its authorities through the state system of sanitary and epidemiologic standards — FMBA's subordinate scientific and research organizations develop sanitary rules and hygienic standards that are binding for all operating organizations, whereas FMBA elaborates and approves them.

FMBA's research institutions provide scientific support for activities involving radiation hazards, their medical and hygienic maintenance, and perform expert reviews of relevant design documentation.

FMBA performs its state sanitary and epidemiologic supervisory (control) functions on its own and through its territorial authorities (interregional and regional departments).

Radiation control over working environment at nuclear facilities, including RW and SNF management facilities, and over radiation safety of the population residing in certain territories is performed by industrial sanitary laboratories (radiation hygienic laborato-

ries) and internal dosimetry laboratories being part of FMBA's centers for hygiene and epidemiology.

According to the Presidential decree of the Russian Federation № 868 of July, 11, 2004, **Ministry of the Russian Federation for Civil Defense, Emergencies and Elimination of Consequences of Natural Disasters** (EMERCOM of Russia) is responsible for state regulation of fire safety in the field of atomic energy use.

The following functions are assigned to EMERCOM under the integrated supervision:

- federal state supervision in accordance with the procedure established by the resolution of the Government of the Russian Federation № 290 «On Federal State Fire Supervision» of April 12, 2004;
- state supervision over the protection of public and territories against natural and man-induced emergencies in accordance with the procedure established by the resolution of the Government of the Russian Federation № 712 «On the Approval of the Regulation on the State Supervision over the Protection of Public and Territories Against Natural and Man-Induced Emergencies Executed by the Ministry of the Russian Federation for Civil Defense, Emergencies and Elimination of Consequences of Natural Disasters» of January 1, 2005;
- state supervision of civil defense in accordance with the procedure established by the resolution of the Government of the Russian Federation № 305 «On the Approval of the Regulation on the State Supervision in the Civil Defense» of May 21, 2007.

Technical regulation of fire safety at NPPs is considered to be an important task for EMERCOM under the Federal Law №184-FZ «On Technical Regulation» of December 27, 2002. The Federal Law № 117-FZ «On Amendments to the Federal Law «Technical Regulation on Fire Safety Requirements» of July 10, 2012 introduce certain amendments extending the provisions of the Federal Law №123-FZ «Technical Regulation on Fire Safety Requirements» of July 22, 2008 on nuclear power plants.

A code of rules «Nuclear Power Plants. Fire Safety Requirements», developed by EMERCOM, provide a background for the implementation of provisions of the Federal Law №123-FZ «Technical Regulation on Fire Safety Requirements» of July 22, 2008 and specifies relevant requirements for all stages of NPP life cycle. Amendments to this paper are now being developed based on the feedback from its application by the EMERCOM.

In accordance with the resolution of the Government of the Russian Federation N° 404 of May 28, 2008, **Ministry of Natural Resources and the Environment of the Russian Federation** (Minprirodi of Russia) is responsible for the development of a state policy and normative and legal regulations in the following areas: research, use, recovery, and conservation of natural resources, also covering the regulation of activities associated with radiation control and monitoring.

Minprirodi of Russian is the federal executive authority authorized to set RW disposal tariffs.

In accordance with the resolution of the Government of the Russian Federation № 400 of July 30, 2004, **Federal Service for Supervision of Natural Resources** (Rosprirodnadzor) is responsible for control and supervision in the field of environmental protection (state environmental control) and state environmental expert examination.

E.3.2. Independence of safety regulatory authorities (Article 20-2)

According to the legislation of the Russian Federation and more specifically Article 24 of the Federal Law «On the Use of Atomic Energy», state safety regulatory authorities are independent from other state authorities, as well as organizations involved in atomic energy use.

Since 2010, the Government of the Russian Federation has been guiding all activities of the Federal Environmental, Industrial and Nuclear Supervision Service (decree of the President of the Russian Federation № 780 of June 23, 2010 «On the Federal Environmental, Industrial and Nuclear Supervision Service»).

The President of the Russian Federation guides all activities of the Ministry of the Russian Federation for Civil Defense, Emergencies and Elimination of Consequences of Natural Disasters (decree of the President of the Russian Federation № 645 of July 25, 2013).

The Government of the Russian Federation guides all activities of the Federal Supervisory service for Consumers Rights and Health Protection (resolution of the Government of the Russian Federation № 612 of June 19, 2012).

Ministry of Healthcare and Social Development of the Russian Federation guides all activities of the Federal Medical and Biological Agency (decree of the President of the Russian Federation № 1304 of October 11, 2004).

The Government of the Russian Federation guides all activities of the Ministry of Natural Resources and the Environment of the Russian Federation (decree of the President of the Russian Federation № 649 of May 20, 2004).

Ministry of Natural Resources and the Environment of the Russian Federation guides all activities of the Federal Service for Supervision of Natural Resources (decree of the President of the Russian Federation № 649 of May 20, 2004).

In accordance with the Federal Law «On the Use of Atomic Energy», state safety regulatory authorities are funded through the federal budget.

In 2011, an amendment was introduced to the Federal Law «On the Use of Atomic Energy» according to which state safety regulatory authorities shall be independent in making decisions and executing their powers from management authorities in the field of atomic energy use, authorized management authority in the field of atomic energy use and organizations involved in the field of atomic energy use.

Discussed below are the steps that enable effective independence of regulatory and management authorities involved in the field of atomic energy use:

- responsibilities and functions of management and regulatory authorities are clearly delineated at the legislative level;
- the Government of the Russian Federation sets the required staff size for the central office and the territorial regulatory authorities;
- expenses of safety regulatory authorities are covered by the federal budget;
- open and transparent procedures for the development of regulations (requirements), licensing all types of activities in the field of atomic energy use, state supervision over the safety in the field of atomic energy use;
- enforcement system applied to organizations involved in SNF and RW management and applicability of administrative sanctions that can be imposed if any breaches of legal requirements and provisions of other safety regulations are revealed.

Section F. Other general safety provisions

F.1. Responsibility of the license holder (Article 21)

Article 21. Responsibility of the Licence Holder

21-1 Each Contracting Party shall ensure that prime responsibility for the safety of spent fuel or radioactive waste management rests with the holder of the relevant licence and shall take the appropriate steps to ensure that each such licence holder meets its responsibility.

21-2 If there is no such licence holder or other responsible party, the responsibility rests with the Contracting Party which has jurisdiction over the spent fuel or over the radioactive waste.

The Federal Law «On the Use of Atomic Energy» (Article 34) stipulates that the operating organization, i.e. the license holder, is fully responsible for the safety of nuclear facilities, as well as for the proper management of SNF, RW and other radioactive material.

Operating organization is an organization established in accordance with the legislation of the Russian Federation and recognized by the relevant management authority in the field of atomic energy use according to the procedure and on conditions established by the Government of the Russian Federation as capable of operating a nuclear installation, radiation source or storage facility and to perform siting, design, construction, operation and decommissioning of a nuclear installation, radiation source or storage facility, as well as to manage nuclear and radioactive material using its own resources or subcontracting other organizations.

Management authority in the field of atomic energy use is authorized to recognize an organization as the operating organization, and state safety regulatory authorities in the field of atomic energy use are responsible for its licensing.

According to Article 34, the operating organization shall have adequate authority, financial and material resources to fulfill the responsibilities assigned to it.

According to Article 35, the operating organization shall ensure:

- that NI, RS and SF are used only for the intended purposes;
- relevant administrative arrangements and coordination of efforts to develop and implement quality assurance programs at all stages of development, operation and decommissioning of NI, RS and SF;
- development and implementation of measures to prevent accidents associated with NI, RS and SF and mitigation of adverse impacts on NI, RS and SF employees, public and the environment;
- enforcement of rights of the employees, involved at nuclear facilities, for social and economic benefits;
- registration of individual doses received by NF employees;
- development and implementation (within its competence) of measures to protect the employees and public in the event of an accident at NI, RS and SF;
- accounting and control of nuclear and radioactive material;
- physical protection of NI, RS, SF, NM and RM;
- development and implementation of fire safety measures;
- radiation monitoring in the surveillance zones and sanitary-protection zones (controlled areas);
- recruitment, training and maintaining competences of NI, RS and SF employees, and establishment of good social environment and all proper conveniences at work places;
- communication of information concerning radiation environment in controlled areas and surveillance zones to the public;
- exercising other authorities in accordance with relevant regulations.

The license holder bears full responsibility for:

- nuclear and radiation safety;
- development and implementation of measures to improve the safety of SNF and RW management;
- radiological protection of personnel, public and the environment;
- financial coverage of civil liability for nuclear damage.

Article 26 of the Federal Law «On the Use of Atomic Energy» stipulates that the operating organization shall be licensed for every type of activity that it performs. The license shall be issued by a state safety regulatory authority and shall contain documented conditions that the operating organization has to follow when performing activities in the field of atomic energy use.

The following institutions are responsible for licensing activities in the field of atomic energy use:

- Rostekhnadzor (resolution of the Government of the Russian Federation № 280 «On the Approval of the Regulation on Licensing Activities in the Field of Atomic Energy Use» of June 29, 2013);
- Rospotrebnadzor (resolution of the Government of the Russian Federation № 278 «On Licensing Activities Involving Sources of Ionizing Radiation (Generating Sources) (unless these sources are of medical application) of April 2, 2012).

According to the resolution of the Government of the Russian Federation № 280 «On the Approval of the Regulation on Licensing Activities in the Field of Atomic Energy Use» of June 29, 2013, the following aspects shall be evaluated by Rostekhnadzor during the review of a license application:

- compliance of design and engineering solutions with the provisions of federal norms and rules in the field of atomic energy use, compliance of staff qualification with the established criteria and availability of proper conditions for its maintenance at the appropriate level, as well as availability of appropriate systems for collection, storage, processing and disposal of RW and their compliance with the established requirements;
- comprehensive technical and managerial arrangements ensuring nuclear and radiation safety when performing the declared activity;
- proper conditions for storage and accounting and control of nuclear and radioactive material, physical protection of nuclear installations, radiation sources, NM and RM storage facilities, action plans for the protection of NF employees and public in the event of an accident and preparedness to their implementation, availability of a quality assurance program and required engineering and technical support of the declared activity;
- ability of the applicant to ensure safety of the declared activity, nuclear facility and conducted operations, as well as the adequate quality of performed operations and delivered services meeting the provisions of federal norms and rules in the field of atomic energy use;
- ability of the applicant to ensure safe termination of the declared activity and decommissioning of the relevant nuclear facility, as well as to submit all relevant design materials.

Rostekhnadzor and Rospotrebnadzor exercise state supervision over the compliance of license conditions by the license holder and if they are breached may impose sanctions in accordance with the legislation of the Russian Federation.

If the operating license (permit) is revoked, the operating organizations shall remain responsible for NI, RS and SF safety prior to their transfer to another operating organization or acquisition of a new license (permit). If the operating organization is unable to ensure safety of the abovementioned facilities, the relevant management authority in the field of atomic energy use shall become responsible for safety assurance and all relevant management activities (Article 35 of the Federal Law «On the Use of Atomic Energy»).

Article 14 of the Federal Law «On the Use of Atomic Energy» stipulates that RW management activities can be executed by organizations granted with appropriate permits (licenses) authorizing such activities in the field of atomic energy use. According to Article 21 of the law, organizations generating RW are responsible for the safety of RW management prior to its transfer to the national operator.

The National Operator for RW management (Article 20) shall ensure safe management of all RW received for disposal, as well as nuclear, radiation, occupational and fire safety, protection of the environment, compliance with the regulatory provisions concerning sanitary and epidemiological welfare of the population during operation, closure and post-closure of RW disposal facilities, and to perform radiation control at RW disposal sites, including periodic post-closure radiation monitoring.

Basic sanitary rules OSPORB-99/2010 stipulate that all management activities involving sources of ionizing radiation including radiation monitoring are allowed only if there is an appropriate sanitary and epidemiologic statement claiming that the work environment meets relevant sanitary rules established for operations performed with ionizing sources. Such statements are issued by authorities exercising state sanitary and epidemiologic supervision on the application of a legal entity or an individual.

F.2. Human and financial resources (Article 22)

Article 22. Human and Financial Resources

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

- i) qualified staff are available as needed for safety-related activities during the operating lifetime of a spent fuel and a radioactive waste management facility;*
- ii) adequate financial resources are available to support the safety of facilities for spent fuel and radioactive waste management during their operating lifetime and for decommissioning;*
- iii) financial provision is made which will enable the appropriate institutional controls and monitoring arrangements to be continued for the period deemed necessary following the closure of a disposal facility.*

F.2.1. Human resources (Article 22 (i))

In accordance with Article 35 of the Federal Law «On the Use of Atomic Energy», the operating organization shall recruit, train and maintain competences of NI, RS and SF employees and ensure good social environment and all proper conveniences at work places.

According to the provisions of federal norms and rules in the field of atomic energy use (NP-001-97, NP-033-011, NP-022-2000, NP-016-05, NP-038-11), the operating organization involved in SNF, RW or RM management shall provide:

- adequate staff number having the required competences and appropriate permits for self-guided work prior to NI, RS or SF commissioning;
- recruitment, training and maintaining the required competence of NI, RS or SF employees;
- an adequate recruitment and training system to achieve, control and maintain employees' competences as required for the safe NI, RS and SF operation;
- arrangement of a permit-to-work system enabling the employees with required competences to perform the permitted activities;
- regular emergency drills enabling to work out employees response in case of operational disorders, including accidents, and accounting of «lessons» learned from previous accidents and faults;
- safety culture development.

Certain activities in the field of atomic energy use require special permits issued to NF employees by state safety regulatory authorities (Article 27 of the Federal Law «On the Use of Atomic Energy»). The list of specialists, for whom certain working permits are required depending on the type of activities they perform in the field of atomic energy use, and relevant qualification requirements are established by the Government of the Russian Federation.

According to the conditions of licenses issued by Rostekhnadzor, the operating organization undertakes a number of obligations, in particular:

- to ensure that the permitted activity is carried out only by employees having adequate competences and work experience, as well as all relevant permits;
- to maintain the staff number and the competence of personnel responsible for safety assurance;
- availability of established procedures enabling to monitor any changes in organizational structure or resources of operating organizations that are likely to affect the safety of NI, RS, SF or of the permitted activities;
- to arrange for training, assessments, re-training and advanced training;
- to enable the acquisition of Rostekhnadzor permits authorizing to perform certain activities in accordance with the List of positions for the atomic energy use sector (resolution of the Government of the Russian Federation № 240 of March 3, 1997) (qualification requirements applied to employees obtaining permits in accordance with the List of Positions are specified in industry-wide Managers, specialists and workforce qualification reference guide approved by Rostekhnadzor and Minzdravsocrazvitiya of Russia).

Rostekhnadzor's central office and its interregional authorities involve special commissions that were established for the review of applications and issuance of permits to employees of operating organizations authorizing them to carry out certain activities in the field of atomic energy use under the procedures established by Administrative regulations authorizing the Federal environmental, industrial and nuclear supervision service to grant such work permits (Rostekhnadzor's decree № 721 of December 21, 2011).

Rostekhnadzor has developed Administrative regulations establishing the procedure for granting work permits in the field of atomic energy use to employees involved in relevant activities (approved by the Rostekhnadzor's decree № 721 of December 21, 2011). This document also sets forth the requirements for arranging supervision over the adequate level of competence of employees involved in NI or SF operation.

Rostekhnadzor's inspectors supervising the permitted activities of operating organizations arrange for and perform regular reviews related to training and admission to work of employees involved in nuclear and radiation hazardous operations. They are also engaged in personnel review boards established at such enterprises.

If the operating organization subcontracts third-party organizations to perform safety related activities, it shall be responsible for the competence and the experience of the third-party employees.

Furthermore, safety culture development shall be viewed as a component of all programs related to training, issuance of self-guided work permits and maintenance of employees (personnel) competence.

Requirements to the safety culture development are specified in a number of federal norms and rules (NP-001-97, NP-16-05, NP-038-11, NP-033-011 and etc.).

The main initiatives to ensure safety culture development are as follows:

- the operating organization shall specify and present its safety policy applied in respect of facilities and organizations involved in activities and (or) providing their services to the op-

erating organization. The policy shall promote good working climate and proper conditions enabling the personnel to perform their safety-related duties. The policy shall clearly define goals of the organization and its social commitment to safety assurance;

- arrangements for distinct distribution of responsibilities between different departments at facilities and in organizations performing safety-related activities for and (or) providing their safety-related services to the operating organization;
- evaluation of resources required to ensure safety (financial, human, energy etc.);
- regular checks and monitoring of safety-important activities, studying and applying practices associated with operational safety assurance.

The State Corporation «Rosatom» is the state management authority in the field of atomic energy use in the Russian Federation that is most actively involved in various areas related to the abovementioned activities, functions and responsibilities.

An important constituent of Rosatom's activities is to provide adequate support enabling to establish a multilevel system for safety training, advanced training and certification of personnel involved in the atomic energy and nuclear industry sectors.

All specialized educational organizations training young specialists for the nuclear sector are parts of «The Consortium of Supporting Higher Educational Institutions of the State Corporation «Rosatom»». The consortium, involving 14 specialized universities, covers 70-80% of the nuclear industry's general demand in young professionals.

National Research Nuclear University «MEPhI» (NRNU «MEPhI»), the main higher education facility of the State Corporation «Rosatom», has an extensive network of branches located in regions where operating organizations of the sector are present. The university is formed of 11 higher educational institutions and 9 institutions of secondary vocational education in 20 cities of 14 constituent territories of the Russian Federation.

MEPhI's higher and secondary vocational educational programs cover correspondingly 60 and 45 major disciplines and professions needed in the nuclear sector. Development of target admission to higher education institutions is now considered to be one of the most important ways of providing staff support to organizations of the sector. Thus, in 2012, the number of students trained under such target programs at the request of atomic energy enterprises amounted to more than 2 100; some 300 of them were trained at the organizations' own expense.

NRNU «MEPhI» educational programs involve multi-level trainings — pre-university profession-oriented tutorials; vocational secondary education programs; undergraduate, specialist, master, postgraduate, doctoral training programs, additional education programs, refresher and advanced training courses.

Managers and experts of the sector have been trained at the sectoral advanced training institute — the Non-state Education Institution of Further Vocational Education and Training — Central Institute for Continuing Education and Training (CICE&T, Obninsk) and its branches (in Moscow and St. Petersburg).

In 2012, 97 persons from management teams of organizations operating nuclear and radiation hazardous facilities completed their NRS training and received certificates authorizing them to perform activities in the field of atomic energy use. In 2012, 5 168 employees of the State Corporation «Rosatom» completed training courses dealing with safety assurance issues (3 895 in CICE&T and 1 273 in NRNU «MEPhI»). Moreover, we believe that conferences (including the international ones), sessions, workshops and other events providing discussion of main issues of the sector and promoting exchange of experience are also important tools of advanced training.

On the whole, the industry-wide training system is capable of meeting the demand of enterprises and scientific institutions in accordance with the adopted «Strategy of Nuclear Power Development».

F.2.2. Financial resources (Article 22 (ii))

The following measures are to ensure adequate financial resources to support the safety of facilities for spent fuel and radioactive waste management during their operating lifetime and for decommissioning:

- operating organizations are required to have adequate financial, material and other resources necessary to fulfill their functions (Article 34 of the Federal Law «On the Use of Atomic Energy»);
- enterprises and organizations shall have available reserves to ensure safety of particularly hazardous nuclear and radiation productions and facilities (subparagraph 33, paragraph 1, Article 264 of the Tax Code of the Russian Federation);
- operator bears civil liability for nuclear damage (not less than 5 million USD) (the Vienna Convention on Civil Liability for Nuclear Damage of May 21, 1963 that came into effect for the Russian Federation on August 13, 2005);
- special reserve funds of the State Corporation «Rosatom» (Article 20 of the Federal Law «On the State Atomic Energy Corporation «Rosatom»);
- RW disposal costs are covered by RW generating organizations (Articles 10 and 21 of the Federal Law «On the Management of Radioactive Waste...»);
- evaluation of decommissioning costs for nuclear facilities;
- state programs ensuring nuclear and radiation safety.

Operating organizations are required to have adequate financial, material and other resources necessary to fulfill their functions

Statement on compliance with this requirement shall be made both when the organization is recognized as an operating organization and when the organization applies for an operating license authorizing it to perform certain activities in the field of atomic energy use (resolutions of the Government of the Russian Federation № 88 of February 17, 2011 and № 208 of March 29, 2013).

Enterprises and organizations shall have available reserves to ensure safety of particularly hazardous nuclear and radiation productions and facilities

These reserves of enterprises and organizations are intended to cover:

- the costs associated with nuclear, radiation, occupational and fire safety;
- the costs associated with physical protection, NM, RM and RW accounting and control;
- the costs associated with decommissioning of NPPs and other nuclear installations, radiation sources, storage facilities for nuclear and radioactive material, RW storage facilities, R&D to demonstrate and improve the safety of the abovementioned facilities;
- the costs associated with newbuilding, increased capacity, reconstruction and technical upgrading of operating production works, procurement of machines, equipment, tools, instruments, design and survey works and other capital expenditures;
- RW disposal costs.

Deductions into these reserves are associated with prime costs.

The procedure for these deductions is established according to the resolutions of the Government of the Russian Federation № 576 of September 21, 2005 and № 68 of January 30, 2002.

Civil liability for nuclear damage beard by operators of nuclear facilities

From July 13, 2005, provisions of the Vienna Convention on Civil Liability for Nuclear Damage of May 21, 1963 extends to the territory of the Russian Federation, pursuant to which:

- liability of the operator for nuclear damage caused to the third party due to a radiation accident (nuclear incident) at nuclear facilities is absolute (full and exclusive);
- operator's liability is limited to no less than USD 5 million in terms of gold on 29 April 1963;
- during the review of operating license application the operator of the nuclear facility shall provide documentary evidence of financial security covering his liability for nuclear damage (financial guarantee to cover his liability for nuclear damage). Financial security may be provided in form of civil liability insurances.

The Government of the Russian Federation shall partially cover the costs associated with losses and damage caused by radiation exposure and being under the operator's liability so far as the losses and damage caused are greater than the liability limit specified for the operating organization.

Availability of adequate financial provisions against civil liability for losses and damage caused by radiation exposure is an essential condition to acquire a Rostekhnadzor's license (parts 1 and 2, Article 56 of the Federal Law «On the Use of Atomic Energy»).

Special reserve funds of the State Corporation «Rosatom»

The Federal Law «On the State Atomic Energy Corporation «Rosatom» specifies the procedure for the establishment of adequate financial resources to ensure the safety of RW and SNF management facilities.

Special reserve funds may be established within the State Corporation «Rosatom» to ensure safety of RW and SNF management facilities during their operating lifetime and for decommissioning:

- fund covering the costs associated with the steps to ensure nuclear, radiation, occupational and fire safety, maintenance and outfitting of emergency rescue teams, and relevant remunerations for activities (services) associated with emergency prevention and response;
- fund covering the costs associated with physical protection, NM, RM and RW accounting and control;
- fund covering the costs associated with decommissioning of NI, RS and SF, SNF management, R&D to demonstrate and improve the NI, RS and SF safety.
- fund covering the costs associated with initiatives aimed to upgrade organizations being part of the Russian nuclear power generation complex, development of nuclear sciences and technologies, performance of design and survey activities and implementation of other investment projects;
- the RW disposal fund.

Rosatom's special funds are established through contributions of enterprises and organizations operating particularly hazardous nuclear and radiation productions and facilities.

RW disposal costs covered by RW generators

This measure consists in ensuring financial provision for RW management activities, including RW disposal, through the funds of organizations generating such RW (Article 10 of the Federal Law «On the Management of Radioactive Waste...»).

The funds intended to cover RW disposal costs are accumulated by the State Corporation «Rosatom» in a special reserve fund — the RW disposal fund.

RW disposal costs are derived on the basis of RW amounts and the relevant tariffs.

The tariffs are set as fixed-rate tariffs per 1 cubic meter of disposed radioactive waste, including the package and container volume (gross volume). RW disposal tariffs are measured in RUB/m³ (paragraph 5 of the Regulation).

Evaluation of costs associated with decommissioning of nuclear facilities is performed in keeping with the provisions of the International Financial Reporting Standards (IFRS).

For these purposes, the State Corporation «Rosatom» adopted Uniform guidelines on aggregate evaluation of NF decommissioning costs specifying the process for the preparation of input data required to calculate relevant decommissioning costs and the procedure for performing such calculations.

Similar recommendations were elaborated to calculate the costs associated with remediation of radioactively contaminated territories.

These liabilities are reevaluated on a regular basis according to several constituents. The costs associated with the implementation of back-end activities and decommissioning are re-estimated and refined. Reconfirmation of the assessed liabilities outside the scope of IFRS reporting instruments is performed by state safety regulatory authorities often with the assistance of revenue bodies.

The abovementioned approaches are applied by organizations being under the authority of the State Corporation «Rosatom»

State programs ensuring nuclear and radiation safety

Major funding of activities to ensure nuclear and radiation safety of RW and SNF management practices is performed under the FTP «NRS». A number of activities carried out under this target program were discussed in Section B.

F.2.3. Financial resources (Article 22 (iii))

Nuclear and radiation control during operation, closure and post-closure of RW disposal facilities is performed by the national operator for RW management (NO RW). Funding of these activities is carried out from the RW disposal fund established via regular fees paid by nuclear operators according to fixed RW disposal tariffs (Articles 18, 20 and 21 of the Federal Law «On the Management of Radioactive Waste...»).

On the whole, the State Corporation «Rosatom» is ultimately responsible for the safety of nuclear facilities, including the RW disposal facilities.

F.3. Quality assurance (Article 23)

Article 23. Quality Assurance

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

F.3.1. Quality assurance programs

According to Article 35 of the Federal Law «On the Use of Atomic Energy», the operating organization shall arrange for and coordinate activities associated with the development and implementation of quality assurance programs at all stages of development, operation and decommissioning of NI, RS and SF and exercise control over their implementation.

Therefore, proper performance of quality assurance programs acts as a guarantee that SNF and RW management activities and the related services provided by operating organizations

and their subcontractors at all stages of development, operation and decommissioning of facilities are of adequate quality.

Availability of a quality assurance program and of a plan for its implementation is essential to acquire a license for operations in the field of atomic energy use and to meet its conditions (Article 35 of the Federal Law «On the Use of Atomic Energy» and the Regulation on licensing activities in the field of atomic energy use approved by the resolution of the Government of the Russian Federation № 280 of March 29, 2013). Safety related issues are reviewed during Rostechnadzor inspections performed for organizations involved in the field of atomic energy use.

A number of federal norms and rules and Rostechnadzor's safety guides (NP-090-11 and RB-086-13) establish the requirements to the contents and structure of quality assurance programs. These requirements were developed on the basis of the Federal Law «On the Use of Atomic Energy» and with due regard to the IAEA safety standards: GS-R-3 «The Management System for Facilities and Activities. Safety Requirements», GS-G-3.1 «Application of the Management System for Facilities and Activities», as well as the provisions of the ISO-9000 international standards.

According to provisions of federal norms and rules, regulation of quality assurance activities intended to meet main safety criteria and safety principles established in respect of NI, RS and SF is viewed as the principle aim of the quality assurance programs applied by operating organizations and other organizations performing activities for and providing their services to the operating organization (subcontractors).

Federal norms and rules specify that the quality assurance policy shall set forth the high priority of nuclear and radiation safety, main quality assurance objectives, issues to be addressed in order to accomplish these objectives, appropriate ways of addressing these issues and relevant liabilities of the organization responsible for the development of such programs (program).

The operating organization shall perform quality assurance activities, make proper arrangements for the development of a general quality assurance program (programs), exercise control over safety assurance activities carried out by its subcontractors. All quality assurance programs shall be reviewed, at least once in 5 years, and amended if necessary.

F.3.2. Standardization and compliance assessment

In addition to the development and implementation of quality assurance programs, the quality assurance initiatives involve standardization and compliance assessment of products (operations, services), as well as of processes associated with their development (including research), production, construction, installation, setup, operation, storage, transportation, sales, disposition and disposal (paragraphs 3 and 4, Article 5 of the Federal Law «On Technical Regulation»).

Rostechnadzor is authorized to establish rules for assessing the compliance of products in accordance with the special nature of relevant activities in the field of atomic energy use (p.5.2.2.16(3) of the Rostechnadzor regulation (approved by the decree of the Government of the Russian Federation № 401 of July 30, 2004).

Currently, Regulation on particular aspects of compliance assessment of products (operations, services) that are subject to the safety requirements valid in the field of atomic energy use is being drafted. The Regulation will also involve the safety requirements to the relevant processes associated with the development (including research), production, construction, installation, setup, operation, storage, transportation, sales, disposition and disposal.

In the Russian Federation, there is a particular consolidated list of standardization documents binding upon all nuclear facilities. The documents included in this list also establish relevant requirements to the abovementioned products (operations, services) and (or) processes. The consolidated list is drawn up by the State Corporation «Rosatom» and involves state standards, codes of rules, industry wide standards, standards of organizations, international standards, regional standards, regional codes of rules, standards and codes of rules of foreign countries registered in the Federal Data Fund of Technical Regulations and Standards, as well as relevant engineering requirements.

The procedure according to which a particular standardization document can enter the consolidated list is established by the Government of the Russian Federation (Regulation concerning particular aspects of the standardization process for products (operations, services) subjected to the safety requirements in the field of atomic energy use, as well as the design (including research efforts), production, construction, installation, setup, operation, storage, transportation, dismantlement and disposal of above mentioned products, approved by the resolution of the Government of the Russian Federation № 173 of March 1, 2013).

F.4. Operational radiation protection (Article 24)

Article 24. Operational Radiation Protection

24-1 Each Contracting Party shall take the appropriate steps to ensure that during the operating lifetime of a spent fuel or radioactive waste management facility:

- i) the radiation exposure of the workers and the public caused by the facility shall be kept as low as reasonably achievable, economic and social factors being taken into account;*
- ii) no individual shall be exposed, in normal situations, to radiation doses which exceed national prescriptions for dose limitation which have due regard to internationally endorsed standards on radiation protection; and*
- iii) measures are taken to prevent unplanned and uncontrolled releases of radioactive materials into the environment.*

24-2 Each Contracting Party shall take appropriate steps to ensure that discharges shall be limited:

- i) to keep exposure to radiation as low as reasonably achievable, economic and social factors being taken into account; and*
- ii) so that no individual shall be exposed, in normal situations, to radiation doses which exceed national prescriptions for dose limitation which have due regard to internationally endorsed standards on radiation protection.*

24-3 Uncontrolled and Unplanned Releases

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

The following federal laws and regulations are the main instruments governing radiation protection of personnel, public and the environment during operation of NI, RS and SF in the Russian Federation:

- Federal Law «On the Use of Atomic Energy»;
- Federal Law «On the Radiation Safety of Population»;
- Federal Law «On the Management of Radioactive Waste...»;
- Federal Law «On the Environmental Protection»;
- Radiation Safety Standards (NRB-99/2009);
- Basic Sanitary Rules of Radiation Safety (OSPORB-99/2010);
- Sanitary Rules for Radioactive Waste Management (SPORO-2002);

- Federal norms and rules (NP-001-97, NP-033-11, NP-022-2000, NP-016-05, NP-058-04, NP-038-11 ant etc.).

These documents reflect internationally recognized principles of radiation safety consistent with the recommendations of the International Commission for Radiation Protection (ICRP) and **the IAEA Safety Standards SF-1 «Fundamental Safety Principles» (2007) and other.**

The Federal Law «On the Use of Atomic Energy» (Article 2) stipulates that the fundamental principle of legal regulation in the field of atomic energy use is to ensure safety and protection of individuals, public and the environment against radiation hazards.

The Federal Law (Article 35) stipulates that the operating organization shall develop and implement measures to maintain NI, RS and SF safety, establish specialized services (if it's necessary), exercise control over NI, RS and SF safety, provide information on safety status of NI, RS and SF to state safety regulatory authorities.

The operating organization shall ensure:

- that nuclear and radioactive materials are managed and stored safely and do not pose risk to the NF employees and public;
- that individual doses received by NF personnel are registered;
- that radiation control is performed in surveillance and controlled areas established for the protection of public residing in the vicinity of NI, RS and SF sites;
- that the public is duly informed on radiation conditions in the surveillance zone and controlled areas.

The following principals are recognized as fundamental NRS principles in the Federal Law «On the Radiation Safety of Population» which also establishes relevant mechanism for their implementation:

- limitation principle — the dose limits set for public and employees shall not be exceeded;
- justification principle — any activity involving radiation sources public and individual benefits from which do not outweigh the radiation risks (caused by additional exposure above natural radiation background) to which it gives rise shall be prohibited;
- optimization principle — individual doses and the number of exposed individuals due to the use of a radiation source shall be kept as low as reasonably achievable, economic and social factors being taken into account.

The law specifies the following fundamental hygienic standards (acceptable dose limits) for radiation exposure due to the use of IRS in the territory of the Russian Federation (including those due to SNF and RW management):

- for the public — annual effective dose limit equals to 0.001 Sv, whereas the lifetime effective dose limit (70 years) is equal to 0.07 Sv; higher annual effective dose values are acceptable in certain years only if the average annual effective dose during five subsequent years does not exceed 0.001 Sv;
- for the employees — annual effective dose limit equals to 0.02 Sv, whereas the effective dose limit for the employment period (50 years) is equal to 1 Sv; annual effective dose value of 0.05 Sv is considered to be acceptable only if the average annual effective dose during five subsequent years does not exceed 0.02 Sv.

During response and recovery operations, higher exposure may be permitted only if it is considered to be necessary to rescue people and (or) to prevent their exposure. Management teams of operating organizations shall inform employees involved in such operations on the potential risk of exposure beyond the established dose limits; such operations shall be executed only if the employees give their consent to it, and FMBA and its territorial entities give appropriate authorizations.

NRB-99/2009 establish basic dose limits, and acceptable exposure levels for ionizing radiation to limit public exposure in accordance with provisions of the Federal Law №3-FZ «On the Radiation Safety of Population» of January 9, 1996. The following categories of exposed individuals are established under the normal operation of ionizing sources:

- personnel (groups A and B);
- all population including employees (personnel) not being involved in relevant operations at the moment.

Two types of regulations are established for these categories of exposed individuals:

- basic dose limits;
- acceptable limits of multiple-factor exposure (for a particular radionuclide, routes of exposure or particular type of external exposure) that are derived from basic dose limits: annual limit on intake (ALI), acceptable annual volumetric activities, annual specific activities and other.

Based on already achieved NRS level, management teams of organizations establish additional control levels (doses, specific activities, flux rates and etc.) to ensure that radiation exposure does not exceed the acceptable limits.

OSPORB-99/2010 establishes sanitary requirements to ensure radiation safety of personnel and public during the operation of man-made radiation sources.

Federal norms and rules (NP-001-97, NP-033-11, NP-022-2000, NP-016-05, NP-058-04, NP-038-11) stipulate that protection of employees (personnel), public and the environment from radiation exposure due to NI, RS and SF operation shall be the main safety objective for these facilities. NI, RS or SF meets the safety requirements if the associated exposure on employees (personnel), public and the environment during normal operation, abnormal operation, including design-basis accidents, does not exceed the dose limits established for employees (personnel) and public, discharge and release limits of radioactive materials, concentrations of radioactive substances in the environment, and mitigates relevant impacts during beyond design-basis accidents.

Acceptable dose limits for employees (personnel) and public, acceptable limits set for discharges and releases of radioactive substances from NI, RS and SF and maximal concentrations of radioactive substances in the environment are specified in the designs for normal operation and abnormal operation conditions, as well as for design-basis accidents in accordance with radiation safety standards and other relevant regulations. Effective doses received by employees (personnel) and public shall not exceed the established limits.

NI, RS and SF designs shall provide for a complex of technical and administrative arrangements that will limit the release of radionuclides into the environment during normal operation, design-basis accidents and the performance of response activities.

According to the current legislation, Rostechnadzor is authorized to establish acceptable discharge and release limits of radioactive substances into the atmosphere and water bodies. It's also authorized to grant appropriate discharge and release permits. For these purposes, special Administrative regulations (№ 594 of September 19, 2012) were developed and approved. These regulations specify the procedures for delivering state services associated with the establishment of acceptable discharge and release limits of radioactive materials into the atmosphere and water bodies and issuance of relevant discharge and release permits.

Calculations of acceptable discharges and releases from nuclear installations shall be performed pursuant to the requirement that the public effective dose during a 70-year lifetime resulting from annual releases and discharges shall be lower than the established acceptable exposure limit.

Acceptable discharges/releases are calculated and approved for each nuclear facility in accordance with the procedures established by Rostekhnadzor.

According to the Rostekhnadzor's Administrative regulation, the operating organization shall submit, as part of the application for operating license, certain papers discussing its plans for the reduction of discharges and releases.

If any events associated with unplanned and uncontrolled radioactive releases into the environment exceeding the established limits occur, the operating organization shall initiate measures to identify their causes and to restore normal operation. Operational disorders at NI, RS and SF, including accidents, shall be investigated and their findings are to be submitted to the regulatory authority.

Availability of radiation and radiological monitoring system is an essential requirement for any organization performing SNF and RW management activities. Radiation control is performed by enterprises and organizations (operational control) and by sanitary and epidemiologic FMBA authorities (state control).

According to federal norms and rules (NP-001-97, NP-033-11, NP-022-2000, NP-016-05, NP-038-11), as well as sanitary norms and rules (NRB-99/2009, OSPORB-99/2010, SPORO-2002), administrative staff employed at NI, RS and SF shall register the exposure received by their employees or by employees of third-party organizations; develop and implement relevant arrangements to reduce and keep such exposure as low as reasonably achievable.

Control levels of controlled parameters (dose values, dose rates, radioactive contamination, acceptable discharges and releases) are established for operational radiation monitoring to prevent the exceedance over the acceptable dose limits, to consolidate the attained level of radiation safety, to ensure further reduction of personnel and public exposure and radioactive contamination of the environment.

In RW and SNF management, operational control is performed over all main radiation factors influencing personnel and public exposure. In every organization, such radiation control system shall provide for a list of particular types of applied controls, specific types of radiometric and radiation-monitoring equipment, points and frequency of measurements. This list shall be approved by executive authorities responsible for state management, state supervision and control in the field of radiation safety (Article 1 of the Federal Law № 3-FZ «On the Radiation Safety of Population» of January 9, 1996).

At enterprises, being under FMBA supervision, internal exposure control is performed by internal dosimetry laboratories being part of FMBA's hygienic and epidemiologic centers. Values of effective doses received by personnel, and, if necessary, equivalent doses to particular organs are calculated on the basis of operational radiation control and the findings of radiation control performed by FMBA's territorial authorities.

Individual control involves the registration of annual effective and equivalent doses, the effective dose during 5 subsequent years, as well as the cumulative exposure during the whole employment period. The relevant results shall be stored during no less than 50 years. A consolidated data repository for individual exposure has been established by FMBA. It stores information on individual doses received by Rosatom's employees, as well as data on specialized dosimetry and medical inventories.

At large NI, RS and SF, special radiation safety divisions perform continuous control over radiation protection of personnel and RM releases into the environment. The relevant results are submitted to supervision agencies in form of monthly, quarterly and yearly reports.

The following instruments have been established in Russia: the Unified State System for Accounting and Control of Public Exposure in the Russian Federation (ESKID), Unified State Automated System for Radiation Monitoring on the Territory of the Russian Federation (EGASMRO), Radiation and Hygienic Certification of Facilities Applying Sources of Ionizing Radiation and Sites in the Constituent Entities of the Russian Federation.

A whole range of technical and administrative arrangements for the improvement of radiation protection, safety culture development and better work management are implemented and assist in reducing the exposure of NI, RS and SF personnel.

In 2012, annual effective dose of personnel exposure remained as it was during the last three years and was equal to 1.7 mSv.

In 2012, emissions of radionuclides into the atmosphere did not exceed the established limits. The total activity of radionuclides released into atmosphere by Rosatom's enterprises decreased by 18% as compared to 2011. In 2012, annual effective dose of personnel exposure (group A) remained as it was during the last three years and was equal to 1.2 mSv.

Classification of nuclear facilities in accordance with the associated levels of potential hazard (risk) is established in basic sanitary rules OSPORB-99/2010. Such classification enables to differentiate requirements to siting, design, operation, decommissioning (closure) of nuclear facilities, as well as the requirements to the measures aimed at elimination of radiation accidents and mitigation of their consequences. The potential risk levels are derived on the basis of potential radiation effects on personnel and public that are likely to be produced in case of a radiation accident at the facility. Thus, facilities are categorized according to the consequences of potential accidents. Classification of nuclear facilities according to the associated radiation risk is summarized in Annex F of this Report.

F.5. Emergency preparedness (Article 25)

Article 25. Emergency Preparedness

25-1 Each Contracting Party shall ensure that before and during operation of a spent fuel or radioactive waste management facility there are appropriate on-site and, if necessary, off-site emergency plans. Such emergency plans should be tested at an appropriate frequency.

25-2 Each Contracting Party shall take the appropriate steps for the preparation and testing of emergency plans for its territory insofar as it is likely to be affected in the event of a radiological emergency at a spent fuel or radioactive waste management facility in the vicinity of its territory.

The following federal laws and regulations address personnel and public protection in the event of accidents at NI, RS and SF in Russia:

- Federal Law «On the Use of Atomic Energy»;
- Federal Law «On the Protection of population and territories from natural and man-induced emergencies»;
- Federal law «On the radiation safety of population»;
- Regulation on the unified state system for prevention and elimination of emergencies» (approved by the Government resolution of the Russian Federation № 794 December 30, 2003), as amended;
- federal norms and rules specifying general safety requirements for NI, RS and SF (NP-001-97, NP-033-11, NP-022-2000, NP-016-05, NP-038-11);
- federal norms and rules specifying the requirements to action plans for the protection of personnel and public in the event of an accident and emergency preparedness at NI, RS and SF (NP-075-06, NP-015-2000, NP-077-06, NP-078-06, NP-015-12);

- federal norms and rules specifying the procedure for the declaration of emergency preparedness, emergency situation, prompt exchange of information in the event of radiation hazardous conditions at NI, RS and SF (NP-055-98, NP-078-06);
- requirements to the planning and preparedness to response activities in the event of an accident during NM and RM transportation (NP-074-06);
- sanitary norms and rules (OSPORB-99/2010, SP AS-03).

These documents have been drafted giving due consideration to Russian and international experience and the relevant provisions of the IAEA safety standards:

- Preparedness and Response for a Nuclear or Radiological Emergency. Safety Requirements. Series No. GS-R-2. (2002);
- Arrangements for Preparedness for a Nuclear and Radiological Emergency. Safety Guide. Series No. GS-G-2.1. (2007).

The said regulations are aimed to prevent the occurrence and development of radiation emergencies and to reduce the associated damage. They provide a background for the establishment of standards for the protection of employees (personnel), public and the environment in the event of radiation emergencies, requirements for planning and preparedness to the response activities, principles of relevant management activities, composition of response forces and interactions between different members of such units, requirements concerning emergency-alert procedures and information exchange.

The Russian Federation is a party to number of international agreements dealing with emergency preparedness, including accidents that involve transboundary consequences:

- The Convention on Environmental Impact Assessment in a Transboundary Context, 1991;
- Convention on Assistance in the Case of Nuclear Accident or Radiological Emergency, 1987;
- Convention on Early Notification of a Nuclear Accident, 1986.

The Federal Law «On the Use of Atomic Energy» (Article 36) stipulates that the operating organization shall be liable for protection of NF employees, public and the environment in the event of an accident at NI, RS or SF.

Appropriate action plans specify the procedure that the operating organization shall follow to perform all relevant activities and interact with different authorities in order to protect NF employees and the public in the event of an accident.

The operating organization shall develop and implement measures to prevent radiation accidents at NI, RS and SF and to mitigate their adverse effects. It is also responsible for the development and implementation of action plans to protect its employees (personnel) in the event of an accident at NI, RS and SF that shall be drafted prior to the NI, RS and SF commissioning.

The Law (Article 36) also stipulates that if due to the accident, the release of radioactive substances into the environment exceeds the established limits, the operating organization shall ensure prompt and timely exchange of information on radiation conditions with relevant state authorities, local authorities, state management authorities in the field of atomic energy use, state safety regulatory authorities, units of the system for the state radiation monitoring on the territory of the Russian Federation and the national system for emergency prevention and response.

Action plans for personnel and public protection in the event of accidents and relevant response activities are developed with account of the facility's category set according to the associated radiation risk level. These action plans also involve criteria that are required for making decisions on appropriate protective arrangements. Procedures that the employees

are to follow in case of emergencies shall be developed for all facilities according to the associated radiation hazard levels.

Federal norms and rules stipulate that action plans for the protection of employees (personnel) and public in the event of an accident at the NF and accounting for the radiation consequences of possible accidents shall be developed and ready for the implementation before fissile nuclear materials are loaded into NF of categories I and II (according to the associated risk levels). Such plans are developed based on design features and parameters of NF and criteria for making decisions on public protection arrangements in the event of an accident at NF with due consideration of economic, natural and other characteristics and features of the site.

The operating organization shall develop action plans to protect employees (personnel) in the event of an accident at NF. These plans shall provide for coordination of efforts of the operating organization, NF administration, internal affairs authorities, state fire-fighting service, management authorities dealing with civil defense and emergencies, medical institutions, local authorities within the site boundaries, emergency response planning area and emergency response planning area for mandatory evacuation of residents. Administration of NF is responsible for maintenance of instant readiness and implementation of the action plans.

Action plans for public protection in the event of accidents at NF shall provide for coordination of efforts of facility-level and territorial response forces being under the jurisdiction of management authorities dealing with civil defense and emergencies, constituent entities of the Russian Federation and local authorities, as well as ministries and institutions involved in public protection and emergency response activities.

The operating organization shall ensure the development of teaching techniques and (or) programs for emergency response drills enabling to work out employees response in case of accidents and arrange for such regular trainings.

During the license review, the licensing authority shall assess feasibility and adequacy of all technical and administrative arrangements ensuring that the operating organization is prepared to all required response activities in the event of an accident.

Such readiness inspections are performed under the Rostekhnadzor inspection visits during the whole lifetime of NI, RS and SF, as well as under Rosatom's inspections (institutional control at Rosatom's enterprises).

Unified State System for prevention and elimination of emergencies (RSChS) covering the whole territory of the Russian Federation has been established in the Russian Federation. The Ministry of the Russian Federation for Civil Defense, Emergencies and Elimination of Consequences of Natural Disasters is responsible for its administrative and real-time management.

RSChS also involves an industry-wide system for prevention and elimination of emergencies at the facilities of the nuclear sector (OSChS) that was established to manage and perform activities aimed at protection of personnel and industrial sites against emergencies, to ensure response preparedness in case of potential nuclear and radiation emergencies in organizations operating particularly hazardous radiation and nuclear productions and facilities.

The OSChS of the State Corporation «Rosatom» unites management authorities, response forces and the facilities of the Rosatom's emergency rescue units and covers both the federal level and the facility level. The first National Report discussed in detail the relevant management system, forces, equipment and OSChS preparedness to emergency response and emergency elimination.

Development and improvement of state systems designed to ensure and monitor nuclear and radiation safety during normal operation and in the event of accidents is an integral

part of activities performed under the FTP «Nuclear and Radiation Safety» with the total funding of about RUR 20 bln.

In 2008-2013, efforts were aimed at the establishment and upgrading systems for territorial radiation monitoring and emergency response in Murmansk, Arkhangelsk, Leningrad, Tver, Kaluga, Kursk, Volgograd, Voronezh, Kaliningrad, Sakhalin and Tomsk regions, Kamchatka, Khabarovsk, Primorsk and Krasnoyarsk Territories, the Republic of Sakha (Yakutia), and Moscow. Similar activities are to be performed in Moscow, Nizhny Novgorod, Rostov, Saratov, Smolensk, Bryansk, Oryol, Tula, Sverdlovsk and Chelyabinsk regions.

Hygienic support of tactical medical aid in the event of radiation accidents is provided by FMBA. Therefore, it has established an exhaustive regulatory and procedural database for emergency response in the event of radiation accidents.

Practical experience in delivering medical aid during radiation accidents enabled to establish special emergency response units to provide medical assistance and to mitigate the consequences of radiation accidents.

Three centers, namely, the Emergency Radiation and Dosimetry Center under the federal state institution «Federal Medical Center of Biophysics Named after Burnazyan» and two regional centers (North-Western and South-Ural) are currently in operation at the premises of core radiation and hygiene research institutions. These centers are primarily focused on the development and improvement of assessment methods to evaluate the consequences of radiation accidents and plans for medical and hygienic measures taken to eliminate the consequences of radiation accidents.

F.6. Decommissioning (Article 26)

Article 26. Decommissioning

Each Contracting Party shall take the appropriate steps to ensure the safety of decommissioning of a nuclear facility. Such steps shall ensure that:

- i) qualified staff and adequate financial resources are available;*
- ii) the provisions of Article 24 with respect to operational radiation protection, discharges and unplanned and uncontrolled releases are applied;*
- iii) the provisions of Article 25 with respect to emergency preparedness are applied; and*
- iv) records of information important to decommissioning are kept.*

The following federal laws and regulations govern NF decommissioning in the Russian Federation:

- Federal Law «On the Use of Atomic Energy»;
- federal norms and rules establishing safety requirements for NI, RS and SF decommissioning (NP-057-04, NP-012-99, NP-028-01 and etc.).

Article 33 of the Federal Law «On the Use of Atomic Energy» stipulates that NI, RS and SF decommissioning arrangements and the relevant procedures shall be provided for in the NI, RS or SF designs in accordance with federal norms and rules in the field of atomic energy use.

The Government of the Russian Federation shall specify the procedure to establish funds covering NF, RS and SF decommissioning costs that shall be set prior to the NI, RS or SF commissioning.

Federal norms and rules in the field of atomic energy use (NP-057-04, NP-012-99, NP-028-01 and etc.) stipulate that institutional and technical measures during design development,

construction and decommissioning of NI, RS and SF shall be performed with due consideration of their future decommissioning (closure).

NI, RS and SF decommissioning (closure) shall be performed in accordance with the established decommissioning (closure) program and the relevant decommissioning (closure) projects.

Comprehensive engineering and radiation investigation of NI, RS and SF shall be performed prior to their decommissioning to evaluate technical and radiation state of engineering systems and equipment, building structures and the territories adjacent to NI, RS and SF sites. Investigation findings will provide a basis for the operating organization to develop relevant decommissioning (closure) projects and to prepare the safety analysis decommissioning (closure) report.

The operating organization shall ensure decommissioning safety, including the development and implementation of administrative and technical measures aimed at prevention of accidents and mitigation of the relevant consequences, safe SNF and RW management, their accounting and control, as well as physical protection of NI, RS and SF, environmental monitoring at the site, in surveillance zones and controlled areas (sanitary-protection zones).

Administrative and technical measures being part of pre-decommissioning activities and decommissioning itself shall reduce radiation exposure of employees (personnel), public and the environment to the minimum practicable with due regard to social and economic aspects.

NI, RS and SF under decommissioning shall be properly staffed, the employees (personnel) shall have appropriate qualifications and permits for self-guided work under the established procedure. Recruitment, training, authorization to self-guided work and maintenance of employees' (personnel) qualifications shall be ensured by the operating organization. NI, RS and SF recruitment and training system shall maintain the appropriate level of personnel qualifications required to perform safe NI, RS and SF decommissioning.

During NI and SF operation, the operating organization shall keep all relevant records and information required for decommissioning, including design and operational documentation.

According to federal norms and rules, prevention of accidents during NF decommissioning and mitigation of their consequences, in case if such accidents occur, are recognized as fundamental safety principles of NF decommissioning.

During the review of applications for licenses authorizing activities in the field of atomic energy use, Rostekhnadzor shall evaluate whether the licensee is able to ensure safe completion of declared activities and NF decommissioning and whether it has all relevant design documentation.

The current Rosatom's «Concept for NF, RS and SF Decommissioning» is aimed at development of basic provisions for the establishment of a unified decommissioning system covering all nuclear and radiation hazardous facilities being under the supervision of the State Corporation.

This goal is achieved through:

- development and improvement of the legal and regulatory framework governing the safety from the decommissioning stage and throughout NF exemption from regulatory control performed by state nuclear and radiation safety regulatory authorities;
- development of economic instruments to support decommissioning activities with due regard to social aspects and those associated with human resources (establishment of proper conditions);
- scientific, engineering and technical support of decommissioning activities (providing opportunities).

In 2011-2013:

The following nuclear facilities were decommissioned:

- critical test facilities at IPPE (RF-GS and BR-1) and VNIKhT (PKS SO-2M);
- installation for UO₂ ceramic powder production at CMP.

The following radiation hazardous facilities were decommissioned:

- test unit «Cristal» and a storage facility for radioactively contaminated equipment at IPPE;
- buildings 7, 20, 70 at PA «Sever»;
- SNF storage facility (buildings 60, 100) at NIIP;
- «hill»-type temporary RW storage facility at SCC;
- conservation of the Б-2 basin at SCC was completed.

Predecommissioning activities are ongoing at the following sites:

- decommissioning of three uranium-graphite production reactors at MCC, SCC and PA «Mayak»;
- predecommissioning is completed and relevant decommissioning projects are developed for three uranium-graphite production reactors (almost 2 000 tons of equipment has been dismantled and removed from the sites);
- units 1 and 2 of the Novovoronezh NPP –decommissioning license was issued in 2013;
- units 1 and 2 of the Beloyarsk NPP — 100 tones of metallic RW have been removed;
- conservation of Б-9 storage water reservoir at PA «Mayak» is nearing its completion — cover was emplace over some 9 480 m² of its water surface;
- efforts have been initiated to establish an industry-wide system for decommissioning of nuclear facilities designed to provide information support and to lend support to the management system for centralized decommissioning of nuclear and radiation hazardous facilities (NRHF) of the sector. Assessment of decommissioning liabilities of Rosatom's enterprises has already been completed; the strategy for decommissioning of NRHF at TVEL enterprises has been established; corporation level of the industry-wide information system for decommissioning will soon be established under the initiated project.

Section G. Safety of spent fuel management

G.1. General safety requirements (Article 4)

Article 4. General Safety Requirements

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

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

- i) ensure that criticality and removal of residual heat generated during spent fuel management are adequately addressed;*
- ii) ensure that the generation of radioactive waste associated with spent fuel management is kept to the minimum practicable, consistent with the type of fuel cycle policy adopted;*
- iii) take into account interdependencies among the different steps in spent fuel management;*
- iv) provide for effective protection of individuals, society and the environment, by applying at the national level suitable protective methods as approved by the regulatory body, in the framework of its national legislation which has due regard to internationally endorsed criteria and standards;*
- v) take into account the biological, chemical and other hazards that may be associated with spent fuel management;*
- vi) strive to avoid actions that impose reasonably predictable impacts on future generations greater than those permitted for the current generation;*
- vii) aim to avoid imposing undue burdens on future generations.*

The legal framework of the Russian Federation provides for measures to be taken at all stages of spent nuclear fuel management in order to ensure adequate protection of personnel, population and the environment against radiation impacts associated with this management.

The following federal laws and federal norms and rules set forth general requirements for the safe SNF management and the safety of SNF management facilities:

- Federal Law «On the Use of Atomic Energy»;
- Federal Law «On the Radiation Safety of Population»;
- Federal Law «On the Environmental Protection»;
- Radiation Safety Standards (NRB-99/2009);
- Basic Sanitary Rules of Radiation Safety (OSPORB-99/2010) (as amended) ;
- federal norms and rules:
 - ◆ General safety provisions for NI, RS and SF (NP-001-97, NP-033-01, NP-022-2000, NP-016-05.);
 - ◆ Accounting of External Natural and Man-Induced Impacts on Nuclear Facilities (NP-064-05);
 - ◆ Facilities for Spent Nuclear Fuel Reprocessing. Safety Requirements. (NP-013-99);
 - ◆ Dry Storage Facilities for Spent Nuclear Fuel. Safety Requirements. (NP-035-02);
 - ◆ Safety Rules for Storage and Transportation of Nuclear Fuel at the Sites of Nuclear Facilities (NP-061-05).

A complete list of regulatory documents is presented in the Annex E of this Report.

G.1.1. Criticality and removal of residual heat (Article 4 (i))

Federal norms and rules in the field of atomic energy use provide for a comprehensive set of measures to ensure nuclear safety of SNF management and the removal of residual heat

generated during SNF management at all management stages including SNF on-site storage, transportation, storage and reprocessing at the SNF reprocessing plants.

Federal norms and rules NP-063-05, NP-013-99, NP-035-02 and Safety rules for storage and transportation of nuclear fuel at the sites of nuclear facilities (NP-061-05) establish nuclear safety requirements for SNF management that extend to a whole range of nuclear facilities: NPPs, including detached storage facilities at NPP sites, SNF storage facilities outside NF sites and SF, research nuclear installations, coastal and floating SNF storages at ships and other waterborne vehicles.

SFAs distribution in shrouds, racks, packages and the mutual disposition of shrouds, racks, packages and containers shall provide that effective neutron multiplication factor during SF storage and transportation shall not exceed 0.95 under normal operation, operational disorders, including design basis accidents (under the NP-061-05).

According to the Russian legal framework, the effective neutron multiplication factor (K_{eff}) during SNF management shall be kept as low as practicable and shall not exceed 0.95 under normal operation. In case of any single failure, K_{eff} shall not exceed 0.98 (NP-063-05).

Development of technologies, design of equipment, engineering, construction, operation and decommissioning of SNF management facilities shall ensure the following:

- that a self-sustained chain fission reaction (SCR) is avoided both for the normal conditions and any initiating events discussed in the safety case;
- that any uncontrolled and unauthorized reprocessing, accumulation, relocation, transfer and transportation of nuclear fissile material (substances) (NFM(S)) can be avoided;
- that conditions and requirements of nuclear safety set forth in design, engineering and operational documentation, nuclear safety regulations and specified both for normal operation and initiating events shall not be breached;
- preferential use of safe equipment, safe technical tools and automated equipment;
- that nuclear safety parameters are monitored;
- that a conservative approach is applied in the safety case.

Design solutions shall reflect the preferential use of such equipment the design and geometry features of which rule out the possibility of an SCR.

Nuclear safety of SNF storage is ensured through:

- imposing restrictions on the distribution of SNF in shrouds, racks, stacks and transportation casks (TUK);
- imposing restrictions on the number of fuel rods and assemblies in shrouds, racks, canisters with SNF and TUKs;
- imposing restrictions on the number of packages, shrouds in a group and packages in a stack;
- imposing restrictions on the distribution of shroud groups, stacks, racks, SNF canisters, on-site TUKs;
- the use of neutron absorbers;
- control over the location of fuel rods and assemblies, heterogeneous absorbers, packages, shrouds, racks, stacks;
- control over the availability of cooling media, its state and composition, as well as over the occurrence of moderator in SNF dry storage facilities;
- compliance with the process parameters set for SNF storage and transportation systems.

Nuclear safety of an SNF reprocessing facility is achieved through:

- restrictions imposed on the geometry and size of equipment;

- restrictions imposed on the mass of nuclear hazardous fissile nuclides, substances, materials, their isotopic compositions and concentrations;
- restrictions imposed on the concentration of nuclear hazardous fissile nuclides;
- the use of neutron absorbers;
- restrictions imposed on the isotopic composition of nuclear hazardous fissile material;
- restrictions imposed on the mass fraction of neutron moderators in a nuclear hazardous fissile material;
- restrictions imposed on the reflectors and equipment layout;
- combination of the abovementioned methods and restrictions.

Residual heat removal systems (passive and active) shall be involved at all stages of SNF management enabling to comply with normal operation limits provided that the passive systems are preferred over the active ones.

SNF storage and transportation system designs shall provide for certain measures or devices eliminating the possibility that the temperature of fuel cladding goes beyond the values established for normal storage and transportation conditions, as well as abnormal operation and design basis accidents.

SNF pools shall be fitted with special systems removing heat from the cooling media and ensuring nuclear safety.

The heat removal system design shall ensure that the temperature of the cooling media in spent fuel pools will not exceed the design limits set for normal operation and operational disorders, including design basis accidents.

Designs of SNF dry storage facilities shall specify the cooling method (forced circulation and (or) natural convection) eliminating the possibility that the fuel cladding temperature exceeds the design values set for normal operation and operational disorders, including design basis accidents.

Lists of initiating events for design basis accidents and list of beyond design basis accidents, including relevant initiating events, accident sequences and the potential consequences shall be drafted during design development, construction and operation of SNF management facilities and installations.

These lists shall include accidents associated with SCR and failure of heat removal.

G.1.2. Minimization of radioactive waste generation (Article 4 (ii))

The requirements concerning the minimization of RW generation also resulting from SNF reprocessing are set forth in the following regulations:

- Federal Law «On the Management of Radioactive Waste...»;
- The Concept for SNF management of the State Corporation «Rosatom» (approved by the Rosatom's decree № 721 of December 29, 2008);
- federal norms and rules in the field of atomic energy use (NP-016-05, NP-058-04, NP-002-04, NP-019-2000, NP-020-200 and etc.);
- sanitary rules (OSPORB-99/2010, SPORO-2002).

Federal norms and rules and sanitary rules set forth the requirements according to which generation and accumulation of radioactive waste shall be kept to the minimum practicable (principle of control over the generation and accumulation of RW).

Design, operation of nuclear facilities, including SNF management facilities, and SNF management shall provide for certain conditions (engineering solutions and administrative arrangements) enabling to keep RW generation as low as practicable. According to NP-016-05, NP-058-04, NP-002-2000 and other federal norms and rules, the operating organization

shall arrange for certain activities to minimize RW generation and prevent its accumulation, including:

- to ensure well-timed RW processing and conditioning;
- to prevent unplanned RW accumulation;
- to limit RW generation to the minimum practicable;
- to establish standards concerning LRW and SRW generation that shall be revised regularly with due consideration to the best RW management practices;
- to avoid unconditioned RW storage if it's not discussed in design and operational documentation;
- to avoid radionuclide releases (discharges) into the environment in exceedance of the established limits.

Specific engineering solutions, means and administrative arrangements minimizing RW generation shall be provided for and implemented during the development of design and operational documentation.

The liabilities of RW generators that pay fees to cover future RW management, including RW disposal, foster them to optimize RW management practices, for example, by developing technologies aimed to minimize RW generation, and, thus, stimulate practical implementation of the abovementioned requirement.

Accelerated technological development of advanced SNF management practices enabling to minimize RW generation during SNF management is stated among future accomplishments of the **Concept for SNF management of the State Corporation «Rosatom»**

Financial provision of RW management activities, including RW disposal, by using the funds of RW generators is viewed as an economic incentive enabling to minimize RW generation during SNF management. RW management tariffs were discussed in Section F.2.2. of the Report.

Federal norms and rules (NP-058-04 and other) stipulate that the required conditions (engineering solutions and administrative arrangements) enabling to minimize RW generation to the minimum practicable shall be ensured during NI, RS and SF design development and operation.

According to general safety provisions (NP-016-05, NP-058-04 and other), the operating organization shall limit RW generation to the minimum practicable that can be also achieved through compliance with the following RW management requirements established for operating organizations:

- to ensure well-timed RW processing and conditioning;
- to prevent unplanned RW accumulation;
- to establish standards concerning LRW and SRW generation that shall be revised regularly with due consideration to the best RW management practices;
- to avoid unconditioned RW storage if it's not discussed in design and operating documentation;
- to avoid radionuclide releases (discharges) into the environment exceeding the established limits.

The operating organization shall submit, as part of the license application, papers discussing its plans for reduction of relevant releases and discharges.

The FTP «NRS» provides for a set of arrangements that will enable to bring the accumulated RW inventory into safe condition and perform well-timed processing of the generated RW. The relevant information is presented in the Section B of the Report.

Development of technologies to minimize RW generation

Advanced SNF reprocessing technologies are currently under development. These technologies will enable considerable reduction of RW generation. A pilot demonstration center for SNF reprocessing applying innovative technologies and enabling significant decrease of RW generation during SNF reprocessing will be established at MCC (SEC «NRS»).

G.1.3. Interdependence among the different steps in spent fuel management (Article 4 (iii))

The system to regulated design, construction, operation, maintenance, inspection and testing of SNF facilities, as well as accounting and review of relevant operational disorders, which exists in Russia, ensures safety at all stages of SNF management.

The Federal Law «On the State Atomic Energy Corporation «Rosatom», FTP «Development of Nuclear Power Generation Complex» and FTP «Nuclear and Radiation Safety» declare the task of establishing an up-to-date system for the safe SNF management as a top priority. Having in mind the realistic figures of projected future arising of SNF, the Russian nuclear sector initiated a program for the establishment of centralized SNF storage and reprocessing facilities to arrange for an SNF management system that will enable safe and well-timed transition from one life-time stage to another.

A number of projects for the establishment of SNF management infrastructure using the state funds are to be implemented under the FTP «NRS» (see Section B).

G.1.4. Protection of individuals, society and the environment (Article 4 (iv))

Section F.4 (Article 24) provides a detailed discussion of the following aspects: regulatory control over radiation safety and the existing regulatory requirements for the protection of personnel, public and the environment, evaluation of radiation impacts on the population and the environment, the established procedures for radiation monitoring of personnel exposure and contamination of the environment resulting from releases and discharges due to SNF management, as well as state supervision over the radiation protection of personnel, public and the environment.

The operating organization shall submit, as part of a license application for siting, construction, operation and decommissioning of an SNF management facility, a SAR demonstrating the adequacy of technical and administrative arrangements to provide safety of personnel, public and the environment. The SAR shall also involve an evaluation of projected radiological impacts on the population and the environment and the corresponding radioactive releases and discharges.

Regulatory authorities shall review the submitted safety analysis and decide whether they should grant a license or not.

The Federal Law «On the Environmental Protection» establishes the legal framework for the environmental protection. Observance of the human right to a healthy environment and mandatory consideration of environmental impact assessment findings when making decisions on economic and other activities are viewed as fundamental principles of the environmental protection.

The questions concerning the tolerability of certain environmental impacts are addressed during state environmental assessments and the reviews of license (permit) applications.

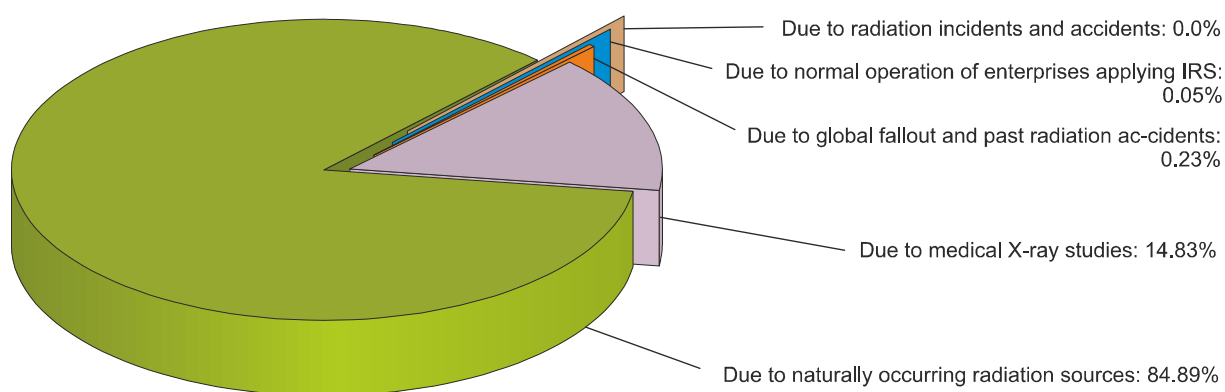
To ensure operational safety of SNF management facilities, the operating organization performs radiation monitoring, involving control of radioactive discharges and releases into the environment and monitors their compliance with the established limits; whereas local or federal competent authorities implement their own independent monitoring programs.

The ongoing monitoring at enterprises indicates that radionuclide concentrations found in the air of industrial sites where SNF reprocessing activities are taking place, within their controlled areas and in near-by settlements are considerably lower than the acceptable NRB-99/2009 limits.

Real-time data on the radiation environment in the regions, where Rosatom's enterprises are located, is available through the automated radiation monitoring system at the following URL: <http://www.russianatom.ru>

Results of annual radiation and hygienic certification indicate that public exposure in the Russian Federation is mostly due to naturally occurring radiation sources and X-ray studies, and, in general, is not related to the production induced effects (see diagram below).

Breakdown of annual effective doses of public exposure in the Russian Federation, %



In certain cases, special arrangements are implemented to mitigate the risk. A case in point, the projects on the SNF return to the Russian Federation for storage and reprocessing. A special procedure to establish and implement state environmental assessment of an integrated return-project was developed in order to demonstrate that such return would contribute to general mitigation of radiation risks and improvement of environmental safety level. It should be noted, that this project also involved the implementation of special environmental programs (SEP) within the project's funding.

Thus, for example, the integrated return projects associated with RR SFA return from foreign customers provided for a SEP on remediation of radioactively contaminated sites in the Chelyabinsk region (where the plant RT-1 is located). The SEP involved a number of social and environmental efforts, including:

1. Remediation of radioactively contaminated sites at the floodplain of the Techa river within the Muslumovo station and settlements Brodokalmak, Russkaya Techa and Nizhnepetrovskoye;
2. Activities to reduce the radioactive exposure of the population residing in the settlements Brodokalmak, Russkaya Techa and Nizhnepetrovskoye (Krasnoarmeysk oblast, Chelyabinsk region), Metlino and Novogorniy (Ozersk urban district);
3. Remediation of soils in the village Muslumovo and partially at the station Muslumovo, the residents are to be relocated in accordance with the Agreement with the Federal atomic energy agency and the Government of the Chelyabinsk region of November 14, 2006;
4. Remediation activities covering the East-Uralsk radioactive plume to eliminate further spread of radioactive contaminants;
5. Activities to reduce the risk of further migration of radioactive contaminants into the environment.

Environmental Policy

Since 2008, Environmental Policy of the State Corporation «Rosatom» has been implemented in order to ensure sustainable development of the atomic energy industry and environmental safety.

Comprehensive plan for the implementation of the Environmental Policy until 2015 covers 55 environmentally significant organizations involving potential sources of impact on human health and the environment.

As part of the Environmental Policy implementation, consistency of environmental management systems is checked against the requirements of the international standard ISO 14001:2004. Among the organizations awarded with positive statements on the compliance with the standard are the central office of the JSC «Rosenergoatom Concern» and its operating NPPs.

Control over the availability and validity dates of environmental authorizations (permits on discharges/releases of radioactive and chemical materials, waste management, including radioactive waste, water use and etc.) granted to organizations is an important element of the Environmental Policy. For example, the list of Rosatom's organizations that shall submit their statistical environmental protection reports, comprising 178 atomic energy organizations, was approved in 2012.

Since 2009, under the policy of public reporting, a considerable number of key Rosatom's enterprises have started to publish regularly their environmental safety reports.

It should be noted, that environmental management systems applied by SNF management organizations are consistent with internationally recognized standards. For example, a compliance assessment against ISO 9001:2008 and ISO 14001:2004 at MCC was performed by the independent international company BUREU VERITAS.

Assessment findings indicated that SNF storage at MCC and all relevant activities ensure high quality and environmental safety and meet the requirements of Russian and international standards.

Relevant certificates were granted following several independent reviews. Certification cycle started from October 11, 2012 and will last for 3 years. By this time, MCC will have to demonstrate to peer reviewers that the MCC's integrated management system has been operating successfully and to undergo once again all relevant certification procedures.

Peer reviewers have noted a number of positive aspects associated with the integrated management system, such as leadership of senior management, strong commitment to the policy and objectives of the integrated management system, top management and personnel involvement in the activities performed under this system, harmonization of management program processes with routine operations carried out at the enterprise under this program, high degree of consistency of the environmental management system objectives and programs for their implementation with the identified environmentally important aspects and the environmental policy.

G.1.5. Taking into account biological, chemical and other hazards that may be associated with spent fuel management (Article 4 (v))

According to the Federal Law «On the Environmental Protection», observance of the human right to a healthy environment and mandatory consideration of environmental impact assessment findings when making decisions on economic and other activities are viewed as fundamental principles of the environmental protection.

According to the law, all factors associated with adverse effects resulting from the performed activities and affecting the environment, including its physical, chemical, biological and other characteristics shall be addressed when SNF management activities are planned and executed.

Decisions on SNF management activities shall be made following an impact assessment that will enable to identify, analyze and account for direct, indirect and other effects of the planned activities on the environment.

Positive statement of the state environmental assessment is an essential condition to acquire siting, construction, operating and decommissioning licenses for SNF management facilities.

It should be noted that biological, chemical and other risks associated with SNF management are negligible as compared to the radiological impact.

In terms of chemical impacts, nuclear industry is among the industrial sectors producing negligible impact on the environment. For instance, in 2012, the breakdown of aggregate releases of chemical pollutants from stationary sources in Russia showed that nuclear industry accounted only for some 0.25%, 0.6% goes for discharges of contaminated waste waters and 0.5% — for production and consumption waste produced in the sector.

The following federal laws and fire safety regulations govern fire and explosion risks in Russia: The Federal Law №69-FZ «On Fire Safety» of December 21, 1994 (as amended on March 12, 2014), Federal Law №123-FZ «Technical Regulation on Fire Safety Requirements» of July 22, 2008, fire prevention regulations (approved by the resolution of the Government of the Russian Federation №390 of April 25, 2012); federal norms and rules and Rostekhnadzor's decrees establishing fire- and explosion safety requirements and provisions for nuclear facilities, including SNF management and SNF reprocessing processes.

Other risks are regulated by relevant regulations, including general industry-wide regulations that establish the requirements on the limitation chemical, biological and other (non-radiation) impacts.

G.1.6. Analysis of actions that impose predictable impacts on future generations (Article 4 (vi))

Protection of future generations is assured through the fulfillment of requirements applied to the evaluation of projected radiation impacts produced on future generations and resulting from SNF management; these impacts shall not exceed the acceptable public exposure levels as established by the existing regulations (Annex E).

G.1.7. Minimization of burdens imposed on future generations (Article 4 (vii))

The requirements stipulating that undue burdens associated with the need to provide safe SNF management shall be not imposed on future generations are set forth in the provisions of the Federal Law «On the Use of Atomic Energy» and federal norms and rules according to which reliable protection of NF employees, public and the environment against unacceptable radiation impacts (as defined in the relevant norms and rules in the field of atomic energy use) and radioactive contamination shall be provided during storage and reprocessing of nuclear and radioactive materials. Section B of the Report discusses a number of practical measures addressing some deferred challenges associated with SNF management.

G.2. Existing facilities (Article 5)

Article 5. Existing Facilities

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

Safety of SNF management facilities is ensured through compliance with legal requirements and regulatory provisions effective in the Russian Federation, including federal norms and rules governing SNF management safety. Compliance with these requirements is evaluated during the review of relevant license applications.

The current regulatory system covering siting, design, construction, operation, maintenance, decommissioning of SNF management facilities, continuous control over their safety level, as well as accounting and review of operational disorders ensures safety at all SNF management stages.

All active NI and SF involved in SNF management activities are operated under Rostekhnadzor licenses issued for operation and management of nuclear materials. Operating licenses are issued following a safety assessment based on the review findings, the evaluation of submitted documents demonstrating operational safety of the facility and inspections reviewing operational safety of the facility. Similar procedure is applied when the license conditions are amended.

The following papers shall be submitted by the operating organization as part of its operating license application:

- safety analysis report;
- report summarizing the commissioning results;
- engineering design of the facility (approved by Rostekhnadzor);
- guidelines on the elimination of accidents, safety guides summarizing beyond design basis accident management; action plans for the protection of personnel in the event of an accident;
- data on recruitment, training, maintenance of qualifications, permits to self-guided work and Rostekhnadzor's permits authorizing certain activities in the field of atomic energy use;
- quality assurance program for commissioning (operation);
- list of operating procedures, instructions, programs and schedules for maintenance, repair, testing and checks of safety-important systems;
- commissioning program (for facilities commissioned following the construction), program for initial testing activities (for facilities commissioned following the construction), trial operation program (for facilities commissioned following the construction);
- measures to make up for deviations from the NRS safety provisions set forth in norms and rules and a program for the elimination of such deviations;
- documentary evidence of accounting and control assurance;
- documentary evidence on the assurance of the NF physical protection;
- data on the availability of a sanitary and epidemiologic statement confirming that activities involving RM are performed in accordance with the relevant sanitary rules;
- data on availability of a paper establishing norms (limits) for acceptable releases and discharges of RM, permits for such discharges and releases and plans for their reduction;
- list of organizations performing activities for and providing their services to the licensee and data on such activities (or delivered services).

License application reviews involve inspections that Rostekhnadzor perform:

- to evaluate NF and SF safety;

- to verify the submitted information;
- to check if the applicant is able to perform the declared activities and if all relevant conditions can be provided.

Thus, operation of all SNF management facilities is carried out in keeping with the license conditions and under Rostekhnadzor's licenses issued to the operating organization and authorizing the operation of relevant facilities, management of nuclear material and transportation of SNF; the compliance with these provisions shall be verified during inspections.

According to Article 35 of the Federal Law «On the Use of Atomic Energy», the operating organization exercises control over NI and SF safety, and submits all relevant safety data to state safety regulatory authorities.

According to federal norms and rules (NP-001-97, NP-033-11, NP-022-2000, NP-016-05), the operating organization shall perform continuous monitoring of all activities important for NI and SF safety. In addition to that, the operating organization shall collect, process, analyze, systematize and store information on failures of safety-important systems and components, and inadequate personnel (employees) response to such failures. The operating organization shall investigate the operational disorders occurred at NI and SF; develop and implement relevant measures to eliminate them in the future.

Furthermore, the operating organization shall prepare regular reports discussing NI and SF safety and submit them to state safety regulatory authority and state management authority in the field of atomic energy use. All enterprises operating SNF management facilities shall submit such report the contents and structure of which are specified in the Rostekhnadzor guideline document (RD-043-08).

According to Article 26.1 of the Federal Law «On the Use of Atomic Energy» enacted in 2011, the organization operating NI and SF under a permit (license) issued for more than 10 years shall perform periodic safety assessments. Such assessments are performed in order to evaluate NI and SF safety with regard to its operational life and aging of equipment based on the legal provisions of the Russian Federation in the field of atomic energy use. The relevant findings shall be applied to ensure operational safety of the facility until the next periodic safety assessment and expiration of its operating lifetime. The first periodic NI and SF assessment shall be carried out in 10 years after the facility's commissioning and further assessments are repeated every 10 years until the expiration of facility's operating lifetime.

Upon the expiration of the operating life (30 years), the operating organization shall evaluate if it can be extended on condition that all provisions of federal norms and rules are met.

To improve SNF management safety at NPPs with RBMK units and research nuclear installations (Leningrad NPP, IPPE, RIAR, NRC «KI») and following extensive advance preparations, in particular, carried under the FTP «NRS», staged removal of SNF and its transportation to centralized storage facilities has been initiated.

G.3. Siting of proposed facilities (Article 6)

Article 6. Siting of Proposed Facilities

6-1 *Each Contracting Party shall take the appropriate steps to ensure that procedures are established and implemented for a proposed spent fuel management facility:*

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

6-2 *In so doing, each Contracting Party shall take the appropriate steps to ensure that such facilities shall not have unacceptable effects on other Contracting Parties by being sited in accordance with the general safety requirements of Article 4.*

A number of federal laws, federal norms and rules (see Section E) and other regulations, in particular, building codes and regulations (SNIP), govern siting of SNF management facilities and the procedure for approval of such sites as suitable for construction and safe operation. The main documents are as follows:

- Federal Law «On the Use of Atomic Energy»;
- Federal Law «On the Environmental Protection»;
- resolution of the Government of the Russian Federation № 306 «On the Rules for Making Decisions on Siting and Construction of Nuclear installations, Radiation Sources and Storage facilities» of March 14, 1997;
- federal norms and rules specifying the NF siting requirements, as well as relevant basic criteria and safety requirements (NP-032-01, NP-050-03, NP-060-05), and requirements to the accounting of external natural and man-induced impacts on NF (NP-064-05).

According to the Federal Law «On the Use of Atomic Energy», decision regarding siting and construction of NI, RS and SF that either are federally owned, are of federal or interregional significance, or are to be sited and constructed in the areas with restricted access shall be made by the Government of the Russian Federation in accordance with the procedure established by the Government of the Russian Federation.

Decisions on siting of abovementioned facilities are made by the Government of the Russian Federation following their approval by the authorities of the constituent entities of the Russian Federation that are to host the proposed facilities. Decisions on the location of sites for nuclear facilities, including SNF management facilities, owned by constituent entities of the Russian Federation and on their construction shall be made by the authorities of relevant constituent entities.

Decisions on the location of a site for the construction of municipally owned nuclear facilities and on their construction shall be made by relevant local authorities.

The procedure and conditions for providing land and subsoil to construct a nuclear facility are established by the legislation of the Russian Federation. Decisions on NF siting and construction are made in keeping with the land, urban development and environmental laws and with due consideration to the findings of reviews performed by public organizations.

Decisions on NI, RS and SF siting and construction shall be made with account of relevant environmental impact assessments.

Decisions on NI, RS and SF siting and construction shall be made in keeping with provisions of the Federal Law «On environmental assessment», based on the statements of the state environmental assessment and the findings of reviews performed by public organizations.

According to the law, the following principles shall be met:

- integrity of environmental impact assessment of the reviewed economic and other activities and their effects;
- transparency, involvement of public organizations (associations) and consideration of public opinion in the decision making process.

For the purposes of the state environmental assessment, the relevant state management authority in the field of atomic energy use or the operating organization shall submit papers discussing radiation effects that are likely to be produced by the proposed nuclear facilities on the environment together with other design documentation required for the abovementioned nuclear facilities.

The following shall be taken into account when making a siting decision:

- if the facility will enable to fill the economic needs of the Russian Federation and its particular regions;
- if proper siting conditions that meet the requirements of federal norms and rules in the field of atomic energy use are available;
- if no safety threats to NI, RS and SF are posed by nearby civil industrial facilities;
- if all likely social and economic effects from siting of the abovementioned nuclear facilities on industrial, agricultural, social and cultural development of the region are addressed.

According to the Russian legislation, public discussions (consultations) are viewed as an essential condition for making decisions on siting of SNF management facilities. Such discussions are arranged and held in accordance with the principles and provisions of the Federal Law «On the Environmental Protection» (Articles 2 and 32) and, in accordance with the Regulation «On the Environmental Impact Assessment of Planned Economic and Other Activities in the Russian Federation» (approved by the decree of Goskomekologiya of Russia № 372 of May 16, 2000), are considered to be an integrated part of the environment impact assessment (EIA) procedure. EIA provision is approved by federal executive authority providing state management in the field of environmental protection.

International law, agreements and treaties, the Russian Federation being party to which, establish the requirements to the public discussions (consultations) of environmental aspects related to the proposed activities. If such activities may result in transboundary effects, provisions of the ECE UN Conventions on the environmental impact assessment in transboundary context shall be also accounted for.

Article 28 of the Urban development code of the Russian Federation involves provisions on arranging and conducting public hearings. The procedure for relevant administrative arrangements and their proceeding is established in the land use and urban development rules and shall comply with the charters of relevant municipalities and (or) regulations of the municipality's delegate body.

The following federal norms and rules specify the way to perform investigations and studies of natural and man-induced settings in the NI, RS and SF siting region:

- NPP Siting. Basic Criteria and Safety Requirements (NP-032-01);
- NPP Seismic Design Standards (NP-031-01);

- Siting of Nuclear Fuel Cycle Facilities. Basic Criteria and Safety Requirements (NP-050-03).
- Accounting of External Natural and Man-Induced Impacts on Nuclear Facilities (NP-064-05);
- Siting of Storage Facilities for Nuclear and Radioactive Materials. Basic Criteria and Safety Requirements (NP-060-05);

as well as Building Codes and Regulations (SNiP).

The abovementioned regulations are currently under revision following the lessons learned from the «Fukushima-1» accident and with consideration for the IAEA safety standards:

- Site Evaluation for Nuclear Installations Safety Requirements, Series No. NS-R-3 (2003);
- Seismic Hazards in Site Evaluation for Nuclear Installations, Series No SSG-9 (2010).

Feasibility studies for NI and SF construction involve engineering surveys and investigations of safety-related features, events and processes.

Compliance with the following safety criteria shall be demonstrated during NI and SF feasibility studies:

- effects of natural and man-induced features, events and processes identified in the siting region and at the site on the safety of a new-build NI and SF, taking into consideration their adverse combinations, shall be limited;
- man-induced impacts on NI and SF exerted by nearby (located in the same region) operating nuclear facilities shall be limited;
- radiation NI and SF impacts on the environment and the population residing within the emergency response planning area, taking into consideration the contributions from operating NF located in the siting region, shall be limited;
- environmental characteristics facilitating migration or accumulation of radioactive substances shall be taken into consideration;
- safe SNF, RM and RW transportation shall be ensured;
- decisions on the size of emergency response planning areas and emergency response planning area for mandatory evacuation of residents shall be made with due consideration of medical, biological, demographic and other characteristics of the region;
- adequate conditions for timely evacuation of the population shall be provided;
- the possibility of eliminating the consequences of design basis and beyond design basis accidents, as well as taking prompt measures to prevent unauthorized actions against NI and SF shall be justified.

Adequacy of a site for NI or SF construction is evaluated in terms NI and SF safety given the identified natural and man-induced features, events and processes, as well as safety of the population and protection of the environment from radiation impacts resulting from normal operation and design basis accidents.

According to provisions of federal norms and rules governing NF siting and accounting of external effects, NI and SF shall not be sited and constructed at the sites which, according to provisions of the environmental legislation and particular requirements in the field of radiation safety of population, civil defense and fire-safety requirements, are not suitable for such NI and SNF SF.

Ministry of regional development of the Russian Federation in coordination with Rostekhnadzor specifies what kind of activities shall be performed during engineering surveys to investigate natural settings at the sites (resolution of the Government of the Russian Federation № 20 of January 19, 2006).

Adequacy of the site and compliance of its settings with legal requirements and provisions of federal norms and rules shall be demonstrated by the licensee in the NI or SF safety analysis

report submitted as part of a siting license application in accordance with the relevant provisions of federal norms and rules and the Administrative Regulations Authorizing the Federal Environmental, Industrial and Nuclear Supervision Service to implement its state function on licensing activities in the field of atomic energy use.

Rostekhnadzor shall evaluate the compliance of NI or SF site settings, the adequacy of performed engineering surveys and investigations and relevant justifications and decide whether it should grant a license or not.

G.4. Design and construction of facilities (Article 7)

Article 7. Design and Construction of Facilities

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

- (i) the design and construction of a spent fuel management facility provide for suitable measures to limit possible radiological impacts on individuals, society and the environment, including those from discharges or uncontrolled releases;*
- (ii) at the design stage, conceptual plans and, as necessary, technical provisions for the decommissioning of a spent fuel management facility are taken into account;*
- (iii) the technologies incorporated in the design and construction of a spent fuel management facility are supported by experience, testing or analysis.*

Design and construction of nuclear facilities, including SNF management facilities are subjected to licensing and are regulated in accordance with the Russian legal framework (see Section E.2.2).

The following federal norms and rules and sanitary rules set up basic principles and general requirements that shall be met during NI and SF design and construction:

- General safety provisions (NP-001-97, NP-033-01, NP-022-2000, NP-016-05,);
- NPP Seismic Design Standards (NP-031-01);
- Accounting of External Natural and Man-Induced Impacts on Nuclear Facilities (NP-064-05);
- SNF Dry Storage Facilities. Safety Requirements (NP-035-02);
- Facilities for Spent Nuclear Fuel Reprocessing. Safety Requirements (NP-013-99);
- Hygienic Provisions Concerning the Design Development for Enterprises and Facilities of Nuclear Sector (SPP PUAP-03);
- Sanitary Rules for Design and Operation of Nuclear Power Plants (SP AS-03)

In accordance with provisions of federal norms and rules (NP-001-97, NP-033-11, NP-022-2000, NP-016-05, NP-013-99, NP-035-02), SNF management facility shall be sited, designed, constructed and operated so that its radiation impacts on personnel, public and the environment during normal operation, operational disorders, including design basis accidents, would never exceed the established limits for personnel and public exposure, radioactive release and discharge limits, limits for RN concentrations in the environment, and limit such effects in the event of beyond design basis accidents.

Provisions of federal norms and rules (NP-001-97, NP-033-11, NP-022-2000, NP-016-05, NP-013-99, NP-035-02) stipulate that NF safety shall be generally provided via consistent implementation of the defense-in-depth and multibarrier concepts based on the application of physical barriers preventing the spread of ionizing radiation, nuclear and radioactive materials into the environment, a system of administrative and technical provisions to protect such physical barriers and to maintain their performance, as well as to protect the employees (personnel), public and the environment.

Provisions of federal norms and rules (NP-001-97, NP-033-11, NP-022-2000, NP-016-05, NP-013-99, NP-035-02) stipulate that administrative and technical arrangements implemented during design and construction of an SNF management facility shall provide for its further decommissioning.

Technical and administrative decisions ensuring safety of an SNF management facility shall be evaluated based on the past experience or justified by studies, investigations or operation of prototypes. This approach is applied during design development, development and testing of equipment, construction, reconstruction and upgrading of different systems (its components).

Compliance of design, engineering and technical solutions and the relevant conditions for storage and management of NM, RM and RW with federal norms and rules in the field of atomic energy use shall be demonstrated by the licensee in the NI or SF safety analysis report submitted as part of a construction and operating licenses application in accordance with relevant provisions of federal norms and rules.

Engineering documentation can be approved only on condition that the state sanitary and epidemiologic supervisory board grants the appropriate sanitary and epidemiologic statement.

The design of a «dry» storage facility (for SNF from RBMK-1000 and WWER-1000) which is being constructed at MCC under the FTP «NRS» largely draws on the best world practices of SNF storage. The design of its start up facilities (for SNF from RBMK-1000) was reviewed by the French engineering company SGN (Société générale pour les techniques nouvelles) currently operating under AREVA NC. The expert recommendations were addressed during the facility's construction.

Furthermore, MCC will also host a pilot demonstration center (PDC) for advance SNF re-processing. Siting license has been granted, PDC design development is completed, and basic technological processes have been verified empirically or through analysis and testing. The construction license is expected to be granted in 2014.

G.5. Assessment of safety of facilities (Article 8)

Article 8. Assessment of Safety of Facilities

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

- (i) before construction of a spent fuel management facility, a systematic safety assessment and an environmental assessment appropriate to the hazard presented by the facility and covering its operating lifetime shall be carried out;*
- (ii) before the operation of a spent fuel management facility, updated and detailed versions of the safety assessment and of the environmental assessment shall be prepared when deemed necessary to complement the assessments referred to in paragraph (i).*

According to the legislation of the Russian Federation, NF safety assessment and the assessment of its radiation impacts on the environment is an essential condition for making decisions on siting and construction of nuclear facilities, including SNF management facilities. These assessments shall be appropriate to the hazard presented by the facility and cover its whole operating lifetime.

Positive statement of the state environmental assessment is an essential condition to acquire a license for the planned activities. Materials of the environmental impact assessment shall be submitted as part of papers subjected to the state environmental assessment.

Statement of the state environmental assessment shall be submitted to Rostekhnadzor as part of the license application for construction or operation of an SNF management facility.

Documents submitted to Rostekhnadzor as part of license application shall include papers demonstrating the assurance of nuclear and radiation safety of the facility and (or) of the declared activities. The relevant requirements are established by Rostekhnadzor depending on the type of facility and activity under consideration.

At the siting stage, a preliminary safety analysis report for the SNF management facility covering all siting justifications required by the current regulations shall be submitted. The report shall discuss all safety-related issues; provide a general description of the facility and its safety for the environment and the population, including a preliminary analysis of safety and physical protection.

Construction and operation of an SNF management facility require the submittal of a safety analysis report presenting a comprehensive safety evaluation.

SAR for an SNF management facility shall provide for a system of technical and administrative arrangements ensuring NF safety. SAR shall present the findings of the NF safety evaluation, a list of initiating events for design basis accidents and a list of beyond design basis accidents, findings of deterministic and probabilistic NF safety analysis. It shall also provide a list of techniques and programs used to demonstrate NF safety. The programs used for NF safety demonstration shall be validated in accordance with the established procedure.

Requirements to NF safety analysis reports, including those for SNF management facilities, and SNF storage facilities, in particular, are established in federal norms and rules (NP-006-98, NP-018-05, NP-051-04, NP-066-05 and etc.).

In general, SAR shall provide the following data:

- general description of the NF;
- characteristics of the region and the site;
- safety demonstration during the development of designs for buildings, structures, systems and its components;
- system for management of nuclear material and other relevant systems;
- management and control;
- RW management;
- radiation safety during normal operation and radiation control;
- nuclear safety;
- commissioning;
- operational management (management arrangements, training and employees' (personnel) qualifications, guidelines, maintenance, control arrangements and provision of safety-related information, fire and occupational safety);
- physical protection;
- accounting and control of NM, RM and RW;
- emergency planning:
 - ◆ accident analysis;
 - ◆ analysis of design basis accidents;
- analysis of beyond design basis accidents and development of measures to manage beyond design basis accidents;
- limits and conditions for safe operation, operational limits and conditions;
- quality assurance;
- NF decommissioning.

According to Article 26.1 of the Federal Law «On the Use of Atomic Energy» (enacted in 2011), the organization operating NI and SF under a permit (license) issued for more than 10 years shall perform periodic safety assessments. Such assessments are performed in order to evaluate NI and SF safety with regard to its operating lifetime and aging of equipment based on the legal provisions of the Russian Federation in the field of atomic energy use. Its findings shall be applied to ensure operational safety of the facility until the next periodic safety assessment and expiration of its operating lifetime.

If necessary, the following aspects shall be addressed in the conditions of a license for sitting and operation of an SNF management facility: requirements to the development and implementation of measures to eliminate and (or) to make up for discrepancies from relevant regulatory provisions, to comply with and (or) make up for the remarks expressed in the expert findings of safety reviews. Corrective actions may involve a follow-up and more detailed safety assessment, a program of additional surveys and investigations, or introduction of amendments into safety case in accordance with the findings of reviews and inspections, as well as other identified safety-related factors. The relevant implementation schedules and the terms for the submittal of reporting documents on their implementation to Rostechndzor shall be also indicated.

G.6. Operation of facilities (Article 9)

Article 9. Operation of Facilities

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

- (i) the license to operate a spent fuel management facility is based upon appropriate assessments as specified in Article 8 and is conditional on the completion of a commissioning programme demonstrating that the facility, as constructed, is consistent with design and safety requirements;*
- (ii) operational limits and conditions derived from tests, operational experience and the assessments, as specified in Article 8, are defined and revised as necessary;*
- (iii) operation, maintenance, monitoring, inspection and testing of a spent fuel management facility are conducted in accordance with established procedures;*
- (iv) engineering and technical support in all safety-related fields are available throughout the operating lifetime of a spent fuel management facility;*
- (v) incidents significant to safety are reported in a timely manner by the holder of the licence to the regulatory body;*
- (vi) programmes to collect and analyse relevant operating experience are established and that the results are acted upon, where appropriate;*
- (vii) decommissioning plans for a spent fuel management facility are prepared and updated, as necessary, using information obtained during the operating lifetime of that facility, and are reviewed by the regulatory body.*

G.6.1. Safety justification and issuance of licenses to operate SNF management facilities

The procedure for acquiring licenses to operate SNF management facilities is set forth in the Regulation on licensing activities in the field of atomic energy use (resolution of the Government of the Russian Federation № 280 of March 29, 2013). Rostechndzor shall adopt relevant decisions following the review of documents submitted by the operating organization as part of a license application.

The scope of documents demonstrating the assurance of nuclear and radiation safety of NI and SNF SF commissioned following their construction is specified in the Administrative regulations for the Federal Environmental, Industrial and Nuclear Supervision Service Concerning the Implementation of Its State Function Associated with Licensing Activities in Field of

Atomic Energy Use (decree of Minpriroda of Russia № 262 of October 16, 2008). The following main documents shall be submitted by the operating organization as part of an operating license application:

- safety analysis report;
- quality assurance program for NI/ SF operation;
- data on recruitment, training, maintenance of qualifications and issued permits to self-guided work;
- guide on elimination of accidents;
- guidelines on management of beyond design basis accidents;
- action plans for the protection of personnel in the event of an accident at the facility;
- guides on providing safe storage, transportation and reloading of nuclear fuel;
- documentary evidence for accounting and control of nuclear material and (or) radioactive waste;
- documentary evidence for physical protection;
- NI and SF commissioning program;
- guides on the operation of main engineering systems of a nuclear fuel storage facility;
- sanitary and epidemiologic statement confirming that the occupational conditions when performing operations with IRS meet relevant provisions of sanitary rules.

An expert review is performed to evaluate the adequacy of nuclear and radiation safety demonstration provided for a NF and (or) declared activity by the applicant. Expert reviews of documents submitted as part of a license application are performed by organizations licensed by Rostekhnadzor to perform reviews of design, engineering and process flow documentation and documents demonstrating nuclear and radiation safety of nuclear installations, radiation sources, NM, RM and RW storage facilities, NM, RM and RW management activities. Information on expert organizations having appropriate Rostekhnadzor licenses is posted in online mode on the web-site www.gosnadzor.ru by the coordinating division of the Rostekhnadzor's central office.

Operation of a NF or an SNF storage facility shall be started only following the completion of all initial testing activities, comprehensive testing of its systems (components). Furthermore, the relevant safety analysis report shall be revised taking into account the results of initial testing activities and comprehensive testing of the systems (components).

G.6.2. Setting and adjusting safe operational limits and conditions

According to requirements of federal norms and rules (NP-001-97, NP-033-11, NP-022-2000, NP-016-05, NP-013-99, NP-035-02), the operating organization shall ensure the development of NI and SNF SF operational documentation based on the materials provided by the designers of equipment, technological processes and the project before the comprehensive testing of systems (components).

Operational documentation shall involve safe-operation guides and techniques, the general procedures for executing safety-related operations, safe operational limits and conditions, specific instructions to employees (personnel) on the ways of executing certain operations under normal operation and operational disorders, including near miss incidents, actions of employees (personnel) to ensure safety in the event of design basis and beyond design basis accidents.

Operational documentation shall be revised following the commissioning results.

Procedures for keeping, storing and amending operational documentation are established by the operating organization in accordance with relevant regulatory requirements.

Frequency of safety assessments performed for SNF management facilities involving the validation or revision of safe operational limits and conditions (taking into account operational experience and the state of scientific and technical provisions) shall depend on the specific aspects of facility's operation and its state and shall be carried out each time the license renewal is required, if amendments to the license conditions are introduced following an overhauled or reconstruction of a facility or following a periodic safety assessment of an NI or SF.

G.6.3. Regulatory system for maintenance, inspection and testing of nuclear facilities

Maintenance, inspections and testing shall be performed for safety-important systems in accordance with the requirements of federal norms and rules (NP-001-97, NP-033-11, NP-022-2000, NP-016-05) to maintain their performance. These operations are carried out in keeping with relevant operational documentation, programs and schedules developed according to the procedure established by the operating organization based on design requirements.

Supervisory personnel of enterprises develop relevant maintenance programs based on valid regulatory and institutional documents. They also develop and approve relevant schedules for their implementation.

The operating organization shall arrange for planned and preventive maintenance and (or) overhaul of equipment at SNF management facilities in accordance with the approved schedules.

All operations are performed in conformity with instructions on maintenance of safety-important systems and with relevant schedules approved by the management team of the enterprise.

During the operation of an SNF management facility, and, in particular, during its maintenance, the operating organization shall ensure that relevant operations are performed by personnel having appropriate qualifications and shall provide the involvement of properly licensed organizations to perform the required activities and to deliver their services.

After technical maintenance, systems and their components are checked against design characteristics, their performance is tested as well, and the results obtained are fixed.

Safety-important systems (their components) are normally subjected to direct and complete checks against relevant design characteristics during commissioning and following their maintenance and are carried out periodically throughout the operating lifetime of NI, SF or SNF management facility.

The need of unscheduled maintenance and repairs is identified following the results of control arrangements performed to identify the status of such systems and their components.

During the operation, appropriate control and supervision is ensured by Rostekhnadzor, accompanied with institutional controls and inspections.

G.6.4. Engineering, technical and scientific support of operation

According to the requirements of federal norms and rules (NP-001-97, NP-033-11, NP-022-2000, NP-016-05, NP-013-99, NP-035-02), the operating organization shall provide the required engineering, technical and scientific support of the SNF management facility operation throughout its operating lifetime using its own resources or subcontracting other organizations.

Forms and types of engineering and technical support may vary depending on the specific tasks facing the operating organization or a particular facility during NI or SF siting, construction, commissioning and operation.

Article 37 of the Federal Law «On the Use of Atomic Energy» stipulates that organizations involved in scientific research and investigations, design development, construction and decommissioning of NI or SF, design and manufacturing of NI or SF equipments, or performing other activities or delivering services in the field of atomic energy use shall ensure that the scope and the quality of relevant activities and services comply with provisions of federal norms and rules in the field of atomic energy use. These organizations shall bear the responsibility for the quality of performed work and delivered services throughout the operating lifetime of NI and SF, or the service life of the manufactured equipment. Management authority in the field of atomic energy use shall recommend the organization responsible for the NI or SF design development.

Normally, the operating organization subcontracts specialized scientific and research, design and engineering, repair, commissioning and other organizations and enterprises manufacturing equipment for NI and SF that have appropriate experience and licenses to provide services in the field of atomic energy use.

G.6.5. Accounting of safety-significant operational incidents at NI and SF

According to the requirements of the Federal Law «On the Use of Atomic Energy», the operating organization shall exert continuous control over the safety of NF operation at all stages of its lifetime.

The following federal norms and rules regulate the procedure for accounting and control of operational disorders, including safety significant incidents:

- Provisions on procedures for investigating and accounting operational disorders (NP-004-97, NP-047-11, NP-027-10 and other),
- General safety provisions (NP-001-97, NP-033-01, NP-016-05),
- as well as internal documents of operating organizations establishing the procedures for accounting and investigating operational disorders at NI and SF.

According to the requirements of federal norms and rules, operational disorders at facilities, including accidents, shall be investigated in accordance with established procedure. The operating organization shall develop and arrange for measures to avoid the reoccurrence of operational disorders. The operating organization shall submit information on such disorders to the state safety regulatory authority in the field of atomic energy use.

Investigation files shall be kept throughout the facility's operating lifetime.

The system for accounting and investigating operational disorders implemented by the operating organization shall be aimed at early detection and prevention of operational failures and their timely elimination.

G.6.6. Programs for collection and analysis of NI and SF operational experience

In accordance with the requirements of federal norms and rules (NP-001-97, NP-033-11, NP-022-2000, NP-016-05, NP-013-99, NP-035-02), the organization operating a NI or an SF shall ensure collection, processing, analysis, systematization and keeping of relevant data on NI or SF operational experience, including the information on investigations of operational disorders, failures of safety-important system components and improper actions of employees (personnel), violations of safe operational limits and conditions; it shall ensure timely and proper exchange of all relevant information with organizations authorized to perform its analysis.

The operating organization shall store the NI and SF design documentation, as-built documentation on NI and SF construction, test certificates and as-built documentation on mainte-

nance of safety-important systems (and their components) throughout the operating lifetime of the facility, whereas certain documents shall be stored until the completion of the facility's decommissioning.

G.6.7. Decommissioning plans

According to the requirements of federal norms and rules (NP-001-97, NP-033-11, NP-016-05, NP-012-99, NP-057-04 and etc.), administrative and technical arrangements during design development, construction and operation of an SNF management facility (NI and SF) shall be implemented with account of its further decommissioning.

The Federal Law «On the Use of Atomic Energy», other relevant regulations, federal norms and rules in the field of atomic energy use establish requirements to the decommissioning of SNF management facilities.

According to Article 18 of the «Regulation on Licensing of Activities in the Field of Atomic Energy Use», during the review of a license application for NI or SF siting, construction and operation and the set of documents demonstrating safety of NI or SF and (or) relevant activities, Rostekhnadzor shall analyze the ability of the licensee to ensure proper conditions for safe completion of declared activities and decommissioning of the nuclear facility, as well as the availability of appropriate design documentation.

Decommissioning of SNF management facility shall be performed in accordance with the decommissioning program and the relevant decommissioning project. NF decommissioning program is an administrative and technical document discussing the main activities and operations, established procedures, conditions and relevant schedules for pre-decommissioning and decommissioning activities. The program shall be developed 5 years prior to the expiration of the facility's operating lifetime.

Decommissioning activities shall be preceded by a comprehensive engineering and radiation investigation of the SNF management facility.

The operating organization shall ensure the development of a decommissioning project for the SNF management facility and prepare a safety analysis report for decommissioning based on the investigation findings.

Decommissioning program and project shall be developed with due consideration of performed improvements and the consequences of occurred incidents.

An SNF management facility that is shut down for decommissioning is considered to be operating until the moment the nuclear materials contained in its systems (components) are removed. Prior to this moment, it shall be subjected to all requirements applied to operating facilities.

G.7. Disposal of spent fuel (Article 10)

Article 10. Disposal of Spent Fuel

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

At present time, in the Russian Federation SNF is not subjected to disposal.

Section H. Safety of radioactive waste management

H.1. General safety requirements (Article 11)

Article 11. General Safety Requirements

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

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

- (i) ensure that criticality and removal of residual heat generated during radioactive waste management are adequately addressed;*
- (ii) ensure that the generation of radioactive waste is kept to the minimum practicable;*
- (iii) take into account interdependencies among the different steps in radioactive waste management;*
- (iv) provide for effective protection of individuals, society and the environment, by applying at the national level suitable protective methods as approved by the regulatory body, in the framework of its national legislation which has due regard to internationally endorsed criteria and standards;*
- (v) take into account the biological, chemical and other hazards that may be associated with radioactive waste management;*
- (vi) strive to avoid actions that impose reasonably predictable impacts on future generations greater than those permitted for the current generation;*
- (vii) aim to avoid imposing undue burdens on future generations.*

In the Russian Federation, safety of RW management is regulated by a number of federal laws, among which the Federal Law «On the Use of Atomic Energy» and «On the Management of Radioactive Waste and Amendments to Certain Legislative Acts of the Russian Federation» are of fundamental importance, as well as regulations and federal norms and rules in the field of atomic energy use, sanitary rules and other.

The legal framework of the Russian Federation stipulates that adequate protection of personnel, public and the environment from radiation impacts associated with RW management shall be ensured at all management stages (collection, segregation, conditioning, storage, transportation, disposal).

Article 48 of the Federal Law «On the Use of Atomic Energy» stipulates that adequate isolation of RW from the environment, protection of current and future generations, biological resources from radiation impacts exceeding the limits established by relevant norms and rules in the field of atomic energy use shall be ensured during RW storage and disposal.

Priorities for the protection of human life and health, current and future generations, and the environment against adverse impacts of RW and liability of organizations generating RW for the safe management of waste prior to its transfer to the national operator are among the fundamental principles of the Unified State System for RW management (p. 1 and 3.3, Article 10 of the Federal Law «On the Management of Radioactive Waste...»).

Organisations generating RW shall ensure its safe management, including its safe storage during the time periods set for intermediate RW storage (pp.2, part 2, Article 21 of the Federal Law «On the Management of Radioactive Waste...») by the state management authority in field of RW management (the State Corporation «Rosatom»).

The following federal laws, federal norms and rules, sanitary rules and regulations establish the basic requirements for the safe management of radioactive waste (Section E):

- Federal Law «On the Radiation Safety of Population»;
- Federal Law «On the Environmental Protection»;

- Federal Law «On the Management of Radioactive Waste and Amendments to Certain Legislative Acts of the Russian Federation»;
- federal norms and rules:
 - ◆ General safety provisions for NI, RS and SF (NP-001-97, NP-033-11, NP-022-2000, NP-016-05, NP-058-04, NP-038-11);
 - ◆ On Taking Account of External Natural and Man-Induced Impacts on Nuclear Facilities (NP-064-05);
 - ◆ Safety in RW Management. General Provisions (NP-058-04);
 - ◆ Safety Rules for Managing RW from Nuclear Power Plants (NP-002-04);
 - ◆ Collection, Processing, Storage and Conditioning of Liquid Radioactive Waste. Safety Requirements (NP-019-2000);
 - ◆ Collection, Processing, Storage and Conditioning of Solid Radioactive Waste. Safety Requirements (NP-020-2000);
 - ◆ Management of Gaseous Radioactive Waste. Safety Requirements (NP-021-2000);
 - ◆ Disposal of Radioactive Waste. Principles, Criteria and Main Safety Requirements (NP-055-04);
 - ◆ Near-Surface Disposal of Radioactive Waste. Safety Requirements (NP-069-06);
 - ◆ Radiation Safety Standards (NRB-99/2009);
 - ◆ Basic Sanitary Rules of Radiation Safety (OSPORB-99/2010);
 - ◆ Sanitary Rules for Radioactive Waste Management (SPORO-2002);
 - ◆ Sanitary Rules and Specifications for Operation and Conservation of Deep Waste Storage Facilities at Nuclear Fuel Cycle Enterprises (SP and TU EKKh-93).

According to NP-058-04, safety objectives of RW management are as follows:

- to ensure adequate protection of personnel and public from RW radiation impacts exceeding the limits established in radiation safety standards;
- to ensure adequate isolation of RW from the environment, protection of current and future generations, biological resources from radiation impacts exceeding the limits established in radiation safety standards;
- to prevent discharges (releases) of RM into the environment in concentrations exceeding the acceptable discharge (release) limits.

According to NP-058-04, the following principles shall be met during RW management:

- to ensure adequate protection of employees (personnel) and public from radiation impacts associated with RW in accordance with the principles of justification, regulation and optimization (principle of human health protection);
- to ensure adequate protection of the environment against adverse radiation impacts associated with RW (principle of environmental protection);
- to account for interdependencies among the different steps in radioactive waste generation and management (principle of accounting interdependencies among different steps in generation and management of radioactive waste);
- the projected exposure of future generations associated with RW disposal shall not exceed the acceptable levels of public exposure established by the current regulations (principle of protection of future generations);
- undue burden associated with the need of providing the safety of RW management shall be not imposed on future generations (principle of avoiding to impose undue burden on future generations);
- generation and accumulation of RW shall be kept to the minimum practicable (principle of control over RW generation and accumulation);
- accidents producing radiation effects shall be eliminated and, in case of their occurrence, their consequences shall be mitigated.

H.1.1. Criticality and removal of residual heat (Article 11 (i))

Article 11. General Safety Requirements

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

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

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

Nuclear safety during collection, processing, storage and conditioning of RW, containing hazardous fissile nuclear materials, is regulated by federal norms and rules in the field of atomic energy use specifying nuclear safety rules (NP-063-05, NP-019-2000, NP-020-2000, NP-021-2000, NP-058-04 and other).

According to NP-019-2000, NP-020-2000, NP-021-2000, design and geometry of the equipment for collection, processing, storage and conditioning of RW, containing hazardous fissile nuclear materials in conditioned RW, and geometry of the packages, as well as relevant handling procedures shall avoid the occurrence of SCR.

Premises with equipment for collection, processing, storage and conditioning of RW containing hazardous fissile nuclear materials shall be fitted with an automated alarm system the operating mode of which shall ensure instant readiness to SCR detection. Compaction shall be avoided for SRW containing such amounts of hazardous fissile nuclear materials that its compaction can result in SCR.

According to NP-058-04 and NP-055-04, special technical provisions and administrative arrangements shall be implemented during disposal of RW containing hazardous fissile nuclear materials (substances) to avoid SCR.

Features of engineered and natural safety barriers shall avoid SCR resulting from possible concentration of radionuclides due to their migration in the RW disposal system.

Requirements of federal norms and rules (NP-019-2000, NP-020-2000) and Sanitary Rules for RW Management (SPORO-2002) stipulate that heat generation from RW shall be accounted for when selecting the appropriate waste conditioning process. The volume of conditioned RW shall be reduced to minimum derived, in particular, on the basis of acceptable specific heat generation and heat dissipation.

During RW disposal, the host rocks shall be resistant to thermal effects produced by heat generating RW, preserve their isolating properties and ensure that engineered barriers won't lose their integrity due to the thermal conditions in the deep RW disposal facility.

H.1.2. Minimization of radioactive waste generation (Article 11 (ii))

RW minimization requirements are set forth in the following regulations:

- Federal Law «On the Management of Radioactive Waste...»;
- federal norms and rules in the field of atomic energy use (NP-016-05, NP-058-04, NP-002-2000, NP-019-2000, NP-020-2000 and etc.);
- sanitary rules (OSPORB-99/2010, SPORO-2002).

Section G.1.2. discussed in detail the RW minimization requirements specified in regulations and their application during design development and operation of NF.

A number of conditioning and processing facilities will be constructed at NPP sites (see Section B) to enable considerable minimization of RW generation.

The following activities, carried out under the FTP «NRS», are provided for the development and establishment of RW management facilities designed for RW minimization:

- treatment facility for low-level waste at PA «Mayak»;
- combined sewer system at PA «Mayak»;
- cementation complex for liquid and heterogeneous intermediate-level waste (considerable amounts of LRW will be conditioned to SRW) (FSUE PA «Mayak»);
- recycling facility for organic LRW at SCC and other.

H.1.3. Interdependence among different steps of RW management (Article 11 (iii))

Interdependence among different steps of RW generation and management accounts for a fundamental principle of the Unified State System for RW management (paragraph 5, part 3, Article 10 of the Federal Law «On the Management of Radioactive Waste...»).

Federal norms and rules regulating predisposal management of RW, RW transportation and disposal (NP-058-04, NP-019-2000, NP-020-2000, NP-053-04, NP-055-04, NP-069-06) establish the requirements according to which interdependencies among different steps of RW generation and management shall be taken into account in RW management.

According to the abovementioned federal norms and rules, interdependence principle shall be ensured through the compliance with the following requirements:

- acquisition of reliable and complete information on the amount and qualitative composition of RW at sites of waste generation, collection, processing, storage and conditioning;
- implementation of proper arrangements to exert control over the quality of technological processes of collection, processing, storage and conditioning of RW, RW quality control and testing of RW packages;
- establishment of a system involving quality criteria which RW shall comply with during collection, processing, storage and conditioning;
- establishment of RW acceptance criteria for disposal and control over the RW compliance with these criteria;
- implementation of an effective system for record keeping and storage of documentation associated with RW collection, processing, storage, conditioning and disposal.

In order to implement the interdependence principle, the Federal Law «On the Management of Radioactive Waste...» enjoin on RW generators to ensure RW conditioning in order to comply with relevant acceptance criteria within the timeframes specified for RW intermediate storage and to transfer the conditioned waste to the national operator for disposal.

The FTP «NRS» provides for addressing a large number of issues that arose in the past and are associated with the failure to observe interdependencies between different steps of RW management. Efforts are ongoing at a number of particularly hazardous facilities, that were established in the past, to ensure their environmental safety. For instance, by 2015, the most contaminated LRW storage water-reservoir V-9 (B-9) at PA «Mayak» (the lake Karachay) is expected to be conserved, and by 2025, conservation activities at the industrial reservoir B-17 (Staroe Boloto) are to be completed too. Moreover, a number of deferred tasks for MCC and SCC are planned to be addressed as well (including conservation of reservoirs B-1, B-25 (Б-1, Б-25), sludge storage facilities PKh-1, PKh-2 and other) (see Section B).

H.1.4. Protection of Individuals, Society and Environment (Article 11 (iv))

Section F.4 (Article 24) provided a detailed discussion of the following issues: regulating control over radiation safety and valid regulatory requirements for the protection of personnel, public and the environment; assessment of radiation impacts on personnel, public and the environment, procedure for radiation control of personnel exposure and environmental con-

tamination due to releases and discharges associated with RW management, as well as state supervision for the protection of personnel, public and the environment during the pre-disposal management of RW.

Federal norms and rules (NP-058-04) stipulate that the following principles shall be observed at all stages of RW management: adequate protection of employees (personnel) and public from radiation impacts associated with RW in accordance with justification, regulation and optimization principles (principle of human health protection) and adequate protection of the environment from adverse radiation impacts associated with RW (principle of environmental protection).

According to NP-058-04, protection of employees (personnel), public and the environment from radiation impacts is viewed as the main safety objective of RW management.

Measures implemented to protect individuals, general public and the environment during the pre-disposal management of RW are, in general, similar to those discussed in Section G.1.4.

Furthermore, the Federal Law «On Special Environmental Programs for the Remediation of Radioactively Contaminated Sites» provides for special measures to ensure radiation safety of public, general reduction of risks associated with radiation impacts and to improve radiation conditions at radioactively contaminated sites (see Section G).

Principles, criteria and general safety requirements for RW disposal, including those concerning long-term safety of RW disposal facilities, are established in relevant federal norms and rules (NP-055-04, NP-069-06) and sanitary rules SPORO-2002. According to NP-055-04, RW disposal facilities, including LRW disposal facilities, comply with the safety requirements at the post-closure stage, if:

- the acceptable exposure level established by sanitary rules and radiation safety standards is not exceeded;
- external natural and man-induced impacts of low-probability (catastrophic) at DF (DWIF) site will not result in the exceedance of the cumulative risk limits established for the critical group.

Adequacy of engineering safety solutions adopted in the design of an RW disposal facility shall be demonstrated for the whole period of potential hazard of the disposed waste and with due consideration of possible external natural and man-induced impacts in the RW DF region, as well as of physical and chemical processes in the RW disposal facility.

Long-term safety of an RW disposal facility, safety of public and the environment shall be demonstrated for the whole period of potential hazard of the disposed waste. Long-term safety shall be demonstrated based on relevant safety assessments, involving prediction calculations performed for the long-term safety assessment of a RW disposal facility after its closure. Adequacy of the safety demonstration, including the long-term safety, is evaluated by Rostekhnadzor during licensing.

H.1.5. On taking into account biological, chemical and other hazards that may be associated with radioactive waste management (Article 11 (v))

Measures implemented by the Russian Federation to address biological, chemical and other hazards that may be associated with pre-disposal management RW are, in general, similar to those discussed in Section G.1.5.

As for RW disposal, biological, chemical and other hazards are addressed through the establishment of RW acceptance criteria for disposal. Valid federal norm and rules discussing RW disposal requirements (NP-055-04, NP-069-06) stipulate that design of an RW disposal facility shall address RW acceptance criteria for disposal established with due

consideration to presence of toxic, chemically toxic substances and pathogenic and contagious materials.

Radioecological monitoring of environmental medium (water, air, soil, vegetation) covering not only radiation factors, but also chemical contamination shall be performed at the sites of storage facilities holding large amounts of RW (water reservoirs — storage facilities for LRW, tailings, deep LRW storage facilities and SRW storage facilities), their sanitary protection zones (controlled areas) and the environment.

H.1.6. Analysis of actions that impose predictable impacts on future generations (Article 11 (vi))

The principle of protection of future generations is implemented through the compliance with the requirements applied to the analysis of projected radiation impacts on future generations associated with RW management; these impacts shall not exceed the acceptable limits of public exposure established by existing regulations (Annex E).

The Federal Law «On the Management of Radioactive Waste...» stipulates that the priority of protection of human health and life, present and future generations, and the environment from adverse impacts associated with RW is considered to be one of the USS RW principles.

According to the Federal Law «On the Environmental Protection», observance of the human right to a healthy environment and mandatory consideration of environmental impact assessment findings when making decisions on economic and other activities are viewed as fundamental principles of environmental protection.

Federal norms and rules (NP-058-04) stipulate that effective isolation of LRW and SRW from the environment, protection of present and future generations, biological resources from radiation impacts greater than the limits established by radiation safety standards is considered to be one of RW management safety objectives.

NP-058-04 stipulate that the following principles established in respect to future generations shall be met during RW management:

- projected exposure of future generations due to RW disposal shall not exceed the acceptable public exposure limits established under the current regulations (principle of protection of future generations);
- undue burden associated with the need to ensure RW management safety shall be not imposed on future generations (principle of avoiding to impose undue burdens on future generations).

The operating organization involved in RW management shall provide relevant demonstration of its compliance with the abovementioned principles and address them in the NF safety analysis report submitted to acquire a license authorizing relevant activities. Adequacy of the presented safety demonstration for an RW DF shall be evaluated by Rostekhnadzor during the license review.

H.1.7. Minimization of burdens imposed on future generations (Article 11(vii))

The Federal Law «On the Management of Radioactive Waste...» provides for a set of administrative and financial arrangements to establish the RW disposal system enabling to avoid imposing undue burden on future generations and adverse environmental effects associated with the accumulated RW inventory not being adequately isolated from the environment and to ensure timely and safe management of newly generated RW, including RW disposal. In particular, the valid legislation prohibits the construction of industrial facilities and the devel-

opment of technologies that deliberately result in the generation of special RW (part 2, Article 26 of the Federal Law «On the Management of Radioactive Waste...»).

Provisions of certain regulations also elaborate the requirement of avoiding to impose undue burdens on future generations associated with safe RW management (Annex E).

The FTP «NRS» also provides for addressing the accumulated challenges and reducing the burden imposed on future generations. A total of 29.7 bln RUR are to cover the costs associated with the key RW management facilities (see Section D).

A number of particularly hazardous facilities, established in the past, will be transferred to an environmentally safe state ensuring safety of future generations, including industrial water reservoirs B-9 at PA «Mayak» (the lake Karachay) and B-17 (Staroe Boloto). Moreover, a number of deferred RW management tasks for MCC and SCC are planned to be addressed as well.

H.2. Existing facilities (Article 12)

Article 12. Existing Facilities and Past Practices

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

- (i) the safety of any radioactive waste management facility existing at the time the Convention enters into force for that Contracting Party and to ensure that, if necessary, all reasonably practicable improvements are made to upgrade the safety of such a facility;*
- (ii) the results of past practices in order to determine whether any intervention is needed for reasons of radiation protection bearing in mind that the reduction in detriment resulting from the reduction in dose should be sufficient to justify the harm and the costs, including the social costs, of the intervention.*

Compliance with legal provisions and regulations of the Russian Federation, including the requirements of federal norms and rules regulating RW management safety, the observance of which is evaluated under the licensing process, ensures safety of RW management facilities and RW management activities at the existing facilities.

Federal norms and rules establish safety requirements for NF including operating RW management facilities and storage facilities for accumulated RW.

During the review of a license application to operate an existing RW management facility, Rostekhnadzor shall evaluate if the operation of the facility complies with established requirements. In general, the licensing procedure, as well the process of preparation and review of submitted materials demonstrating safety of existing facilities for predisposal RW management, their expert evaluation and definition of conditions for operating licenses is similar to those discussed in Section G.2.

Operation of all existing RW management facilities (including those being part of NI, RS and SF) shall be licensed and comply with established conditions of the licenses issued by Rostekhnadzor to operating organizations and authorizing them to operate relevant facilities and manage RW. Inspections are conducted to verify the observance of license conditions.

Requirements to the control over the safety of existing RW management facilities and relevant activities performed at the existing facilities, drafting and submittal of safety analysis reports for such facilities and activities to state safety regulatory authorities, as well as the requirements concerning periodic safety assessments of NI and SF operated under permits (licenses) issued for more than 10 years, are similar to those discussed in Section G.2.

Federal norms and rules (NP-058-04, NP-055-04, NP-069-06) stipulate that evaluation of current safety level and prediction calculation for the safety assessment of RW SF system shall be performed for operating RW storage and disposal facilities to identify the need of implementing relevant technical and administrative arrangements to improve the safety level at these facilities. All reasonably practicable improvements based on the findings of the evaluation and prediction calculations shall be implemented to meet the existing requirements.

Principles established in NRB-99/2009 shall govern decisions regarding the implementation of protective arrangements (intervention) to improve safety of storage facilities holding accumulated RW:

- public benefits from the proposed intervention shall outweigh the associated damage, i.e. the reduction in detriment resulting from the reduction in dose should be sufficient to justify the harm and the costs, including the social costs, of the intervention (principle of justified intervention);
- form and scope of intervention, as well as its duration shall be optimized so that ultimate benefits from the reduction in dose, i.e. the benefit from the reduction in radiation detriment after deduction of the detriment due to the intervention, are maximal (principle of intervention optimization).

The Federal Law «On the Management of Radioactive Waste...» provides for efforts to bring the accumulated «legacy» RW resulted from the past practices to environmentally sound state. The law stipulates that decisions on management plans regarding accumulated RW shall be made on the basis of comparison of risks associated with radiation impacts and other risks and costs due to the removal of the RW from the storage facility, its further management, including disposal, with risks and costs in case if the RW are kept in the storage facility.

The FTP «NRS» provides for addressing a big number of challenges concerning the improvement and reconstruction of RW management facilities to upgrade safety and reduce risks associated with the adverse effects. The Federal Law «On the Management of Radioactive Waste...» stipulates that deep disposal of liquid LLW and ILW in subsoil shall be permitted exclusively in deep well injection facilities constructed and operated prior to its enactment (i.e. before July 15, 2011).

In late 2012, the State Corporation «Rosatom» and the IAEA Secretariat approved the terms of reference for International Peer Review on the deep well injection practice for the liquid radioactive waste in the Russian Federation (IAEA Mission). A program for calculations and experimental investigations of materials, structures and substances applied and held in the DWIF was developed to evaluate the feasibility of the closure concept and prepared for the implementation to comply with the remarks expressed during the discussion of review's preliminary results. The program provides for a full range of experimental and calculation steps to close the injection wells and demonstrate DWIFs' long-term safety.

In 2013, three expert evaluations of operational safety were performed under the FTP «NRS»:

- deep well injection facility for LRW disposal «Experimental and industrial test site» (the Ulyanovsk Region, Dimitrovgrad-10);
- deep well injection facility for LRW disposal «Test site: sites 18 and 18a» (the Tomsk Region, Seversk);
- deep well injection facility for LRW disposal «Test site «Sever» (Krasnoyarsk Territory, Zheleznogorsk).

The expert evaluations were conducted under the instruction of Rostekhnadzor in accordance with its function of a state authority licensing activities in the field of atomic energy use.

FSUE «NO RAO» acted as the applicant in line with provisions of the Federal Law «On the Management of Radioactive Waste...» that stipulate that ownership over all DWIFs mentioned above was transferred to state management authority in the field of RW management — the State Corporation «Rosatom» and, henceforth, these facilities are under the jurisdiction of FSUE «NO RAO».

Provisions of federal norms and rules and other regulations in the field of atomic energy use were used as criteria for the feasibility evaluation. The evaluation accounted for advances in science and technology, as well as the feedback from past operation of Russian and foreign NFs.

H.3. Siting of proposed facilities (Article 13)

Article 13. Siting of Proposed Facilities

13-1 Each Contracting Party shall take the appropriate steps to ensure that procedures are established and implemented for a proposed radioactive waste management facility:

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

13-2 In so doing, each Contracting Party shall take the appropriate steps to ensure that such facilities shall not have unacceptable effects on other Contracting Parties by being sited in accordance with the general safety requirements of Article 11.

A number of federal laws, Rostechнадзор's federal norms and rules (see Section E) and other regulations, in particular, building codes and regulations (SNIP), govern siting of NF facilities, including RW management facilities, RW storage and disposal facilities. The main documents are as follows:

- Federal Law «On the Use of Atomic Energy»;
- Federal Law «On the Management of Radioactive Waste»;
- Federal Law «On the Environmental Protection»;
- Urban Development Code;
- resolution of the Government of the Russian Federation № 306 «On Rules for Making Decisions on Siting and Construction of Nuclear Installations, Radiation Sources and Storage Facilities» of March 14, 1997;
- federal norms and rules regulating NF siting and specifying general criteria and safety requirements for NF (NP-032-01, NP-050-03, NP-060-05), accounting external natural and man-induced impacts on NF (NP-064-05), RW disposal safety (NP-055-04, NP-069-06);
- sanitary rules (SPORO-2002) and etc.

In general, procedures for making decisions on siting and construction of facilities for predisposal management of RW, relevant procedures for environmental impact assessments, as well as the contents, structure and procedures for submitting documents discussing NI, RS and SF radiation impacts on the environment are similar to those discussed in Section G.3.

Specific siting requirements applied to RW disposal facilities are established in federal norms and rules NP-055-04 and NP-069-06.

According to section 3.1 of NP-055-04, a site is considered to be suitable for siting RW disposal facility (RW DF) if RW can be disposed of safely taking into account all relevant natural events and processes, as well as natural and man-induced features. The choice of a site for RW DW shall be justified in its designs on the basis of research and investigations carried out in the proposed siting region and the prediction calculations performed for the safety assessment of the RW DF system.

According to provisions of the federal norms and rules regulating RW disposal (NP-055-04 and NP-069-06), adequacy of engineering safety solutions provided for in the design of an RW DF shall be demonstrated for the whole period of potential hazard of the disposed waste with account of likely external natural and man-induced impacts in the siting region, as well as those after the DF closure.

In general, procedures for licensing siting activities for RW management facilities, including RW disposal facilities, requirements to the contents and structure of relevant materials demonstrating safety are similar to those discussed in Section G.3.

During the license review of activities associated with siting of RW disposal facilities, the submitted demonstration of the long-term safety of RW disposal facilities, also covering the post-closure stage and extending throughout the period of potential hazard of disposed waste shall be evaluated. In the siting application, the licensee shall demonstrate the long-term safety of RW DF based on relevant long-term safety assessment. Recommendations on performing safety assessments, as well as the content and structure of safety analysis reports for near-surface RW disposal facilities are established by Rostekhnadzor in relevant safety guides (PNAE G-14-038-96, RB-058-10, RB-011-2000 and etc.).

H.4. Design and construction of facilities (Article 14)

Article 14. Design and Construction of Facilities

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

- (i) the design and construction of a radioactive waste management facility provide for suitable measures to limit possible radiological impacts on individuals, society and the environment, including those from discharges or uncontrolled releases;*
- (ii) at the design stage, conceptual plans and, as necessary, technical provisions for the decommissioning of a radioactive waste management facility other than a disposal facility are taken into account;*
- (iii) at the design stage, technical provisions for the closure of a disposal facility are prepared;*
- (iv) the technologies incorporated in the design and construction of a radioactive waste management facility are supported by experience, testing or analysis.*

Design and construction of RW management facilities are regulated by the following federal norms and rules in the field of atomic energy use and sanitary rules:

- General safety provisions for nuclear fuel cycle facilities (NP-001-97, NP-033-11, NP-022-2000, NP-016-05);
- Safety in RW Management. General Provisions (NP-058-04);
- Rules for the Safe Management of Radioactive Waste from Nuclear Power Plants (NP-002-04);
- Collection, Processing, Storage and Conditioning of Liquid Radioactive Waste. Safety Requirements (NP-019-2000);
- Collection, Processing, Storage and Conditioning of Solid Radioactive Waste. Safety Requirements (NP-020-2000);
- Management of Gaseous Radioactive Waste. Safety Requirements (NP-021-2000);

- Disposal of Radioactive Waste. Principles, Criteria and General Safety Requirements (NP-055-04);
- Near-Surface Disposal of Radioactive Waste. Safety Requirements (NP-069-06).
- Basic Sanitary Rules of Radiation Safety (OSPORB-99/2010);
- Sanitary Rules for Design and Operation of Nuclear Power Plants (SP AS-03);
- Sanitary Rules for Radioactive Waste Management (SPORO-2002);
- Sanitary Rules and Technical Standards for Operation and Conservation of Deep Well Injection Facilities for Liquid Radioactive and Chemical Waste Disposal at Nuclear Fuel Cycle Enterprises (SP and TU EKKh-93).

According to the requirements of federal norms and rules (NP-001-97, NP-033-11, NP-022-2000, NP-016-05), facility for predisposal management of RW being a nuclear facility shall be designed and constructed so that the associated radiation impacts on personnel, public and the environment during normal operation, operational disorders, including design basis accidents, shall be not greater than the established limits for personnel and public exposure, radioactive discharge and release limits, as well as the limits set for the concentrations of radioactive substances in the environment.

Federal norms and rules regulating RW disposal safety (NP-055-04, NP-069-06) and SPORO-2002 establish safety requirements for RW disposal facilities that shall be observed during design activities. According to the abovementioned documents, the long-term safety of a disposal facility after its closure shall be ensured by a system of barriers preventing the spread of ionizing radiation and radioactive substances into the environment. Loss of a barrier's integrity or likely external natural or man-induced impacts shall not result in the reduction of the long-term safety of the RW disposal facility (multi-barrier principle). Engineered barriers of an RW disposal facility shall remain functional without any maintenance after DF closure for the time specified and justified in the DF designs.

Requirements of federal norms and rules (NP-058-04, NP-055-04, NP-069-06) stipulate that administrative arrangements and technical provisions during design development, construction and operation of an RW management facility and RW disposal facility shall be put in place with due regard to their future decommissioning (closure).

Engineering and administrative decisions made to ensure safety of RW management facilities, including RW disposal facilities, shall rely on past experience or testing, investigations or operation of prototypes. Such approach shall be applied for the development of facilities' designs, manufacturing and development of equipment, construction, reconstruction and upgrading of systems (their components).

Design and operational documentation shall provide for particular engineering solutions and administrative arrangements to ensure safety for each category of RW.

Design documentation can be approved only if the state sanitary and epidemiologic supervision board issues an appropriate sanitary and epidemiologic statement.

When applying for a license to construct or to operate an RW management facility, the licensee shall demonstrate in the relevant safety analysis report that the design and engineering solutions applied in the RW management facility, including RW disposal facilities, and conditions of RW storage and handling comply with the requirements of federal norms and rules in the field of atomic energy use.

H.5. Assessment of safety of facilities (Article 15)

Article 15. Assessment of Safety of Facilities

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

- (i) before construction of a radioactive waste management facility, a systematic safety assessment and an environmental assessment appropriate to the hazard presented by the facility and covering its operating lifetime shall be carried out;*
- (ii) in addition, before construction of a disposal facility, a systematic safety assessment and an environmental assessment for the period following closure shall be carried out and the results evaluated against the criteria established by the regulatory body;*
- (iii) before the operation of a radioactive waste management facility, updated and detailed versions of the safety assessment and of the environmental assessment shall be prepared when deemed necessary to complement the assessments referred to in paragraph (i).*

According to the legislation of the Russian Federation, decisions on siting or construction of NF, and RW management facilities, in particular, shall be made following relevant safety assessments and environmental assessments of the associated radiation impacts appropriate to the hazard presented by the facility and covering its operating lifetime, and for RW disposal facilities — the relevant period of potential hazard associated with the disposed waste.

Positive statement of the state environmental assessment is an essential condition for acquiring licenses authorizing certain activities in the field of atomic energy use. Materials on the environmental impact assessment of activities under the review are submitted as part of documents subjected to the state environmental assessment.

Statement of the state environmental assessment shall be submitted as part of justifying documents to the Rostekhnadzor that it shall review it as part of the license application to construct or to operate an RW management facility.

The set of documents submitted by licensee as part of a license application to Rostekhnadzor shall provide materials demonstrating safety of the facilities and (or) declared activity the requirements to which are established by Rostekhnadzor depending on the type of facility or the reviewed activity.

As part of the license application for RW management facilities, including RW disposal facilities, the licensee shall submit to Rostekhnadzor a preliminary safety analysis report providing all justifications relevant for the selected site and safety-relevant aspects, in accordance with regulatory requirements, general description of the facility and its safety for the environment and public, also featuring a preliminary analysis of safety and physical protection.

Safety analysis report featuring a detailed safety evaluation shall be submitted for construction and operation of RW management facility.

SAR for an RW management facility (NP-058-04) shall describe the system of technical provisions and administrative measures to ensure NF safety, feature findings of relevant safety assessments, including a list of initiating events for design basis accidents and a list of beyond design basis accidents, findings of deterministic and probabilistic safety evaluations, as well as practices and programs used for NF safety demonstration. SAR for an RW disposal facility (NP-055-04, NP-069-06) shall provide the demonstration of the facility's long-term safety, including the results of prediction calculations performed to assess the long-term safety of the RW disposal system after its closure and during the period of potential hazard of the disposed waste. Programs used to demonstrate NF safety shall be validated in accordance with established procedures.

Requirements to safety analysis reports for RW management facilities and RW disposal facilities are set forth in relevant federal norms and rules (NP-006-98, NP-018-05, NP-051-04, NP-066-05 and etc.) and safety guides (PNAE G-14-038-96, RB-035-05, RB-058-10 and etc.).

Conditions of licenses to construct or operate RW management facilities and RW disposal facilities may feature, if necessary, requirements to the development and implementation of activities to eliminate and (or) to make up for discrepancies from the relevant regulatory provisions, to comply with and (or) make up for the remarks expressed in the expert findings of the safety reviews. Corrective actions may involve a follow-up and more detailed safety assessment, a program of additional surveys and investigations, or introduction of amendments to the safety case in accordance with the findings of reviews and inspections, as well as other identified safety-related factors. Relevant implementation schedules and terms for the submittal of reporting documents on their implementation to Rostekhnadzor shall be also indicated.

Federal norms and rules (NP-001-97, NP-033-11, NP-022-2000, NP-016-05, NP-055-04, NP-069-06) stipulate that technical and administrative arrangements during design, construction and operation of NF, and RW management facilities, in particular, including RW disposal facilities, shall be put in place with account of their future decommissioning (closure).

H.6. Operation of facilities (Article 16)

Article 16. Operation of Facilities

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

- (i) the licence to operate a radioactive waste management facility is based upon appropriate assessments as specified in Article 15 and is conditional on the completion of a commissioning programme demonstrating that the facility, as constructed, is consistent with design and safety requirements;*
- (ii) operational limits and conditions, derived from tests, operational experience and the assessments as specified in Article 15 are defined and revised as necessary;*
- (iii) operation, maintenance, monitoring, inspection and testing of a radioactive waste management facility are conducted in accordance with established procedures. For a disposal facility the results thus obtained shall be used to verify and to review the validity of assumptions made and to update the assessments as specified in Article 15 for the period after closure;*
- (iv) engineering and technical support in all safety-related fields are available throughout the operating lifetime of a radioactive waste management facility;*
- (v) procedures for characterization and segregation of radioactive waste are applied;*
- (vi) incidents significant to safety are reported in a timely manner by the holder of the licence to the regulatory body;*
- (vii) programmes to collect and analyse relevant operating experience are established and that the results are acted upon, where appropriate;*
- (viii) decommissioning plans for a radioactive waste management facility other than a disposal facility are prepared and updated, as necessary, using information obtained during the operating lifetime of that facility, and are reviewed by the regulatory body;*
- (ix) plans for the closure of a disposal facility are prepared and updated, as necessary, using information obtained during the operating lifetime of that facility and are reviewed by the regulatory body.*

H.6.1. Safety demonstration and acquisition of licenses to operate RW management facilities

The procedure for acquiring licenses to operate RW management facilities is established in the Regulation on Licensing Activities in the Field of Atomic Energy Use (resolution of the Government of the Russian Federation N 280 of March 29, 2013). Decision on issuance of a license to operate RW management facilities is made by Rostekhnadzor following a review of documents submitted by the operating organization as part of a license application.

Administrative Regulation for the Federal Environmental, Industrial and Nuclear Supervision Service Regarding the Implementation of its State Function Associated with Licensing Activities in the Field of Atomic Energy Use specifies the required set of documents to demonstrate the radiation safety of RW management facilities commissioned following the construction.

The following documents shall be submitted by the operating organization as part of an application for an operating license:

- safety analysis report;
- quality assurance program for the operation of RW management facilities;
- data on recruitment, training, maintenance of qualifications and issued permits to self-guided work;
- guide on elimination of accidents;
- guidelines on management of beyond design basis accidents;
- action plans for the protection of personnel in the event of an accident at the facility;
- documentary evidence for accounting and control of radioactive waste;
- documentary evidence for physical protection;
- commissioning program for the RW management facility;
- guides on the operation of main technological systems.

A review is performed to evaluate the adequacy of nuclear and radiation safety demonstration provided for a NF and (or) declared activity by the applicant. Expert reviews of documents submitted as part of license applications are carried out by organizations having Rostekhnadzor licenses authorizing them to perform reviews of design, engineering and process flow documentation and documents demonstrating nuclear and radiation safety of facilities, radiation sources, NM, RM and RW storage facilities, NM, RM and RW management activities. Information on expert organizations having appropriate Rostekhnadzor licenses is posted in online mode on the web-site by the coordinating division of the Rostekhnadzor's central office.

The Federal Law «On the Management of Radioactive Waste...» provide for transformation of RW conservation facilities into RW disposal facilities given that the facility is fitted with appropriate safety barriers isolating RW from the environment during the period of potential hazard of the disposed waste. Procedures for licensing activities associated with the operation of such facilities are similar to those established for RW DF.

Operation of RW management facilities can be started only following the completion of all initial testing activities, and comprehensive testing of its systems (components). Furthermore, the relevant safety analysis report shall be revised based on the results of initial testing activities and comprehensive testing of the systems (components).

H.6.2. Setting and adjusting safe operational limits and conditions

The operating organization shall ensure the development of operational documentation for RW management facilities based on the materials provided by the designers of equipment, technological processes and the project before the comprehensive testing of systems (and its components).

Operational documentation shall involve safe operation guides and techniques, general procedures for execution of safety-related operations, limits and conditions for safe operation, specific instructions to employees (personnel) on the ways of executing certain operations under normal operation and operational disorders, including near miss incidents, actions of employees (personnel) to ensure safety in the event of design basis and beyond design basis accidents.

Operational documentation shall be revised following the commissioning results.

Prior to any amendments having effect on nuclear and radiation safety are introduced to the operational documentation, these materials together with the revised documents demonstrating safety (reports, supplements to reports and etc.) shall be submitted to Rostechnadzor for further review; following the review Rostechnadzor will decide whether the conditions of the license are to be altered or not.

H.6.3. Regulation of maintenance and repairs, inspection and testing of RW management facilities

The operating organization shall arrange for planned and preventive maintenance and (or) overhaul of equipment at RW management facilities in accordance with the approved schedules.

Supervisory personnel of enterprises develop relevant maintenance programs based on valid regulatory and institutional documents. They also develop and approve relevant schedules for their implementation. All operations are performed in conformity with maintenance instructions for safety-important systems and with relevant schedules approved by the management team of enterprises.

Maintenance, inspections and testing are performed for safety-important systems to maintain their performance. These operations are carried out in keeping with relevant operational documentation, programs and schedules developed according to procedure established by the operating organization based on design requirements.

After technical maintenance, systems and their components are checked against design characteristics and their performance is tested as well, the results obtained are fixed.

Safety-important systems (their components) are normally subjected to direct and complete checks against relevant design characteristics during commissioning and following their maintenance and are carried out periodically throughout the operating lifetime of RW management facilities.

The need of unscheduled maintenance and repairs of systems and equipment is identified following the results of relevant control arrangements.

Inspections of safety-important systems (components) and their testing are performed in accordance with technical regulation.

According to the requirements of federal norms and rules, functional tests of safety important systems shall be performed prior to commissioning of RW management facilities, after their overhaul, reconstruction and (or) modernization, as well as periodically in accordance with the design requirements or provisions of relevant regulations or operational documentation. Frequency and scope of periodic checks are set in accordance with relevant schedules.

During the operation of an RW management facility, and during its maintenance and repair, in particular, the operating organization shall ensure that relevant operations are performed by personnel having appropriate qualifications and shall provide the involvement of appropriately licensed organizations to perform the required activities and to deliver their services.

During operation, Rostechnadzor shall exercise appropriate control and supervision, accompanied with institutional controls and inspections.

H.6.4. Engineering, technical and scientific support of operation

The operating organization shall provide the required engineering, technical and scientific support of RW management facility operation throughout its operating lifetime using its own resources or subcontracting other organizations.

The operating organization shall arrange for planned and preventive maintenance and (or) overhaul of equipment at RW management facilities in accordance with the approved schedules. Maintenance, repairs, testing and tests are performed to maintain the performance of safety important systems and to avoid dangerous failures.

Forms and types of engineering and technical support may vary depending on the specific tasks facing the operating organization or a particular facility during its siting, construction, commissioning and operation.

Normally, the operating organization subcontracts specialized scientific and research, design and engineering, repair, commissioning and other organizations and enterprises manufacturing equipment for RW management facilities that have appropriate experience and licenses to provide relevant services in the field of atomic energy use.

H.6.5. Accounting of safety significant operational incidents at RW management facilities

According to requirements of the Federal Law «On the Use of Atomic Energy», the operating organization shall exert continuous control over the safe operation of RW management facilities at all stages of their lifetime.

At present time, activities associated with accounting and control of operational disorders at RW management facilities, including safety significant incidents, are regulated by the following federal norms and rules:

- Regulation on procedures for investigating and accounting operational disorders (NP-047-11 and etc.);
- General safety provisions (NP-016-05 and etc.);
- as well as internal documents of operating organizations establishing the procedures for accounting and investigating operational disorders at RW management facilities.

Operational disorders at facilities, including accidents, shall be investigated in accordance with established procedures. The operating organization shall develop and arrange for measures to avoid reoccurrence of operational disorders and submit information on such disorders to the state safety regulatory authority in the field of atomic energy use.

The system for accounting and investigating operational disorders implemented by the operating organization shall be aimed at early detection and prevention of operational failures and their timely elimination.

H.6.6. Programs to collect and analyze operational experience of RW management facilities

The organization operating an RW management facility shall ensure collection, processing, analysis, systematization and keeping of data on the relevant operational experience, including the information on investigations of operational disorders, failures of safety-important system components and improper actions of employees (personnel) in accordance with established procedure; it shall ensure timely and proper exchange of all relevant information with organizations authorized to perform its analysis.

The operating organization shall store relevant design documentation on NFC facility, as-built documentation on the construction of NI and SF, test certificates and as-built documentation on maintenance of safety-important systems (and their components) throughout the operating lifetime of the facility.

As for RW disposal facilities, the operating organization shall document and store information required for RW DF (DWIF) closure, including design and operational documentation, as well

as information on alterations introduced to process flow sheets, refurbishments, radioactive contamination of surfaces prior to closure, as well as radioactive contamination of the RW DF site, on the amounts and radionuclide composition of waste accumulated during operation and held at DF site, their characteristics and locations, amounts of disposed waste, radionuclide inventory and specific activity, storage capacity and free space in the repository, accidents at RW DF that resulted in radioactive contamination of systems, components, premises and structures.

H.6.7. Decommissioning program

Requirements to the safe decommissioning (closure) of NFs, and RW management facilities, in particular, are established in the Federal Law «On the Use of Atomic Energy», by-laws, federal norms and rules in the field of atomic energy use (NP-001-97, NP-033-11, NP-022-2000, NP-016-05, NP-057-04, NP-012-99, NP-028-01, NP-055-04, NP-069-06) and sanitary rules OSPORB-99/2010, SPORO-2002, SP and TU EKKh-93).

According to Article 18 of the Regulation on Licensing Activities in the Field of Atomic Energy Use, during the review of a license application for NI or SF siting, construction and operation and the set of documents demonstrating safety of NI or SF and (or) relevant activities, Rostekhnadzor shall analyze the ability of the licensee to ensure proper conditions for safe completion of declared activities and decommissioning of the nuclear facility, as well as the availability of appropriate plans, programs and design documentation.

Appropriate technical provisions and administrative arrangements during design, construction and operation of RW management facilities, including RW disposal facilities, shall be put in place with account of their future decommissioning (closure).

Decommissioning of RW management facilities (closure of RW disposal facilities) shall be performed in accordance with decommissioning (closure) program and decommissioning (closure) project.

Decommissioning (closure) activities shall be preceded by a comprehensive engineering and radiation investigation of the RW management facility. The operating organization shall ensure the development of a decommissioning project for the RW management facility and prepare a safety analysis report for decommissioning (closure) based on the investigation findings.

Decommissioning (closure) program and project shall be developed with due consideration of performed improvements and the consequences of occurred incidents.

H.7. Institutional measures after closure (Article 17)

Article 17. Institutional Measures after Closure

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

- (i) records of the location, design and inventory of that facility required by the regulatory body are preserved;*
- (ii) active or passive institutional controls such as monitoring or access restrictions are carried out, if required; and*
- (iii) if, during any period of active institutional control, an unplanned release of radioactive materials into the environment is detected, intervention measures are implemented, if necessary.*

The following requirements are set forth in the Federal Law «On the Management of Radioactive Waste...»:

- the RW DF designs shall provide for periodic post-closure radiation monitoring at the RW DF site;

- after RW DR closure and after the period of potential hazard of the waste disposed thereof is expired, the state management authority in the field of RW management in coordination with state safety regulatory authorities shall make a decision on termination of periodic radiation monitoring service at the RW DF site and on introduction of relevant amendments to the registry of RW storage facilities.

Federal norms and rules regulating RW disposal safety (NP-055-04, NP-069-04) specify the requirements for the safe closure of RW disposal facilities, the relevant closure procedures and the procedures for post-closure controls.

NP-058-04, NP-055-04 and NP-069-06 establish the requirements to post-closure institutional control over RW disposal facilities. Post-closure institutional control of RW disposal system shall involve monitoring of engineered and natural barriers status, and the environmental monitoring. Main objectives of such monitoring surveys are as follows: to identify the dynamic pattern of RW plume, monitoring of changes in geological medium, early detection of incidents and their elimination. In the course of monitoring, the results obtained shall be documented and stored in relevant data basis.

Duration of monitoring surveys and their frequency shall be identified during the development of the closure project and depend on the total activity of disposed RW and the radionuclide inventory.

Part of existing monitoring wells shall be kept for post-closure monitoring purposes, and if some wells are found to be technically inadequate, new monitoring wells shall be constructed.

The existing requirements provide for the following:

- drafting and submittal of RW disposal accounting documents (passports) to the system of state accounting and control of RM and RW;
- input of RW disposal data into the registry of RW disposal facilities;
- permanent storage of data on RW inventory, registry of RW storage facilities and RW passports.

According to the requirements of federal norms and rules, an RW DF (DWIF) monitoring system shall involve a computer model designed to forecast the migration of waste in the geological medium with account of processes that are likely to result in changes of the geological medium due to RW disposal, as well as likely impacts of the disposal on the population and the environmental medium.

As for DWIF, modeling of migration processes that occur in the reservoir bed shall account for generation of piezometric surfaces, interactions of radioactive waste with rocks and underground waters, temperature changes, gas generation and microbiological processes. The computer model shall be validated and certified by relevant regulatory authority.

The most important safety indicators that can be forecasted for an DWIF are as follows:

- concentrations of radionuclides within the mining allotment and accessible biosphere;
- plume representing the migration of radioactive components contained in waste;
- temperature and pressure in the reservoir bed;
- exposure doses for individuals and environmental medium.

The following shall be considered in the forecasts:

- geological structure and geological setting of the disposal unit;
- radionuclide and chemical composition of waste;
- injection mode;
- sorption, chemical and biological processes;
- RW heat generation;
- filtration processes, including those in low-permeability rocks.

New items can be added to this list during the development of DWIF closure project.

If monitoring of RW disposal system identifies any non-conformities with the RW DF (DWIF) end state established in the RW DF (DFIF) closure project that can undermine its safety, all practicable efforts shall be put in place to ensure the post-closure safety, including the reduction radionuclide migration, soil decontamination, treatment of surface and underground waters, dewatering of disposal cells, as well as other necessary activities. Detailed program of possible actions shall be developed along with the closure project. Post-closure monitoring of RW DF (DWIF) shall be performed in accordance with the program developed and implemented by the operating organization. The program shall specify procedures, conditions and the schedules for the following arrangements:

- post-closure monitoring of RW DF (DWIF) safety;
- monitoring of RW disposal system, including control of engineered and natural barriers state;
- environmental monitoring;
- protection of engineered barriers from degradation caused by animal intrusion or intrusion of roots;
- dismantlement of systems and equipment used to monitor RW disposal system;
- prevention of inadvertent human intrusion.

The program shall specify:

- maintenance of records on the closed RW DF (DWIF);
- the end state of RW DF (DWIF) after the termination of monitoring services in the RW disposal system.

Section I. Transboundary movement (Article 27)

Article 27. Transboundary Movement

27-1 *Each Contracting Party involved in transboundary movement shall take the appropriate steps to ensure that such movement is undertaken in a manner consistent with the provisions of this Convention and relevant binding international instruments.*

In so doing:

- (i) a Contracting Party which is a State of origin shall take the appropriate steps to ensure that transboundary movement is authorized and takes place only with the prior notification and consent of the State of destination;*
- (ii) transboundary movement through States of transit shall be subject to those international obligations which are relevant to the particular modes of transport utilized;*
- (iii) a Contracting Party which is a State of destination shall consent to a transboundary movement only if it has the administrative and technical capacity, as well as the regulatory structure, needed to manage the spent fuel or the radioactive waste in a manner consistent with this Convention;*
- (iv) a Contracting Party which is a State of origin shall authorize a transboundary movement only if it can satisfy itself in accordance with the consent of the State of destination that the requirements of subparagraph (iii) are met prior to transboundary movement;*
- (v) a Contracting Party which is a State of origin shall take the appropriate steps to permit re-entry into its territory, if a transboundary movement is not or cannot be completed in conformity with this Article, unless an alternative safe arrangement can be made.*

27-2 *A Contracting Party shall not license the shipment of its spent fuel or radioactive waste to a destination south of latitude 60 degrees South for storage or disposal.*

27-3 *Nothing in this Convention prejudices or affects:*

- (i) the exercise, by ships and aircraft of all States, of maritime, river and air navigation rights and freedoms, as provided for in international law;*
- (ii) rights of a Contracting Party to which radioactive waste is exported for processing to return, or provide for the return of, the radioactive waste and other products after treatment to the State of origin;*
- (iii) the right of a Contracting Party to export its spent fuel for reprocessing;*
- (iv) rights of a Contracting Party to which spent fuel is exported for reprocessing to return, or provide for the return of, radioactive waste and other products resulting from reprocessing operations to the State of origin.*

The following instruments regulate transportation of nuclear and radioactive materials, including SNF import to the Russian Federation:

- The Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal;
- The Vienna Convention on Civil Liability for Nuclear Damage;
- Federal Law «On the Use of Atomic Energy»;
- Federal Law «On the Environmental Protection»;
- Federal Law «On the Management of Radioactive Waste and Amendments to Certain Legislative Acts of the Russian Federation»;
- Federal Law «On the Sanitary and Epidemiological Welfare of the Population»;
- resolution of the Government of the Russian Federation N° 418 of July 11, 2003 «On the Importation of Irradiated Fuel Nuclear Reactor Assemblies to the Russian Federation»;
- Federal Law № 92-FZ of July 10, 2001 «On Special Environmental Programs for the Remediation of Radioactively Contaminated Territories»;
- resolution of the Government of the Russian Federation № 204 of March 19, 2001, as amended on September 15, 2009 (№ 751) and on February 15, 2011 (№ 78) «On the State Competent Authority Ensuring Nuclear and Radiation Safety for Transportation of Nuclear Materials, Radioactive Materials and the Relevant Products».

Article 63 of the Federal Law «On the Use of Atomic Energy» stipulates that export and import of nuclear materials, including nuclear fuel, radioactive materials and radiation sources shall be subjected to international obligations of the Russian Federation on non-proliferation of nuclear weapons and international agreements of the Russian Federation in the field of atomic energy use.

Import of SNF from foreign countries to the territory of the Russian Federation for the purposes of its temporary technological storage and (or) reprocessing shall be performed in accordance with procedures established by the Russian legislation and international agreements of the Russian Federation.

Import to the Russian Federation of irradiated fuel assemblies of foreign origin is authorized following a positive statement of a special commission set up by the President of the Russian Federation.

Import of irradiated fuel assemblies from nuclear reactors to the Russian Federation for the purposes of temporary technological storage and (or) reprocessing is allowed only if state environmental expert assessment and other state expert assessments of the project envisaged by the legislation of the Russian Federation confirm overall reduction of risks associated with radiation impacts and the improvement of environmental safety due to the implementation of the project.

According to the Federal Law «On the Environmental Protection» (Articles 48 and 51), import of RW from foreign countries to the Russian Federation under storage contracts, including for the purposes of their disposal or decontamination, is prohibited.

Article 31 of the Federal Law «On the Management of Radioactive Waste and Amendments to Certain Legislative Acts of the Russian Federation» stipulates that import of radioactive waste to the Russian Federation for the purposes of its storage, processing and disposal is prohibited unless these wastes are sealed radiation sources.

Procedure for the importation of nuclear reactors' spent fuel assemblies to the Russian Federation, as well as for the return of SFAs or by-products resulting from their reprocessing (including RW) to the country of origin is established by the resolution of the Government of the Russian Federation № 418 «On Importation of Irradiated Fuel Assemblies of Nuclear Reactors to the Russian Federation» of July 11, 2003.

According to the resolution, import of SFAs to the Russian Federation is authorized only if the statement of the state environmental assessment of the unitary project drafted by authorized organizations and approved by the atomic energy ministry (currently, ROSATOM) and the Federal Environmental, Industrial and Nuclear Supervision Service is positive, and if these authorized organizations have appropriate licenses issued by the Federal Environmental, Industrial and Nuclear Supervision Service.

SNF import to the Russian Federation is performed in compliance with international legal standards and the Russian legal and regulatory framework, in particular:

- Agreement between the Government of the Russian Federation and the Government of Ukraine on Scientific, Technical and Economic Cooperation in Atomic Energy of January, 14, 1993;
- Agreement between the Government of the Russian Federation and the Government of the Republic of Bulgaria on Cooperation in Atomic Energy of May 19, 1995;
- Agreement between the Government of the Russian Federation and the Government of the Republic of Uzbekistan on Scientific and Technical Cooperation for Peaceful Nuclear Uses of December 22, 1997;

- Agreement between the Government of the Russian Federation and the Government of the Republic of Kazakhstan on Cooperation for Peaceful Nuclear Uses of September 23, 1993;
- Agreement between the Government of the Russian Federation and the Government of the Czech Republic on Scientific and Technical Cooperation in Atomic Energy of December 4, 1994 and Supplement to the Agreement between the Government of the Russian Federation and the Government of the Czech Republic on Scientific and Technical Cooperation in Atomic Energy of April 15, 1999;
- Agreement between the Government of the Russian Federation and the Government of the Republic of Latvia on Cooperation in Import of Research Reactor SNF to the Russian Federation of December 3, 2007;
- Agreement between the Government of the Russian Federation and the Government of the Socialist Republic of Vietnam on Cooperation in Construction of a Nuclear Power Plant in the Territory of the Socialist Republic of Vietnam of October 31, 2010;
- Agreement between the Government of the Russian Federation and the Government of the Republic of Belarus on Cooperation for Peaceful Nuclear Uses of May 28, 2009;
- Agreement between the Government of the Russian Federation and the Government of the Republic of Belarus on Cooperation in Import to the Russian Federation of Spent and Fresh Highly Enriched Fuel for Research Reactors and in Supplies to the Republic of Belarus of Fresh Low-Enriched Nuclear Fuel of October 8, 2010;
- Agreement between the Government of the Russian Federation and the Great Socialist People's Libyan Arab Jamahiriya on Cooperation for Peaceful Nuclear Uses of November 1, 2008;
- Agreement between the Government of the Russian Federation and the Great Socialist People's Libyan Arab Jamahiriya on Cooperation in Import of Research Reactor SNF to the Russian Federation of October 21, 2009;
- Agreement between the Government of the Russian Federation and the Government of the Republic of Poland on Cooperation in Import of Research Reactor SNF to the Russian Federation of September 1, 2009;
- Agreement between the Government of the Russian Federation and the Government of the Republic of Serbia on Cooperation in Import of Research Reactor SNF to the Russian Federation of June 10, 2009;
- Agreement between the Government of the Russian Federation and the Government of the Republic of Romania on Cooperation in Import of Research Reactor SNF to the Russian Federation of February 19, 2009;
- Agreement between the Government of the Russian Federation and the Government of the Republic of Hungary on Cooperation in Import of Research Reactor SNF to the Russian Federation of July 22, 2008;
- Agreement between the Government of the Russian Federation and the Government of the Republic of Bulgaria on Cooperation in Import of Research Reactor SNF to the Russian Federation of January 18, 2008.

Transportation of irradiated fuel assemblies and by-products of their reprocessing within the territory of the Russian Federation is carried out in accordance with federal norms and rules in the field of atomic energy use, special transport rules, transport regulations for dangerous goods, as well as with due consideration to existing international standards for the safe transportation of radioactive material, including:

- Rules for the safe transport of radioactive material (NP-053-04). ***NP-053-04 was developed on the basis of IAEA recommendations presented in Safety Series documents TS-R-1 (ST-1, Rev.). Regulations for the Safe Transport of Radioactive Material (2000).***

- Sanitary Rules for the Radiation Safety of Personnel and the Public During Transportation of Radioactive Materials (substances) (SanPiN 2.6.1.1281-03);
- Basic Rules for Accounting and Control of Radioactive Material and Radioactive Waste in Organizations (NP-067-05);
- Rules for Physical Protection of Radioactive Material and Radiation Sources During their Transportation (NP-073-06);
- Basic Sanitary Rules of Radiation Safety (OSPORB-99/2010);
- Radiation Safety Standards (NRB-99/2009) and etc.

The Government of the Russian Federation establishes the annual amounts of SNF import to the territory of the Russian Federation.

Positive statement of state environmental expert assessment of relevant unitary project is an essential condition for SNF import from foreign countries to the Russian Federation for the purposes of its temporary technological storage and (or) reprocessing.

Unitary project is a set of documents prepared for the proposed foreign trade contract on providing certain operations with irradiated fuel assemblies; subjected to state environmental expert assessment, developed and approved in accordance with established requirements, including:

- draft of the foreign trade contract;
- SEP the costs of which are covered by funds raised from foreign trade operations with irradiated fuel assemblies;
- materials justifying overall reduction of risks associated with radiation impacts and improvement of environmental safety due to the implementation of the unitary project, as well as time limits for technological storage of irradiated fuel assemblies and the by-products envisaged by the foreign trade contract.

Carrier responsible for transportation of nuclear and radioactive materials shall have an appropriate permit (license) issued by relevant state safety regulatory authority and authorizing him to perform relevant activities in the field of atomic energy use.

Foreign trade contract on import of irradiated fuel assemblies of foreign production shall provide for further return of radioactive waste to the country of origin except as otherwise provided in international agreements of the Russian Federation.

Return of by-products resulting from reprocessing is provided on the following terms:

- return of reprocessing by-products shall be carried out in compliance with the international obligations of the Russian Federation on non-proliferation of nuclear weapons;
- foreign contract with the Russian Federation shall involve provisions on obligations and liabilities of the country of origin on receipt of the by-products, as well as on providing opportunities to verify if adequate conditions for their receipt and safe management are available;
- the foreign trade contract shall specify inventory, composition, physical form, amounts of by-products, and types of packages intended for return.

To determine the amount of by-products intended for return to the country of origin, special procedures approved by both Parties are used assuming that activity of irradiated assemblies previously imported for reprocessing is equivalent to the activity of returned by-products resulting from the reprocessing with account of natural decay due to IFA reprocessing and temporary technological storage of the irradiated assemblies and the by-products.

Rostekhnadzor and its sanitary and epidemiologic bodies, Ministry of the Russian Federation for Civil Defense, Emergencies and Elimination of Consequences of Natural Disasters and Federal Service for Supervision of Natural Resources exercise state supervision over nu-

clear, radiation and fire safety, as well as state control over environmental safety at all management stages involving irradiated fuel assemblies and by-products of their reprocessing.

In accordance with effective contracts, spent nuclear fuel is imported from Ukraine and Bulgaria. In 2014, damaged SFAs were imported from NPP «Paks» (Hungary).

On May 27, 2004, a bilateral agreement concerning the return of Russian-origin (soviet-origin) high-enriched uranium (HEU) research reactor fuel to Russia was signed in Moscow by the Government of the Russian Federation and the Government of the United States of America.

According to the agreement, Russian-origin SNF, potentially suitable for manufacturing nuclear weapons, shall be returned back to Russia.

Scheduled RR SNF return from Uzbekistan (2005-2006, 2012), the Czech Republic (2007, 2013), Latvia (2008), Bulgaria (2008-2009), Hungary (2008, 2013), Kazakhstan (2008-2009, 2014), Romania (2009), Libya (2009), Poland (2009-2010, 2012, 2014), Belarus (2010), Ukraine (2010, 2012), Serbia (2010), and Vietnam (2013) to Russia has been completed.

In the coming years, RR SNF is scheduled for return from Uzbekistan, Poland and Kazakhstan.

SNF transport from abroad and within the territory of the Russian Federation is carried out by rail, by air and by road.

Transport of SNF packages from Ukrainian NPPs is carried out via direct (reloading-free) rail connections.

Transport of SNF packages from Kozloduy NPP (Bulgaria) is performed by water transport and by rail, since the NPP is situated on the Danube River and has no rail facilities.

Non-self-propelled barge «Nautilus» is used for transportation of SNF packages from Kozloduy NPP along the Danube River, and then, in the river harbor Ismail (Ukraine), the packages are reloaded and transported by rail, or packages from NPP Kozloduy are shipped directly by «Baltiyskiy-202» to the sea terminal in Taganrog where they are reloaded and transported by rail.

The transportation involves:

- certified transportation packages, for which the compliance of the designs with provisions of rules for safe transportation of radioactive material was demonstrated both through calculations and experimental studies of full-sized prototypes, transportation package models and their components. Findings from these justifications demonstrating the safety of transportation package designs and the safety of its transport can be found in various calculations, engineering analysis notes, reports, records and statements;
- specially designed rail cars and vessels are used for transportation of such packages;
- transportation is carried out in specially designed railway trains under special conditions (special train);
- continuous control over transportations.

All shipments are performed in full compliance with international law, as well as legal and regulatory frameworks of Russia, Bulgaria, Ukraine, Uzbekistan, the Czech Republic, Latvia, Hungary, Kazakhstan, Romania, Libya, Poland, Belarus, Serbia and Vietnam and only if appropriate transportation permits issued by relevant competent authorities of these states are available.

TUK-13/1V, TUK-10V and TUK-13V are used for transport of SNF from WWER-1000 reactors to MCC. The relevant transportation procedure is established by the Rostekhnadzor's

license № GN-05-401-2337 «On handling of nuclear material during transportation» of April 1, 2010, based on the following valid certificates of approval:

- certificate for design and transportation permit for TUK-13/1V RU/052/B(U)F-96T (Rev.6);
- certificate for design and transportation permit for TUK-10V-1 RU/050/B(M)F-96T (Rev.6);
- certificate for design and transportation permit for TUK-13V RUS/046/B(U)F-96T (Rev.7).

TUK-6 is used for transportation of SNF from WWER-440 reactors to PA «Mayak» on the basis of valid certificates of approval RU/042/B(M)F-96T (Rev.7) and RUS/3110/B(M)F-96T in accordance with the procedure established by the Rostekhnadzor's license № GN-05-401-2381 «On handling of nuclear material during transportation» of June 1, 2010.

The Federal Law № 139-FZ «On the Ratification of the Joint Convention on the Safety of Spent Fuel Management and the Safety of Radioactive Waste Management» of November 4, 2005 ensures, in particular, the compliance with provisions of Article 27-2 of the Convention that the Russian Federation shall not license the shipment of its spent fuel or radioactive waste to a destination south of latitude 60 degrees South for storage or disposal.

RW export to and import from the Russian Federation for the purposes of their storage, processing and disposal are prohibited except for cases referred to in the Article 31 of the Federal Law № 190-FZ «On the Management of Radioactive Waste...» of July 11, 2001 (as amended on July 2, 2013):

- RW resulting from the reprocessing of SNF imported to the Russian Federation is allowed to be returned to the country of origin if this is provided for in the relevant international agreement of the Russian Federation;
- spent sealed ionizing radiation sources are allowed to be returned to the country of origin, if the sealed sources were exported to the Russian Federation;
- spent sealed ionizing radiation sources produced in the Russian Federation are allowed to be returned to Russia including for the purposes of their processing and disposal.

Section J. Disused sealed sources (Article 28)

Article 28. Disused Sealed Sources

28-1 Each Contracting Party shall, in the framework of its national law, take the appropriate steps to ensure that the possession, remanufacturing or disposal of disused sealed sources takes place in a safe manner.

28-2 A Contracting Party shall allow for reentry into its territory of disused sealed sources if, in the framework of its national law, it has accepted that they be returned to a manufacturer qualified to receive and possess the disused sealed sources.

According to the system of RM and RW accounting and control, each year, an average of some 40 000 SRSs with expired service lives are withdrawn from service in the Russian Federation.

Following withdrawal, SRSs are handed over to the FSUE «NO RW» for long-term storage in accordance with established procedure.

The legal framework governing management of SRS, including disused and expired SRS, involves legal provisions in the field of atomic energy use, RW management and environmental protection, resolution of the Government of the Russian Federation № 1298 «On the Approval of Rules for Arranging the System of State Accounting and Control of Radioactive Material and Radioactive Waste» of October 11, 1997 (as amended on February 4, 2011), «Regulation on State Accounting and Control of Radioactive Material and Radioactive Waste in the Russian Federation» (approved by Atomic Energy Ministry on October 11, 1999), federal norms and rules in the field of atomic energy use setting up safety requirements for radiation sources containing radionuclide sources (NP-038-11), as well as requirements to accounting and control of radioactive material and radioactive waste in organizations.

According to provisions of federal norms and rules in the field of atomic energy, operation of radiation sources with radionuclide sources of radiation hazard categories 1, 2 and 3 are to be licensed in accordance with the Federal Law «On the Use of Atomic Energy».

Operation of radiation sources containing exclusively radionuclide sources of radiation hazard categories 4 and 5 are to be included on the registry of organizations operating radiation sources containing exclusively radionuclides of radiation hazard categories 4 and 5. Registration of such organizations is performed by Rostekhnadzor in accordance with notification procedure (resolution of the Government of the Russian Federation № 1184 of November 19, 2012).

In accordance with provisions of the Federal Law «On the Management of Radioactive Waste...» sealed ionizing radiation sources produced in the Russian Federation are allowed to be imported to Russia, including for the purposes of their reprocessing and disposal.

According to the Federal Law «On the Use of Atomic Energy», owners of RS and RM shall ensure control over their safety and proper use.

Accounting and control of RM and RW shall be ensured by the operating organization.

Rules for accounting and control of RM and RW, including SRS, are set forth in NP-067-11.

SRS with expired service life are either to be taken of the books as RM, their status is to be changed to RW, relevant notes are entered both to the RW accounting journal and the RM accounting journal and the relevant acts are drawn up, or the SRS service life is to be extended and appropriate notes are to be entered to the RM accounting journal.

The recipient organization shall compare actual data on received SRS with the data provided by the organization that handed over the SRS. If such comparison reveals losses, theft, unauthorized use or non-delivery (extra amount) of spent SRS, the recipient organization shall

inform relevant management authorities of the state system for accounting and control of RM and RW (relevant management body of the state system for accounting and control at the federal level, management body of the state system for accounting and control at the regional level, management body of the state system for accounting and control at the institutional level), state safety regulatory authority in the field of atomic energy use supervising the state system for RM and RW accounting and control within 24 hours of establishing the abovementioned facts.

Organizations shall put in place and maintain a system of arrangements to store accounting documents on SRS and unsealed radiation sources (USR) during 10 years following the SRS and USR were defined as RW or handed over to other organizations.

Rostekhnadzor exercises control over the safety of SRS management in the Russian Federation.

Rostekhnadzor is responsible for licensing activities associated with SRS use, control over the compliance with the license conditions and regulatory requirements.

Currently, notification procedure is applied in respect of organizations for the provision of information on SRS transport, given that such data are to be provided both by the supplier (after the SRS was sent) and the receiving organization (after the receipt).

Transportation and storage (disposal) of disused SRSs is performed by specialized organizations having appropriate licenses of Rostekhnadzor and in compliance with the requirements of federal norms and rules in the field of atomic energy use.

Active efforts to dispose highly active SRS, including RTGs, are implemented under the national program and international cooperation, also involving the IAEA. As of the end of 2013, 16 RTGs out of 1007 were still operating: 12 RTGs were operated by the Defense Ministry (Kamchatka), and 4 RTGs owned by Rosgidromet are located on Antarctic Continent. RTGs transportation from Antarctic is expected to start in 2015.

Section K. Planned activities to improve safety

«State Policy Fundamentals of the Russian Federation in the Field of Nuclear and Radiation Safety up to 2025» (approved by the decree of the President of the Russian Federation № Pr-593 of March 1, 2012) specifies crucial tasks in the field of safe management of spent nuclear fuel and radioactive waste currently addressed in practice and those that are to be addressed in the future.

The federal target program «Nuclear and Radiation Safety for 2008 and until 2030» is still underway. A draft of a similar program for the period until 2025 has been developed and its approval is expected in 2015.

Most important tasks as regards the improvement of safety in SNF and RW management facing the Russian Federation are as follows:

- a) with regard to the development of state management, regulation and coordination of efforts for the safe use of atomic energy:
 - ◆ follow-up the development of the USS RW in order to arrange for and ensure safe and cost-effective RW management, also covering RW disposal;
 - ◆ to establish a unified system for SNF management;
 - ◆ to upgrade and elaborate the state system for accounting and control of radioactive material and RW;
 - ◆ to increase the efficiency of scientific, methodological, regulatory, material, technical, and administrative support of activities involving management of nuclear material, radioactive material, RW and SNF;
- b) with regard to the improvement of safety at nuclear and radiation hazardous facilities, protection of personnel, public and the environment:
 - ◆ development and incorporation of advanced facilities, equipment, operational procedures characterized by a higher safety level, including the use of nuclear and radiation safe, and bust- and flameproof technologies, modern technologies ensuring safety of NM, RM, RW and SNF management;
- c) with regard to disposition and dismantlement of nuclear and radiation hazardous facilities which currently are not used for their functional purposes, SNF and RW management, remediation of radioactively contaminated sites:
 - ◆ control over nuclear and radiation hazardous facilities which currently are not used for their functional purpose, SNF and RW, radioactively contaminated sites on the territory of the Russian Federation;
 - ◆ assured transportation of SNF from operators' sites, its reprocessing and long-term storage;
 - ◆ development and implementation of a set of measures to commission new SNF management facilities being part of a centralized infrastructure to ensure its safe transportation, long-term storage and reprocessing;
 - ◆ construction of near-surface disposal facilities for low-level and intermediate-level RW and a deep disposal facility for long-lived and high-level RW;
 - ◆ development of cutting-edge technologies for SNF and RW reprocessing, and decommissioning of nuclear and radiation hazardous facilities;
 - ◆ mitigation of environmental damage and remediation of radioactively contaminated sites;
 - ◆ safe industrial-scale dismantlement of nuclear submarines, nuclear-powered surface ships and nuclear maintenance vessels withdrawn from naval service, as well as of decommissioned ships of the Russian icebreaker fleet;
 - ◆ disposition of decommissioned equipment and materials used in the development of nuclear weapons complex, including the arrangements for reprocessing and transportation of such items to the work site.

SNF removal from sites of operating organizations for the purposes of its reprocessing or long-term storage will be continued. Commissioning of cutting complexes designed for SFAs from RBMK units is expected at Kursk and Smolensk NPPs.

Plans also call for commissioning of a centralized infrastructure for RW management ensuring safe transportation, long-term storage and processing of waste, involving the commissioning of the second unit of the «dry» storage facility.

Furthermore, plans call for commissioning of near-surface RW disposal facilities, as well as of a deep disposal facility for long lived and high-level RW.

Infrastructure development, including design development and construction of SRW processing complexes at Smolensk and Leningrad NPPs is to be provided under the RW management activities performed by operating organizations.

Management issues associated with accumulated RW inventory and conservation of water reservoirs storing LRW are planned to be addressed as well.

Organizations under OJSC «Atomenergoprom» perform annual valuation of liabilities (in accordance with IFRS provisions) for decommissioning and safe management of SNF and RW against regular payments into relevant reserve funds intended to cover the associated costs.

More detailed discussion of planned activities to improve safety is presented in relevant Sections of the Report.

Section L. Annexes

Annex B1. SNF management

Table B1.1. Infrastructure facilities for SNF management

Location		Facility type
NPP		
Kola NPP	WVER-440	Storage Facility
Novovoronezh NPP	WVER-440	
	WVER-1000	
Balakovo NPP	WVER-1000	
Volgodonsk NPP	WVER-1000	
Kalinin NPP	WVER-1000	
Kursk NPP	RBMK-1000	
Leningrad NPP	RBMK-1000	
Smolensk NPP	RBMK-1000	
Beloyarsk NPP	BN-600	
	AMB	
Bilibino NPP	EGP-6	
NFC		
PA Mayak	WVER-440, AMB	Reprocessing Facility Storage Facility
MCC	WVER-1000 RBMK-100	Storage Facility
RR		
National Research Center «Kurchatov Institute»	MR	Storage Facility
	IR-8	
IPPE	AM-1	
	BR-10	
IRM	IVV-2M	
RIAR	MIR.M1	
	SM-3	
	RBT-10/2	
	BOR-60	
	VK-50	
	KORO	
PNPI named after Konstantinov	VVR-m	Storage Facility
Branch of Karpov IPC	VVR-ts	
MEPhI	IRT- MEPhI	
SSU «TPU SRI NF»	IRT-T	
NPF		
«Atomflot», FMB «Lotta»		Storage Facility
Container Storage for Icebreakers' SNF		

Table B1.2. SNF inventory from different reactor units, as of January 1, 2014

Operating organization and its branches	Fuel type	SNF quantity, metric tons
Kola NPP	WWER-440	84.554
Novovoronezh NPP	WWER-440	2.919
	WWER-1000	154.342
Balakovo NPP	WWER-1000	349.714
Rostov NPP	WWER-1000	149.122
Kalinin NPP	WWER-1000	308.159
Kursk NPP	RBMK-1000	4733.883
Leningrad NPP	RBMK-1000	4776.363
Smolensk NPP	RBMK-1000	2960.06
Beloyarsk NPP	BN-600	30.704
	AMB	190.9
Bilibino NPP	EGP-6	159.361
PA Mayak	WWER-440, AMB	453
MCC	WWER-1000	6582
	RBMK	344
IPPE	AM-1	10.57
RIAR	MIR, SM, VK-50, BOR-60	63.613
NRC «Kurchatov Institute»	MR, IR-8	
Atomflot, FMB «Lepse»		2.52*
Atomflot, FMB «Lotta»		3.58*
Atomflot, FMB «Imandra»		1.01*
Atomflot, NI SNF container-type SF		1.34*

* recalculated to uranium metal

Annex B2. RW generation

Table B2.1. LRW generation in 2013

Total LRW	Volume 1.88 mln m ³ — 100%	Activity 1.55·10 ¹⁸ Bq — 100%
LLW	90.43%	Less than 0.01%
ILW	9.36%	2.08%
HLW	0.21%	97.91%

Table B2.2. SRW generation in 2010

Total SRW	Mass 1.2 mln t (100%)	Activity 4.0·10 ¹⁸ Bq (100%)
LLW	99.91%	Less than 0.004%
ILW	0.06%	1.26%
HLW	0.03%	98.7%

Annex E. Framework normative and legal acts

Annex E provides the list of framework normative legal acts (international agreements, federal laws, decrees and orders of the President of the Russian Federation and resolutions of the Government of the Russian Federation) regulating RW and SNF management activities, as well as the list of basic regulations.

1. Fundamental international agreements of the Russian Federation

№	Title of the document	Year
1.	International Convention for the Safety of Life at Sea	1965
2.	Convention on Early Notification of a Nuclear Accident	1986
3.	Convention on Assistance in the Case of a Nuclear Accident or Radiological Emergency	1986
4.	Convention on the Physical Protection of Nuclear Material	1987
5.	Convention on Environmental Impact Assessment in a Transboundary Context	1991
6.	Convention on Nuclear Safety	1996
7.	Convention on Civil Liability for Nuclear Damage	1996
8.	Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management	1998

2. Federal laws

№	Title of the document	Reference number, date of signature
1.	On the Use of Atomic Energy	№170-FZ of November 21, 1995
2.	On Subsoil	№ 2395-1 of February 21, 1992
3.	On the Ratification of the Joint Convention on the Safety of Radioactive Waste Management	№139-FZ of November 4, 2005
4.	On the Uniformity of Measurements	№ 4871-1p of April 27, 1993
5.	On the Protection of Population and Territories Against Natural and Man-Induced Emergencies	№68-FZ of December 21, 1994
6.	On Fire Safety	№69-FZ of December 21, 1994
7.	Water Code of the Russian Federation	№74-FZ of June 19, 2007
8.	On Environmental Assessment	№174-FZ of November 23, 1995
9.	On the Radiation Safety of Population	№3-FZ of January 9, 1996
10.	On Financing Particularly Hazardous Nuclear and Radiation Productions and Facilities	№29-FZ of April 3, 1996
11.	On the Industrial Safety of Hazardous Production Facilities	№116-FZ of July 21, 1997
12.	On the Safety of Hydraulic Facilities	№117-FZ of July 21, 1997
13.	On Counteracting Terrorism	№35-FZ of March 6, 2006

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№	Title of the document	Reference number, date of signature
14.	On Sanitary and Epidemiological Welfare of Population	№52-FZ of March 30, 1999
15.	On Departmental Security Service	№77- FZ of April 14, 1999
16.	On Special Ecological Programs for the Remediation of Radioactively Contaminated Territories	№92- FZ of July 10, 2001
17.	Code of the Russian Federation on Administrative Violations	No 195-FZ of December 30, 2001
18.	On the Environmental Protection	No 7-FZ of January 10, 2002
19.	On Technical Regulation	No 184-FZ of December 27, 2002
20.	On Licensing Certain Types of Activities	No 128-FZ of August 8, 2001
21.	On Amendments and Supplements to the Criminal code of the Russian Federation, Procedural Criminal Code of the Russian Federation and Code of the Russian Federation on Administrative Violations	No 133-FZ of October 31, 2002
22.	Urban development code of the Russian Federation	No 190-FZ of December 29, 2004
23.	On the State Atomic Energy Corporation «Rosatom»	No 317-FZ of December 1, 2007
24.	On Special Aspects of Managing and Disposing Property and Stocks of Organizations Involved in Activities in the Field of Atomic Energy Use, and Amendments to Certain Legislative Acts of the Russian Federation	No 13-FZ of February 5, 2007
25.	Technical Regulation on Fire Safety Requirements	No 123-FZ of July 22, 2008
26.	On the Protection of Rights of Legal Entities and Individual Entrepreneurs in the Course of State Control (Supervision) and Municipal Control	No 294-FZ of December 26, 2008
27.	On the Procedure for Foreign Investments into Economic Entities of Strategic Importance for National Defense and Security	No 57-FZ of April 29, 2008
28.	Technical regulation on the safety of buildings and constructions	No 384-FZ of December 30, 2009
29.	On the Amendment to the Convention on the Physical Protection of Nuclear Material	No 130-FZ of July 22, 2008
30.	Discipline Regulations for Employees Involved in Organizations Operating Particularly Hazardous Radiation and Nuclear Productions and Facilities in the Field of Atomic Energy Use	No 35-FZ of March 8, 2011
31.	On the Management of Radioactive Waste and Amendments to Certain Legislative Acts of the Russian Federation	No 190-FZ of July 11, 2011
32.	On Amendments to Certain Legislative Acts of the Russian Federation Concerning State Control (Supervision) and Municipal Control	No 242-FZ of July 18, 2011
33.	On Amendments to Certain Legislative Acts of the Russian Federation for the Purposes of Safety Regulation in the Field of Atomic Energy Use	No 347-FZ of November 30, 2011
34.	On amendments to Articles 25 and 26 of the Federal Law «On the Use of Atomic Energy»	No 159-FZ of July 2, 2013

3. Decrees and orders of the President of the Russian Federation

№	Title of a decree or an order	Reference number and signature date
1.	On the Control over Export of Nuclear Materials, Equipment and Technologies from the Russian Federation	№312, of March 27, 1992
2.	On the Organization Operating Nuclear Power Plants in the Russian Federation	№1055, of September 7, 1992
3.	On Fulfilling Obligations Arising from Intergovernmental Agreements on Cooperation in Overseas Construction of Nuclear Power Plants Assumed by the Russian Federation	№472, of April 21, 1993
4.	On the State Support of Structural Reorganization and Re-engineering of the Nuclear Sector in Zheleznogorsk (the Krasnoyarsk territory)	№72, of January 25, 1995
5.	On the Follow-up Steps to Strengthen Control over the Compliance with the Environmental Safety Requirements for SNF Reprocessing	№ 389, of April 20, 1995
6.	On Improved Management of Nuclear Fuel Cycle Enterprises	№166, of February 8, 1996
7.	On the Approval of the List of Nuclear Material, Equipment, Special Non-Nuclear Material and Relevant Technologies, Falling under the Export Control	№202, of February 14, 1996
8.	Competences of the Ministry of Civil Defense, Emergencies and Elimination of Consequences of Natural Disasters of the Russian Federation	№868, of July 11, 2004
9.	On the Improvement of State Administration in the Field of Fire Safety	№1309, of November 9, 2001
10.	On the Ad-hoc Commission for the Import of Foreign-made Spent Fuel Assemblies to the Territory of the Russian Federation	№ 828, of July 10, 2001
11.	On the Approval of a Statute on the Ad-hoc Commission for the Import of Foreign-made Spent Fuel Assemblies to the Territory of the Russian Federation and its Composition	№ 858, of July 31, 2003
12.	On Restructuring Nuclear Power and Industry Complex of the Russian Federation	No 556, of April 27, 2007
13.	On Steps for the Establishment of the State Atomic Energy Corporation «Rosatom»	No 369, of March 20, 2008
14.	On Systems and Structures of Federal Executive Authorities	No 724, of May 12, 2008
15.	On Amendments to Certain Regulations of the President of the Russian Federation due to the Establishment of the State Atomic Energy Corporation «Rosatom»	No 460, of April 8, 2008
16.	Competences of the Federal Environmental, Industrial and Nuclear Supervision Service	No 780 of June 23, 2010
17.	On Headcount Optimization Concerning Federal Public Officials and Employees of Federal State Authorities	No 1657 of December 31, 2010

4. Decrees and regulations of the Government of the Russian Federation

№	Title of an ordinance	Reference number and signature date
1.	On the Approval of the Procedure to Inventory the Locations and Facilities Involved in Mining, Transportation, Processing, Use, Collection, Storage and Disposal of Radioactive Substances and Sources of Ionizing Radiation in the Territory of the Russian Federation	№ 505, of July 22, 1992
2.	On Steps to Address Comprehensively the Issues Associated with Management of Radioactive Waste and Cessation of their Disposal in Seas	№ 710, of July 23, 1993
3.	On the Approval of the Regulation on the State Environmental Assessment	№ 942, of September 22, 1993
4.	On the Approval of the Regulation Concerning the Procedure for the State Environmental Assessment	№ 698, of June 11, 1996
5.	On the Procedure for Drafting Radiation and Hygienic Certificates («passports») for Organizations and Sites	№ 93, of January 28, 1997
6.	On Rules for Making Decisions on Siting and Construction of Nuclear Installations, Radiation Sources and Storage Facilities	№ 306, of March 14, 1997
7.	On Steps Pursuant to the Decree of the President of the Russian Federation № 166 «On the Improved Management of Nuclear Fuel Cycle Enterprises» of February 8, 1996	No 367, of April 2, 1997
8.	On the Approval of the Regulation on the Procedure for the Development and Approval of Federal Norms and Rules in the Field of Atomic Energy Use and the List of Federal Norms and Rules in the Field of Atomic Energy Use	No 1511, of December 1, 1997
9.	On Export and Import of Nuclear Material, Equipment, Special Non-nuclear Material and Relevant Technologies	№ 973, of December 15, 2000
10.	On the Approval of the Regulation Concerning the State Sanitary and Epidemiologic Supervisory Board of the Russian Federation and of the Regulation on the State Sanitary and Epidemiologic Regulatory Standardization	№ 554, of July 24, 2000
11.	Regulation Concerning State Supervision over the Protection of Population and Territories Against Natural and Man-induced Emergencies Exerted by the Ministry of the Russian Federation for Civil Defense, Emergencies and Elimination of Consequences of Natural Disasters	№ 712, of December 1, 2005
12.	On the State Competent Authority Ensuring Nuclear and Radiation Safety during Transportation of Nuclear Material, Radioactive Material and the Relevant Products	№ 204, of March 19, 2001
13.	On the Importation of Irradiated Fuel Nuclear Reactor Assemblies to the Russian Federation	№ 418, of July 11, 2003
14.	On the Approval of the Regulation on Financing Special Environmental Programs for the Remediation of Radioactively Contaminated Territories	№ 588, of September 22, 2003
15.	On the Approval of the Regulation on the Development of Special Environmental Programs for the Remediation of Radioactively Contaminated Territories	№ 421, of June 14, 2002
16.	On the Federal Environmental, Industrial and Nuclear Supervision Service	№ 401, of July 30, 2004
17.	On the Federal Medical and Biological Agency	No 206, of April 11, 2005
18.	On Federal Executive Authorities Exercising State Management in the Field of Atomic Energy Use and the State Regulation of Safety in the Field of Atomic Energy Use	No 412, of July 03, 2006
19.	On the Federal Target Program «Development of Russian Nuclear Power Complex in 2007-2010 and up to 2015»	No 605 of October 06, 2006

№	Title of an ordinance	Reference number and signature date
20.	On the Engineering Investigations for the Development of Design Documentation, Construction and Reconstruction of Capital Facilities	No 20, of January 19, 2006
21.	On the State Building Supervision in the Russian Federation	No 54, of February 1, 2006
22.	On the Procedure and Conditions for the Transfer of Ownership Rights for a Nuclear Material to a Foreign State or a Foreign Legal Entity	No 724, of October 31, 2007
23.	On the Federal Target Program «Nuclear and Radiation safety in 2008 and until 2015»	No 444, of July 13, 2007
24.	On the Approval of Rules for Physical Protection of Nuclear Material, Nuclear Installations and Storage Facilities for Nuclear Material	No 456, of July 19, 2007
25.	On the Composition of Sections of Design Documentation and Requirements to their Contents	No 87, of February 16, 2008
26.	On the Approval of the Regulation on the System for Accounting and Control of Nuclear Material	No 352 of May 06, 2008
27.	On the Approval of the Regulation on the State Atomic Energy Corporation «Rosatom»	No 888, of November 26, 2008
28.	On the List of Organizations Operating Particularly Hazardous Nuclear and Radiation Productions and Facilities	No 1311-r, of September 14, 2009
29.	On Amendments to Certain Resolutions of the Government of the Russian Federation Concerning the Competences of the Ministry of Natural Resources and the Environment, the Federal Service for Supervision of Natural Resources, the Federal Environmental, Industrial and Nuclear Supervision Service	No 717, of September 13, 2010
30.	On Amendments to Certain Government Regulations of the Russian Federation	No 48, of February 4, 2011
31.	On the Approval of the Regulation on the Recognition of an Organization Able to Operate a Nuclear Installation, Radiation Source or Storage Facility and to Perform Siting, Design, Construction, Operation and Decommissioning of the Nuclear Installation, Radiation Source or Storage Facility, as well as to Manage Nuclear and Radioactive Materials Using its Own Resources or Subcontracting Other Organizations	No 88, of February 17, 2011
32.	On the National Operator for Radioactive Waste Management	No 384-r, of March 20, 2012
33.	On the Approval of the Regulation on Continuous State Supervision at Nuclear Facilities	No 373, of April 23, 2012
34.	On the Approval of the List of Nuclear Facilities Subjected to Continuous State Control	No 610-r, of April 23, 2012
35.	On the Initial Registration of Radioactive Waste	No 767, of July 25, 2012
36.	On the Approval of the Regulation on the Transfer of Radioactive Waste for Disposal, Including Waste Resulting from Development, Manufacturing, Testing, Operation and Disposition of Nuclear Weapons and Military Nuclear Power Units	No 899, of September 10, 2012
37.	On the Federal State Supervision in the Field of Atomic Energy Use	No 1044, of October 15, 2012
38.	On Criteria Used to Define Solid, Liquid and Gaseous Waste as Radioactive Waste, Criteria Used to Define Radioactive Waste as Special Radioactive Waste and Removable Radioactive Waste, Criteria for the Classification of Removable Waste	No 1069, of October 19, 2012

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№	Title of an ordinance	Reference number and signature date
39.	On the Registration of Organisations Operating Radiation Sources Containing Exclusively Radionuclide Sources of the Fourth and the Fifth Categories of Radiation Hazard	No 1184, of November 19, 2012
40.	On the Procedure and Timeframes for the Establishment of a Unified State System for RW Management	No 1185, of November 19, 2012
41.	On the Approval of the Regulation Concerning the Return of Spent Sealed Source of Ionizing Radiation of Russian Production to the Russian Federation, and the Return of Spent Sealed Sources of Ionizing Radiation to the Countries of Origin	No 1186, of November 19, 2012
42.	On the Approval of Rules Governing National Operator' Contributions, Being Part of Costs Paid by RW Generating Organizations that Do Not Operate Particularly Hazardous Nuclear and Radiation Facilities, to the RW Disposal Fund	No 1187, of November 19, 2012
43.	On the Procedure for State Accounting and Control of Radioactive Waste, Including the Registration of Radioactive Waste and Storage Facilities for Radioactive Waste, by the State Management Authority in the Field of Radioactive Waste Management	No 1188, of November 19, 2012
44.	On Amendments to Certain Governmental Resolutions of the Russian Federation	No 1189, of November 19, 2012
45.	On the Procedure for the State Regulation of Radioactive Waste Disposal Tariffs	No 1249, of December 3, 2012
46.	On Federal Norms and Rules in the Field of Atomic Energy Use	No 1265, of December 6, 2012
47.	On the Approval of the Regulation Concerning Particular Aspects of the Standardization Process for Products (Operations, Services) Subjected to the Safety Requirements in the Field of Atomic Energy Use, as well as for Design (Including Research Efforts), Production, Construction, Installation, Setup, Operation, Storage, Transportation, Dismantlement and Disposal of Above Mentioned Products	No 173, of March 1, 2013
48.	On Licensing Activities in the Field of Atomic Energy Use	No 280, of March 29, 2013
49.	On Special Aspects of Technical Regulation Concerning the Development and Adoption of Mandatory Requirements by State Customers, Federal Executive Authorities Authorized in the Field of State Management of Atomic Energy Use and State Regulation of Safety in the Field of Atomic Energy Use, and the State Atomic Energy Corporation «Rosatom» Applied to Production Subjected to the Safety Requirements Effective in the Field of Atomic Energy Use, as well as Design Processes (Including Research Efforts), Production, Construction, Installation, Setup, Operation, Storage, Transportation, Dismantlement and Disposal of Above Mentioned Products	No 362, of April 23, 2013
50.	On the Approval of the Regulation on Assigning a Legal Entity to a Scientific and Technical Support Organization Providing its Services to the State Safety Regulatory Authority in the Field of Atomic Energy Use	No 387, of April 30, 2013
51.	On Accreditation in the Field of Atomic Energy Use	No 612, of July 20, 2013
52.	On Fire Prevention Conditions	No 390, of April 25, 2012
53.	On Federal State Metrological Supervision	No 246, of April 6, 2011 (as amended on June 5, 2013)

5. Federal norms and rules in the field of atomic energy use

No	Title of the Document	Reference number
1.	Radiation Safety Standards	NRB-99/2009
2.	Basic Sanitary Rules of Radiation Safety	OSPORB-99/2010
3.	Sanitary Rules for Radioactive Waste Management	SPORO-2002
4.	Sanitary Rules for Design and Operation of Nuclear Power Plants	SP AS-03
5.	Hygienic Requirements to the Design of Enterprises and Facilities in the Nuclear Sector	SPP PUAP-03
6.	Sanitary Protection (Control) Zones and Surveillance Zones of Nuclear Facilities. Operational Conditions and Justification of the Boundaries	SP SZZ and ZN-07
7.	Fire Safety at Enterprises. General Requirements	NPB 201-96
8.	General Safety Provisions for Nuclear Power Plants (OPB-88/97)	NP-001-97
9.	Rules for the Safe Management of Radioactive Waste from Nuclear Power Plants	NP-002-04
10.	Regulation on the Procedure for Investigating and Accounting Operational Disorders at Nuclear Power Plants	NP-004-08
11.	Requirements to the Contents of Safety Analysis Reports for NPPs with WWER Units	NP-006-98
12.	Rules for the Safe Decommissioning of NPP Units	NP-012-99
13.	Spent Nuclear Fuel Reprocessing Facilities. Safety Requirements	NP-013-99
14.	Rules for Investigating and Accounting Violations Associated with Management of Radiation Sources and Radioactive Materials Applied in National Economy	NP-014-2000
15.	Standard Contents of Action Plans for Personnel Protection in the Event of an Accident at an NPP	NP-015-2000
16.	General Safety Provisions for Nuclear Fuel Cycle Facilities (OPB OJaTTs)	NP-016-05
17.	General Requirements for Operating Lifetime Extension of an NPP Unit	NP-017-2000
18.	Requirements to the Contents of Safety Analysis Reports for NPPs with BN Units	NP-018-05
19.	Collection, Processing, Storage and Conditioning of Liquid Radioactive Waste. Safety Requirements	NP-019-2000
20.	Collection, Processing, Storage and Conditioning of Solid Radioactive Waste. Safety Requirements	NP-020-2000
21.	Management of Gaseous Radioactive Waste. Safety Requirements	NP-021-2000
22.	General Safety Provisions on Marine Nuclear Propulsion Units	NP-022-2000
23.	Requirements to the Safety Analysis Report for Marine Nuclear Propulsion Units	NP-023-2000
24.	Requirements to Justify the Design Life Extension of Nuclear Facilities	NP-024-2000
25.	Rules for the Safe Decommissioning of Research Nuclear Installations	NP-028-01
26.	Siting of Nuclear Power Plants. General Criteria and Requirements	NP-032-01
27.	Dry Storage Facilities for Spent Nuclear Fuel. Safety Requirements	NP-035-02
28.	Rules for Safe Decommissioning of Vessels and Other Watercrafts with Nuclear Installations and Radiation Sources	NP-037-11
29.	General Safety Provisions for Radiation Sources	NP-038-11
30.	Regulation on the Procedure for Investigating and Accounting Operational Disorders at Nuclear Fuel Cycle Facilities	NP-047-11

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No	Title of the Document	Reference number
31.	Requirements to the Contents of Safety Analysis Reports for Research Nuclear Installations	NP-049-03
32.	Siting of Nuclear Fuel Cycle Facilities. Main Criteria and General Safety Requirements	NP-050-03
33.	Requirements to the Contents of Safety Analysis Reports for Nuclear Fuel Cycle Facilities	NP-051-04
34.	Requirements for Safe Temporary Storage of Radioactive Waste Resulting from Mining, Processing and Use of Minerals	NP-052-04
35.	Rules for the Safe Transportation of Radioactive Material	NP-053-04
36.	Disposal of Radioactive Waste. Principles, Criteria and General Safety Requirements	NP-055-04
37.	Rules for the Safe Decommissioning of Nuclear Fuel Cycle Facilities	NP-057-04
38.	Safety in Radioactive Waste Management. General Provisions	NP-058-04
39.	Rules for the Safe Transportation and Storage of Nuclear Fuel at Nuclear Facilities	NP-061-05
40.	Nuclear Safety Rules for Nuclear Fuel Cycle Facilities	NP-063-05
41.	On Accounting External Natural and Man-induced Impacts on Nuclear Facilities	NP-064-05
42.	Requirements to the Safety Analysis Reports for Storage Facilities Holding Nuclear Material	NP-066-05
43.	General Rules for Accounting and Control of Radioactive Material and Radioactive Waste in Organizations	NP-067-11
44.	Near-surface Disposal of Radioactive Waste. Safety Requirements	NP-069-06
45.	Rules for the Safe Configuration and the Safe Operation of Equipment and Pipelines at Nuclear Fuel Cycle Facilities	NP-070-06
46.	Rules for Compliance Assessment of Equipment, Components, Materials and Semi-finished Material Supplied to Nuclear Facilities	NP-071-06
47.	Requirements to Planning and Ensuring Readiness for the Elimination of Consequences of Accidents Associated with Transportation of Nuclear Material and Radioactive Substances	NP-074-06
48.	Requirements to the Contents of Action Plans for Personnel Protection in the Event of an Accident at a Research Nuclear Installations	NP-075-06
49.	Installations for Immobilization of Transuranic Radioactive Waste. Safety Requirements	NP-076-06
50.	Requirements to the Contents of Action Plans for Personnel Protection in the Event of an Accident at a Nuclear Fuel Cycle Enterprise	NP-077-06
51.	Regulation on the Procedure for the Declaration of Emergency Preparedness, Emergency Situation, and Prompt Exchange of Information in the Event of Radiation Hazardous Conditions at Nuclear Fuel Cycle Enterprises	NP-078-06
52.	Requirements for Planning Actions and Protection of Employees (Personnel) in the Event of a Radiation Accident at a Nuclear-powered Vessel and (or) other Watercraft	NP-079-06
53.	Requirements to the Quality Assurance Program for Nuclear Facilities	NP-090-11
54.	General Safety Provisions for Research Nuclear Installations	NP-033-11
55.	Standard Contents of Action Plans for Personnel Protection in the Event of an Accident at a NPP	NP-015-12
56.	Regulation on the Procedure for Investigating and Accounting Operational Disorders at Research Nuclear Installations	NP-027-10

6. Safety guides of the Rostechnadzor

№	Title of the document	Reference number
1.	Recommendations on the Development of Quality Assurance Programs for Radioactive Waste Management	RB-086-13
2.	Requirements for Accounting External Impacts in Safety Analysis Reports for Radioactive Waste Storage Facilities	PNAE G-14-038-96
3.	Identification of Initial Seismic Vibrations of Soil for Design Basis	RB-006-98
4.	Safety Assessment of Near-surface Storage Facilities for Radioactive Waste	RB-011-2000
5.	Regulation on the Structure and Contents of Radiation Safety Reports for Organizations Operating Radionuclide Sources	RB-054-09
6.	Safe Management of Radioactive Waste Resulting from Mining, Processing and Use of Minerals	RB-014-2000
7.	Assessment of Seismic Hazards at Sites Considered for Construction of Nuclear and Radiation Hazardous Facilities on the Basis of Geodynamic Data	RB-019-01
8.	Recommendations on the Establishment of Acceptance Criteria for Storage and Disposal of Conditioned Radioactive Waste	RB-023-02
9.	Recommendations on Recruitment, Training, Maintaining and Enhancement of Competence of Operating Personnel at Nuclear Fuel Cycle Facilities	RB-034-05
10.	Structure and Contents of Safety Analysis Reports on Temporary Storage Facilities for Radioactive Waste Resulting from Mining, Processing and Use of Minerals	RB-035-05
11.	Monitoring of Engineering and Geological Conditions at the Sites of Nuclear Fuel Cycle Facilities	RB-036-06
12.	Structure and Contents of Annual Reports on Nuclear and Radiation Safety of Nuclear Fuel Cycle Facilities	RB-043-08
13.	Dynamic Monitoring of Building Constructions at Nuclear Facilities	RB-045-08
14.	Monitoring of Meteorological and Aerological Conditions at the Sites of Nuclear Facilities	RB-046-08
15.	Methods of Assessing the Safety Culture Level at Nuclear Fuel Cycle Enterprises	RB-047-08
16.	Life Extension of Transportation Casks Designed for Transport of Spent Nuclear Fuel	RB-048-09
17.	Safety Assessment of Radioactive Waste Management at the Techa Cascade of Reservoirs During RW Processing and Storage	RB-049-09
18.	Structure and Contents of Safety Analysis Reports for Solid Radioactive Waste Storage Facilities	RB-050-09
19.	Regulation Concerning the Re-categorization of Nuclear Material as Radioactive Waste	RB-052-10
20.	Regulation on Improving the Accuracy of Prognostic Assessments of Radiation Characteristics of Radioactive Contamination of the Environment and Personnel and Public Exposures	RB-053-10
21.	Regulation on the Structure and Contents of Safety Analysis Reports for Near-surface Storage Facilities for Radioactive Waste	RB-058-10
22.	Regulation on Fire-explosion Safety Assessment of Work Processes at Radiochemical Productions	RB-060-10

№	Title of the document	Reference number
23.	Regulation on the Structure and Contents of Safety Analysis Reports for Radiation Sources	RB-064-11
24.	Regulation on the Procedure for Acquiring Data on the Amount of Nuclear Material for Accounting and Summarizing the Physical Inventory	RB-065-11
25.	Regulation on the Application of Mathematical Statistics in Accounting and Control of Nuclear Material	RB-066-11
26.	Regulation on Counting the Inventory of Radioactive Waste in Organizations	RB-071-11
27.	Regulation on Counting the Inventory of Radioactive Material in Organizations	RB-072-11
28.	Safe Decommissioning (Closure) of Tailings	RB-078-12

7. Guideline documents of the Rostekhnadzor

№	Title of the document	Reference number
1.	Administrative Regulation for the Federal Environmental, Industrial and Nuclear Supervision Service on the Implementation of its State Function Associated with Licensing Activities in the Field of Atomic Energy Use	№ 262, of November 16, 2008
2.	Administrative regulation for the Federal Environmental, Industrial and Nuclear Supervision Service on Authorizing it to Issue Permits to Perform Activities in the Field of Atomic Energy Use to the Employees of Nuclear Facilities	№ 721, of December 21, 2011
3.	Regulation on the Quality Management System of the Federal Environmental, Industrial and Nuclear Supervision Service for the State Regulation of Safety in the Field of Atomic Energy Use	№ 80, of February 3, 2012
4.	Administrative Regulation for the Federal Environmental, Industrial and Nuclear Supervision Service on the Implementation of its State Function Associated with Federal State Supervision in the Field of Atomic Energy Use	№ 248, of June 7, 2013
5.	Guide on Arranging for the Review of Software Tools Applied for the Demonstration and (or) Assurance of Safety at Nuclear Facilities	RD-03-33-2008
6.	Guide on Information Support of Activities Performed by the Federal Environmental, Industrial and Nuclear Supervision Service	RD-22-06-2007
7.	Procedure for Issuing Work Permits in the Field of Atomic Energy Use to the Employees of RW Storage Facilities (Specialized Enterprises Managing Radioactive Waste) and Enterprises (Institutions, Organizations) Operating Radiation Sources	№ 90, of March 26, 2010
8.	Regulation on Compilation and Uploading Data on Activities of the Federal Environmental, Industrial and Nuclear Supervision Service to the Official Site www.gosnadzor.ru	№ 800, of October 14, 2008
9.	Method for the Development and Establishment of Standards for Acceptable Discharge Limits of Radioactive Substance into the Air	№ 639, of November 7, 2012