

Annual Report 2017



JSC "SSC RIAR" does its best to preserve the natural ecological system and landscapes

THE YEAR OF ECOLOGY IN RUSSIA



STATE SCIENTIFIC CENTER – RESEARCH INSTITUTE OF ATOMIC REACTORS



Annual Report

of JSC "SSC RIAR"

2017

Approved by the Resolution of Board of Directors, JSC "SSC RIAR" (Protocol #493 as of May 25, 2018)

Director of JSC "SSC RIAR"

A.A. Tuzov

Dimitrovgrad
2018

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The Report covers the key financial, economic and production results of JSC "SSC RIAR" activities for the reporting period as well as the results of the sustainability-related activities (economic, ecological and social impact on the world around us). The Report has been prepared in conformity with the GRI standards, version G4. The Report focuses on the strategy and perspectives of JSC "SSC RIAR" as well as on the activities targeted at enhancing the effectiveness of corporate management and nuclear and radiation safety. The Report has been issued on a voluntary basis and is addressed to a wide audience.



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Research Institute of Atomic Reactors"
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**The principle of openness, transparency and accessibility
of information is an important component
of the environmental policy of JSC "SSC RIAR".
Annually, the official site of the company displays
reports on environmental safety and various
documents related to environmental issues**

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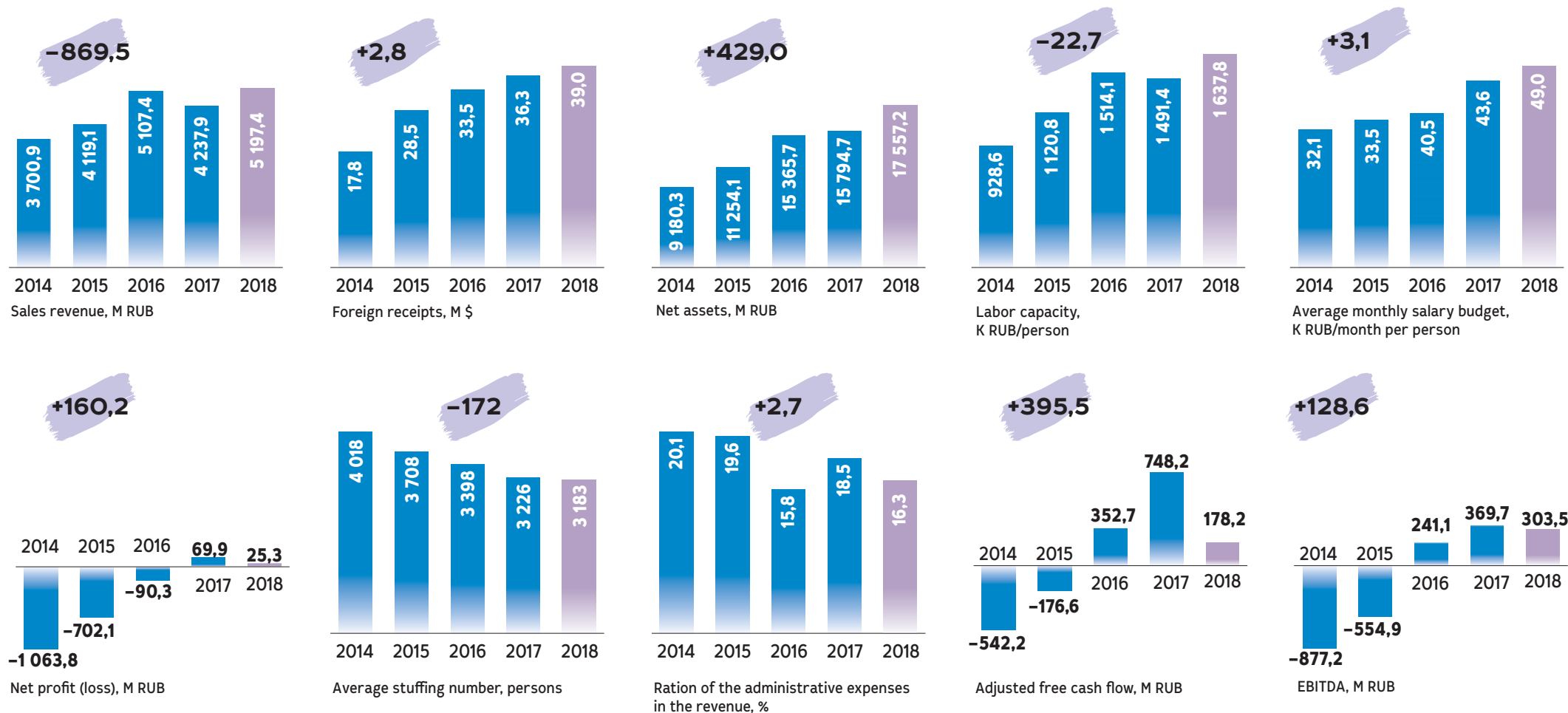
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Key Performance Indicators*

Difference between indicators in 2017 and in 2016

■ – Actual value

■ – Estimates



* The dynamics of key performance indicators of JSC "SSC RIAR" is presented in details in Sub-section 4.1 "Financial Capital" and 4.5 "Human Capital" herein.

Appeal of Directors



Director General
of JSC "Science
and Innovations"
P.A. Zaitsev

Dear Colleagues!

In 2017, the Scientific Division of ROSATOM that unites eleven scientific&research organizations of the industry continued the important transformation aimed at increasing the competitiveness of Russian nuclear science on the domestic and foreign markets. These are scientific achievements which determine the ROSATOM's world leadership for the coming decades. The ROSATOM's Administration recognizes the strategic importance of the scientific direction development, that is why this year is announced to be the Year of Science.

According to the reporting period results, JSC "SSC RIAR" have demonstrated the high-quality implementation of the financial recovery plan. The management and staff of the enterprise achieved the established key performance indicators. As in previous years, in 2017, RIAR did not tolerate a single violation of nuclear safety classified according to the international scale of nuclear events INES. Reliable and safe operation of nuclear facilities is still an absolute priority of RIAR, Scientific Division and the industry as a whole.

For the reported year, activities have been heavily developed that seemed to have no direct relation to science and production.

They are aimed at implementing social and educational projects of ROSATOM on the JSC "SSC RIAR" habitat. These projects certainly increase the trust of partners in the activities of RIAR. In particular, in 2017 one of the grants of the ROSATOM's social projects was awarded to Dimitrovgrad, Ulyanovsk region, to develop pupils' interest to cognitive jobs.

I have no doubt that all goals we face are achievable. The key success factor here is the team of highly professional employees who have the necessary experience, competence and focus on high results!

A blue ink handwritten signature, likely belonging to P.A. Zaitsev, written in a cursive style.



Director
of JSC "SSC RIAR"
A.A. Tuzov

Dear Colleagues and Partners!

This year, the management and staff of JSC "SSC RIAR" have done a lot to increase the efficiency of activities; to provide nuclear, radiation, industrial, and fire safety, labor and environmental protection, accident-free operation of main and auxiliary process equipment; to develop and maintain the partnership relations with all stakeholders.

RIAR continued implementing a set of measures for financial recovery. It took us significant efforts to fulfill the revenue plan and optimize costs. As a result, the RIAR's team managed to cut costs by more than half a billion rubles and for the first time in several years to receive a profit.

The construction of a multi-purpose fast reactor MBIR is going on permanently attracting attention of both Russian and foreign colleagues. Last year the RIAR site received key equipment to complete the first construction stage. The first priority goals today are the development of design documents to implement the project in full, completion of a part of R&D activities in provision of fuel and manufacture of control rods, obtaining a license for operation, proceeding of construction and purchase and mounting of equipment.

Efforts are made to upgrade the RIAR's experimental base. For example, in the reporting period we launched a production line for Co-60-based gamma-sources. Our scientists and

engineers are heavily involved in one of the most important projects that is modernization of the SM reactor core.

I cannot but mention the efforts of the relevant RIAR's Departments aimed at expanding the international cooperation and attracting new customers. The total portfolio of the RIAR's foreign contracts (not only R&D and rendering services, but also the supply of isotopes) exceeds \$ 100 million.

Today, the RIAR's team is in power to fulfill all the goals that the management of the industry and Division sets us. The experience and knowledge of scientists and engineers as well as our production capabilities give confidence that RIAR is able to reach a new level of its development and take a flagship position in the industry in the field of reactor and isotopic technologies.

I express my gratitude both to our partners for their trust and productive cooperation and to RIAR's staff for their professionalism and devotion to work. Our further sustainable development depends entirely on the contribution and efforts of each employee and commitment to high performance.

Key Events

More than **115** M RUB was allocated to improve working conditions and labor protection



JSC "SSC RIAR" is the winner of the regional stage of All-Russian Contest "A Russian Entity of High Social Efficiency"

More than **500** M RUB is capital investment to the construction of a storage facility for solid waste and reconstruction of storm water sewage



Employees of JSC "SSC RIAR" became the winners of a regional contest "Engineer of the Year 2017"



Employees of JSC "SSC RIAR" won the competition for the awarding of ROSATOM prizes to young scientists of the nuclear industry



JANUARY ^

FEBRUARY v

MARCH ^

OCTOBER v

NOVEMBER v

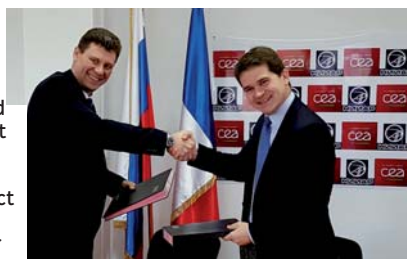
DECEMBER ^

JSC "SSC RIAR" was awarded the Golden Plate "For the Weighty Contribution to the Economy of the Ulyanovsk Region". Seven employees were also noted with Contest Laureate Diplomas



More than **180** M RUB was invested into the Co-60-based gamma-sources production line

A contract was signed with the Commissariat à l'énergie atomique et aux énergies alternatives to conduct research activities in the BOR-60 reactor



The work of RR Safety Data Acquisition & Analysis Center was highly appraised at the international level



Awards



Contest of Annual reports among the ROSATOM's entities:

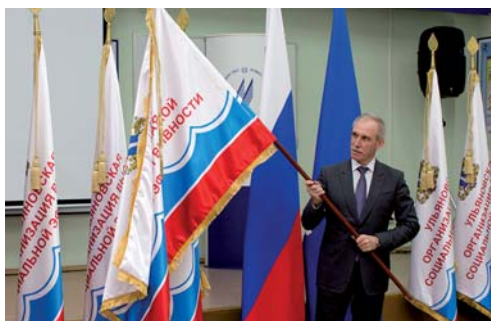
- **II place** in the nomination "The Best Public Annual Report among Entities and Divisions of ROSATOM";
- **Diploma** for the productive cooperation with different stakeholders



61 industry-level awards



245 site-level awards



40 federal-level awards



63 awards from local authorities

SECTION 1

General Information



1.1. General Information

Company details

Brand name

Full	Short
Акционерное общество «Государственный научный центр – Научно-исследовательский институт атомных реакторов»*	АО «ГНЦ НИИАР»
Joint Stock Company «State Scientific Center – Research Institute of Atomic Reactors»	JSC «SSC RIAR»

Contact details

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Website	http://www.niiar.ru
Phone	+7 (84-235) 9-83-83
Fax	+7 (84-235) 9-83-84

* Hereinafter referred to as JSC "SSC RIAR" or RIAR.

Information about Registrar

Brand name

Full	Short
Joint Stock Company "R.O.S.T. Registrar"	JSC "R.O.S.T. Registrar"

Documents giving the right to conduct business

Decision of the Board of Directors #4 as of 30.12.2008	License of the Federal Commission for the Securities Market as of 03.12.2010 # 10-000-1-00264
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Registrar details

OGRN 1027739216757	TIN 7726030449
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Contact details

Postal address	107996, Russian Federation, Moscow 18/13 Stromynka St.
E-mail	info@rrost.ru
Phone / Fax	+7 (495) 780-73-63 +7 (495) 780-73-67

The date since the Registrar has maintained the register of issuer's inscribed stock

11.01.2009

Key information about JSC "SSC RIAR" stakeholders

Stakeholders	Legal / postal address	Number of shares by		Share in the charter capital, % by	
		31.12.2016	31.12.2017	31.12.2016	31.12.2017
Joint Stock Company "Atomic Energy Power Corporation"	119017, Moscow, Bolshaya Ordynka St., 24	8 953 605 675	9 115 605 675	52,7803	53,0235
Russian Federation represented by ROSATOM State Atomic Energy Corporation		1 645 035 900	1 710 732 800	9,6972	9,9510
ROSATOM State Atomic Energy Corporation		6 365 286 800	6 365 286 800	37,5225	37,0255

Subsidiary companies and joint ventures of JSC "SSC RIAR"

Company	Activities	Stake, %
NIIAR – GENERATSIYA Ltd.	Generation and supply of energy: electricity, heat, steam, hot water, drinking and general-use water, water discharge	100
Belorussian-Russian Joint Stock Company "Isotope Technologies"	Production, storage, receipt, usage, transportation of radioactive materials and products; design engineering, fabrication, assembling, adjustment, failure assessment, operation, repair and maintenance of radioisotope-based devices and facilities	51
Chinese-Russian Joint Venture "Beijing CIAE – RIAR Radioisotope Technology Co. Ltd."	Production of Cf-252 neutron sources and other sources, their integration in devices and equipment, selling at the territory of the People's Republic of China, promotion of Cf-252 sources and other sources for their use in the industry of the People's Republic of China, rendering services for consumers	50

Background



Decree of the Council of Ministers of the USSR on construction of a pilot nuclear power plant



Establishment of the Reactor Materials Testing Complex
Establishment of the Radiochemistry Division



Startup of the MIR reactor



Startup of the RBT-6 reactor



Establishment of the Radioisotopes and Radiochemicals Division



Resolution on construction of the MBIR reactor



The first batch of BN-800 FAs with MOX fuel
Supply of Mo-99 on a regular basis



1956 1961 1964 1965 1967 1969 1975 1984 1991 1994 2010 2011 2014 2016

Startup of the SM reactor



Startup of the VK-50 reactor



Startup of the BOR-60 reactor



Startup of the RBT-10/2 reactor



RIAR was assigned a status of the state scientific center



Resolution on construction of the Polyfunctional Radiochemical Complex



RIAR was assigned the ICERR status



More details about RIAR's background can be found at <http://niar.ru/history>

1.2. Key Competencies. Products and Rendered Services

The Key competencies as well as products and rendered services are related to the JSC "SSC RIAR" activities and described in detail in previous Reports that can be found at http://niiar.ru/annual_report.

The key consumers of the R&D products and services are ROSATOM's enterprises: research and design organizations developing materials, fuels and components for nuclear facilities; operators of NPPs and their maintenance sub-contractors, some industrial and scientific organizations from other industries as well as customers from the USA, South Korea, Japan, China and France.

A wide range of radionuclides and ionizing sources developed by JSC "SSC RIAR" is supplied to both Russian and foreign markets. The key consumers of RIAR's radioisotopes are not only radiopharmaceutical companies, healthcare providers and medical equipment manufacturers but also educational institutions and research institutes carrying

out ionizing sources-based research and joint ventures.

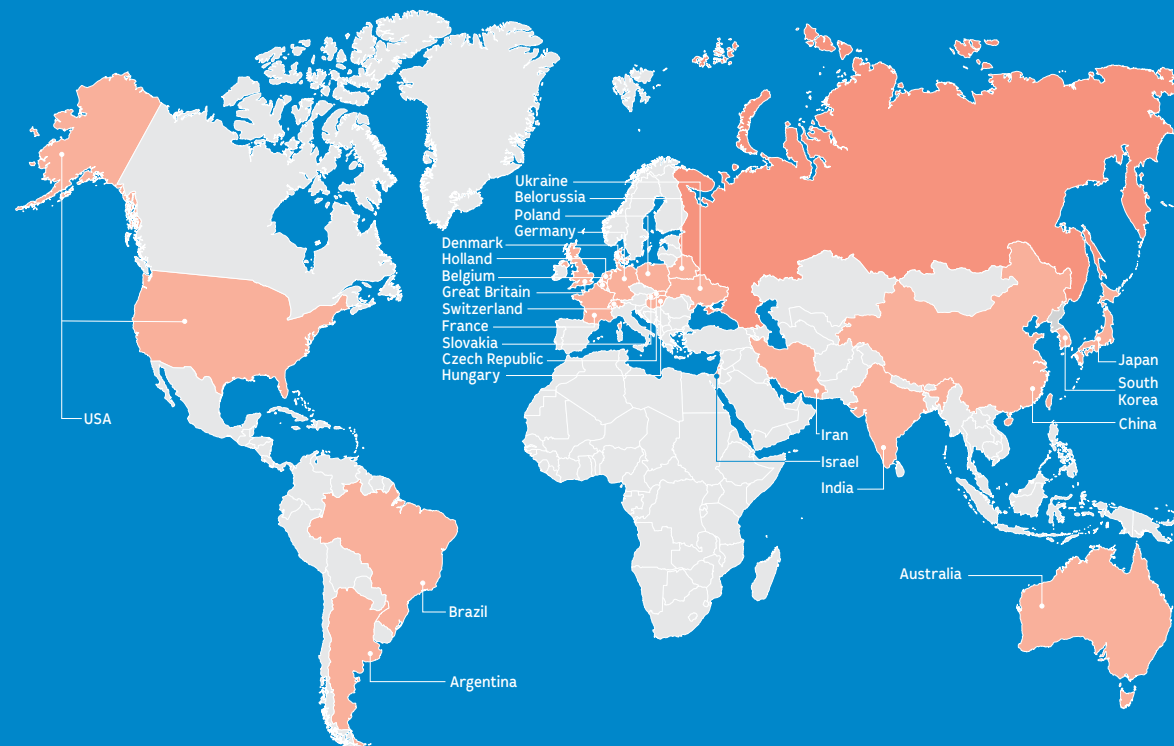
The full mixed uranium-plutonium fuel fabrication cycle has been implemented at the RIAR's pilot facility from the generation of the initial uranium and plutonium oxides to as-built fuel assemblies. In addition to the fabrication of the pilot batches of fuel assemblies for the domestic fast reactors, the pilot facilities are used to carry out research on the non-aqueous methods for the spent nuclear fuel reprocessing, to fabricate vibropacked fuel pins, to master closed fuel cycle technologies and to carry out transmutation of minor-actinides to involve them into the fuel cycle.

The consumers of the power resources produced by RIAR are not only the site facilities but also different industrial companies, population and other consumers of the city of Dimitrovgrad. The utilities consume not only all thermal energy produced by RIAR, but also 100 % of cold and hot water supply.

Products and services produced and rendered by JSC "SSC RIAR"

- R&D and engineering activities (reactor tests, research and materials testing, radionuclide sources and radiochemicals, radiochemistry and fuel cycles)
- Radionuclides production and sale
- Manufacture of FAs containing mixed uranium-plutonium fuel
- Generation, transfer and sale of energy resources at the regional market

Geography of JSC "SSC RIAR" international cooperation



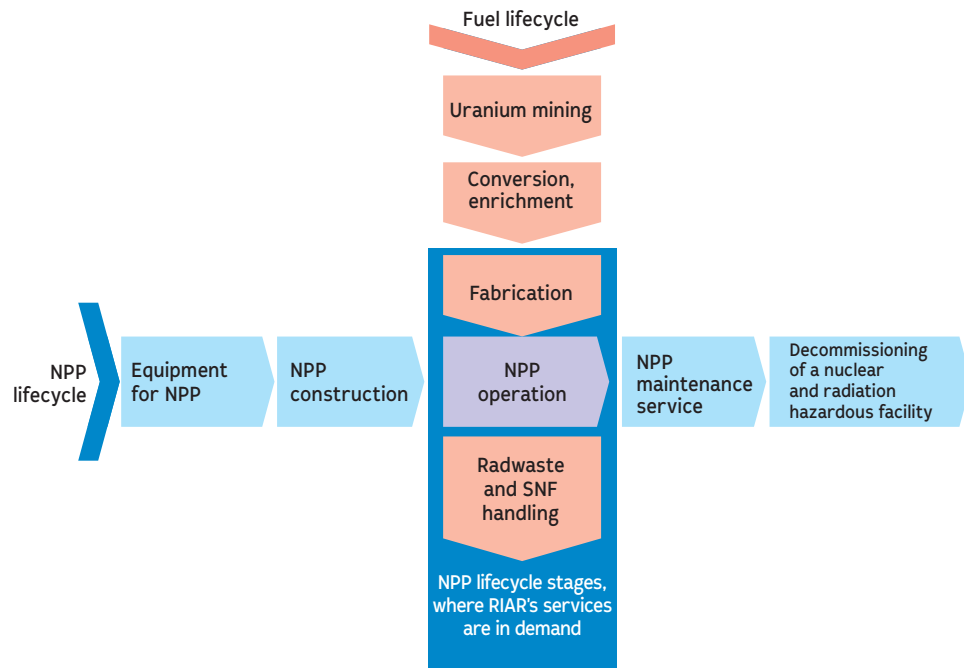
More detailed information about the RIAR's achievements in 2016 can be found in [Section 4](#)

1.3. Position in the Industry

The key activities of JSC "SSC RIAR" are focused on the R&D provision of the ROSATOM's enterprises in the field of the NPP fuel lifecycle at the stages of its development, fabrication, operation and handling of SNF and radwaste. The ROSATOM's

enterprises are known to implement two full process runs that are related to the development, construction, operation and decommissioning of NPP, production and use of nuclear fuel and handling of generated waste.

Key process runs



RIAR, being an important experimental base, contributes to the achievement of the ROSATOM's strategic goals related to the development of fuel technologies such as: effective provision of the national economy with electrical energy produced at NPPs; provision of the national geological interests and achievement of the leading positions for the national companies at the world's market of nuclear

technologies and services; maintenance of national nuclear arsenals at the level required to provide the nuclear deterrence policy and nuclear and radiation safety of nuclear facilities, personnel, population and environment; development of innovative nuclear technologies and broadening their application areas.

RIAR's contribution to the achievement of the ROSATOM's strategic goals

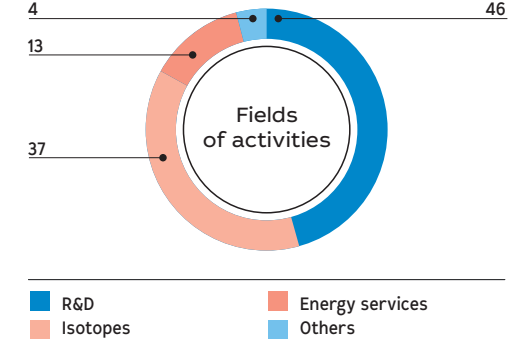
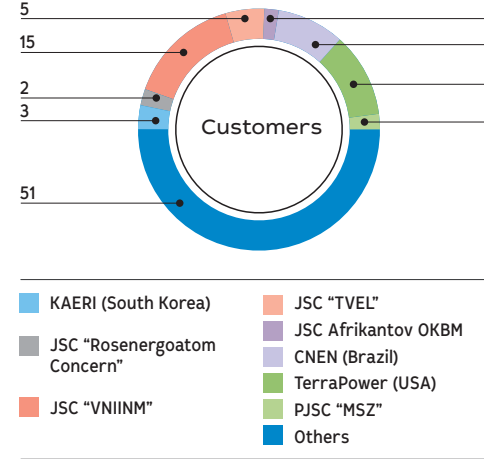
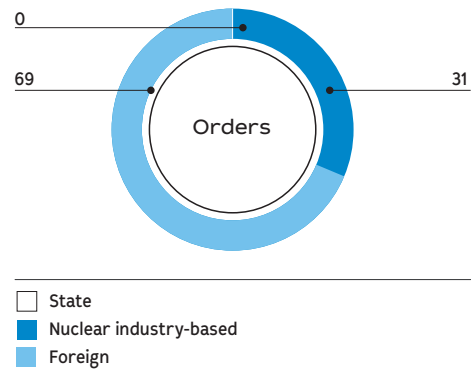
Justification of materials and design components of various reactors, their performance and lifetime; new technical decisions aimed at the improvement of their characteristics important for the NPP effective operation;

Development and tryout of the closed fuel cycle technology; development of fuel fabrication technologies for fast and low-power reactors; generation of experimental data on the properties of structural materials for innovative power conversion facilities; development of technologies and arrangement of production of radioisotopes for scientific, technical and medical purposes

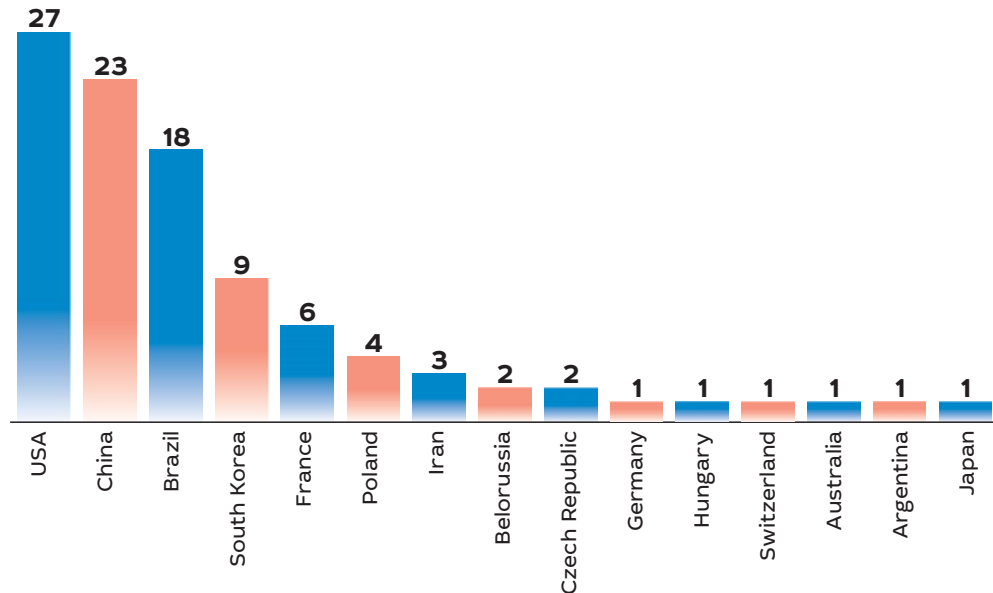
Scientific and experimental justification of technological and design decisions for the refurbishment, upgrading, lifetime management and decommissioning of nuclear facilities, including the development of conventional technologies for handling generated waste and reprocessing spent nuclear fuel from nuclear ice-breakers; standards for monitoring and interpretation of facility conditions values at all stages of its lifetime

In 2017, JSC "SSC RIAR" demonstrated stable dynamics in development holding a firm place in the industry. At a time when the number of government contract is decreasing, and there are no orders for the BN-800 FAs fabrication, RIAR has increased supplies of products and services as compared to the previous year. The share of R&D services increases: in 2017 the increase in this activity made up 7 % from the total scope of supply as compared to 2016.

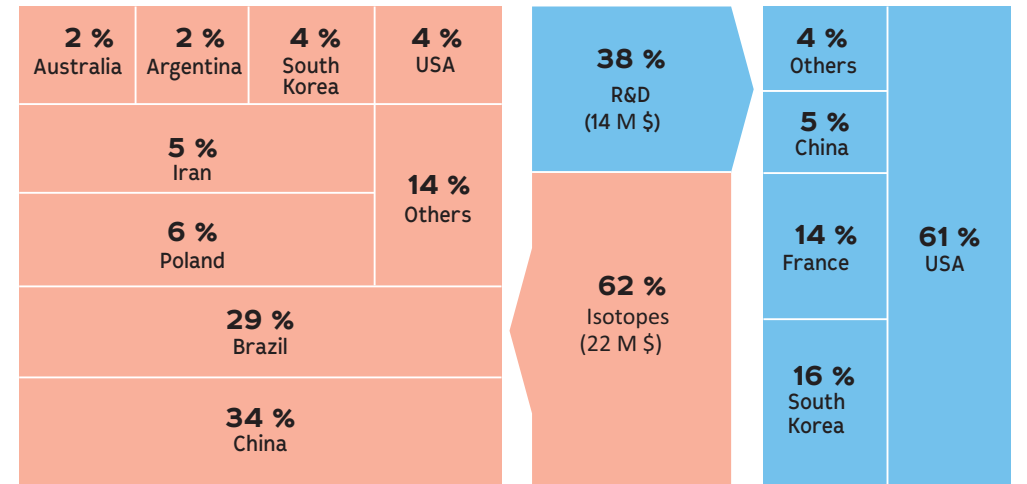
Structure of JSC "SSC RIAR" supplies in 2017, %



Export of production services in 2017, %



Export in 2017



SECTION 2

Strategy



2.1. Mission and Values

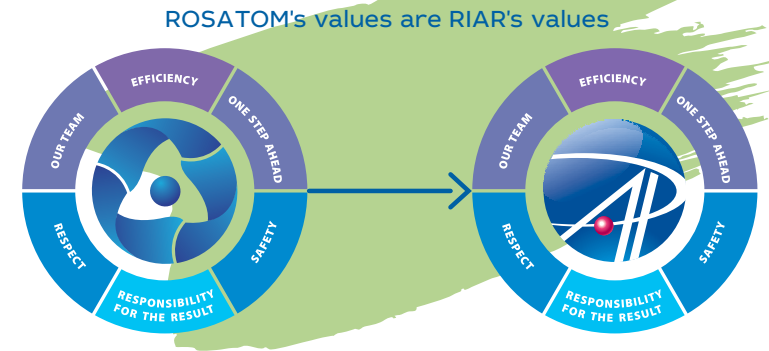
Mission of JSC "SSC RIAR" is to solve current issues of both Russia's and world's nuclear science, engineering and medicine by rendering science-intensive high-tech services on the experimental justification of the performance of materials and core components of operational and promising reactors, by developing innovative fuel cycle technologies, and by producing radionuclides

JSC "SSC RIAR", being nowadays the largest in Russia and in the world research center, provides science-intensive high-tech services on a wide range of irradiation and post-irradiation experiments. It is also a key ROSATOM's center producing high-tech innovative products being in demand in different branches of industry and will remain as it is in the long-term. The basis of RIAR's operational activity is its participation in the industrial

projects aimed at the development of Russia's and global nuclear technologies as well as the implementation of the self-development projects. The main way for RIAR to achieve its strategic goals is to solve a number of strategic issues on the development and strengthening of key competences as well as on increasing its economic efficiency.

Values global for ROSATOM are extremely important for JSC "SSC RIAR".

Please, find more details in Sub-section 2.3 "Business-Model and Capitals" and in Section 4 "Management of Capital and Performance"



One step ahead

We aspire to be a leader on global-scale markets. We are always a step ahead in technologies, knowledge and competencies of our employees. We look ahead with confidence. We are constantly developing and learning. Every day we try to work better than yesterday.

Responsibility for the result

Each of us bears a personal responsibility for the result of work and quality of work to our country, industry, colleagues and customers. We impose the highest requirements to our work. These are not efforts that are estimated, but the result achieved. A successful result is the basis for our new achievements.

Safety

Security is our highest priority. Safety of people and environment is the first thing we provide in our work. There are no trifles in the safety provision. We know the safety rules and execute them, and suppress safety violations.

Respect

We respect our customers, partners and suppliers. We always listen to and hear each other irrespective to the occupied position and place work. We respect history and the traditions of the industry and our institute. The achievements of the past inspire us to new victories.

Efficiency

We always find the best options to solve problems. We are effective in everything what are we doing. When fulfilling the set goals, we use resources to the maximum and constantly improve the work processes. There are no obstacles, which can prevent us from finding the most effective solutions.

Our Team

We are all ROSATOM. We have common goals. Working in a team of like-minded people allows us to achieve unique results. We are stronger together and can achieve the highest goals. Successes of employees is our successes.

2.2. Strategic Tasks

Achievement of strategic goals and key results for the year of 2017

Strategic goals

Research and experimental support of defense procurement.

Research and experimental justification of technical decisions aimed at the enhancement of safety and performance of nuclear reactors of different types to provide a sustainable development of Russia's nuclear engineering.

Development of technologies and research and experimental justification of technical decisions aimed at the enhancement of nuclear and radiation safety of nuclear facilities and effective management of SNF and radwaste.

Development of technologies and research and experimental justification and establishment of production of science-intensive unique innovative output.

Development and strengthening of key competencies, improvement of the economic output of the current activities of RIAR on the global market and provision of sustainable long-term development

Tasks to solve

Provision of nuclear and radiation safety at all facilities, enhancement of the production culture level as well as the labor efficiency.

Provision of financial stability and efficiency of the enterprise activities.

Development of the experimental potential of the RR fleet, facilities and research infrastructure.

Development of the production infrastructure for a full fuel supply cycle, SNF and radwaste management.

Development of the production infrastructure to provide the innovative high-tech output.

Development of the scientific, marketing, financial-economical and production potential to increase the high value-added output.

Development of human resources to provide the fulfillment of promising research tasks faced by the Russia's nuclear industry, assistance in the regional development and arrangement of the conditions to engage highly-qualified employees

Results achieved

In 2017 no accidents were recorded at the JSC "SSC RIAR" nuclear hazardous facilities.

The 21 M RUB State Contract was fulfilled on the "Design Project to Justify the Technical Upgrade of reactor BOR-60".

Sales revenues on the international market increased thrice as compared to the year of 2013 and made up more than 2 billion rubles (\$ 36 mln); Portion of the export income made up 50 %.

Exclusive rights were registered for 164 objects of intellectual property, 228 objects are supported.

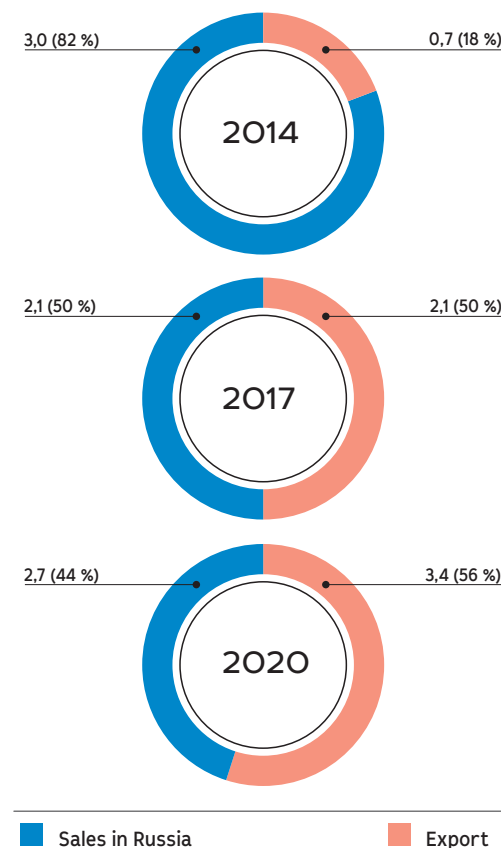
R&D results made up 46 % from the total output in 2017 that is 7 % higher as compared to 2016.

Portion of the export income from the total one increased from 18 % (2014) up to 50 %, including revenues from isotopes supply increased from 12 % up to 31 %.

Revenues from R&D sales on the international market increased from 6 to 14 mln \$ as compared to 2014, including revenues from isotopes supply increased from 12 to 22 mln \$

Social-related expenditures made up 33 119 k RUB

Distribution of revenue, billion rubles



Please, find more details in Sections 3 and 4

2.3. Business Model and Capitals

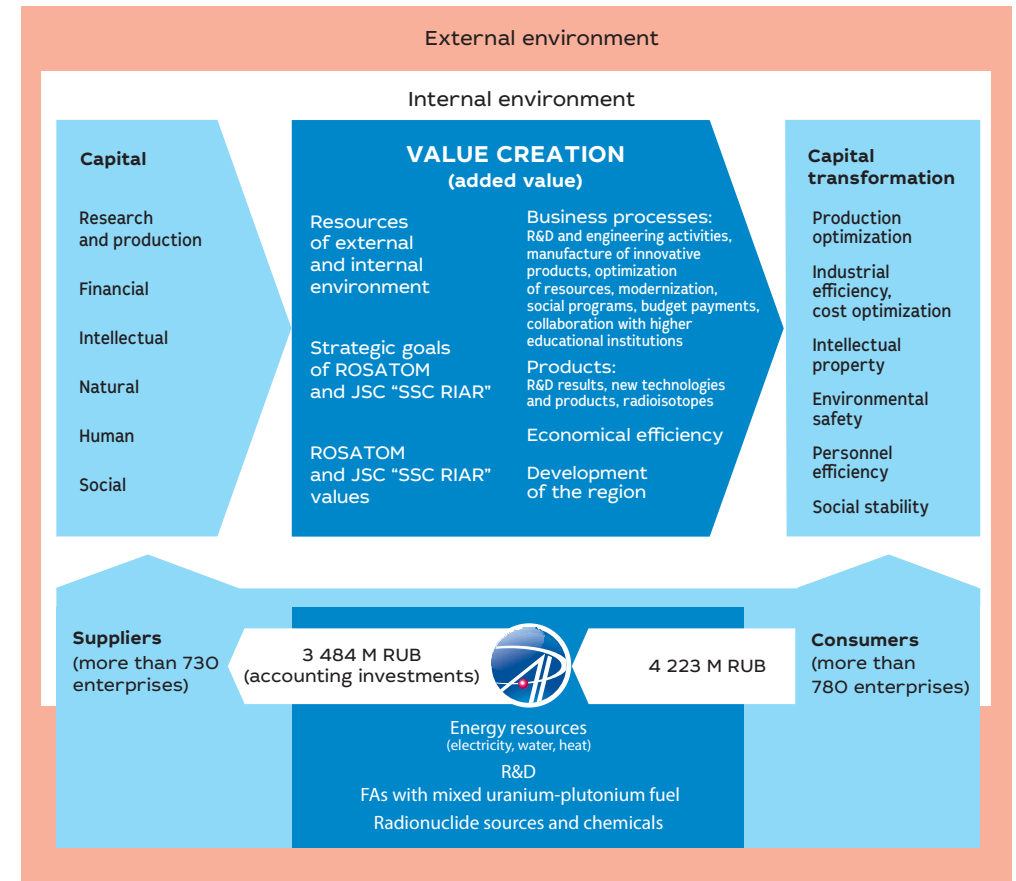
JSC "SSC RIAR" business model reflects a system of activities related to the value creation and achievement of strategic goals using resources available. This is an overall description of the value-added creation disclosing the processes and results of capitals transformation and their impact on the stakeholders. A supply chain is an integral component of the business model directly effecting the process of values creation. Interaction with sub-contractors is done within a single policy related to the ROSATOM's reporting and procurement system. The value creation process is based on the mission, values and strategic tasks and is provided by internal resources (capital) and is under the influence of external factors (resources, risks, opportunities).

To achieve its strategic goals, the Institute possesses all the required reactor and non-reactor experimental facilities, equipment, administration and amenity buildings, territory, skilled personnel to carry out world-level experiments. RIAR also has logistics structure and suppliers to provide the site with all technical and natural resources required for its activity. The Institute activities are based on the industrial-level nuclear technologies development projects,

in which the Institute participates to provide new knowledge. Activities in the interest of Russian enterprises as well as self-development projects are usually financed in the frame of industrial-scale and federal target programs. Activities for foreign customers are done under signed commercial contracts. In addition to research activities, RIAR produces radioisotopes, fuel assemblies for fast reactors, and supplies heat, electricity and water to Dimitrovgrad. By improving its experimental capabilities and engineering infrastructure, JSC "SSC RIAR" implements self-development projects to achieve the strategic goals.

JSC "SSC RIAR" successfully uses both its internal and external capitals thus demonstrating the effectiveness of its business model and high level of its integration into the environment and active interaction with the stakeholders.

JSC "SSC RIAR" business model



Capital assets of JSC "SSC RIAR" and their efficiency in 2017

Capital	Internal resources	External resources	Capital gain*
R&D and production	R&D and production infrastructure	R&D and production infrastructure of subcontractors	Gain of net assets made up 3 %. Investment projects allocation made up 2 053.32 M RUB
Financial and economic	Financial resources	Consolidated investment resource, Federal Target Programs assets, borrowed funds	Break-even operation: net profit made up 70 M RUB (+ 160 M RUB); No borrowed funds as of 31.12.2017
Intellectual	Ideas and developments, results of intellectual activity	Intellectual property, experience and knowledge	Number of registered patents for invention and useful models – 15, number of supported ones – 228; the increase is 6.5 %
Natural	Natural resources	Environment and consumed environmental resources	Costs for the environmental protection made up 101.7 M RUB. Consumption of thermal energy decreased by 2.38 %
Human	Personnel, knowledge and skills gained	Personnel, gained knowledge and experience of subcontractors	Average monthly salary growth made up 8 %. LTIFR made up 0. 1423 employees were trained. Training costs made up 6 633 K RUB
Social	Social relations, reputation of the organization at the domestic and international target markets, effective cooperation and communication	Public acceptance of industry, effective interaction with subcontractors, chain of supplies	Gross tax charges to the different-level budgets made up 838 M RUB

* Capital gain compared to the year of 2016

2.4. Risk Management

The risk management policy of RIAR is targeted at enhancing sustainability of its development. It is governed by relevant regulatory documents of the ROSATOM State Atomic Energy Corporation. They are used as a basis to put in place unified requirements for analysis of risks affecting achievement of financial and business performance indicators. Analysis of risks provides for their identification, assessment, preparedness evaluation and elaboration of risk management plan including monitoring. One of the key instruments RIAR uses to realize its strategy and achieve relevant objectives is to establish effective risk management and internal control systems. The primary goals and objectives of the risk management process are as follows:

- Identification of risks and their mitigation, provision of information and reporting about risks to make managerial decisions with a view to responding to the strategic objectives of RIAR;
- Promotion of process continuity (stability) through identification, assessment and mitigation of threats which can affect the performance of the Institute;
- Allocation of risk management responsibility area for Institute's employees at an appropriate level of management.

The risk management policy of RIAR is based on the principles and methods described in the corporate risk management system. It provides for consistency of management processes commencing with review procedures that encompass risk factors including further elaboration and implementation of risk

management procedures with the focus on minimization of risks and completing with their testing. These activities are aimed at timely identification of the events which could impact adversely on the achievement of objectives and at adequate responding to them. The existing measures of risk mitigation are assessed as to each of the identified risks, including procedures of internal control and their adequacy for restraining a residual risk level. In order to neutralize some risks, protection measures are put in place as they are more directly related to the production plan. Possible algorithms of actions are available if any risk arises. Risk management is done and supervised in the divisions and units of the Institute within the assigned area of every responsible.

Internal business processes are among the targets of the operational risk as they affect the sustainable development of the enterprise. In 2017 responsibility was assigned for implementation of financial improvement plan in accordance with the action plan for financial stabilization at JSC "SSC RIAR" to mitigate such risks. The risk management or risk mitigation activities are consistent with the objectives of short-, medium- and long-term planning in support of RIAR development and with the main lines of its fiscal policy.

The risks were classified according to their significance and likelihood with a view to take decisions on necessary risk management activities. The risks attributable to business activities of RIAR mostly do not require elaboration of additional measures to mitigate them.

Risk management at JSC "SSC RIAR"

 Decrease

 Increase

 No changes

Risk	Risk factor	Risk management activities	Results achieved
Risk of exchange losses	Volatility of exchange rate	Analysis of contracts concluded and future possible contracts. Costs optimization	Losses in foreign exchange earnings associated with the decline in the dollar in 2017 compared with 2016 (-281 million rubles) were compensated by the search for additional orders for products (services) in Russia, as well as cost optimization
Operational risk	Uncertain and unforeseen difficulties in the work process	Introduction of the state-of-the-art production methods. Modernization and technical retrofitting of radiation hazardous facilities. Mitigation (elimination) of hazards	-
Risk of underemployed capacities	A decrease in demand leads to the risk of underemployed capacities and underemployment of the personnel	Financial and industrial support of innovative products during the market slump. Increased production and sales of industrial grade products. Sale of non-core property	Sale of non-core assets (revenues amounted to 24.6 M RUB.)
Risk of quality	Unconformity of quality to the assigned quality standards or quality specifications as to products, accomplished work and services rendered	Maintenance of the quality management system. Evaluation of the Customer's satisfaction.	See Sub-section 3.5 "Quality Provision"
Risk associated with the increase in the cost of services	Setback of the worldwide / Russian financial and monetary system. Changes in the charge rates for public utilities and services, of shipping companies etc. Increase of the minimal subsistence wage etc. Failures in the work processes. Lower level of equipment capacity utilization. Technological obsolescence	Identification of risk owners and defining areas of their responsibility. Implementation of programs targeted at energy saving and energy efficiency enhancement. Integration of the ROSATOM industrial system to improve processes. Optimization of production areas. Headcount optimization	Decrease in the number of staff for 172 people in comparison with the previous year. Reducing the cost of energy resources by 1.5 M RUB in comparison with the indicator of 2016. Savings costs (from the plan) amounted to 640 M RUB. Reduction of reserves by 19 M RUB
Risk associated with movements in market prices for procured materials and output products due to changes in economic situation	Changes in the pricing policies of Contractors provided that the contracts concluded for input supplies enable reconsideration of prices	Invention of new market segments. Expansion of the range of products and services rendered	-
Legal risks	Loss of income, capital or loss in connection with violations or inconsistencies with internal and external legal norms	Implementation of activities strictly in accordance with the main local normative acts in the field of corporate governance. Compliance and ongoing monitoring of the current legislation of the Russian Federation and the presence jurisdictions in the field of nuclear energy, marketing, export control and non-proliferation of weapons of mass destruction. Following all recommendations of regulatory bodies of international and national level. Obligatory coordination of all concluded contracts with the Department for Legal Work and Corporate Relations, and in some cases, involvement of independent consultants	Lack of delays in the implementation of production activities related to changes in the legislation. No adoption of the court's orders detrimental to the society

Risk	Risk factor	Risk management activities	Results achieved
Social risks	Restructuring of society. Optimization of production. Reduction in the enterprise income	Implementation of the ROSATOM social policy. Implementation of corporative social programs. Periodical update of the JSC "SSC RIAR" CBA. Minimization of social tension, if any	Social-related expenditures made up 33 119 K RUB. 1 423 persons were trained. Within the framework of the housing program, interest-free loans amounting to 1.3 M RUB were issued to seven employees. A deposit agreement amounting to 3 M RUB was concluded with the insurance company SOGAZ. Construction of new facilities at RIAR creates additional jobs (600 and 86 people respectively). Each workplace contributes to the emergence of jobs in related industries from 6 500 to 7 500 people. For more details see Sub-sections 4.5 "Human capital" and 3.10 "Public position in the field of sustainable development"
Labor protection risk	Violation of safety requirements and rules of internal labor regulations. Dangerous and harmful production factors. Violation of the regime of work and rest. Insufficient resources to perform safety arrangements	Implementation of ROSATOM unified industrial policy in the field of labor protection. Functioning of the enterprise's labor protection management system on the prevention of occupational injuries and occupational diseases, improvement of working conditions of the RIAR staff. Organization of individual dosimetry control for seconded persons and employees of contractors performing work on radiation hazardous sites and objects of RIAR. Reflection in contracts concluded by the enterprise with contract organizations responsibilities of contractors in the field of compliance with labor protection requirements. Regular safety compliance checks together with representatives of contracting organizations. Perfection of the labor protection and safety culture. Implementation of measures to prevent injuries. Provision of the staff with collective and individual protection. Conducting activities to improve working conditions in the organization, including preventive work	Absence of accidents and cases of professional diseases among the RIAR employees and representatives of contractors and subcontractors performing work at the JSC "SSC RIAR" site. For more details see Sub-section 4.7 "Occupational Safety and Industrial Safety"
Nuclear and radiation safety risk	Infringement of requirements in the field of nuclear and radiation safety. Insufficient level of emergency preparedness. Insufficient resources to perform decommissioning activities and provide safety. Major accidents / incidents in the enterprise	Monitoring of the status and implementation of a complex of engineering activities to ensure trouble-free operation of nuclear research facilities and nuclear-hazardous areas (with observance of norms and taking into account changes in the current Russian legislation). Implementation of special events: – implementation of modernization programs for the technological equipment; – compliance with current standards in production and technological processes when operating nuclear installations, store and handle radioactive materials. Functioning of the radiation safety system, which includes: – dosimetric control of external and internal exposure of personnel; – control of coming of radioactive substances into the atmosphere; – maintaining the readiness of the special reaction forces to prevent, localize and eliminate consequences of possible accidents and emergency situations. Staff development. Conducting of comprehensive and inspection checks	Work at nuclear hazardous areas and operation of nuclear research installations was conducted accident-free. Non-exceeding the dose limits for personnel exposure. Compliance with standards for radioactive substances emission into the atmospheric air. Absence of violations in the work of RIAR facilities, characterized by level 1 and above on the INES scale. Implementation of guidelines of the Federal Medical and Biological Agency of Russia, Federal rules and regulations in the field of use of nuclear energy, and standards of ROSATOM. For more details see Sub-section 4.7 "Occupational Safety and Industrial Safety"

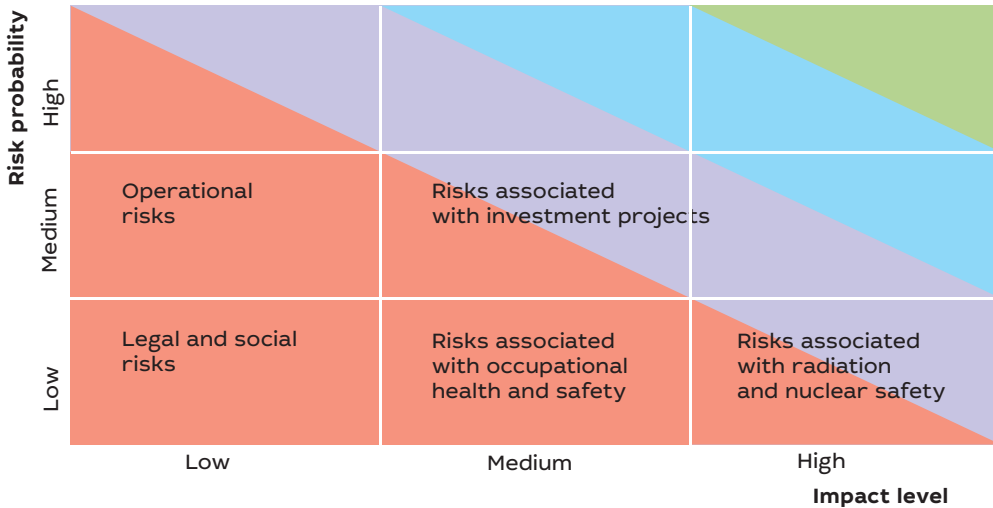
Risk	Risk factor	Risk management activities	Results achieved
Investment projects risk	Lack or changes in financing. Design errors. Overrun of project budget. Deviation from schedule, extension of project implementation terms	Monitoring of project risks and revealing of key once during regular reporting. Updating of risk list and risk assessment. Identification of risk owners and their responsibilities. Development and implementation of measures to minimize risks. Optimization of investment costs taking into account the priorities and risks of projects. Professional development of specialists. Interaction with the ROSATOM profile structures. Private-public partnership, attraction of external investors	Execution of the federal targeted investment program and state defense order in due time. Approval of the SM reactor core modernization project. Approval of the passport for the full cost of the MBIR reactor construction project. Financing for other priority projects due to the cost optimization within limits of the ROSATOM consolidated investment resource. For more details see Sub-section 3.8 "Management of Investment Activities"
Ecological safety risk	Infringement of industrial and environmental safety. Lack of compliance with requirements in the field of environmental protection, including insufficient resources for security measures implementation. Insufficient level of emergency preparedness	Setting goals, objectives and developing measures to reduce risks in the field of environmental protection. Analytical control of sources of influence on the environment. Development and implementation of the requirements of regulatory documentation containing requirements in the field of environmental protection. Conducting comprehensive and inspection checks, audits, environmental monitoring. Improvement of the integrated ecological safety management system. Informational and educational activities. Public acceptability	Lack of lawsuits for environmental damage compensation and the prerequisites for their emergence in the future. The volume of investment into the environmental protection amounts to 2 045 K RUB. Issue of the annual public report on environmental safety (http://niiar.ru/annual_report). For more details see Sub-section 4.6 "Natural Capital"
Reputation risk	Stakeholders' perceptions of the reliability and attractiveness of JSC "SSC RIAR", confidence in its activities and quality of products and services	Analysis of the structure of stakeholders, identification of their expectations, widening of the circle of stakeholders, attraction of foreign partners. Participation in Russian and foreign conferences, seminars. Compliance with the industry regulations on the information of public in abnormal situations that threaten business and public reputation. Implementation of integrated communications. Implementation of targeted communication programs to promote products and services. Formation of the corporate culture values and implementation of the ROSATOM's project "Public resonance of ROSATOM's values". Formation of a positive public attitude to the activities of RIAR via increasing information transparency and openness and through constructive interaction with stakeholders. Continuous monitoring and analysis of reports in national and foreign media, at business meetings, industry conferences and seminars	According to the questionnaire results, 100 % of consumers of services and products consider JSC "SSC RIAR" as a reliable supplier and plan to continue joint cooperation and are ready to recommend RIAR to other consumers. More than 300 references to RIAR activities in the Russian media. The increase in the number of publications by 13 % compared to the last year. 101 specialists from 14 countries visited RIAR. The following reports were issued and posted on the corporate website: integrated, scientific, on environmental safety. For more details, see Sub-sections 3.6 "Quality Assurance", 4.4 "International activities" and 5.2 "Information and Communication"

Our plans:

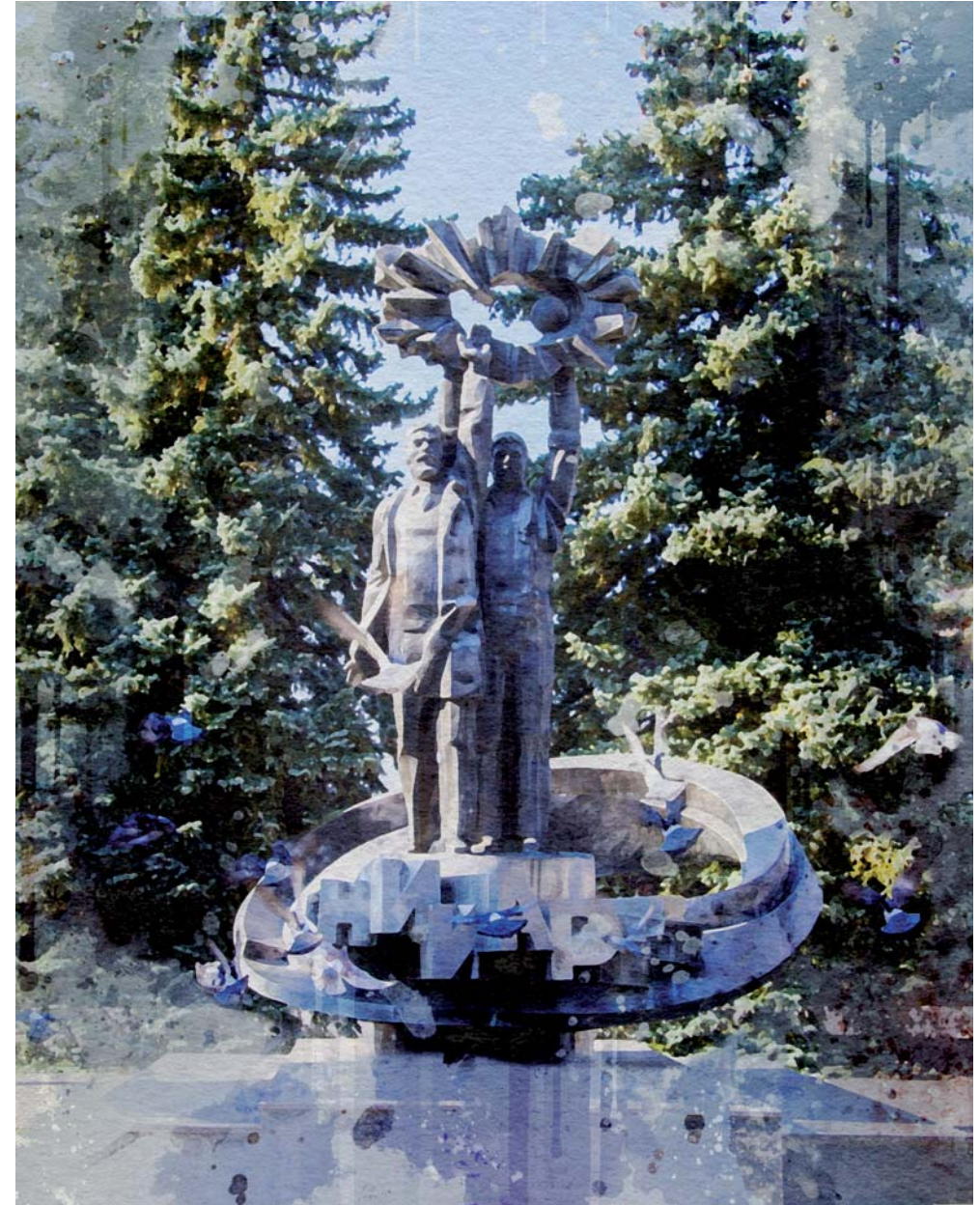
- risk assessment in the framework of implementation financial rehabilitation measures;
- continuation of the work aimed at the development of risk management system and its integration into the existing management processes;

- identification, assessment and monitoring of risks in groups of processes "Budgeting" and "Medium-Term Planning" to analyze the impact of implementation of uncontrolled (both managed and unmanaged) budget risks, control over the implementation of risks management activities.

Risk assessment map



- There is no need to develop an additional action plan to minimize risks
- There is a need to develop an additional action plan to minimize risks
- There is a need to develop an additional action plan to minimize risks and to implement insurance risks
- The development of extra measures does not contribute much to risk minimization, a question of the rationale for the activity is raised



SECTION 3

Effectiveness of Management



3.1. Members and Structure of the Governance Bodies

Structure of the Corporate Governance Bodies



The supreme governance body of JSC "SSC RIAR" is the General Shareholders Meeting. The Charter of JSC "SSC RIAR" and the Federal Law No.208-FZ "On Joint Stock Companies" as of 26 December 1995 govern the powers, the procedure for convocation and holding the general Shareholders Meeting. In 2017 three General Shareholders Meetings were held: one Annual Shareholders Meeting and two Extraordinary Shareholders Meetings.

3 General Meetings of Shareholders

The **Board of Directors** is a collegial managing body that is in charge of overall management, corporate development strategy, and it also exercises control over financial and economic activities and over the Sole Executive Body for RIAR. The Board of Directors occupies a central position in the corporate management system. A number of members for the Board of Directors is specified in the Charter of JSC "SSC RIAR". The RIAR's Board of Directors acts in compliance with the scope of its competence stipulated by Federal Law No. 208-FZ "On Joint Stock Companies" as of 26 December 1995, the Charter of JSC "SSC RIAR", and the Statute of the Board of Directors. In 2017 there were forty four in absentia meetings of the Board of Directors (all the members of the Board of Directors provided their absentee feedback so there was a 100 per cent attendance rate).

44 Meetings of the Board of Directors

70 Matters and topics addressed at the Meetings

The record of performance of the RIAR's Board of Directors is given in [Attachment 2 hereto](#)

Members of the Board of Directors and the term of its power

From 15 June 2016 until 27 June 2017

Vyacheslav A. PERSHUKOV
(Board Chairperson)
Sergey P. KASHLEV
Nikolay A. KONDRATIEV
Il'ya V. CHEREMUKHIN
Alexander A. TUZOV

From 27 June 2017 until 31 December 2017

Nikolay A. KONDRATIEV
(Board Chairperson)
Sergey P. KASHLEV
Vladimir D. RISOVANY
Il'ya V. CHEREMUKHIN
Alexander A. TUZOV

Board of Directors

Age	Members of the Board of Directors		
	Men	Women	Total
Aged 30 and under	0	0	0
Aged 31 and through the age of 50	2	0	2
Aged 51 and over	4	0	4
Total	6	0	6

There are no committees under the Board of Directors.

The collegial executive body has not been established at JSC "SSC RIAR" during the period under report.

RIAR does not have independent members in the Board of Directors as defined by the Code of Corporate Governance and recommended to be implemented in accordance with the letter of the Bank of Russia No.06-52/2463 as of 10 April 2014 "Concerning the code of Corporate Governance" that is why there is no information about the rate of remuneration and performance (key performance indicators) of the Board's members (see the Charter of JSC "SSC RIAR" (paragraphs 12.1.14 and 14.12) that is accessible on the RIAR's website http://niiar.ru/sites/default/files/ustav_2017_zaregistrirrovanny.pdf).

Board of Directors for JSC "SSC RIAR"

As at 31 December 2017

**KASHLEV**

Sergey

PERSHUKOV

Vyacheslav

CHEREMUKHIN

Ilya

KONDRATIEV

Nikolay

TUZOV

Alexander

RISOVANY

Vladimir

Personal
details

Date of birth: 23 February 1960
Academic background: higher, graduate from Novosibirsk State University (1982) majoring in economic cybernetics

Date of birth: 20 May 1958
Academic background: higher, graduate from the Lomonosov Moscow State University (1980) majoring in mechanics

Date of birth: 23 March 1975
Academic background: higher, graduate from Yaroslavl State University (1997) majoring in jurisprudence

Date of birth: 19 October 1960
Academic background: higher, graduate from Tomsk Polytechnic Institute (1982) named after S. Kirov majoring in engineering electronics

Date of birth: 9 April 1971
Academic background: higher, graduate from Nuclear Power Engineering Institute in Obninsk (1994) majoring in power generation and automatic control engineering

Date of birth: 15 March 1955
Academic background: higher, graduate from Ural Polytechnic Institute named after S. Kirov majoring in metal science

Place of employment
and positions held over
the last five years

JSC "Science and Innovations"
From March 2012 until January 2013 – Advisor
From January 2013 until December 2015 – Deputy Director General for Economics and Finance
From December 2015 until November 2017 – Director General
From November 2017 until January 2018 – Deputy Director General for Economics and Finance

ROSATOM State Atomic Energy Corporation
From June 2011 until September 2017 – Deputy Director General, Director of the Unit for Innovation Management
From October 2017 and to the present day – Designated Officer for ROSATOM's International and Science & Technology Projects
JSC "Science and Innovations":
from October 2015 until December 2015 – Director General

Moscow Branch Office, Production Association TGK-14
From December 2011 until January 2013 – Head of Legal Office
"ENERGOPROMSBYT" LLC
From February 2013 until April 2015 – Head of Legal Office
"ATOMENERGOSBYT" JSC
From February 2013 until April 2015 – Chief Executive Officer, Government relations Department
JSC "Science and Innovations"
From July 2015 and to the present day – Head of Agency for Legal and Corporate Performance

JSC "Science and Innovations"
From November 2011 until October 2013 – Director General
Since October 2013 and to the present day – Chief Executive Officer

ROSATOM State Atomic Energy Corporation
From November 2010 until April 2015 – Program Executive, Deputy Director of the Innovation Management Unit – Head of Department for Technological Development
JSC "Science and Innovations"
From May 2015 and to the present day – Director
JSC "SSC RIAR"
Since October 2015 and to the present day – Director
JSC "Reactor Materials Institute"
Since July 2017 and to the present day – Board Chairperson

JSC "SSC RIAR"
From March 2013 until January 2014 – Research Coordinator
JSC "Science and Innovations"
From October 2013 until April 2017 – Deputy Director General – Chief Research Officer for Physics and Power Engineering Unit
Since April 2017 and to the present day – R&D Director, Chief Research Officer for Physics and Power Engineering

Share of members of the Board of Directors in the share capital of RIAR is 0 %. Their equity share in the ordinary nominal shares of RIAR is 0 %. There were no transactions related to acquisition and alienation of shares in the year under report

The ongoing activities of JSC "SSC RIAR" were managed by sole executive bodies during the period under report: by Alexander A. Tuzov, Director

of JSC "SSC RIAR" and by the managing company that is Joint Stock Company "Science and Innovations".

Information about the managing company and its Director General

Full name	Joint Stock Company "Science and Innovations"
Abbreviated Company name	JSC "Science and Innovations"
Director General	<p>Date of birth: 8 May 1981</p> <p>Academic background: higher, graduate from Moscow State Technological University "STANKIN" (2005) majoring in technology of machine building</p> <p>Place of employment and positions held over the last five years:</p> <p>FSUE "Luch" Scientific Production Association: from October 2014 until November 2017 – Director General</p> <p>JSC "Science and Innovations": since November 2017 and to the present day – Director General</p> <p>A share in the share capital of the JSC "Science and Innovations" is 0%.</p> <p>Equity share in the ordinary nominal shares of the JSC "Science and Innovations" is 0%.</p> <p>There were no transactions related to acquisition and alienation of shares in the reporting year.</p>
Head Office and legal address	32/2 Kadashevskaya Emb., Bldg.1, Moscow, 115035
Primary State Registration Number	1117746621211
Individual Taxpayer Identification Number	7706760091
Industrial Enterprise Classification Code	770601001
Date of registration	11.08.2011
Share in the share capital	0 %
Equity share in ordinary nominal shares	0 %



ZAITSEV
Pavel

There were no transactions related to acquisition and alienation of shares in the year during the year under report.

Remuneration payable to the Director and to the members of the Board of Directors

The principle of forming remuneration for the top management is similar to the principle of forming compensation to other employees of JSC "SSC RIAR". The amount of remuneration payable to the Director of JSC "SSC RIAR" is determined in accordance with the terms and conditions of employment contract which are subject of approval by the Board of Directors. The general shareholders meeting may resolve to pay remuneration

to the members of the Board of Directors and/or reimburse for expenses arising out of discharging their duties as the members of the Board of Directors at RIAR. The general meeting of shareholders at RIAR did not resolve to pay any remunerations during the year under report. Therefore, no remuneration was paid to the members of the Board of Directors.

For more detailed information, see the Section 4.5 entitled "Human Capital Management"

3.2. Corporate Governance System

For the corporate governance system, JSC "SSC RIAR" adheres to the policy of observing recognized national and international standards as well as the corporate governance principles of ROSATOM State Atomic Energy Corporation. The corporate governance framework should recognize rights and interests of all the parties involved and contribute to the success of RIAR.

Regulatory framework

Charter of JSC "SSC RIAR"

Civil Code of the Russian Federation

Regulation for the RIAR's Board of Directors JSC "SSC RIAR"

Federal law No.208-FZ "On Joint Stock Companies" as of 26 December 1995

Principles of corporate governance

Protection of shareholders' rights and legitimate interests

Federal law No.208-FZ "On Joint Stock Companies" as of 26 December 1995 and the Charter of JSC "SSC RIAR" set forth the shareholders' rights. A procedure of information exchange between RIAR and a shareholder is governed by the applicable Russian Federation laws currently in force, the RIAR's Charter, industry's and internal documents

Effective governance on the part of the Board of Directors

The board of Directors acts in good faith with a view to the best interests of shareholders and JSC "SSC RIAR" to ensure the fullest transparency of its activities to the shareholders

Transparency and objectivity in information disclosure

JSC "SSC RIAR" ensures timely disclosure of reliable information about its financial standing, economic performance, output including ownership and governance structures to its shareholders and parties concerned. Such information is disclosed in full compliance with the law on state and trade secrets

Rule of law and ethics

JSC "SSC RIAR" acts in full compliance with the applicable laws, generally accepted standards of business ethics, ROSATOM's Code of Conduct, and its contractual commitments. Relations between the shareholders and the Board of Directors are based on mutual trust, respect, accountability and control

Plans for enhancing the corporate governance system

Enhancement of the corporate governance system at JSC "SSC RIAR" is targeted at achieving better efficiency, responsibility and liability, transparency in undertaken activities and administration and it is primarily attributable to the protection of shareholders' rights and achieving equity of opportunities in exercising their rights that is to say prevention of any actions aimed at affected redistribution of corporate governance and control as well as to submission of the best available information regarding the matters discussed at the general meeting of shareholders. One of the basic directions for enhancing the corporate governance system is to ensure expeditiousness of decision-making process on the part of the governing board pursuing a comprehensive study of the matters addressed. Prospects for further development of the corporate governance system are closely linked to JSC "Science and Innovations" and ROSATOM State Atomic Energy Corporation. In ongoing efforts to enhance the corporate governance system, JSC "SSC RIAR" continuously keeps track of all the changes in applicable laws and advanced standards hereto.

Information concerning the observance of the Corporate Governance Code

Certain provisions of the Corporate Governance Code are implemented by RIAR

as it was recommended to be put in place based on the letter of the Bank of Russia No. 06-52/2463 as of 10 April 2014 but with due consideration for the legal status of ROSATOM stipulated with the applicable laws and regulations of the Russian Federation ensuring the unity of governance for all the nuclear enterprisers.

Reporting of the Board of Directors on developing the business priorities

The Board of Directors made the following decisions on major issues related to the high-priority areas of RIAR's business activities at its meetings during the year under report:

- It was agreed to make contract for construction and installation work to build a multi-functional onsite radiochemical complex;
- The following papers and documents were approved:
 - Target figures for business and financial performance, corresponding budgets and relevant limits;
 - Revised Charter of JSC "SSC RIAR";
 - Annual accounting reports of JSC "SSC RIAR" for 2016;
- It made recommendations to the annual general meeting of shareholders concerning allocation of profit (including a dividend rate on shares and procedure of payment thereof) and losses made by JSC "SSC RIAR" according to the 2016 results.

The report of the Board of Directors is given in [Attachment 2](#) hereto

The report on related-party transactions is given in [Attachment 3](#) hereto

Related party transactions

The revised Charter of JSC "SSC RIAR" was registered on the 3rd of February 2017 in the Inter-Regional Inspectorate of the Federal Tax Service of the Russian Federation No. 7 for Ulyanovsk region as it grants a waiver of Article XI of Federal Law No. 208-FZ "On Joint Stock Companies" dated 26 December 1995 (Sub-section 3.11 of the Charter) in respect of JSC "SSC RIAR".

There were no dividends paid or attributed to the shares of JSC "SSC RIAR" during the year under report and over the last five years

Changes in the size and structure of ownership

The RIAR's share capital comprises a nominal amount of its shares purchased by its shareholders. As on 1 January 2017 the share capital amounted to RUB 12 685 792 475 (twelve billion six hundred eighty-five million seven hundred ninety-two thousand four hundred seventy-five)

12.686 bln rubles
is the share capital
of JSC "SSC RIAR"

High-priority areas of RIAR's business with the focus on fulfilling the needs of the Physics and Power Engineering Unit at ROSATOM were presented in the Annual Reports for the previous years (for instance http://www.niiar.ru/sites/default/files/riar_annual_report_2015small_O.pdf). Chapter 4 "Management of Capital and Performance" provides an overview of RIAR's business performance for 2017.

and remained the same during the entire time period under report. It was divided into 12 685 792 475 ordinary registered shares with a par value of RUB 1 each. All the shares were issued in book-entry form. Every ordinary registered share confers on the shareholder owing it the same scope of rights secured. The general meeting of shareholders (Protocol No. 41 dated 28 November 2015) resolved to increase the charter capital of JSC "SSC RIAR" via issuing 6 932 394 550 (six billion nine hundred thirty two million three hundred ninety four thousand five hundred fifty) additional shares through a closed subscription. The Board of directors approved the decision to issue additional shares (Protocol No. 334 dated 30 November 2015). The additional issue of securities was registered by the Bank of Russia on the 15th December 2015 under state registration number 1-01-55411-E-008D.

In 2017 RIAR placed 227 696 900 (two hundred twenty seven million six hundred ninety six thousand nine hundred) shares coming out from the additional issue of securities. The total number of shares placed by RIAR is 17 191 625 275 (seventeen billion one hundred ninety one million six hundred twenty five thousand two hundred seventy five).

Distribution of issued shares, %

Shareholders	Distribution date	
	31 Dec. 2016	31 Dec. 2017
Joint Stock Company "Nuclear Power Generation Complex"	52,7803	53,0235
The Russian Federation legally represented by ROSATOM State Atomic Energy Corporation	9,6972	9,9510
ROSATOM State Atomic Energy Corporation	37,5225	37,0255

3.3. Auditing of Financial and Business Activities

An independent auditor and Department for Internal Control and Audit at JSC "SSC RIAR" are in charge of financial and business supervision. Pursuant to the resolution of the general meeting of RIAR's shareholders (Protocol No. 448 dated 26 May 2017), Limited liability Company "Financial and Accounting Consultants" was designated and approved as Independent Auditor for statutory annual audit of JSC "SSC RIAR" for the time period under report.

The internal control and auditing system is one of the essential elements of managing risks attributable to observance of regulations imposed by applicable laws by the executive departments at JSC "SSC RIAR". It is considered to be an alternative to the State control and auditing. JSC "SSC RIAR" has had a Department for Internal Control and Audit since 2015 that has been

Information about independent audit company	
The head office and legal address	Myasnitskaya street 44/1, Bldg. 2 AB, Moscow, 101990, Russia
Phone	8(495) 737-53-53
Official website	http://www.fbk.ru
Email	fbk@fbk.ru

There is no audit commission (Auditor) at JSC "SSC RIAR"

guided in its activity by the Russian laws currently in force, international standards and internal regulations. The Department is directly subordinated to the Director of RIAR and undertakes its inspections and auditing in conformity with a single consolidated plan of control activities approved by the Order of ROSATOM as directed and ordered by the Director. Revealed improprieties,

non-observance, divergences and identified risks are addressed within the timeframes specified in the plan of control activities.

The following actions are undertaken in order to enhance the quality of control, ensure timely detection of non-observance and problems and reduce working hours lost:

- use of ROSATOM's information system 1C:ERP and internal information and reporting resources;

- auditing of financial and business operations at RIAR's primary business units whose business performance affects the fulfillment of key performance indicators;
- enhanced training of the staff members and exchange of professional expertise with the associated departments at the ROSATOM State Atomic Energy Corporation and its subordinate institutions.

Internal Control and Auditing System

Internal control over financial and business performance of RIAR is carried out in order to obtain the following information:

- Effectiveness and expediency of the enterprise performance;
- Reliability and authenticity of financial (accounting) statements;
- Enforcement and compliance with the laws and regulations

Internal control and auditing helps the management team to identify and assess risks and works out relevant measures addressing the following:

- Risk mitigation;
- Improved effectiveness of systems and processes

Key objectives to be fulfilled by the Department for Internal Control and Auditing

The Department undertakes to do the following: continuously enhance effectiveness and reliability of internal control and corporate governance at RIAR in conformity with the laws in force in the Russian Federation, regulatory authorities' requirements, international standards, provisions of domestic policy and applicable internal regulations

Internal audits and review sessions with the focus on reliability and effectiveness of risk management, internal control system, corporate governance system, business operations and information management systems to achieve planned financial and operational performance, strategic targets of the Company, ensure the reliability of information about its financial and business performance, effectiveness and results, safeguarding of assets, and cost-effectiveness in the use of resources

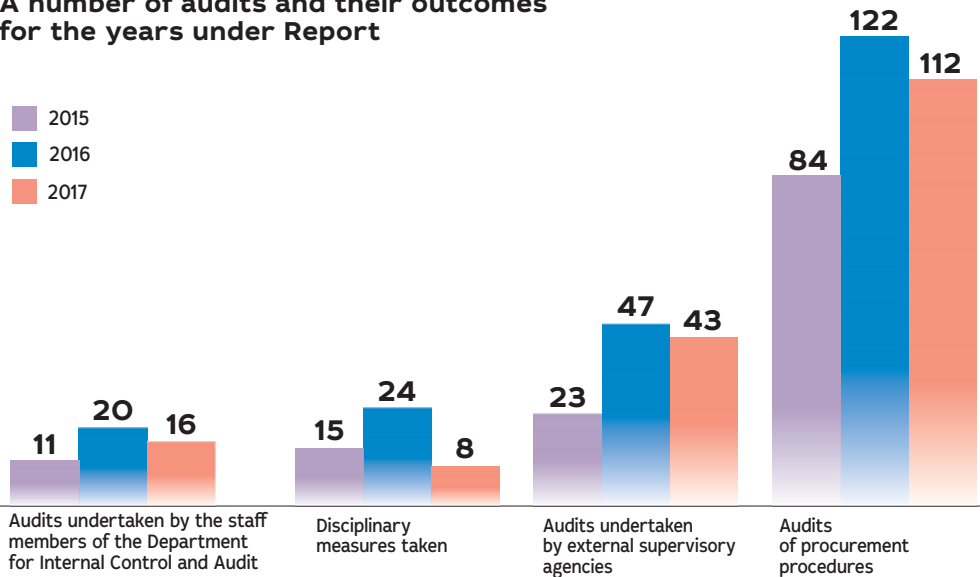
Identify and assess criticality of identified risks attributable to the business processes in a timely manner under ex ante, current and ex post control

Conduct an independent assessment of internal control adequacy and effectiveness at RIAR

In 2017 all the staff members of the Department for Internal Control and Audit (seven people) were successfully trained on "Single Unified Labor Remuneration System as a Part of Staff Motivation System. Distance Learning Course" and given respective certificates of ROSATOM State Atomic Energy Corporation. The Head of Department attended the advanced training course for "Internal Control and Audit in the Russian Federation" and was awarded with a Certificate issued

by the Competence and Advanced Training Center at the Audit Chamber of the Russian Federation. In December 2017 he was involved in business training "Digital Transformation of Internal Audit and Compliance Control" at the Institute of Certified Financial Managers (ICFM, UK). On the 7th of December 2017 he won an award "The Best Internal Auditor" in London at annual awards ceremony for Global Lifetime Award in the field of finance, internal control and audit "Luka Pacioli-2017".

A number of audits and their outcomes for the years under Report



Plans

Plans for the first half of 2018 are as follows:

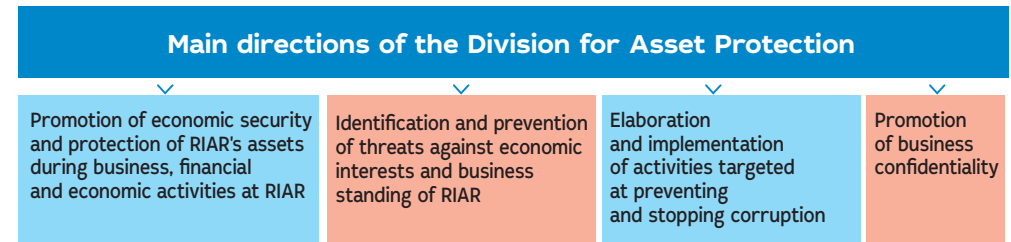
- ;To undertake eight compliance measures including four thematic inspections and audit under the supervision of ROSATOM's Internal Control Department;
- To conduct an annual internal audit of making Integrated Annual Report for 2017 followed by the auditors' report;
- To conduct auditing of financial and business operations, procurement and contract-related activities undertaken by RIAR in 2017 and other things.

System for combating unlawful acts, actions and corruption

Enterprises and organizations subordinate to ROSATOM set up a unitary Industry-specific mechanism for combating corruption and protecting assets, have in place well-defined mechanisms of functional management, a chain of command and business data intelligence. The Deputy Director for Security and Asset Security Office directed by him

with a total number of staff of six people (as of 31 December 2017) are in charge of organizing a relevant work, implementing and coordinating activities targeted at countering corruption offences.

For additional information you can visit the following websites of ROSATOM State Atomic Energy Corporation (<http://www.rosatom.ru/partnership/theft/>) and JSC "SSC RIAR" (<http://www.pub.niiar.ru/>)



ROSATOM's communication channel "hotline"

For preventing corruption and fraud in nuclear industry

07-07
8-800-100-07-07
@rosatom.ru

A major part of work against corruption and its prevention is to exercise control over management of procurement activities. The staff members of the Asset Security Office approved five hundred thirty four (534) procurement procedures and one thousand twelve (1 012) procurement contracts in place including their modifications during the year under Report to prevent any cases of economic harm. They conducted

thirty two (32) administrative investigations and are entitled to check the veracity of information declaring earned income, property status and related commitments of certain categories of officials, carry out an expert appraisal of trustworthiness and business reputation for some staff members involved in procurement to reveal affiliation of persons and entities as well as potential conflicts of interest.

In 2017 one hundred fifty five (155) RIAR's staff members were checked for affiliation as the positions they were applying for or their appointment in case of substitution called for declaring their income, property and property obligations.

All the possible vendors and contractors are informed about anti-corruption policy in place and practices available with the help of procurement documentation and procurement terms and conditions.

RIAR's internal regulations, policies and procedures for combating unlawful actions and corruption

Unified industry-specific anticorruption policy of ROSATOM and its subordinate enterprises and organizations

Unified industry-specific recommended practices for the corruption risk assessment at ROSATOM's institutions

Anti-bribery and anticorruption policy of JSC "SSC RIAR"

Regulation on establishing relationships with a contracting party during procurement

Corruption risk register of JSC "SSC RIAR"

Procedure for employees of JSC "SSC RIAR" to inform the employer about the address facts for the purpose of inducement to make corruption, review and verification of such complaints and their filing

Procedure for coordination of actions between RIAR's employees and law-enforcement agencies for combating and preventing corruption

Code of professional ethics and official conduct for the RIAR's employees and other institutions fallen into the JSC "Science and Innovations" governance system

The above-listed documents are available for use and placed on the RIAR's website in the section entitled "Anticorruption efforts". The same section of the website has addresses and other details of contacts for a special purpose communication channel "hotline" designated for preventing corruption and fraud in nuclear industry so that any employee or an outsider who has knowledge of fraud or theft can

communicate this information even on anonymous basis. It is mandatory for all the RIAR's employees to study regulatory and procedural documents addressing corruption and fraud. The awareness of personnel is 100 per cent. Pursuant to standard industry-specific recommended practices, guidelines and procedural documents addressing the corruption risk assessment at ROSATOM's enterprises

and organizations, all the RIAR's divisions and departments perform analyses of business processes to identify critical control points and describe potential corruption offences. The results of analyses are used as a basis for corruption risk mapping and working out action plans

targeted at minimizing risks. Awareness-rising activities are organized to ensure that the employees are intolerant towards any form of illegal actions. RIAR also takes targeted efforts to prevent, identify and document the cases of corrupt practices.

RIAR's internal regulations, policies and procedures for enhancing anticorruption efforts, safeguarding assets and trade secrets

Guidance document on registration, recording, retention and keeping of data carriers with the information constituting the RIAR's trade secrets

List of knowledge, data and documents constituting the RIAR's trade secrets

Guidance document on ensuring protection of knowledge, data and documents constituting the RIAR's trade secrets

Guidance document of the experts' committee for ensuring trade secrets protection

Regulation on conducting security inspections with a view to ensuring the regime of business confidentiality for inside intelligence (official information of restricted circulation classified as restricted access information) at JSC "SSC RIAR"

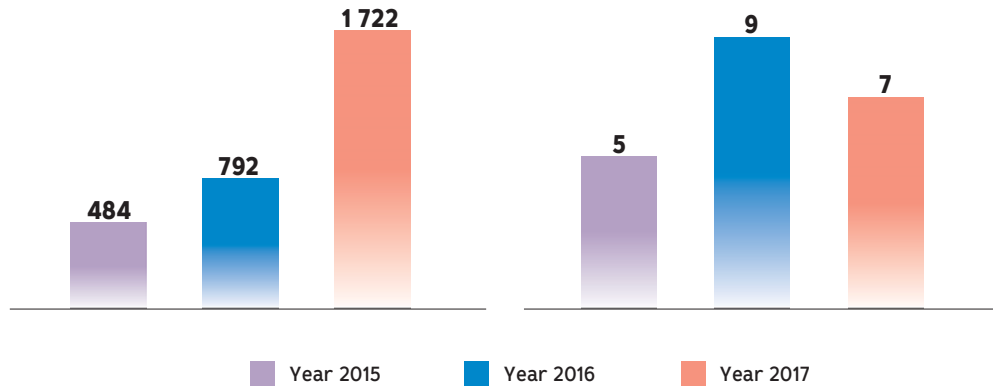
Plans

Pursuant to the policy of ROSATOM State Atomic Energy Corporation and JSC "SSC RIAR" and based on the experience gained and identified heightened awareness zones, the staff members of the Asset Security Office are challenged to make efforts towards further enhancing measures and methods for combating corruption, safeguarding assets and trade secrets at JSC "SSC RIAR" in 2018.

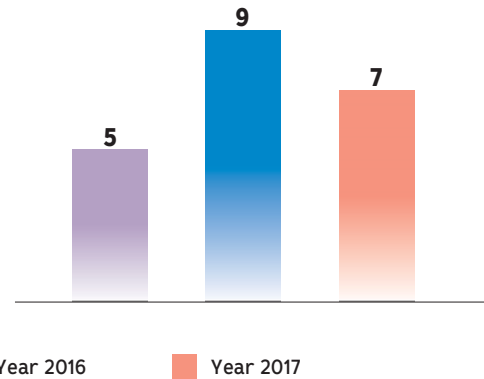
8 356 426 RUB
of economic loss was
prevented

(84-235) **7-91-00**, areshin@niar.ru, are the telephone number and electronic mailbox to report about corruption at JSC "SSC RIAR"

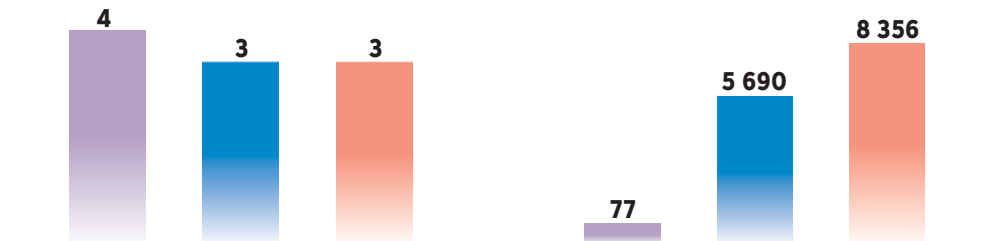
A number of audits targeted at preventing any losses including loss of assets



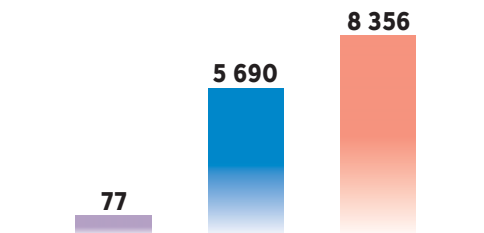
A number of staff members under disciplinary proceedings



A number of checks aimed at verifying information about malpractices and corrupt activities reported via communication channel "hotline"



Loss prevented, RUB, in thousands



6 case reports were handed over to the law-enforcement agencies

During 2015–2016 there were no case reports handed over to the law-enforcement agencies as well as no criminal proceedings initiated.

4 criminal proceedings were instituted as a result of investigations conducted

3.4. Key Performance Indicators

The improving performance management system has been successfully implemented at JSC "SSCRIAR" since 2009. A matrix of key performance indicators (KPI) is an essential mechanism that governs this process. Its fundamental principle is to decompose strategic goals of ROSATOM State Atomic Energy Corporation and managing company into financial, economic, business performance indicators and others assigned to the top management for a year term. The key performance indicators governing economic, business, environmental and social performance are formalized into the KPI matrix of JSC "SSCRIAR" Director and cascaded down or decompose for lower level staff members in conformity with the key goals and relevant to their functional burden. The key performance indicators are assigned to the managers at all the levels in a mandatory manner. The SAP based personnel management system was adopted to improve effectiveness of KPI setting and to evaluate their achievement.

Performance appraisal is one of the integral parts of the personnel remuneration policy. An approved KPI data record is essential for bonus payment. Bonus payments are effected once a year upon the fulfillment

of key performance indicators but within the limits of payroll budget and with due consideration for the annual business performance of the enterprise. The amount of remuneration payable and its relevance to the performance are clear and transparent. The established remuneration policy is based on the Regulation on Remuneration of Labor at JSC "SSCRIAR". The amount of remuneration depends on the position held, actual level of KPI fulfillment and hours worked. Each key performance indicator is assigned with a specific numeric value in the KPI matrix with relevance to the total amount of bonus payable. In its turn the total amount of bonus payment is based on the annual amount of fixed salaries and target amount of remuneration. Bonus payments are effected upon fulfilling the KPI threshold level. The KPI threshold levels are also specified in the appropriate. When noticeable and significant achievements are made and they are beyond the target level of performance, bonus payments can be effected at a higher rate. Higher bonus factor can be additional motivation tool (150 %) to achieve the upper level of performance indicators which are approved by the Strategic Board at the ROSATOM State Atomic Energy Corporation.

The total amount of remuneration paid in 2017 to the key management personnel such as deputy directors and other executives delegated with authority

and enabled to take responsibility for planning, administration and management at RIAR amounted to RUB 94 605.65 k.

Key principles of performance appraisal

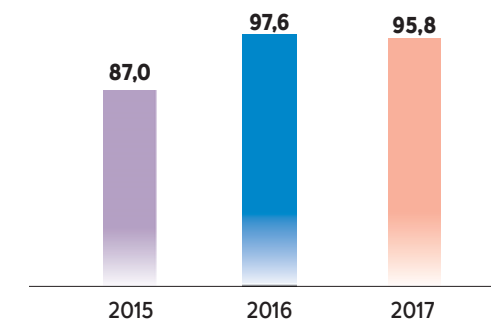
Decomposition	Key performance indicators reflect an area of responsibility and management sphere for each manager
Being focused	KPI number is limited for the staff to focus on the key priorities of work
Periodicity	KPIs are set for a calendar year term
Balance	KPIs do not contradict each other but agree
Meeting SMART criteria	KPIs are definable, achievable, actual and measurable
Ambitiousness	KPIs are targeted at the growth of financial and business performance of ROSATOM
Relevance	The actual level of KPI fulfillment is confirmed by the information provided as statistical, accounting and management statements and can be selectively checked as part of audit procedures and standing orders or internal control initiated by ROSATOM

Strategy matrix with the key performance indicators of JSC "SSC RIAR" Director for 2017

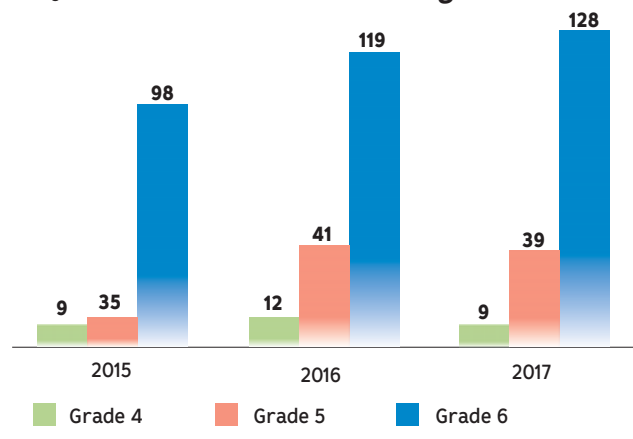
Key performance indicator	Fulfillment against the target level, %	Strategic goal
Free adjusted cash flow	120	Increased share on the global market
Labor productivity	70	
Revenue from sale of innovative products	120	
Total costs	109	Reduction of production costs
Integrated index of new products	150	Creation of new products
Integrated index of investment performance	100	More efficient investments
Engagement rate	120	Improved staff motivation and loyalty
LTIFR and nonoccurrence of incidence of falling from elevations	Accomplished	RIAR's business environment
No events with safety relevance of 2 and higher and accidents at hazardous production facilities according to the INES scale	Accomplished	
Fulfillment of government orders including state defense contracts and contracts with other governmental customers and companies	Accomplished	

Sustainable development goals are addressed in the key performance indicators of the supreme governing body and top management team. Sustainable development of RIAR calls for both high financial and business performance and for high social and environmental performance. The RIAR's top management was given the key performance indicators targeted at higher energy performance, further development of innovative products as well as the key performance indicators demonstrating the level of staff motivation towards higher performance with the use of different practices and methods, awareness of RIAR strategic goals and their contribution to the overall performance.

Average rate of KPI fulfillment from year to year, %



A number of employees engaged in performance assessment, from year to year and with relevance to grades



Motivation of top management

A motivation system of top management towards the effective work, improved business and economic performance is based on the ROSATOM's Unified Standard Remuneration System. An annual bonus payment depends on the fulfillment of key performance indicators. The amounts

of bonuses to be paid are agreed by the managing company. Bonus payments are mainly used as a reward. Key performance indicators provide a basis for making decisions. They are based on the assessment of RIAR's performance and targeted at pursuing both ROSATOM's and its own strategic goals.

94 605.65 k RUB
is the remuneration amount of managing staff

3.5. Quality Assurance

The quality management system is intended to ensure institutional governance, research, business and engineering management at RIAR and is targeted at meeting the Customer's requirements to the full extent with a view to provide the desired quality within the fixed timeframes as well as safe performance

Quality management at RIAR is based on the quality management concept stated in international quality management standards. The integrated quality management system is under the direct supervision of the Chief Engineer who is the RIAR's top management representative in charge of quality and ecology. As to the quality policy guidance, it is implemented by the Quality and System Engineering Department that is subordinate to the Chief Engineer.

Quality Assurance Policy

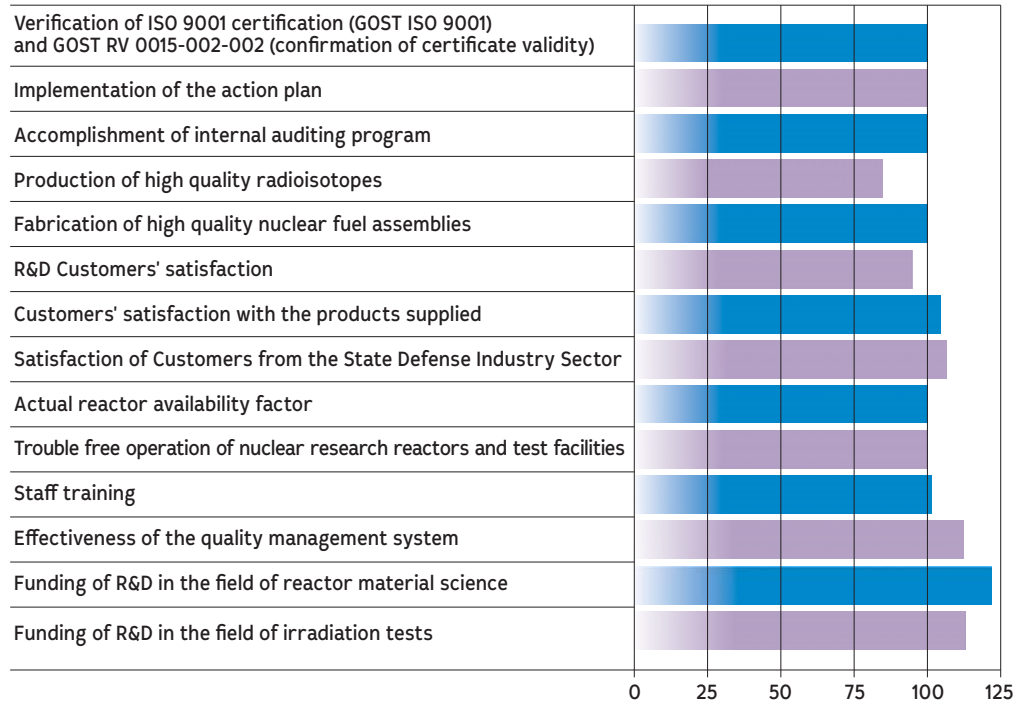
Common intentions of the RIAR's management and areas of its business to assure quality are set forth in the quality management policy of JSC "SSC RIAR". The quality assurance policy was made up to date in 2015. It was brought to attention of every employee and made available to the general public. Its timely applicability is verified annually. The integrated quality management system is applicable to the design engineering, fabrication and supply of fuel elements, fuel assemblies, radiochemicals and radionuclide sources. It also extends to research and development work in the field of nuclear energy application and complies with the requirements of international standards.

Regular internal audits of integrated management system and its supervision audits for compliance with the requirements of standards were conducted during the year under report as a part of work targeted at proper performance and further enhancement of certified integrated management system (quality management system, environmental management system) to bring it in conformity with the requirements International Standards ISO 9001:2008 "International Requirements to Quality Management Systems" (GOST ISO 9001-2011), ISO 14001:2004 "Environmental Management Systems. Requirements and Guidance for Use" (GOST R ISO 14001-2007) and State Military Standard GOST RV 0015-002-2012 "System for Military Equipment Development and Launching into Manufacture. Quality Management Systems. General Requirements". Audits of integrated management system were conducted in thirty eight (38) divisions and sub-divisions at RIAR. They indicated stable functioning of integrated management system at JSC "SSC RIAR". Introductory and consulting workshop on revised standards ISO 9001:2015 and ISO 14001:2015 was held as a part of work on further development of integrated management system. Seventy five (75) employees who are in charge of quality and ecology at different divisions and sub-divisions at RIAR attended this event.

Yearly RIAR sets goals and objectives for safety, quality, execution of contracts, improving effectiveness and corporate culture in order to enhance its production capacities. These goals and objectives are decomposed as performance indicators

and assigned to all divisions and departments of RIAR. Attainment of goals and objectives assigned to both RIAR and its divisions and departments is monitored at least twice a year.

Accomplishment of quality objectives by JSC "SSC RIAR" in 2017, %



87.7 % is averaged Customers' satisfaction with products supplied

86.4 % is general averaged Customers' satisfaction level

Plans for 2018

1. Replacement and implementation of revised standards ISO 9001:2015 (GOST R ISO 9001-2015), ISO 14001:2015 (GOST R ISO 14001-2016) (see Section 3.7 hereto "Production management").
2. Recertification auditing in terms of:
 - certified quality management system of JSC "SSC RIAR" for compliance with the requirements of State military GOST RV 0015-002-2012;
 - certified integrated quality management system for (QMS, EMS) for compliance with the requirements of International Standards ISO 14001:2015 (GOST R ISO 14001-2016) and ISO 9001:2015 (GOST R ISO 9001-2015).

Customer's satisfaction assessment

Activities related to assessing the customer's satisfaction, methods and frequency of data acquisition as well as the data analysis method are governed in conformity with the RIAR's Standard STO DP 086-410-2015 "Integrated Quality Management System of JSC "SSC RIAR".

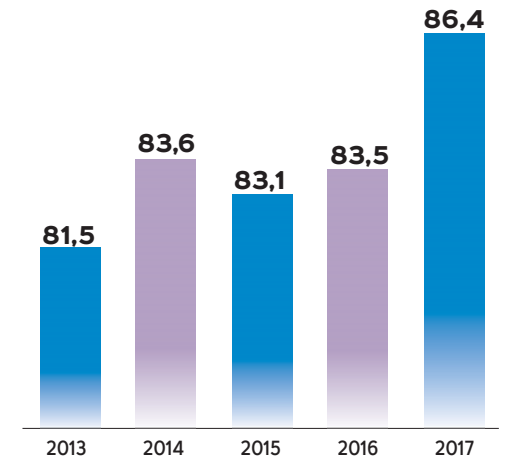
A questionnaire survey was conducted the main customers of RIAR's products (10 Companies) and services (19 Companies) rendered following the results of 2017.

An average level of customers' satisfaction grew in 2017 at the expense of grown level of customer's satisfaction with R&D activities.

As to the level of the customer's satisfaction with the products supplied is remained the same compared to the last year.

As evidenced by the questionnaire survey, Companies who use services and products of JSC "SSC RIAR" consider RIAR a reliable supplier and they have plans to continue cooperation under the contracts. Moreover, they are ready to refer other consumers to RIAR. In their opinion, the information about services rendered by the Company and its products is available.

Average level of customers' satisfaction from year to year, %



85.0 % is averaged Customers' satisfaction with R&D

3.6. Procurement Management

Procurement activities are undertaken by RIAR at its own costs and expense and with the use of extra-budgetary funding and they are governed pursuant to the Federal Law No. 223-FZ "On Procurement of Goods, Works and Services by Certain Legal Entities" as of 18 July 2011. The ROSATOM State Atomic Energy Corporation approved Unified Industry-Specific Procurement Standard under this Federal Law. This Procurement Standard was adopted by RIAR as a regulatory document for procurement activities.

To promote openness and transparency of procurement process, RIAR makes the information about procurement available on the official websites on the Internet i.e. on the government website relevant to the unified procurement information system

(www.zakupki.gov.ru) and on the dedicated website for placing purchase orders for goods, work and services for the ROSATOM's needs (www.zakupki.rosatom.ru). The information regarding competitive procurement procedures as well as regarding their outcomes is posted by RIAR at the electronic market place dedicated and authorized by the ROSATOM State Atomic Energy Corporation that makes it possible to engage a maximum number of bidders. The majority of competitive procurements are available on the electronic trading platforms of LLC "Fabrikant".

As a result of open competitive bidding RUB 111920.704 thousand were saved in 2017 making up 6.21% of the planned procurement price. A share of the contracts made between RIAR and small – and medium-sized

100 % is a share of competitive procurements made by electronic means

111.921 mln RUB is the amount saved as a result of procurements made

The fundamental principles of procurement activities undertaken by JSC "SSC RIAR" are available on its official website (<http://niar.ru/?q=postavshikam>) and are given in Section 2.8 "Procurement management" in Annual Report for the year of 2014 (<http://niar.ru>)

business entities for supply of goods, work execution and rendering services was equal to 60.64 % of the total value of contracts entered in 2017 of which a share of contracts to which parties were small- and medium-sized business entities made up 37.79 %. A share of expenditures incurred in procuring goods, work and services under the contracts entered with the supplies geographically located in the administrative district of RIAR made up 8.1 % of the total value of contracts entered according to the results of procurement process in the year of 2017.

Plans:

- To increase the rate of open competitive bidding up to 95 %;
- To increase the rate of timely competitive bidding procedures up to 95 %;
- To keep small- and medium-sized business entities in procurement at the level no less than 18 % of the total annual value of contracts entered of which at least 15 % are the contractors representing small- and medium-size business entities;
- To ensure the effectiveness of competitive procurement at the level no less than 7 %.

In 2017 JSC "SSC RIAR" entered into 470 contracts for a total amount of RUB 3 097 548.008 ths within the framework of the annual procurement plan



3.7. Production Management

JSC "SSC RIAR" is consistently improving its production management system to perform research and development, render services as well as timely response to the expectations of the customers. In conformity with the requirements of international and Russian standards, RIAR has identified the processes that should be put in place for the proper performance of its quality management system (governance, primary and supporting processes), worked out and updated its existing standards. The major projects launched by JSC "SSC RIAR" in the year under report to enhance the management system were as follows:

- Supervisory auditing Certified quality management system and integrated quality management system for compliance with the requirements of international and Russian standards;
- Further development and enhancement of the integrated quality management system with a view to implement a unified quality management policy of ROSATOM, to update and integrate regulations and requirements relevant to the management system;
- Elaboration and enforcement of quality assurance programs under the operator's responsibility including the programs for NPP life extension in conformity with Safety Rules and Regulations NP-090-11

"Requirements for Quality Assurance Programs of Nuclear Facilities".

20 standards were worked out and updated in the year under report

Plans

In 2018 JSC "SSC RIAR" will continue to enhance the integrated quality management system in conformity with the plan of actions targeted at its proper performance and putting in place latest revisions of ISO 9001:2015 ISO 14001:2015.

Enhancement of production efficiency

The production system of ROSATOM State Atomic Energy Corporation as an industry-specific tool is being adopted for consistent enhancement of production and management processes. It is targeted at elaborating a multi-purpose management system for integrated optimization of production and management processes

at ROSATOM's enterprises based on the best national and foreign practices. It is also intended for enhancing performance of nuclear enterprises, including cost reduction and for increasing productivity to attain the level of Russian and foreign competitors.

To enhance efficiency of the processes, improve their transparency and get economic benefit, JSC "SSC RIAR" agreed and approved projects for a time period of 2016–2017. Thirteen projects were selected for implementation.

7 projects were accomplished in 2017

To ensure higher level of production safety, RIAR pursued its work in 2017 under the project targeted at optimizing

collection of solid radioactive waste. This project made it possible to implement a coloristic method to improve a waste collection process. The pilot stage of the project led to nearly RUB 700 ths reduction of expenses attributable to radioactive waste management. As to the volume of waste generation, it was reduced by 30 %. This project resulted in both a significant economic benefit and in fostering the nuclear safety culture among the personnel engaged in nuclear industry. Moreover, it made it possible to put in place the "lean manufacturing" principles. RIAR could shorten the time for production of various radioisotopes within the framework under the projects. It is anticipated that an economic benefit of RUB 18 mln a year will be achieved following the results of 2017.

Pilot project targeted at optimizing collection of solid radioactive waste:

18 mln RUB is the economic benefit attained for 1 year of project implementation

700 ths RUB is the reduced expenses

3.8. Investment Management

RIAR undertakes its investing activities in conformity with the unified industry-specific policy of ROSATOM and its subordinate companies. The primary goal

is to maintain and enhance productive capacities as well as to strengthen scientific and research expertise at RIAR with a view to achieve its strategic goals.

Investment management

Objectives	<ul style="list-style-type: none"> • Enhance the investment efficiency • Fulfill the nuclear industry contracts and out-of-the industry commitments • Ensure that the main long-term strategic objectives are fulfilled within the fixed timeframes by RIAR
Tasks	<ul style="list-style-type: none"> • Retain the current positions and develop new shares on the market within an medium- and long-term periods • Keep and update the RIAR's infrastructure with the focus on radiation, environmental and industrial safety as well as research infrastructure

2.1 bln RUB is the amount of investment (capital expenditures) for technical retrofitting and modernization

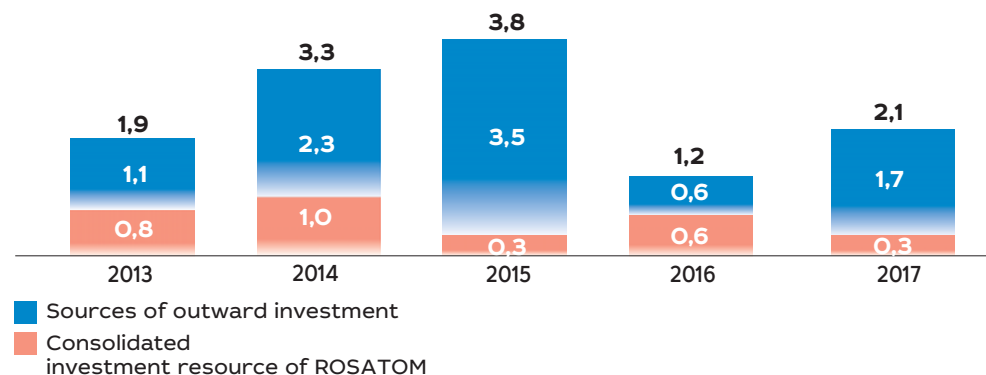
There were no significant changes in the system for investment projects management during the year under report as compared to the latest year under report. The investment management at RIAR is undertaken through managing investment programs throughout their life cycle. These activities involving planning, implementation, motivation, control and management are targeted at the anticipated output of investment challenge within limited time frames, budgeting and in the presence of risks. Investment planning is done in combination with the mid-term business planning to ensure comparability and consistency of performance indexes.

Outcomes for 2017

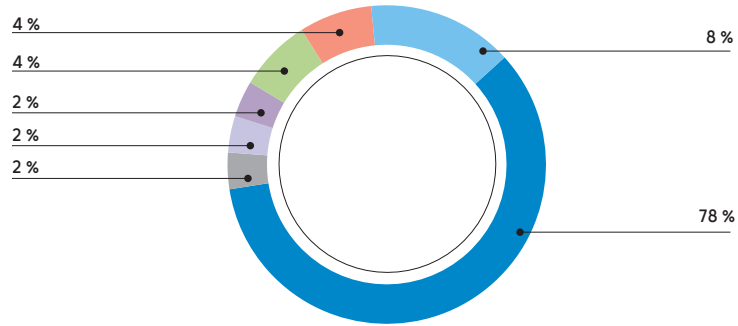
- Project for relocation and modernization of cobalt-60 production area (cobalt-60 sources of medical application) was accomplished. Production area of cobalt-60 sources was successfully put into operation.

- In April 2017 RIAR began making investments in the SM-reactor core modernization to extend its operational lifetime until 2030, increase a volume and number of irradiation positions roughly twice as well as to increase a range of produced isotopes. Key project milestones were accomplished in a timely manner.
- Since the end of 2017 a multi-building storage facility and utility buildings have been under construction for security unit to provide necessary conditions for military service, combat and training of the military unit No.3 706 who is in charge of physical protection, security and patrolling of the RIAR's site.
- The following investment projects are under way: "Construction of multi-purpose fast research reactor MBIR", "Construction of multifunctional research module for spent fuel reprocessing with the use radiochemical methods", "Technical retrofitting of the BOR-60 reactor" (see Section 4.2 "Intellectual Capital").

Amount of investment made by JSC "SSC RIAR" in billion rubles



Amount of investment made by JSC "SSC RIAR" in 2017 per projects



- MBIR construction
- Other projects / investment activities
- Provision of access for the Federal High-Technology Center of Nuclear Medicine under FMBA to electric power supply mains
- SM core modernization
- Technical retrofitting of the BOR-60 reactor
- Projects targeted at ensuring industrial safety at the site, fire safety, IT sustaining, equipment maintenance
- Construction of multifunctional research module for spent fuel reprocessing with the use of radiochemical methods



3.9. Property Management

Key goals for property management

Enhanced functioning of property complexes in cooperation with the divisions and departments concerned

Grown income and reduced expenses of RIAR because of efficient management and cost-efficient use of premises (estate property)

Enhanced competitiveness of RIAR, improved economic and financial performance via efficient management of property including non-core assets

Balanced economy of property complexes to achieve their balanced employment

Combined approaches and comprehensive strategies to enhance functioning of non-core property complexes, non-core estate property and shareholders' equity of RIAR, subsidiaries and associated companies

As of December 31, 2017 JSC "SSC RIAR" had 119 land plots with a total area of 3 130.88 hectares, from which in the actual use are:

- 107 land plots with a total area of 247.62 hectares belonged to RIAR on the property right;

- 12 land plots with a total area of 2 883.26 hectares were on use on a leasehold basis and continuous (termless) use.

In 2017 the lease of one land plot was terminated as the construction of routing for power transmission cables was accomplished but a number of land plots belonged to RIAR on the property right increased

because of land plot division for residential housing.

The following non-core property was sold at the auction: the land plot having the cadastral number 73:23:012801:4 (the income received amounted to RUB 21.66 mln) and the cordon building of the forestry management unit (the income received amounted to RUB 3.01 mln).

The ownership of non-core property such as utility and drinking water supply systems, wastewater piping including roughly 120 km of water mains and sewerage and their

related special buildings, constructions, installations and plots of land was transferred to municipal authorities of Dimitrovgrad.

RIAR received USD 1.35 mln and RUB 6.84 mln as a share of profit from the companies where it has the coownership share.

As of 31 December 2017 eight hundred fifty six (856) real estate objects belonged to RIAR under the property right. Its property right to all the objects of real estate has been registered.

68.2 mln RUB was the revenue from the leasing property

3.2 mln RUB were charged against the debtor for the property rented out in 2016–2017



3.10. Public Stance as to Sustainable Development

The sustainable development of JSC "SSC RIAR" is understood as a consistent work of economic, social and environmental implications contributing to the attainment of ROSATOM's strategic objectives and further overall development of the Institute.

The economic pillar of sustainable development in addition to efficient utilization of scarce natural resources and application of the latest environmental, low impact, energy- and material-saving technologies depends on the key performance indicators. Safe business performance and improved production efficiency of RIAR, social benefits and guarantees for its employees (see Section 3.4 "Key Performance Indicators") are the key reference points to identify the key performance indicators. The key performance indicators are set up by the relevant departments at ROSATOM and the managing company and they embrace the entire range of RIAR's activities. The major areas of its business concentration include nuclear, radiation, industrial and environmental safety, operating and economic efficiency, increase of its share on the national and global markets. The key performance indicators are targeted at growing financial and business performance of RIAR and industry. However,

there are also non-financial performance indicators (for instance, requirements to the occupational and health safety standards cannot be violated, event with severe consequences are not allowed). RIAR adheres to the principle of equal opportunities and is notable for a lack gender-based discrimination: a rate of fixed salary ratio is one to one for men and women for all the categories of staff.

From an environmental perspective, sustainable development should provide or integrity and viability of biological and natural systems, environmentally sound development of RIAR without any harm being done to the environment and personnel's health (see Chapter 4 "Management of Capital and Performance"). The KPI matrixes of top management have performance indicators attributable to the environmental impact. RIAR's Director is fully liable for environmental performance. The RIAR's top management was entrusted with responsibility for mitigation of adverse environmental effect. These duties were shared among the Chief Engineer and Deputy Directors. The Chief Ecologist is fully liable for observing environmental laws and regulations.

The social pillar of sustainable development is targeted at preserving stability of existing social and cultural

arrangements and reducing a number of personal conflicts. The available research and production capacities, optimization of business, efficiency enhancement as well as extension of its business range and expertise contribute to a long-term stable and sustainable development of JSC "SSC RIAR" and thus being a good evidence of high-level social responsibility. Particular attention is given to development of corporate culture, human resources and to interaction with educational institutions (see Section 4.5 "Human Capital").

Such revenue-generating business indicators as "Free adjusted cash flow", "Integrated index of new products"

and "Revenue from sale of innovative products", which could bring a tangible benefit, were achieved in the year under report. The amount of internal funds which could be used for investing is estimated following the fulfillment of the aforesaid indicators. The orders RIAR booked provides for a total employment higher than 3 000 in the city, an adequate level of pay (the average salary level achieved is higher compared to the average salary level at other enterprises an companies in the city), social benefits and guarantees, engagement of Contractors within the framework of existing cooperation and thus contributing to further development of the regions of their residence.

JSC "SSC RIAR" is a major taxpayer and an enterprise with a high level of social responsibility

Development in the region of RIAR's business presence

JSC "SSC RIAR" puts great importance to the development in the region of its business presence because the challenging tasks it has been faced up with call for substantial development of the infrastructure in Dimitrovgrad and bringing it in conformity with the highest standards known in the world. Relations with the region where RIAR undertakes its business activities are established through the intensive work with the local authorities and general public, elaboration and financial backing of projects with social and humanist response and with the focus on specific goals and given territories. The ROSATOM State Atomic Energy Corporation and the government of Ulyanovsk region entered

into the cooperation agreement. This agreement opens up new extensive opportunities for additional targeted financial backing of socially important projects using tax payments of JSC "SSC RIAR" to the budget of the RF constituent territories.

The economic value generated is distributed among Suppliers and Contractors (within operational expenditures), providers of funds (in the form of interests payments to creditors), RIAR's staff members (payroll payments of employees and social charges), the RF government (in the form of tax payments), local communities and agencies of the regional and municipal authorities (in the form of investments in communities and taxes).

In 2017 the ROSATOM State Atomic Energy Corporation in cooperation with the Government of Ulyanovsk region

Economic value generation and its distribution among the shareholders on an annual basis

Criterion, mln RUB	2015	2016	2017
Generated economic value (sales revenue, investment revenues, assets revenues)	4 999,6	5 727,7	4 755,1
Direct economic value generated and distributed:	5 356,2	5 499,9	4 149,1
Operational expenditures	2 983,5	3 058,7	1 808,2
Payroll payments and other benefits for employees	1 492,3	1 652,2	1 688,9
Payment to the providers of funds	287,2	154,8	20,7
Gross tax payments	543,0	578,1	584,3
Investing to communities	50,2	56,1	47,0
Undistributed economic value	-356,6	+227,8	+606,0

838 million rubles is the amount of charges paid by RIAR to all level budgets and non-budgetary funds
+ 5 % increase compared to 2016

commenced the implementation of joint projects targeted at developing digital economy and digital public administration in the Ulyanovsk region. The majority of the best present-day high-tech developments and innovations available at ROSATOM will be implemented in Dimitrovgrad. For instance, the ROSATOM State Atomic Energy Corporation is involved in a joint large-scale cooperation project together with the Ministry of Health of the Russian Federation to establish a lean health center. The project is aimed at introducing ROSATOM's principles of work management in the out-patient medical units. In November 2017 outpatient clinic No. 2 was renovated and refurbished in Ulyanovsk: patient-friendly appointment scheduling system, call center, a proper

layout of doctors' offices, comfortable halls with couches, Wi-Fi zones, and entirely renovated consultation rooms. Soon new standards will be put into effect in Dimitrovgrad.

In the middle of 2017 Dimitrovgrad was granted a status of priority social and economic development area. This status promotes creating an investment-friendly and urban favorable environments. Such a mechanism of entrepreneurship encouraging will make it possible to gain extra revenues for the budget so that to spend them for improving social and economic conditions in the municipal entity. At present, an appropriate legal and regulatory framework has been developed. For instance, zero rates as to profit tax, property tax, land tax and tax

Social events of 2017 attended by JSC "SSC RIAR" and their children

Social events for children under the auspices of ROSATOM

ROSATOM School
International creativity contest "Nuclear Kids"
All-Russian creativity contest "Praise pioneering creators"
ROSATOM Schooler
RUSNANO School League
International dance solo festival "Zolotoe Zernyshko"

Joint projects sponsored by ROSATOM, JSC "SSC RIAR" and local and regional administration

Interregional Forum "Health and Nuclear Medicine in the XXI century"
Christmas and Easter Charity Festivals
Young Orthodox Christians' Days
Theatrical AtomGrad;
International Festival "Peace, era, names..."
Creativity shopping festival "Atominka"
Creation of comfortable urban environment

Improvement of housing and utilities infrastructure and contribution to the beautification of public amenities

JSC "SSC RIAR" provides electrical power, supplies cold and hot water as well as heat to the western district of Dimitrograd. Redundant electric power is supplied to the unified energy grid of Ulyanovsk region.

The housing program pursued by RIAR in cooperation with the Investment and Construction Company "Zapad" is still under way as it is targeted at construction of a new neighborhood housing complex "AcademGorodok" in Dimitrovgrad for researchers and people engaged in Nuclear Innovation Cluster. Housing Complex "AcademGorodok" is a comprehensive development of residential area that represents itself low-rise prefabricated apartment buildings

located in the forestall area and covers an area of 8 ha. The accomplishment of adjacent territory provides for construction of children's playgrounds and sports grounds, recreation areas for adult residents and vegetation. There are parking lots for temporary parking of cars and bicycles. New apartment buildings are equipped with individual heating systems which offer significant savings in paying the utility bills. The ground floors of some apartment buildings are reserved for commercial facilities. In December 2017 the fourth construction stage was accomplished that involved commissioning of another five apartment buildings. Between 2015 and 2017 one hundred fifty seven staff members of RIAR became owners of apartments in the housing complex "AcademGorodok" under the National housing program allowing for different concessions (see Section "Social Policy and Corporate Culture", Chapter 4.5 "Human Capital"). There will be 26 three-floored and five-floored apartment buildings with total area of 39 ths square meters.

157 staff members became owners of apartments on concessionary terms



Interaction with suppliers and contractors in the RIAR's business presence

The construction of multi-purpose fast research reactor and multifunctional research module for spent fuel reprocessing with the use radiochemical methods stimulates the creation of new jobs. Some staff members are hired from the local residents who live in the Ulyanovsk region. Each job in the construction of the aforesaid facilities actually provides opportunities for creating another 10 to 12 jobs in the allied industries

Nuclear Innovation Cluster in Dimitrovgrad

The Nuclear Innovation Cluster in Dimitrovgrad was actively promoted and supported by municipal administration in Dimitrovgrad, the Government of Ulyanovsk region, ROSATOM State Atomic Energy Corporation, Federal Medical and Biological Agency under the RF Ministry of Health and Social Development. Nowadays the main purpose of the Nuclear Innovation Cluster is to develop and enhance the innovation-driven R&D territory of presence in Dimitrovgrad. The fundamental idea behind the Cluster is to accumulate unique R&D infrastructures and expertise of the parties concerned. By the end of 2017, it consisted of 55 organizations including three Research Institutes, seven high educational institutions, state-owned companies and enterprises belonging to the innovation-driven sector of economy in Ulyanovsk region.

Establishment and growth of nuclear innovation cluster implies its involvement into social matters in the city of its presence. Within a few years more than 120 advanced technology jobs have been created and roughly 700 professionals have been engaged in educational projects and programs promoting further development

of the Nuclear Innovation Cluster with the focus on the specified trends.

JSC "SSC RIAR" forms the core of the Cluster. A close cooperation among the parties concerned creates a favorable climate for investment to implement the program on the Nuclear Innovation Cluster development with the focus on three major trends of activities: implementation of large-scale cluster projects within the scope of federal target-oriented programs; establishment of social, engineering and transport infrastructure to create favorable conditions for living and optimal conditions for business doing as well as for beginning small-sized innovation-driven business and its promotion.

In early 2018, one of the major projects of the Nuclear Innovation Cluster that is the construction and launching of the Federal High-Tech Center for Medical Radiology has been basically at the finish line. Construction, erection and installation are almost 90 per cent complete. Basic equipment and medical facilities have been installed. In 2017 the construction of a new dual-dual highway was commenced from Kurchatov Street to the High-Tech Center for Medical Radiology in order to provide accessible logistics.

RIAR pursues its work together with the university departments for medicine, science and technology of the Volga Federal Region, branches of FSAEI HE NRNU "MEPhI", as well as FSBEI HE Bauman Moscow State technical University for human resourcing and staffing support of the Nuclear Cluster projects. More than forty staff members of JSC "SSC RIAR" participated in educational training courses provided by the designated company of the Nuclear Cluster including training courses in software for engineering design "COMPASS -3D" and "SolidWorks. Design Studies", "Export Control of Dual-Use Goods and Technologies for Nuclear Industry".

Major Projects of the Nuclear Innovation Cluster



Construction and launching of the Federal High-Tech Center for Medical Radiology

<http://cluster-dgrad.ru/rus/proekty-klastera/9-pages-ru/55-federalnyj-vysokotekhnologichnyjtsentr-meditsinskoj-radiologii-fmba-rossii>; <https://fvcmr.ru>



Set up of Research and Production Complex for Radio-Pharmaceuticals and Medical-Use Products

<http://clusters.monocore.ru/file/708/%D0%98%D0%BD%D0%B2%D0%B5%D1%81%D1%82%D0%B8%D1%86%D0%B8%D0%BE%D0%BD%D0%BD%D1%8B%D0%B9%20%D0%BF%D1%80%D0%BE%D0%B5%D0%BA%D1%82%20%D0%9D%D0%9F%D0%9A%20%D0%A0%D0%A4%D0%9F.pdf>



Molybdenum-99 Sustainable Production

<http://cluster-dgrad.ru/rus/proektyklastera/9-pages-ru/49-molibden-99>



Construction of Multifunctional Radiochemical Research Complex

<http://cluster-dgrad.ru/rus/proekty-klastera/9-pages-ru/47-mbir-iyau-mbir>



Construction of Multipurpose Fast Research Reactor

<http://cluster-dgrad.ru/rus/proekty-klastera/9-pages-ru/51-polifunksionalnyj-radiokhimicheskij-issledovatel'skij-kompleks>

More detailed information about major projects implemented by the Nuclear innovation Cluster is available on its official web-site (<http://cluster-dgrad.ru/rus/proekty-klastera>)

In 2017 Dimitrovgrad launched a project "Comfortable Urban Living Environment". The primary goal of this project is to provide necessary conditions for promoting and improving the quality and well-being in the urban environment. This goal is achieved via the high-quality management of multi-apartment residential buildings and municipal common-use open spaces. This project made it possible to improve 25 backyards, a parkway along Lenin Avenue, the City pond embankment, the infrastructure for bike riders in the park, establish a Center for Creative Industries "GORIZONT" and pursue further development of the Intelligence Center on Korolev Street. More than 45 mln RUB funding from the municipal and Ulyanovsk region budgets was spent on implementing this program.

The Nuclear Innovation Cluster is in the list of Pilot Innovation- Driven Territorial

Clusters. It is supported by the Center for Nuclear Innovation Cluster Development under the program of the RF Ministry for Economic Development targeted at small- and medium-size business support.

The cooperation among the main participating parties arose interest to cooperation expansion and its geography and thus giving impetus to formation of research and production basis for agglomeration of Ulyanovsk and Dimitrovgrad. In 2016 the management principle of Nuclear Innovation Cluster was analyzed by leading experts of the European Secretariat for Cluster Analysis. Bronze Certificate of the European Cluster Excellence Initiative was awarded based on the results of analysis (<http://www.clusteranalysis.org/>). Moreover, similar analysis is being performed at the moment with a purpose to obtain Silver Certificate.



Foreign Participants of the Nuclear Innovation Cluster

	France Clusters	http://www.franceclusters.fr
	INTER-MEDICO GmbH	http://www.intermedico.de
	NANOPROGRES Company	http://www.nanoprogres.cz
	National Cluster Association	http://www.nca.cz
	RAMON Science & Technology Co.	http://www.ramon.com.cn
	Slovak Innovation and Energy Agency	http://www.siea.sk
	Le-Marc Projektmanagement GmbH	http://www.le-marc.com/
	Frankfurt Innovation Center Biotechnology GmbH	http://www.fiz-biotech.de

More than **40** mln RUB in grants have been allocated since 2013 to develop sports, education and cultural infrastructure in Dimitrovgrad

Public Stance as to Sustainable Development in partnership with Shareholders

In the year under report JSC "SSC RIAR" continued working out the public stance with the focus on corporate social responsibility to establish trust channels through interactions with shareholders in conformity with the requirements and basic principles of the AA1000-series international standards. Adherence to these standards can guarantee active engagement of all the shareholders and parties concerned, respect and consideration of their views and opinion for analysis and management of the RIAR's business.

In accordance with Standard AA1000 APS (The AA1000 AccountAbility Principles Standard), JSC "SSC RIAR" demonstrates a systematic approach to managing interaction with the shareholders

and the parties concerned as it is considered to be an important factor for enhancing management performance and quality of reporting. Its adoption led to identification of the most critical challenges for sustainable development and thereby enabled timely response to them. Standard AA1000SES (The AA1000 Stakeholder Engagement Standard) made it possible to engage shareholders to the maximum extent possible and thus to consider their views and ideas for analysis of RIAR's business performance. Interaction with shareholders is targeted at advancing in strategic goals and actions. RIAR in its efforts to ensure a high level of openness and transparency, in its business, more predictable and sustainable results in enhancement of public reporting system, interacts with its shareholders purposefully (see Chapter 5 "Stakeholders' Engagement"), provides information on all the aspects of its business, responds

to the demands and wishes speedily, implements consistently the principles of corporate information policy by maintaining a proper balance between openness and accessibility of information and its commercial interests. For the purpose of successful implementation of transparency policy, all currently available forms of communication

such as publication of reports (Annual Report, Environmental Compliance Report, Annual Scientific Report (http://niiar.ru/annual_report), internet, websites, questionnaires, press conferences, public dialogues, consultations, arrangement of shareholders' on-site visits, distribution of promotional brochures etc. are used.

Principles set forth in the AA1000 Standards

Principle description	Specification
Engagement	Participation of shareholders in elaboration of crucial strategic decisions with a view to attain sustainable development (see Chapter 2 "Strategy")
Importance	Evaluation with a view to determine timeliness and significance of the information disclosed to the Company and its Shareholders (see Attachment 1 and Chapter 5 "Stakeholders' Engagement")
Responding	Responsive measures taken by the Company responding to requests of shareholders as to its business activities and effecting sustainable development performance (see Chapter 3 "Effectiveness of Management", Chapter 4 "Management of Capital and Performance", Chapter 5 "Stakeholders' Engagement" and Attachment 1)



SECTION 4

Management of Capital and Performance





KNYAZKIN Igor

Deputy Director of JSC "SSC RIAR"
for Economics and Finance

One of the main tasks set three years ago by the ROSATOM State Corporation to JSC "SSC RIAR" within the framework of the approved program of financial recovery is to breakeven since 2018. This task was ambitious for the Institute: a look at the indicators reveals that the loss was about 1 billion rubles in 2014, which means that it was necessary to implement measures to increase the operational efficiency and orders volume by at least 1 billion rubles in a short time!

The finance and economics subdivisions were tasked with developing measures and controlling implementation of the costs optimization program. In 2016–2017 the developed program was added with more than 30 measures to optimize the costs on main lines of business, including radioactive waste management, property complex maintaining, and optimization of the annual procurement program. The net effect of the activities conducted was 1.2 billion rubles. The Institute was thus able to fulfill the set task ahead of schedule.

In 2017, JSC "SSC RIAR" broke even for the first time in the last six years. It is also necessary to point out some important results associated with the implementation of the financial recovery program. The Institute:

- has not attracted loans to finance current activities for more than 2.5 years;
- fully repaid long-term investment loans (602 million rubles);
- had no outstanding loans by the end of the year.

It is important to note the following performance indicators set by the ROSATOM SC and Division to evaluate the work of financial and economic units:

- quality of the reporting documentation submitted under the financial calendar (on condition of conformity with the reporting deadlines);
- percent deviation of real values from the planned ones (quality of planning).

These indicators are fulfilled at a high level for the past two years which attests high quality solution of the tasks.

The experience gained in implementing the financial recovery program and the results achieved place the responsibility and assign certain duties on the financial and economic units in the implementation of RIAR's strategic plans and objectives in the coming years.

2018 is a jubilee year for the RIAR's financial and economic department (60 years). At the same time, in terms of age, it is one of the youngest divisions in the Institute: the average age of the staff is 37 years. It is my hope that this circumstance will contribute to the achievement of the identified objectives and to the prompt decision of the tasks faced by the financial and economic units.

I am of the opinion that in 2017 JSC "SSC RIAR" justified the confidence of the ROSATOM SC and I strongly believe that 2018 will be a year of new achievements which will consolidate the progress achieved.

4.1. Financial Capital

Financial stability of JSC "SSC RIAR" is mainly ensured by the effective management of its economic performance which basis is the system of budget management of financial and economic activity. The system is regulated by the standards of integrated management system and is based on economic data acquisition, classification, processing and analysis in the context of construction projects and income and expenses items of the RIAR's departments. The budget system that meets strategic goals assigns the target values of economic indicators by means of a regular plan-fact analysis and provides the timely information on deviations from the target values. This information is necessary to make management decisions by RIAR's top and line managers.

Financial policy of JSC "SSC RIAR" and application of industry-specific and internal financial risk management regulations and standards provide financial management efficiency. This facilitates the establishment of relationships with banks which optimize bank accounts structure and minimize bank servicing expenses and also allows us to carry out operative planning and optimization of money flows to effectively allocate finance resources within the Institute, invest free funds and manage financial risks.

Positive dynamics of the JSC "SSC RIAR" performance indicators in the reporting period is a result of activities implemented in the Institute to improve operating efficiency in accordance with the approved action plan for financial recovery of JSC "SSC RIAR" for 2016–2018. Due to the fact that the target revenues might not be achieved in the reporting period, additional measures were developed to achieve the financial indicators which result was both an increase in the revenue in the international market (more than 2 billion rubles (36 million dollars)), and a significant cost reduction (by 640 million rubles against the planned indicator). RIAR also improved its operating efficiency and ensured break-even. In 2017, net profit of JSC "SSC RIAR" made up 70 million rubles for the first time in the last six years.

Among the work carried out to reduce the costs, we may highlight the optimization of schedules of routine and big repairs, reduction of estimated liabilities on radwaste management by means of the recalculated cost of waste reprocessing at the enterprise, control over rising raw materials and products prices, savings from competitive procedures, work performance by RIAR's forces without the involvement of outside companies, optimization of working capital in a part of reserves.

Forecast figures for the next year have positive dynamics. The plan is to continue the financial recovery measures involving increased prices for products and services and optimization of staff number, reserves and costs.

The achievement of planned results will allow RIAR to close the year 2018 with the net profit in the amount of 25 million rubles which is lower than the 2017 net profit. The decrease of net profit will be caused by the costs

to support the experimental and production infrastructure, increase in prices for goods and materials and performance of work postponed from the previous periods (big and routine repairs of buildings and constructions, refreshment of auxiliary equipment, etc).

Decrease in revenues (as compared with 2016) is caused by the absence of the work order to produce fuel assemblies for the BN-800 reactor,

JSC "SSC RIAR" key performance indicators

Indicator	Values per years		
	2016	2017	
		Target	Actual
Adjusted free cash flow, bln. rubles	0,353	0,619	0,748
Labor efficiency, mln. rubles/people a year	1,51	1,53	1,491*
Full costs, billion rubles	3,176	4,009	3,836
Integrated indicator for new products, %	137,3	100	976
Integrated indicator for investment activity efficiency, %	–	100	100
Innovative products sales revenue, bln. rubles	3,602	3,094	3,466
Level of engagement, %	84	74	85
Managerial activity appraisal	1,1	1,0	1,2
LTIFR and absence of work accidents resulted from fall from height at production facilities, including Contractors	0	0,1 (retaining of the base level)	0
Events rated at level 2 and higher on the INES scale	0	No events	0
Performance of state level tasks, including execution of the state defense order from other governmental customers and organizations, %	100	100	100

* Considering the influence of uncontrolled factors.

50 % – share of export revenues

More than **2 bln. rubles** – revenues in the international market

Key economic indicators of JSC "SSC RIAR" activities, mln. rubles

Indicator	Indicator values by years				
	2014	2015	2016	2017	2018
Revenues from sale of goods, products, work and services, mln. rubles	3 700,9	4 119,1	5107,4	4237,9	5 197,4
Self-cost of sold goods, products, work and services	3 862,2	4 185,4	4055,6	3 370,2	4 372,6
Gross profit/ loss	-161,3	-66,3	1 051,9	867,7	824,8
Administrative costs*	743,1 (20,1)	805,6 (19,6)	807,4 (15,8)	781,9 (18,5)	848,0 (16,3)
Sales profit /loss	-972,2	-884,6	110,7	-70,5	-203,4
EBITDA	-877,2	-554,9	241,1	369,7	303,5
Net Operating Profit After Tax (NOPAT)	-825,9	-335,6	2,3	101,2	-10,0
Net profit/ loss	-1 063,4	-702,1	-90,3	69,9	25,3
Reserves	1862,8	1715,1	742,2	722,8	695,7

* Data in brackets are share of administrative costs in revenue, percent.

decrease in the year average dollar exchange rate from 66.3 rubles to 58.5 rubles, completion of the main bulk of work on the federal target program and absence of other long-term federal or industry-specific programs aimed at research with the use of the RIAR's infrastructure.

Volume of research and development arose from the finance of the federal target program "New-generation nuclear energy technologies for the period 2010–2015 and up to 2020". The largest part of the funds devoted to this work came on 2013 (2.1 bln. rubles). The proportion

of federal budget in the overall volume of funds fell from 32 % (2014) to 0.5 % (2017). However, the Institute managed to compensate for this decrease. As a result of compensating measures, additional revenues were contributed by R&D activities implemented under the industry-specific project "Proryv" (+ 259 mln. rubles).

From 2014 to 2017, the volume of research and development under foreign contracts increased by 565 mln. rubles (USD 8 mln.) which was 42 % of the total volume of work executed in 2017 (11 % in 2014).

70 mln. rubles – net profit at the end of the year

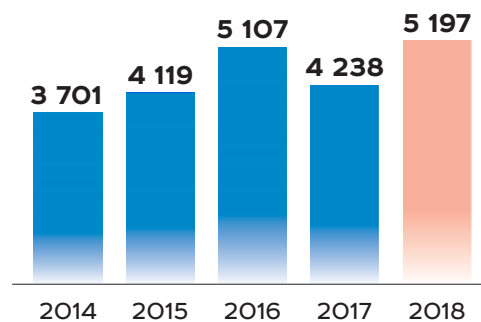
640 mln. rubles – cost reduction

Dynamics of RIAR's revenues from services rendered during the years showing deviations of the 2017 indicators vs. 2016 indicators, mln. rubles

■ Actual value

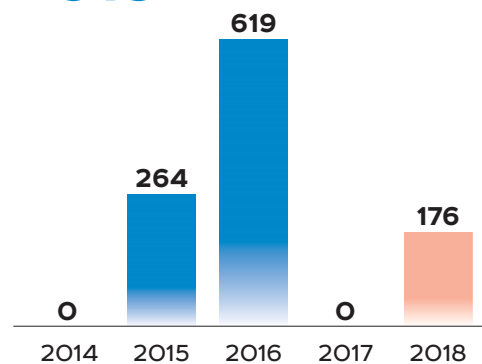
■ Planned value

-869



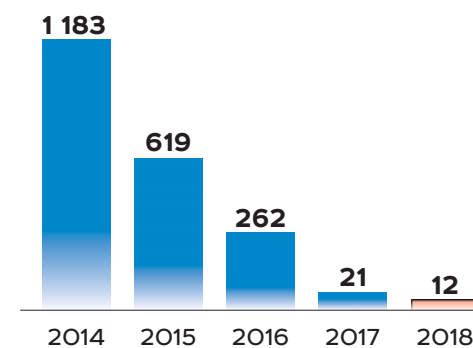
Total revenue

-619



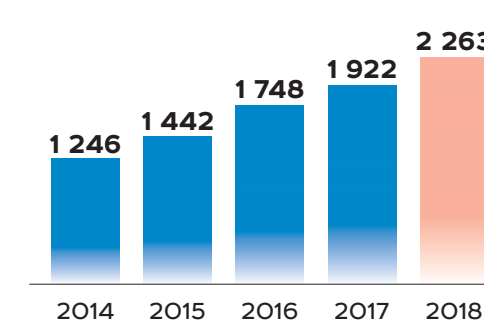
Manufacture of fuel assemblies

-241



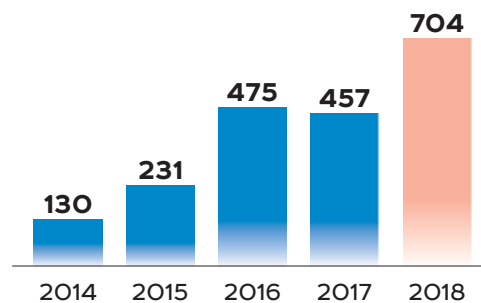
Federal Target Programs (FTP)

+174



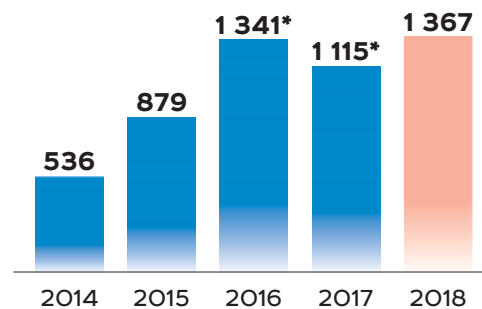
R&D with no FTPs

-18



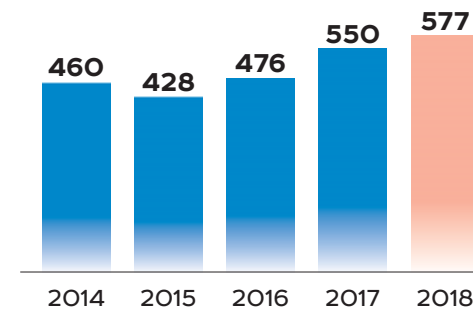
⁹⁹Mo production

-226



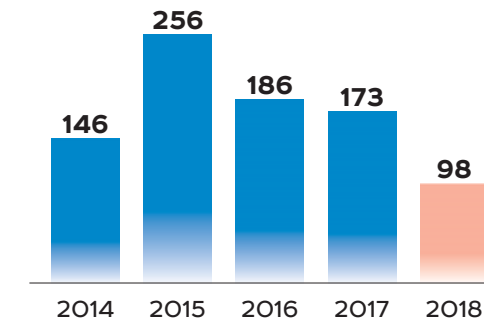
Production of other isotopes

+74



Energy services

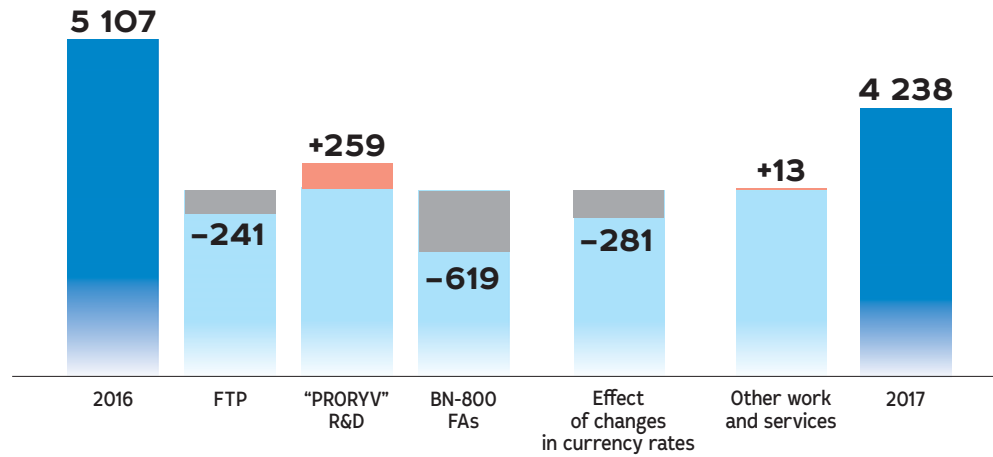
-13



Other services

* Early delivery of 252Cf to the Customers (delivery date transfer from January 2017 to December 2016) in the amount of 214 mln. rubles.

Dynamics of RIAR's revenues from services rendered in 2017 as compared with 2016, mln. rubles



Among the plans for 2018 is the increase of revenue from R&D under the contracts not involving the FTPs up to 2 263 mln. rubles (+ 18 % against 2017).

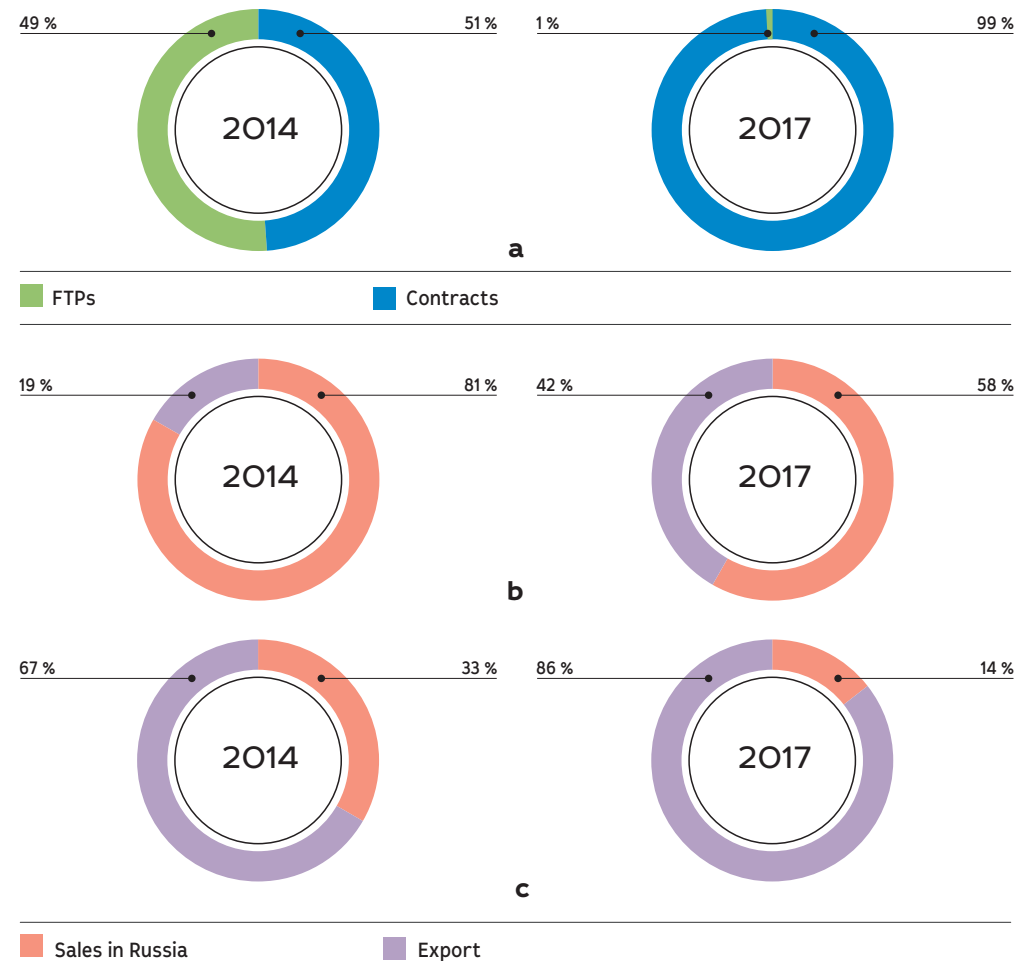
From 2014 to 2017, isotopes production and export sales increased from 12 to 22 mln. US dollars (+83 %), including production of preparation for medical use ⁹⁹Mo increased by \$ 6 million (+600 %). The plan is to grow the revenue from production and sales of isotope products up to 2 071 mln. rubles in 2018 (+32 % to the level of 2017).

The geographical segment of the sold products shows steady increase in the demand from foreign customers. All work was executed using RIAR's employees without involving outside

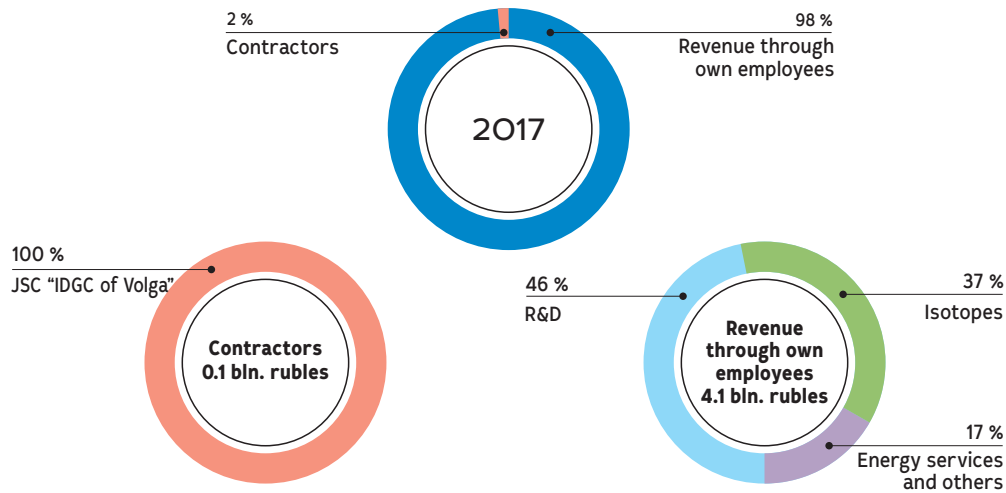
organizations, except for the electricity transmission (the major portion of expenditures is on contractors).

The analysis of the RIAR's financial and economic activities gives evidence of some decrease in solvency which is still above the standard norm. This occurred due to the increase in the short-term liabilities and assignment of highly liquid assets in the balance sheet total (cash) for the full repayment of loans. Repayment of all loans reduces the dependence of the Institute and improves its financial stability. Despite some decrease in the revenue, the turnover of current assets remains at a high level due to their effective use.

Structure of revenues from R&D: a) including FTPs; b) with no FTPs; c) distribution by years of revenues from sales of isotope products



Revenue structure and key co-contractor portion



Revenue distribution by geographical segments and areas of business, mln. rubles

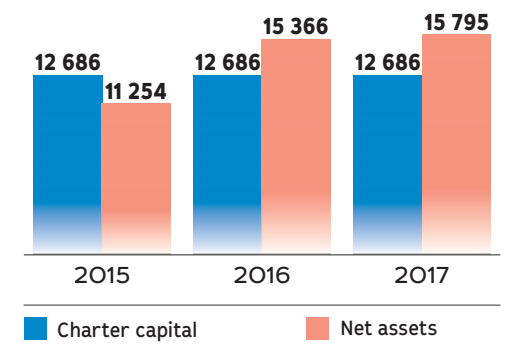
Indicator	Values per years				
	2014	2015	2016	2017	2018
Revenues (sold products, work, services)	3 701	4 119	5 107	4 238	5 197
Including intra-group transactions	1 180	1 239	2 015	1 312	1 452
Distribution by geographical segments:					
Russian Federation	3 014	2 465	2 882	2 076	2 713
CIS	22	34	38	50	64
Non-CIS countries	665	1 620	2 187	2 112	2 420
Distribution by areas of business:					
Manufacture of the BN-800 reactors FAs	0	264	619	0	176
R&D	2 429	2 061	2 010	1 943	2 275
Isotope production	666	1 110	1 816	1 572	2 071
Energyservices	460	428	476	550	577
Otherservices	146	256	186	173	98

Solvency, liquidity and financial stability indicators, %

Indicators	Values per years			Recommended value
	2015	2016	2017	
Financial stability				
Leverage (capitalization) ratio	49	13	15	Less than 100
Ratio of borrowed and own funds	49	31	14	Less than 100
Equity ratio	67	88	87	40–80
Financial stability index	73	91	90	60–90
Long-term debt ratio	7	4	4	-
Liquidity and solvency				
Absolute liquidity ratio	18	143	62	20–50
Quick ratio	36	165	99	70–80
Current ratio	86	250	170	100–200
General solvency ratio	305	849	762	200–250
Current assets turnover				
Current assets turnover ratio	87	113	109	-

Over the time, the value of RIAR's net assets has been growing steadily: this indicator value increased by 3 % to the level of 2016 and by 40 % if compared with 2015. In 2017, the excess of net assets over the charter capital meets the requirements of the Law in terms of the ratio between these indicators and gives evidence of the improved performance of the enterprise.

Net assets dynamics by years, mln. rubles



4.2. Intellectual Capital

Being a key to developing innovation in the Institute and achieving strategic goals, intellectual capital includes intangible assets: knowledge, technology, intellectual property and people with a variety of competences. Highly qualified experts allow the RIAR's engineering capability to be preserved and the research to be performed at a high level.

Knowledge Management System

The process of knowledge generation, preservation, distribution and use is one of the essential processes to manage RIAR's innovation activity and development. Preservation of acquired scientific and technical competencies is very important for the safe operation of existing nuclear facilities and effective introduction of new developments. The purpose of the knowledge management system is to effectively use the intellectual capital, identify and distribute the acquired knowledge and arrange conditions for knowledge transfer. The project "Knowledge Management System" has been successfully implemented in the Institute since 2012. Phases of the project are described in full in the annual reports for the prior years (<http://niiar.ru>) and on the internal web-site, section "Knowledge Management System". In order to maintain and improve the process, a functional organization structure of the knowledge management system was established.

Key tasks

- minimizing the risks of losing the knowledge and skills used in the course of business;
- shaping the mechanisms for commercial use of knowledge, including the results of intellectual activity;

- integrated approach to preserving and developing critical knowledge and skills;
- motivating the employees to acquire new knowledge and competencies;
- improving the efficiency of knowledge formalization, arrangement of a permanent teaching and experience transfer system;
- providing access to information sources;
- improving the efficiency of staffing business processes: personnel selection, training and motivation.

54.9 % of employees have higher education (27.1 % – industry-specific)

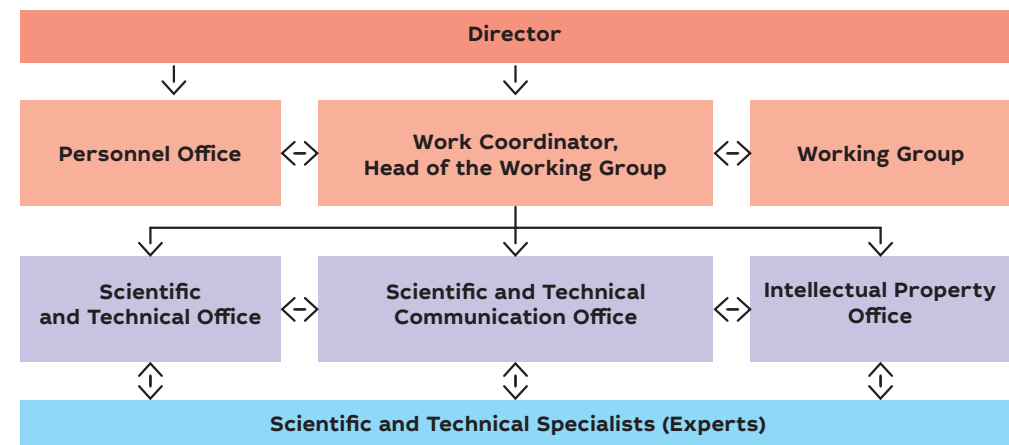
80 persons holds degrees (11 persons – Doctors of Science; 2 persons defended their thesis work in 2017)

34 publications in peer-reviewed nuclear energy journals (per year for 100 researchers and developers)

Details on publications of RIAR's specialists and their involvement in to various events

Indicator	Value
Total number of publications in peer-reviewed journals	111
Number of publications in journals:	82
International	12
Russian	70
Monographs	2
Attended conferences, symposia, workshops, etc:	72
Russian	59
International	12
Including CIS countries	1
Attended conferences, symposia, workshops, etc:	45
Russian	15
International	30
Including CIS countries	-

Knowledge Management System Functional Organization Structure



Major Achievements

- Regulatory and guidance documents to preserve critical knowledge has been elaborated, introduced and are updated.
- A knowledge map and a list of critical knowledge are prepared on a yearly basis.
- Multi-media modules on RIAR's activities are developed on a yearly basis.
- A mentorship system is in effect.
- A systematic approach to R&D result process management is arranged.
- A system to identify the results of intellectual activity has been introduced.
- Publications of JSC "SSC RIAR" have been placed in the RISC system.
- A licensing agreement has been concluded for the access to the information-analytical system Science Index of the scientific electronic library eLIBRARY.RU.
- Access has been obtained to the international database of indices of academic citing Web of Science.

Innovative ideas

- lectures conducted by JSC "SSC RIAR" experts and creation of a library of video lectures;
- release of a RIAR-oriented multimedia teaching video for students and post-graduate students;
- launching new sections "Knowledge Management System" and "Library" on the enterprise website;
- release of print media: scientific publications, popular science editions, publications about RIAR's history and people;
- English language courses;
- establishment of an interactive platform on the enterprise website for sharing

knowledge, discussing ideas, tasks and projects;

- forming a collection of works of RIAR's employees and provision of access to full-text publications.

Plans

- to deal with the tasks of increasing the use of intellectual property objects;
- to extend opportunities for critical knowledge preservation and transfer.

21 lectures conducted by RIAR's experts

50 lectures in the video library

55 English language course participants

16 multimedia modules on RIAR's activities

Management of Intangible Assets

In 2017, the innovation activity of JSC "SSC RIAR" was aimed at solving the tasks and achieving the performance indicators of the ROSATOM's Innovation Development and Technology Modernization Program for the period up to 2030 which activities are focused on solving one of the strategic tasks of the ROSATOM State Corporation – the achievement of global leadership in the international market of high technology products and services. The above program requires that a new effective intellectual property management system should be created and implemented to allow technical innovations to become the main factor of economic growth and social development of the Institute and the industry in whole. The system should ensure that the results of intellectual activity are effectively revealed, considered and analyzed, an optimal protection mode is established, legal and other protection of intellectual property is implemented, and intellectual activity results are included in to the list of intangible assets.

In its efforts to manage intellectual property, JSC "SSC RIAR" is governed by the requirements of current legislation, regulatory documents of the ROSATOM State Corporation and local regulations.

8 applications for the results of intellectual activity, including applications corresponding to the International Patent Cooperation Treaty

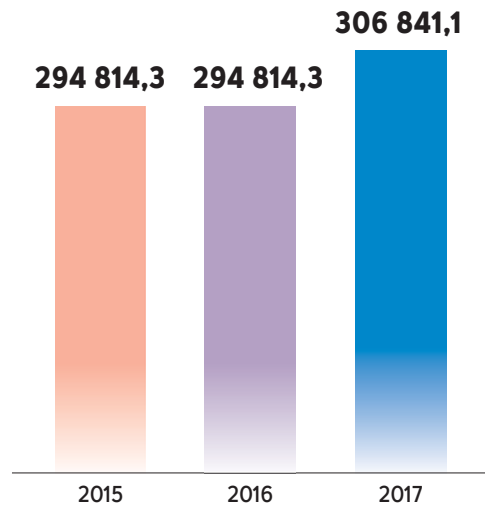
15 patents for useful models and inventions, certificates for computer programs

3 production secrets (know-how)

Inventive work in JSC "SSC RIAR"

Indicator	Values per years		
	2015	2016	2017
Application for an invention and useful model, computer program	14	9	8
Patents obtained for an invention and useful model, certificates for computer programs	8	16	15
Production secret legal protection	17	0	3
Inventions, useful models, computer programs and know-how in force	198	214	228
Inventions and useful models in use	42	48	49

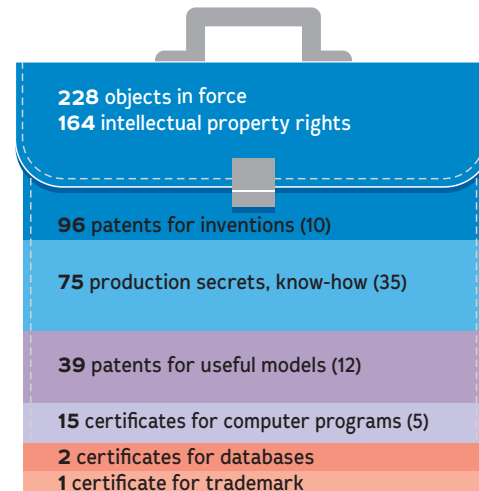
Full accounting value of intellectual property objects per years, thousand rubles



Provision of scientific and technical information

The provision of sci-tech information to scientific workers of JSC "SSC RIAR" aims at ensuring access to information sources of different levels and formats. Traditional work (enlarging the collection of the scientific and technical library in accordance with the RIAR's areas of expertise and needs of the workers; arranging subscriptions to scientific journals and scientific-technical periodicals; supporting information and bibliographic database of publications of RIAR's specialists) go with later techniques

Intellectual property portfolio (as of December 31, 2017)*



* The brackets indicate the number of objects which holder is the Russian Federation.

and methods of work. In order to improve the effectiveness of information provision and to create conditions for access to the up-to-date scientific and technical information of various levels, one of the most important developments in 2017 was the increased use of electronic resources which was reached through the access to the full-text database of the RIAR's scientific and technical library from work computers of the users (local network) and thought the access to external databases: scientific electronic libraries, sci-tech information portal of the ROSATOM SC and other external information sources of appropriate thematic scope.

In 2017, agreements were made to post printed and electronic editions and selected articles of RIAR's specialists in the scientific electronic library eLIBRARY.RU integrated with the national information analytical system "Russian index of academic citing". During the reporting period, the following works were posted: thirteen issues with collections of scientific articles of JSC "SSC RIAR" from 2010 to 2017; three collections of abstracts published in 2015-2017; two monographs of the RIAR's scientists.

An agreement was signed with the State Public Scientific-Technical Library (Moscow) for the purpose of access to all-Russian collection through interlibrary loan. Nearly 30 publications were received from the collection of the national library on requests of the RIAR's employees.

As part of the national subscription of JSC "SSC RIAR" as a scientific center registered in the federal system for monitoring of research organizations performance, access was provided to the international database of indices of academic citing Web of Science.

At the end of 2017 a license agreement was concluded for access to the Science Index system which allows performing comprehensive analytical and statistical studies of publication activity of the Institute and receiving as a result an objective evaluation of scientific results for both RIAR's subdivisions and individual scientists. Expanded access to the instruments of the Science Index system allowed activities to be carried out to properly

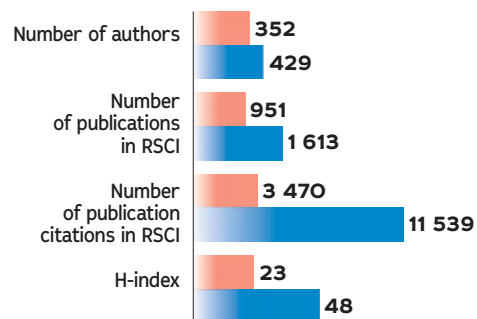
reflect the information on the publications of RIAR's specialists and also made it possible:

- to register authors, to check the correctness of the information on the RIAR's employees who are the authors of the publications (data on more than 200 authors were introduced in to the system and the information about more than 70 authors was previously missing);
- to monitor publications, to add the RSCI database with publications missing in the system (more than 260 publications);
- to make adjustments that exclude various readings in the name of the Institute;
- to identify authors, to adjust accounting of the authors who are the RIAR's workers.

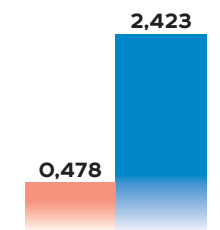
As a result, the correct presentation of the data significantly improved with regard to the RIAR's scientometric indicators which are taken into account in evaluating the activities of the Institute as the State Scientific Center of the Russian Federation. The total number of publications of RIAR's specialists registered in the RSCI database grew by almost 70 %, and the number of citations of the RIAR's publications increased more than threefold. The plan is to continue systematic work on account of publications of the RIAR's specialists, to regularly add the RSCI database with the information on new publications and to update the data on the RIAR's authors.

Information on publications of RIAR's specialists

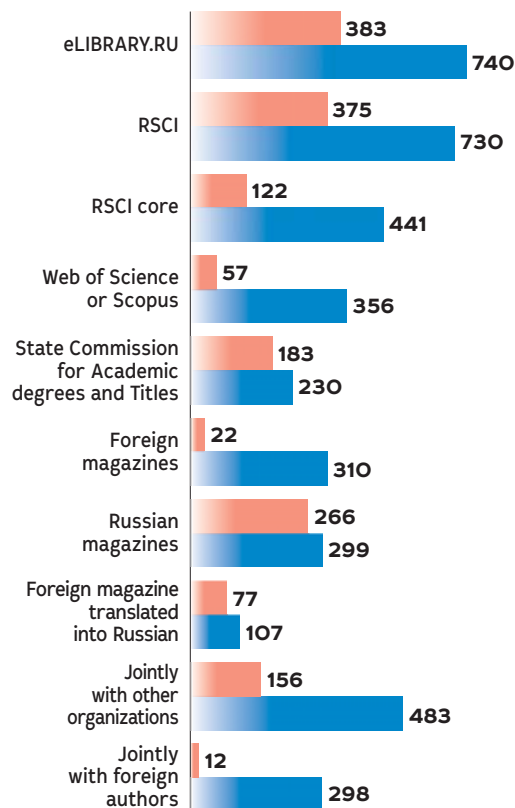
General indices



Averaged impact-factor of magazines with published articles



Number of publications for last 5 years



Before connecting to Science Index

After connecting to Science Index

Release of publications

JSC "SSC RIAR" continues releasing printed and electronic publications in order to preserve critical knowledge on the key topics, expand the competence of scientific and technical specialists and horizons of young employees, inform about the capabilities and achievements of the institute, strengthen the mentoring system, perpetuate the history of the organization. JSC "SSC RIAR" seeks to ensure that all its publications are official, i.e. they are assigned the ISBN number and UDC indexes, SRSTI, LBC, materials are compulsorily edited and published, which guarantees high quality of the published material and compliance with all standards in the field of editorial and publishing activities.

A scientific report is annually issued in JSC "SSC RIAR" (report on the key research activities carried out in the reporting year); Annual Report is issued in Russian and English; collection of scientific articles of JSC "SSC RIAR" is released on a quarterly basis, as well as collections of abstracts and presentations of conferences and seminars, books, brochures, booklets.

Detailed information on the editorial-publishing activity of JSC "SSC RIAR" can be found in the scientific annual report (the report on the key research works carried out in 2017): http://niiar.ru/annual_report

13 issues
were published in 2017



Staff training and development

People and their competencies are the most important component of the knowledge management system. In accordance with the Work Program of the Scientific-Education-Innovation Consortium engaging higher education institutions and scientific establishments in Ulyanovsk region, JSC "SSC RIAR" assisted in establishing an industry-oriented department "Irradiation Technologies" at the faculty of High Technology Physics and Engineering in Ulyanovsk State University. In 2017 seven post-graduates employed by RIAR undertook post-graduate courses at this Department to be trained in "Condensed Matter Physics" and "Material Science (Nuclear power Engineering)". Four RIAR's Doctors of Science combine their work at RIAR with their position of lecturer at this department. In 2017, 31 post-degree students hired by RIAR attended educational courses in the following faculties: Nuclear Reactors and Materials, Radiation Chemistry, General and Medical Physics, Reactor Material Science, and Radiation Safety at MEPhI, Dimitrovgrad Branch. RIAR in collaboration with this University established the Department of Nuclear Reactors and Materials. 30 RIAR's experts are part-time lecturers at MEPhI, Dimitrovgrad Branch including 5 Doctors of Science and 7 Masters of Science (for details about cooperation in staff training see Section 4.5 "Human Capital").

English language courses

Since 2016 JSC "SSC RIAR" provided annual English courses for its employees. The main purpose is to develop competencies of researchers and engineers and give them a chance to perform their duties successfully as well as to promote international and scientific collaboration. One of the major expectations is their attendance of international scientific events which are held in English, including but not limited to writing presentations in English, making report in English, reading scientific articles in English.

Training was given in three levels such as basic, advanced and the course for management. The English teachers were interpreters of JSC "SSC RIAR". The trainees were selected following the results of their placement tests. They lasted nine months. At the end they took an exam to the Commission headed by the Director. The employees who completed the English course successfully will have a chance to attend international scientific events and have priority in their further promotion.

Mentorship

From the very first days of RIAR establishment there has been a mentorship system functioning, and this system is still relevant. Highly-qualified experts are appointed mentors.

Mentorship for students and trainees.

The Human Resources Department of RIAR signs contracts to collaborate with industry-oriented and regional higher educational institutions, secondary vocational educational establishments, and schools of Dimitrovgrad, Ulyanovsk region. RIAR conducts hands-on training which is focused on involving students in the federal target programs, individual approach to every trainee, and close collaboration between RIAR and training departments. In 2017, JSC "SSC RIAR" has implemented Standard STO O86-298-2017 "Procedure for students' training planning and arrangement".

Mentorship for recent graduates.

The key objective of on-the-job training for recent graduates is their occupational and psychosocial adaptation, learning theoretical aspects and acquiring practical skills needed to fulfill their job duties. In compliance with the RIAR's Collective Labor Agreement, Section Work with the Youth, the employer shall provide social and occupational adaptation for its young employees. For example, for recent graduates who are hired for the first time a mentor is appointed for up to six months, and young professionals with the major in industry-oriented specialties a mentor is appointed for up to one year.

28 young specialists were given employment, including those trained under specified training programs

2 225.881 k RUB is the relation between the expenditures to support profession-oriented high education entities and number of young specialists employed

354 students took practical training in 2017

47 students took pre-degree practice

307 students took on-the-job training





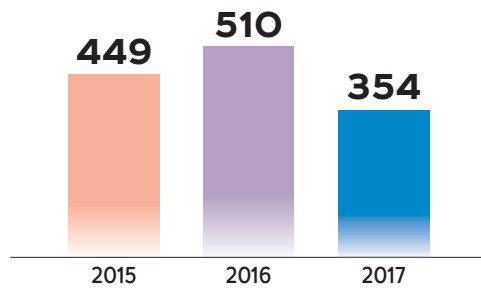
Mentorship for the transfer of key knowledge and skills. Such mentorship includes scientific management of the post-graduates making it possible to keep and transfer the key knowledge and skills. In 2017 thirty-one recent graduates hired by RIAR attended post-graduate courses in four industry-specific specialties in higher educational institutions. Seven highly-qualified scientific executives were appointed for these employees at RIAR.

To create conditions attractive for recent graduates including advanced training and mastering skills, transfer of knowledge and experience by leading professionals RIAR has an established and successfully functioning Board of Young Professionals that represents the interests of young employees. The scientific and engineering unit under this Board is targeted at providing assistance to the young employees in mastering their job, and acquiring

hands-on experience that contribute to fast technical and business career growth.

To provide the knowledge continuity, RIAR annually holds contests, forums and conferences.

Number of students trained at JSC "SSC RIAR" per years



Number of employees who took part in contests 2017

Contest	Number of participants	Winners
Contest to get a scholarship of the President of the Russian Federation for young scientists and graduate students who carry out advanced research and development in priority areas of modernization of the Russian economy	3	1
Contest for the ROSATOM award to young scientists working in the nuclear industry	5	2
"ROSATOM" Contest "Innovative leader of the nuclear industry"	4	1
Industry tournament of professional skill «Atomskills»	4	-
All-Russian contest "Engineer of the Year"	1	1
Contest among RIAR young employees	85	35

206 mentors, among them:

- 123** for trainees
- 73** to transfer key knowledge
- 10** for high-potential employees



Results of innovative activities

Construction of the multi-purpose test fast reactor MBIR

Construction of the poly-functional radiochemical complex

Retrofitting of the fast test reactor BOR-60

Purpose

The high-flow reactor should become a new technological platform for nuclear power based on the closed nuclear fuel cycle of fast reactors. The peculiarity of the reactor is a three-circuit scheme for transferring heat from the reactor to the environment: the primary and secondary circuit coolant is sodium, the third one is water. The reactor thermal capacity is 150 MW, the electric power is up to 55 MW, the maximum neutron flux density is about $5.3 \cdot 10^{16} \text{ cm}^{-2} \text{ s}^{-1}$

The complex is intended for research in selecting a technology for spent nuclear fuel reprocessing and radioactive waste handling. The complex will significantly reduce the amount of spent nuclear fuel, make it possible to dispose radioactive waste with a radiation background close to natural, reproduce any technology for spent nuclear fuel reprocessing or to use technologies in combination; for this purpose, there are modular hot that can be biologically shielded, unified platforms for operational readjustment, etc

The 60 MW reactor is a unique multi-purpose facility for testing structural, fuel and absorbing materials used and intended for use in various types of nuclear reactors, including fusion ones. It is also used to test primary and secondary equipment of fast reactors

Basis for implementation

Federal Target Program "Nuclear Energy Technologies of New Generation for the Period from 2010–2015 and beyond 2020"

Objects

Reactor tests, including dynamic regimes, and post-irradiation examinations, tests and approbation of new types of equipment of various technological systems, production of electricity and heat, development of new technologies to produce radioisotopes and modified materials

Obtaining reasonable data for testing and justification of advanced closed fuel cycle technologies; development of design documents for industrial-scale modules to reprocess spent nuclear fuel from fast reactors; establishment of an international center for fast reactors fuel management at JSC "SSC RIAR"

Increase the safety of the reactor facility and expand its experimental capabilities to provide an experimental basis for the main parameters of the IV generation reactors, their nuclear safety and fuel cycle

Year-end results

- 17 973 m³ of concrete has been placed (85 458 m³ in total from the beginning of construction).
- 3 815 tons of fittings was assembled (15 489 tons from the beginning of construction).
- In January, the construction of reactor building walls was conducted at an elevation of +0.900 m, and in December concreting work was done at elevations up to +13 100 m.
- Items delivered: a component of the transport-technological tract (guide adapting pipe); reactor thermal shielding; reactor lower support.
- Items manufactured: screens (top, horizontal, nozzle); rods for control and protection system reloading; the upper reactor support; block thermal insulation; overlapping top

- 168 m³ of concrete has been placed (18 433 m³ in total from the beginning of construction).
- 10.8 tons of fitting was assembled (2 501 tons from the beginning of construction).
- 28.23 tons of complicated embedded items was installed (111.7 tons from the beginning of construction).
- Design documents were finalized.
- Design documents went successfully through the State Expertise

- Projects developed: upgrading of the sodium circuits electric heating control and regulation system; cutting out of sections of the heat exchange tube of the IV section of the air heat exchanger; replacing the collectors of cooling tower sprinklers; replacement of the uninterruptible power supply unit in the emergency power supply system; modernization of the dispatch control system.
- Activities conducted: strength calculations for the buffer tank of the reverse steam generator, air-lift of the observation chamber, and condensate preparation column; examinations of mechanical properties of samples cut off from the dismantled section of the reverse steam generator; full-scale testing of the measuring channel model of the flowmeter nozzle; the flowmeters calibration procedure is finalized; verification of TRIGEX-KAR software for neutronic calculations; calculation analysis of emergency situations with unauthorized removal and pushing out of control rods

Plans for 2018

Trial assembling in Volgodonsk

- Purchase of lifting equipment.
- Mounting of delivered components of biological shielding.
- Preparation of module for testing using simulators of equipment, units for mid-level waste treatment and units for HLW vitrification

- Start of radiation control system mounting.
- Mounting of emergency power supply storage battery.
- Revision of retrofitting project plan

Mid-term and long-term plans

Proceed with construction, manufacture, delivery and mounting of equipment, start-up activities

Implementation of project according to the revised plan



**IZHUTOV
Alexey**

Deputy Director
of JSC "SSC RIAR",
Science&Research

The R&D and production activity was primarily focused on achieving the 2017 target indicators while ensuring nuclear, radiation and basic safety at the nuclear and radiation hazardous facilities of JSC "SSC RIAR". In 2017 RIAR's research reactors operated according to the approved experimental schedules and plans. Completed were all the scheduled activities on safety improvement and assurance for the reactors and entire complex of the nuclear and radiation hazardous facilities. The operating licenses were extended for the MIR and SM reactors.

In April 2017 the investment project on SM reactor core upgrading was set in motion. The major design and manufacture of the core components, as well as start-up and adjustment will be carried out by the experts using RIAR's materials and equipment. The preparatory work is to be accomplished by the middle of 2019, and replacement of the main core components with the upgraded ones are to be completed by the middle of 2020. This project will sufficiently improve the reactor experimental capabilities and prolong its operation at least until 2030.

A fair amount of R&D (about 25 %) was carried out under the Proryv (Breakthrough) project that covered testing in the BOR-60 reactor of experimental fuel elements of various modifications, PIE of experimental FAs after testing in the BN-600 and BOR-60 reactors, as well as experiments to improve spent mixed nitride U-Pu fuel reprocessing technologies. As a result, experimental data were obtained in support of such fuel performance in the BREST and BN-1200 reactors to be used in the development of reprocessing technologies for spent nuclear fuel

and radioactive waste. The qualification (lifetime) tests were successfully completed in the MIR reactor with experimental fuel elements containing innovative REMIX fuel under VVER-1000 operating conditions, fuel testing continued, and alloy 718 spring components for FA Kvadrat were tested.

In the Reactor Materials Testing Complex integrated examinations went on with advanced VVER-1000 FAs in support of new engineering solutions to improve the efficient use of fuel for NPPs and generate experimental data for fuel licensing abroad.

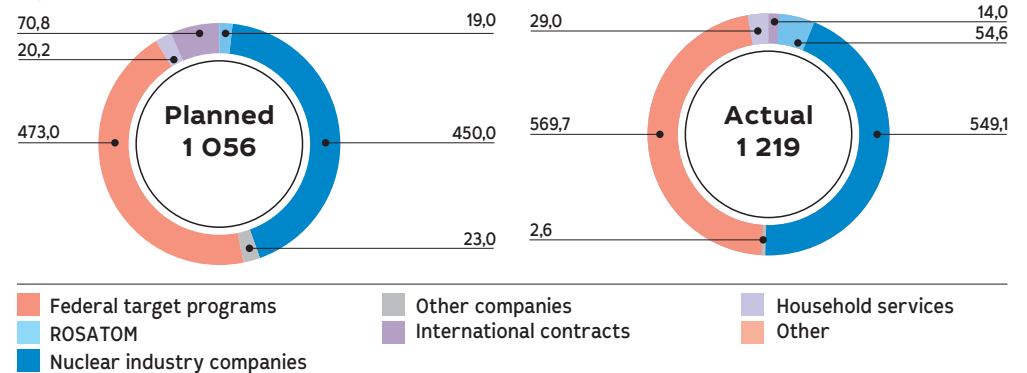
In 2017 in order to extend the volume of radioisotope production and supply, the list of radioisotope products became wider, and the number of consumers increased. The major sales were made from molybdenum-99 and strontium-89, as well as sources of selenium-75, iridium-192, cobalt-60, and californium-252. For the first time californium-252 was produced in the reactor from californium-249 and berkelium-249, and then extracted radiochemically from the irradiated material. After a long break a manufacturing process was renewed for medical californium-252 mini-pin sources, and they were shipped to the customer. A new production area was commissioned where cobalt-60 sources are manufactured, and the first batch of medical sources was produced and delivered to the customer. A stable level was achieved in producing strontium-89, gadolinium-153, and tungsten-188. After supplying single trial batches of lutetium-177, its regular commercial supply began. Thus, the solid ground was established for 2018 production and supplies.

4.3. Output

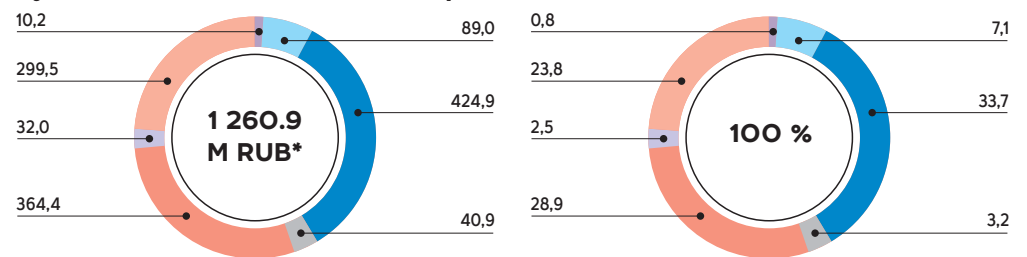
Physics and engineering of nuclear reactors, irradiation technology and safety of nuclear reactors

The Research Reactors Complex of JSC "SSC RIAR" renders a wide range of services to the outside companies including the international ones.

Revenue made from the work and services by the Research Reactors Complex in 2017, M RUB

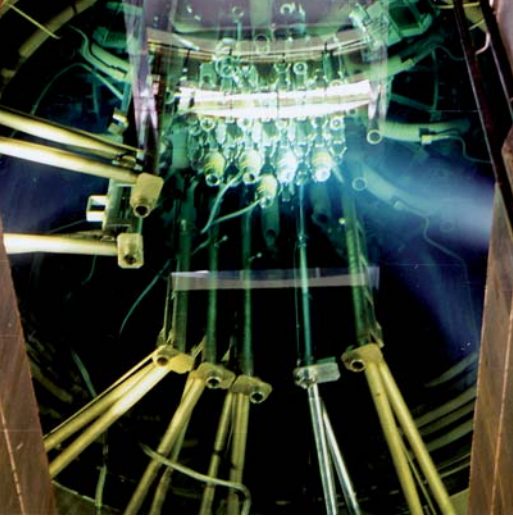



Planned revenue from the work and services by the Research Reactors Complex in 2018



*Revenue under international contracts is estimated based on the 2018 forecast exchange rate: 1 \$ = 63,9 P, 1€ = 75,3 P.

Key activities in 2017

Reactor	R&D	Production plan	Engineering activities
MIR reactor	 <p>Tests continued in the PV-2 loop facility under boron-lithium water chemistry for the fuel elements with advanced zirconium alloy claddings in the experimental FA-Kvadrat. During the scheduled reactor shutdown interim examinations were carried out for these fuel elements at the inspection stand in the storage pool. A power ramping test was performed with the fuel elements from this FA in the PVK-1 loop facility to justify the performance and further develop the design of such fuel elements. The PVK-2 loop facility was used to irradiate hold-down springs for the FA-Kvadrat headpiece under boron-lithium water chemistry to evaluate the effect of the alloy chemical composition, heat treatment conditions and load on stress corrosion cracking and stress relaxation. The loop tests continued as well to include as follows: VVER fuel rods with REMIX fuel when single fuel rods were taken out periodically and examined; FAs containing dispersed fuel to show the feasibility of the components used in propulsion reactors; alloy 718 specimens under the contract with AREVA (France).</p>	Irradiation of the initial material to accumulate carbon-14 continued	A reactor operating license was obtained valid until 31 December 2025. The reactor nuclear and radiation safety over 2016 was assessed. A backup diesel power plant was under trial run
SM reactor	 <p>Tests of alloy 718 specimens continued under the contract with AREVA (France) to investigate stress corrosion cracking under boron-lithium water chemistry</p>	Radioisotopes of high specific activity were accumulated, such as strontium-89, tungsten-188, barium-131, lutetium-177, iridium-192, and cobalt-60. Iodine-125 and iodine-131 were produced. The cores of selenium-75 sources intended for flaw detection were activated. The program went on to generate transplutonium element isotopes including californium-252	A reactor operating license was obtained valid until 31 December 2021. The reactor nuclear and radiation safety over 2016 was assessed. Calculations and experiments to justify safety were carried out under the reactor core upgrading program, and a set of design and engineering documents was developed; components manufacture has begun

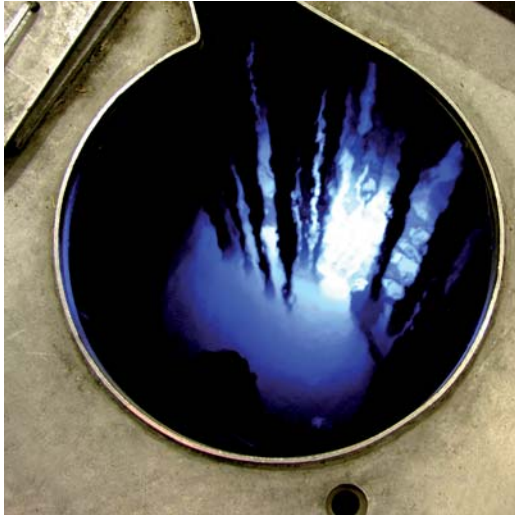
Reactor

R&D

Production plan

Engineering activities

RBT-6 reactor



Investigation of irradiation creep of uranium-gadolinium oxide fuel continued at temperatures ranging from 550 °C to 950 °C. As a result of this investigation followed by post-irradiation examinations data will be generated to predict the stressed-strained state and operating lifetime of gadolinium fuel elements under the fuel-cladding interaction

Irradiation of the targets continued for molybdenum-99 (weekly shipments) and iodine-131 accumulation


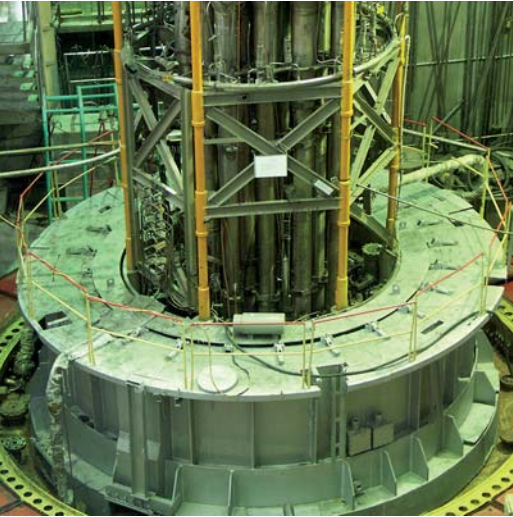
The reactor nuclear and radiation safety over 2016 was assessed. A plan of integrated survey for the safety-critical systems and components was issued. A plan of activities to prolong the reactor operating lifetime was issued. The state of metal reactor equipment and pipelines was checked. The integrated survey was launched to extend the reactor operating lifetime after 31 December 2020

RBT-10/2 reactor



Continued were silicon doping, irradiation mineral coloring, and accumulation of molybdenum-99 (weekly shipments) and iodine-131

A backup diesel power plant was under trial run. The state of metal reactor equipment and pipelines was checked. Installation, start-up, adjustment and testing (excluding connection to the operating systems) were carried out for the new equipment of the automated control and protection system. The reactor nuclear and radiation safety over 2016 was assessed

Reactor	R&D	Production plan	Engineering activities
BOR-60 reactor	 <p>Tested were: structural material specimens (core components of different reactor types); dummy fuel pins for BREST-OD-300 and BN-1200 reactors containing mixed uranium-plutonium nitride fuel with claddings made of steels ЭП823-Ш (EP823-Sh), ЧС139 (ChS-139) and ЭК181 (EK181) with helium and lead substrates; dummy fuel elements for the MBIR reactor containing vibropac MOX fuel; dummy fuel elements and structural materials under the contracts with KAERI (South Korea), CEA (France) and TerraPower (USA)</p>		<p>The reactor nuclear and radiation safety over 2016 was assessed. Equipment repair, maintenance and survey were completed, and radiation monitoring sensors were checked and calibrated</p>
VK-50 reactor	 <p>The experimental database on boiling water reactors was updated in terms of reactivity parameters, core stability, power density fields and charge distribution over the core (to verify the software). Carried out were calculations and experiments in support of reactor operation, maintenance and check of water chemistry, as well as upgrades of the in-core instrumentation system to monitor power density in the core by activation of copper wire indicators</p>	<p>Generated were 1131 801 MWh, 24 206 Gcal thermal power and 235 766 MWh electric power.</p>	<p>Activities were performed to keep high reactor self-protection properties, improve its stability margin and economic viability</p>

There are six operating reactors at JSC "SSC RIAR".

Reactor performance in 2017

Parameter	SM	RBT-6	MIR	RBT-10/2	BOR-60	VK-50
Max power, MW	90	6	43	10	50	200
Time factor, relative units:						
planned	0,66	0,76	0,57	0,70	0,65	0,82
actual	0,69	0,76	0,58	0,70	0,65	0,73
Reactor operation time, days:						
planned	242	278	208	255	237	298
actual	253	278	211	255	237	265
Shutdowns	25	34	19	42	5	6
Including unscheduled shutdowns	-	-	-	-	1	2

A set of documents was prepared and submitted to Rostechнадзор to obtain a license for safety justification review

The key trends of experimental activities performed by JSC "SSC RIAR" are provided in the Annual Report 2017 (<http://niar.ru>)

at the nuclear installations and nuclear storage facilities.



Reactor materials science, methods to test materials and nuclear components

In 2017 the Reactor Materials Testing Complex carried out examinations of:

- two leaky FAs (TVSA) operated at unit 3 of Kalinin NPP with achieved burnup of 31.27 MWd/kgU and 43.91 MWd/kgU, respectively. Each FA had one leaky fuel element due to cladding debris damage with a foreign object;
- leaky VVER-1000 FAs (TVS-2M) operated at unit 1 of Rostov NPP during two fuel campaigns with achieved burnup of 40.96 MWd/kgU: there was one leaky fuel rod detected with cladding debris damage with a foreign object under the first spacer grid;
- two leaky and one tight FAs (TVSA-ALPHA) operated at unit 1 of Kalinin NPP (examinations began in November);
- welded joints of TVSA-PLUS guiding channels and reference welded joints (under the contract with Elektrostal Machine-Building Plant);
- fuel elements of experimental FA-Kvadrat after basic irradiation in the MIR reactor to justify safety of fuel elements with Russian-made alloy claddings (E110, E110-M, E125, E635-M) intended for PWR (under the contract with VNIINM);
- experimental fuel elements containing REMIX fuel irradiated in the MIR reactor with achieved burnup of about 10 MWd/kgU and 20 MWd/kgU (under the agreement with ROSATOM);
- experimental fuel elements with a simulated defect irradiated in the MIR reactor to investigate the fission product release from leaky fuel elements into the coolant (under the contract with TVEL);
- VVER-1000 fuel rods after thermal tests simulating dry storage conditions to obtain data related to a change in the fuel microstructure, structural and phase state and fuel cladding mechanical properties for the fuel rods of different design and burnup (under the contract with TVEL);
- absorber rods with pellets of the reactor control and protection system operated at unit 4 of Balakovo NPP during two years and a half. It was demonstrated that high performance of the absorber rods maintained after they had been under operation in the reactor. It was recommended to carry out PIE after operation during a longer period (at least, five or six years);
- the effect of oxide film, hydrogenation and structural and phase state of alloy E110 (zirconium sponge or electrolytic zirconium) on the fuel cladding mechanical properties after the fuel elements contained in TVSA-5M and FA-2 had been irradiated: longitudinal and transversal tensile testing of plate-type (segment) and ring-shaped specimens showed the anisotropy of the cladding properties;
- behavior of VVER-1000 fuel rods of Zaporizhia NPP under the conditions simulating dry storage in vented reinforced concrete containers: predictions on maintaining the fuel cladding tightness and safety of long-term (50 years) dry storage were justified based on a conservative approach. The final report was issued (under the contract with NNEGC "Energoatom" (Ukraine));
- three combined experimental FAs containing fuel elements of different design and three fuels with claddings

made from various materials after they had been under trial operation in the BN-600 reactor to compare changes in the fuel composition characteristics, cladding materials and fuel elements, and generally to obtain the performance limits under fast reactor operating conditions (Proryv project). FA dismantling followed by non-destructive and destructive examinations showed that all experimental FAs kept their integrity and original shape over their operation time and further process; there were no defects in their structural components and no damage of the fuel elements. The testing parameters for different fuel element types were similar to the operating parameters characteristic to BN-600 standard fuel elements and BN-1200 and BREST-OD-300 fuel elements. The maximum burnup of nitride fuel in these FAs achieved 5 % h.a. New data were generated and the existing data were updated related to changes in the microstructure, irradiation swelling of nitride fuel, corrosion state and mechanical properties of the fuel claddings. The mechanisms of how the nitride fuel affects the claddings were identified. These data are the scientific basis for further work on fuel enhancement and lifetime extension.

Spent nuclear fuel reprocessing and radioactive waste conditioning

As during the recent years, R&D activities to improve SNF reprocessing and radwaste conditioning technologies were carried out under the Proryv (Breakthrough) project. Continued were investigations of promising methods for spent mixed nitride uranium-plutonium fuel and their experimental testing including voloxidation. It is particularly relevant to study nitride

fuel behavior in voloxidation of real fast reactor fuel samples. Investigations included irradiated mixed nitride uranium-plutonium fuel with a burnup of 5.45 % h.a. and volatile fission products generated under fuel oxidation, as well as methods of their determination. Gen II microwave denitration units were designed and fabricated: they confirmed their performance with the use of standardized test solutions. Determined were: the oxidation completeness for fragmented mixed nitride uranium-plutonium fuel in the air flow when varying temperature and rate of oxidizing agent supply; amount of nuclear materials remaining on the fuel cladding surface after voloxidation and cleaning; removal rate for tritium, carbon-14 and other volatile fission products in the fuel mass during the oxidation process. The generated data will be further employed to confirm experimentally the process solutions underlying the reprocessing module design with the use of real spent nitride fuel samples.

In order to enhance the SNF combined reprocessing hydrometallurgy, the promising systems to extract transplutonium elements from PUREX raffinates were investigated. Data on the target metal distribution were required for revision and finalization of the mathematical model for this process, and to develop a fractionation process it required investigation of how extractant radiation damage affects the americium macro-amount distribution. A pulse high-frequency linear accelerator (ILU-6) was used for accelerated degradation of the extractant where curium-244 was introduced. The investigation related to the distribution of fission products and transplutonium elements in water and organic flows in extractant fractionation was successfully

completed. The solutions were analyzed for precipitates, obtained were: acidity, different neodymium states, element inter-phase distribution, and change in the diethylene-triaminepentaacetic acid concentration. Radiation-damaged extractant behavior was as well investigated when contacting transplutonium elements.

In 2017 cooperation with Marubeni Utility Services, Ltd. (Japan) was renewed, and a stage of contract on producing zirconium and americium hydride was successfully completed. A batch of americium-241 dioxide was accumulated using a know-how method developed when carrying out the work. This method will improve the efficiency of americium burning in the reactors and reduce the nuclear power effects on the environment. In order to minimize these effects experiments were performed to recover uranium from the waste generated as a result of Mo-99 production: uranium-contained residues were fully dissolved, and uranium was converted into weighed triuranium octoxide. In 2018 a full-scale experiment will be performed on reprocessing of real residues resulted from production.

In addition to the data generated in the experiments to dissolve the simulants of Fukushima Daiichi NPP corium, glass samples were produced with included wastes resulted from molybdate electrolyte reprocessing. A microwave glass melting process was explored for radioactive waste immobilization. A promising mineral-like murataite matrix was investigated for its ability to replace some part of the mixture with non-process radioactive waste. Approaches were found to remove cesium as insoluble compound from spent electrolyte and vitrify this electrolyte without cesium removal.

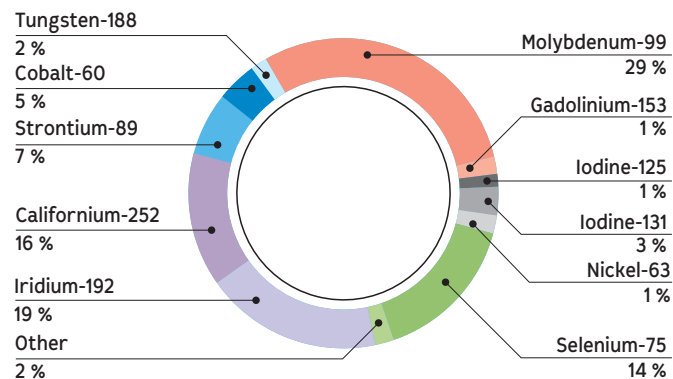
Radioisotope production

The key objective of the RIAR's Division for Radioactive Sources and Radiochemicals in 2017 was to increase the volume of radioisotope production and supply. To meet this objective, a list supplied products and consumers was enlarged. In 2017, as in the previous year, 90 % of sales referred to traditional products, such as molybdenum-99 and strontium-89, and sources and irradiated materials based on selenium-75, iridium-192, cobalt-60, and californium-252.

The major contribution to sales was made by molybdenum-99. As compared to 2016, its share in the total revenue from radioisotope production increased by 3 %. Molybdenum-99 was delivered to Karpov Institute of Physical Chemistry (NIFKhI), CNEN (Brazil), Laboratorios Bacon (Argentina), and for the first time to Technonuclear (Argentina) and PARS Isotope Co. (Iran). Molybdenum-99 sales in 2017 increased compared to those of 2016 to make up 493.173 TBq (actual activity calibration). It was produced and shipped weekly on a regular basis; and periodically (twice a week) the total delivery volume increased to 16.65 TBq (6 day calibrated) per week.

A significant contribution to the radioisotope sales was made by iridium-192. In 2017 the optimization of the irradiation plan continued, thus ensuring a more efficient response to a possible sharp increase in iridium-192 demand and accelerated accumulation of cobalt-60 in the same irradiation positions when demand is stabilized.

Sales of radioisotope products in 2017



In 2017 for the first time an express process of californium-252 reactor accumulation using initial californium-249 and berkelium-249 was applied as well as radiochemical extraction of californium-252 from the irradiated material ensuring the implementation of the urgent order on delivery of two startup neutron sources for Beloyarsk NPP while in fact there was no ready product by the time when the order was received. An important result of 2017 was the development of a californium-252 production plan for 2017–2021 to have stable annual accumulation of this radioisotope and the necessary stock of initial transplutonium element isotopes to ensure long-term production without procuring these isotopes from the outside companies. After a long break a process was renewed to manufacture medical californium-252 mini-pin sources:

a set of eight sources was manufactured and delivered to A. Tsyb Medical Radiological Research Center for contact neutron therapy of patients with oncological diseases.

In 2017 construction and installation, start-up, adjustment and inspection were completed to commission a new area of manufacturing cobalt-60 sources. This area was brought into pilot operation. Seven medical sources were fabricated and delivered to UJP PRAHA a.s. (Czech Republic).

In 2017 activities to stabilize the process parameters of iodine-131 production facility were carried out. The causes of unstable process yield were detected, and engineering solutions to eliminate these causes were introduced. These measures along with a clearer initial material ensure stable production

and weekly delivery of iodine-131 to Russian and international customers from the USA, Brazil, Argentine, and Iran. An important achievement of 2017 was an increased output of iodine-125 production facility. The sales of iodine-125 increased by 35 % in physical terms as compared to 2016.

In 2017 the demand in strontium-89, gadolinium-153, and tungsten-188 was stable enough. After supplying single trial batches of lutetium-177, its regular commercial supply began to PARS Isotope Co. (Iran). Trial batches continued to be delivered to Poland, Germany and Japan, and requests to deliver trial batches were received from Russian companies. After a long break regular production and weekly delivery of medical cesium-131 commercial batches renewed for Isoray (USA).

Shipping services

JSC "SSC RIAR" considers shipment of radioisotope products as the essential component in the production cycle; therefore, it pays particular attention to building capabilities in shipment and logistics, updating the fleet of special-purpose vehicles, optimizing logistic schemes and improving service quality provided that the safety requirements are fully met. At present, JSC "SSC RIAR" ensures shipment of Russian radioisotope products (both domestic products and products from other companies) not only within Russia and CIS states, but also in the EU states, such as Germany,

Czech Republic, Poland, Spain, France, and other countries. RIAR has a large number of special-purpose containers that have international certificates to ship radioactive materials and a fleet of special-purpose vehicles equipped according to the European requirements on road transport of dangerous goods by vehicles.

In addition to radioisotope shipment, RIAR renders integrated services to Russian and international companies on arranging and ensuring delivery to RIAR and return of other products engaged in R&D and production (for example, nuclear fuel samples and structural materials to carry out research, as well as natural minerals for irradiation). RIAR is included into the EORI system and has the unique number as the company whose activity is related to transit and submittal declarations to the EU customs. JSC "SSC RIAR" has a permanent permission of the Poland National Atomic Energy Agency valid until 31 December 2020 for transit and shipment of radioactive materials in Poland and shipment of high hazard radioactive materials in the Czech Republic. In 2017 RIAR obtained a new license from Rostekhnadzor valid until 2022 to handle radioactive materials during their shipment.

JSC "SSC RIAR" aims at further development and building capacities in shipment and logistics to improve its performance and render a full range of services to Russian and international customers.

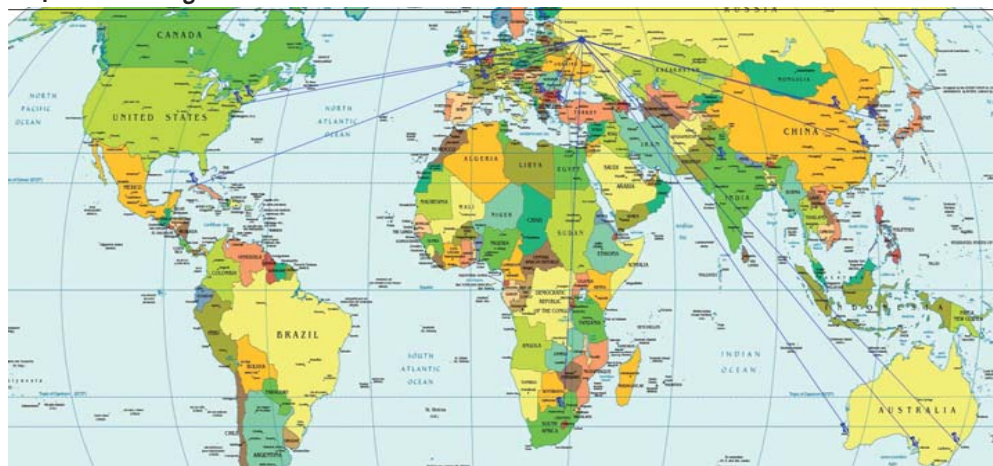
Shipment through Kurumoch Airport



Frankfurt	Almaty	Osaka	New York	Warsaw
Munich	Chicago	Tokyo	Istanbul	Helsinki
Brussels	Hanoi	Los Angeles	Prague	Vancouver
Hanover	Soul	Portland	Budapest	Zurich



Shipment through DME and SVO



Lyon	Beijing	Melbourne	Boston	Istanbul
Havana	Johannesburg	Adelaide	Sydney	Sofia
Helsinki	Damascus	Deli	Perth	Lisbon
New York	Soul	Paris	Shanghai	Madrid



10 vehicles of different capacity – fleet of special-purpose vehicles of JSC "SSC RIAR"



250 shipments of radioisotope products took place in 2017



Fabrication of fuel for BOR-60

The major activities of the RIAR's Division for Fuel Technologies were manufacture of 52 FAs containing uranium oxide granulated fuel for the BOR-60 reactor. All FAs were timely manufactured, and there were no complaints from the customer.

The 2017 results show the stability of the fuel manufacture process.

In order to try out closed nuclear fuel cycle technologies and minor actinide disposal scenarios under the Proryv (Breakthrough) project five experimental fuel elements containing uranium-plutonium fuel were fabricated to be further irradiated in the BOR-60 reactor.



For more details on activities carried out in 2017 at the RIAR's reactors, such as MIR, RBT-10/2, BOR-60, SM, RBT-6, VK-50 and critical test facilities of the SM and MIR reactors, as well as research in fuel elements and reactor materials, fuel and nuclear fuel cycle components, transuranium elements, radiochemicals and radioactive sources, nuclear fuel and radioactive waste management, radiation and environmental safety see JSC "SSC RIAR" SCIENTIFIC ANNUAL REPORT on the major research in 2017: http://niar.ru/annual_report

4.4. International Activities

One of the overriding priorities at JSC "SSC RIAR" is to intensify international activities and extend the portfolio of overseas orders. In recent years RIAR's expertise has become more in demand among the international partners.

The international customers of JSC "SSC RIAR" have traditionally been companies and national labs from France (AREVA, CEA), the USA (TerraPower, ANL), the Republic of Korea (KAERI), China, Japan, Ukraine, and other countries. In 2017, RIAR experts held active dialogue with international partners and carried out pre-contractual

activities on preparing new long-term contracts for irradiation, PIE, research in materials science, radiochemistry, and minor actinides handling. Among the main 2017 achievements confirming that JSC "SSC RIAR" is the leading world's center of research to support sustainable development of the world's nuclear power are:

- a contract was signed in October 2017 (Cadarache, France) between JSC "SSC RIAR" and the CEA's Nuclear Energy Division to carry out R&D activities in irradiation of absorber

+USD 2.8 M –
revenue from the international contracts has grown as compared to 2016

experimental specimens in the BOR-60 fast reactor;

- two contracts were signed in 2017 with the China Nuclear Energy Industry Corporation (CNEIC).

Since 2013 JSC "SSC RIAR" has been the Basic Organization of CIS member states on information exchange in ensuring safety of nuclear research installations.

USD 100 M –
portfolio of overseas orders for a decade

Over the reporting period, the RIAR's experts of the industry-wide Center for collection and analysis of the information related to safety of nuclear installations have implemented a range of important projects, the significance and relevance of which were highly appreciated by the experts during the 18th Meeting of the CIS Commission on Peaceful Uses of Nuclear Energy.

The CIS Commission on Peaceful Uses of Nuclear Energy was established in January 1997 by the resolution of the Heads of CIS States Council. It is the CIS inter-governmental coordination and consultative agency. Its objective is to coordinate the common efforts of the CIS member states in preparing the agreed solutions on multilateral cooperation issues in the nuclear power development. The Commission includes the representatives of eight states: Azerbaijan, Armenia, Belarus, Kazakhstan, Kyrgyzstan, Russia, Tajikistan, and Ukraine



In 2017 the RIAR's scientists and experts joined different working groups, technical meetings and workshops under the auspices of international organizations. The experts from RIAR attended 12 international scientific conferences making presentations on the major results and promising trends of RIAR's activities including the following recognized events:

- International Conference on Fast Reactors and Related Fuel Cycles:

Next Generation Nuclear Systems for Sustainable Development (FR-17) held by the IAEA Secretariat and ROSATOM;

- International Scientific Conference "Radiofarma-2017";
- 2017 Water Reactor Fuel Performance Meeting / Top Fuel 2017;
- Annual International Congress of nuclear medical experts held by the European Association of Nuclear Medicine (EANM).



In 2017 JSC "SSC RIAR" carried out activities to establish a sustainable basis and further develop international activities and scientific cooperation with the international partners.

In 2017 the portfolio of overseas orders for a decade was about USD 100 M, and the list of international contracts confirms that RIAR's experimental capabilities, scientific expertise, and science-intensive products are highly-demanded and competitive on the international high-tech market.

12 international conferences attended by RIAR's experts





TITOVA
Yulia

Deputy Director of JSC "SSC RIAR"
for HR Management
and Social Development

The key HR management goal at RIAR is to support business while implementing the strategy. The main objectives to achieve this goal are based on five priorities of ROSATOM's HR policy. The first priority is to foster employees' motivation for meeting the top business targets: new tools were initiated for bonuses and KPI identification; the work continued to raise RIAR subdivision managers' and employees' awareness of the motivation tools.

A second priority is leader development at all management levels. A system was initiated for long-term career planning, job rotation and talent development.

Another priority is capacity building at a business-required rate. Four RIAR's employees took part in the second championship AtomSkills-2017 held by ROSATOM based on WorldSkills methods. RIAR's employees participated in different competitions, and many became the winners. In 2017 implementation of a distance learning system continued.

One more important priority is building a result-oriented culture. The focus was

put both on keeping the achieved staff involvement rate and raising this rate, as well as on promotion of ROSATOM's values. Focus groups were established including those involving subdivision managers to identify the problematic issues of staff concern. An action plan is under implementation to improve the certain factors. Finally, the fifth priority is to enhance business satisfaction with HR management activities. In 2017 RIAR continued HR management process computerizing, and new document templates were introduced.

This year RIAR continued to develop engagement of local higher educational institutions that are the key partners in education and training: 296 students underwent hands-on training, and 28 graduates were employed.

In the future the above activities will continue, and there will be new objectives. To successfully meet them, it is necessary that RIAR's employees and management give confidence to HR management services, as trust is the most appreciation and result of our high-quality activities.

4.5. Human Capital

The most precious RIAR's value is a team of highly-expertized professionals who help us to achieve good results over all these years. That is why the key components of RIAR's social policy are staff training, development, motivation, social programs and social responsibility. All these aspects are set forth in a collective bargaining agreement, which is applicable to all staff members of RIAR.

The human capital management strategy is based on the RIAR's mission

and the top priorities of ROSATOM. It is human resourcing that ensures viable business aiming at a maximized shareholder value of RIAR, its fully functional business model within the scope of strategic objectives, as well as a considerable growth in the business scope and profitability due to human capital augmentation, which implies both an increased number of the staff and capacity building, career and professional development, and better working conditions.

HR management strategy at RIAR

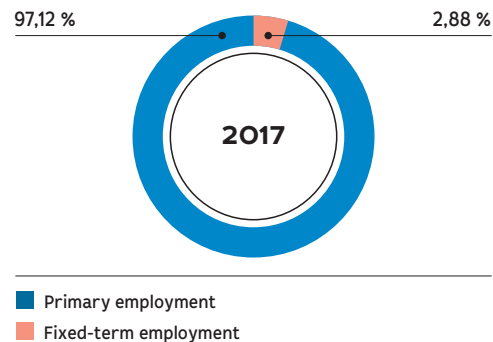
Aspect	Activities
Human resourcing	<ul style="list-style-type: none"> RIAR is provided with highly-qualified and skilled professionals through attracting best experts, staff efficient selection, training and development, implementation of the integrated assessment system and career planning. The talent-pool development program is enhanced to make well-arranged selection and appointment of the candidates to the key positions using RIAR's own internal talent pool; compiled are succession plans for the critical positions. A knowledge management system is implemented and motivation is provided to keep and transfer the key knowledge to young professionals using the mentorship system
Enhancement of HR management efficiency	<ul style="list-style-type: none"> The unified HR management system is under operation making the following processes computer-aided: keeping the organizational structure and schedule; HR management; working time schedule and recording; social programs implementation; rewards management; employee performance management; analytics and statistical reporting; service rendering to the employees; implementation of a pilot project of the Social Insurance Fund of the Russian Federation. Involvement in the projects on introducing the ROSATOM production system, thus enabling HR services to be improved, and the work to be arranged in a more efficient way. Reduction in the staff costs including reduced travel costs
Corporate culture development	<ul style="list-style-type: none"> Operation of the unified automated data management system. Use of ROSATOM values to attract professionals and build their career. Participation in the surveys on ROSATOM's staff involvement

HR management regulating documents

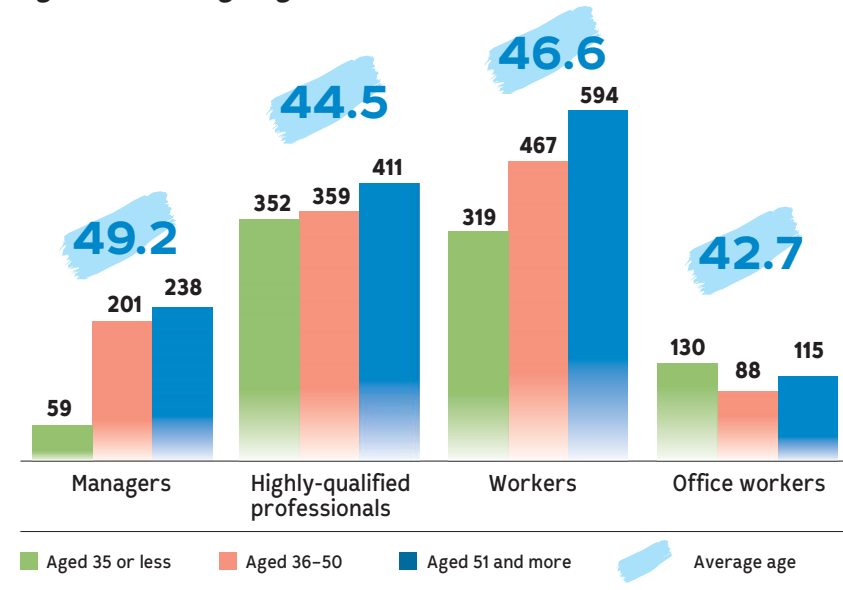
Labor Code of the Russian Federation
Agreement on nuclear power, industry and science for the period of 2015–2017
Common procedure on performance management of ROSATOM and its organizations
Code of Conduct of JSC "Science and Innovations" and organizations under its supervision
Charter of JSC "SSC RIAR"
Internal work regulations of JSC "SSC RIAR"
Standard of Enterprise STO KP 086-416-2016 "Integrated Management System of JSC "SSC RIAR". HR Management"
Provision on performance appraisal of JSC "SSC RIAR" staff members
Labor bargaining agreement between JSC "SSC RIAR" and its staff members (effective 2014–2017)
Main provisions on work arrangement for JSC "SSC RIAR" staff members

As at December 31, 2017 the total number of RIAR staff members was 3 333 including 3 295 full-time employees and 38 part-time employees. As compared to 2016, the number of employees decreased by 0.5 %, which resulted from the financial rehabilitation program to optimize the number of the staff members. Out of 3 333 staff members 54.8 % have higher education degrees including 27.08 % employees who have industry-specific education. In 2017 staff turnover made up 5.92 %, which is by 4.71 % more as compared to 2016. In 2017, 22 women and 1 man took maternity and parental leave, and 22 employees returned to work after maternity and parental leave: all of them have been working at RIAR during 12 months after their return.

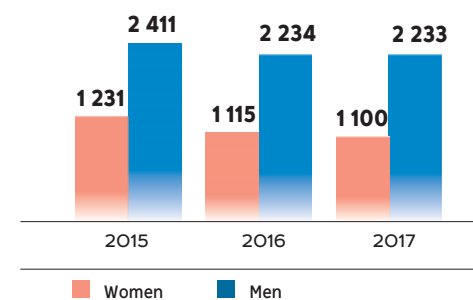
Total labor force by the contract type



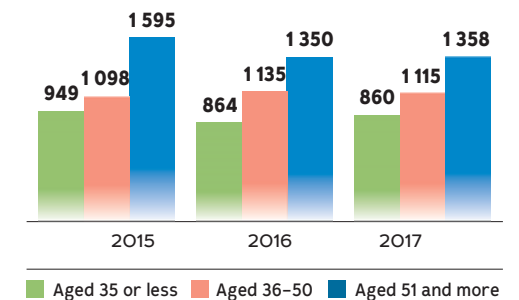
Staff composition and structure by categories, age and average age



Staff by sex



Staff by age



Basic staff categories by year, %

Category

Sex

Age

Managers

14,92

Highly-qualified professionals

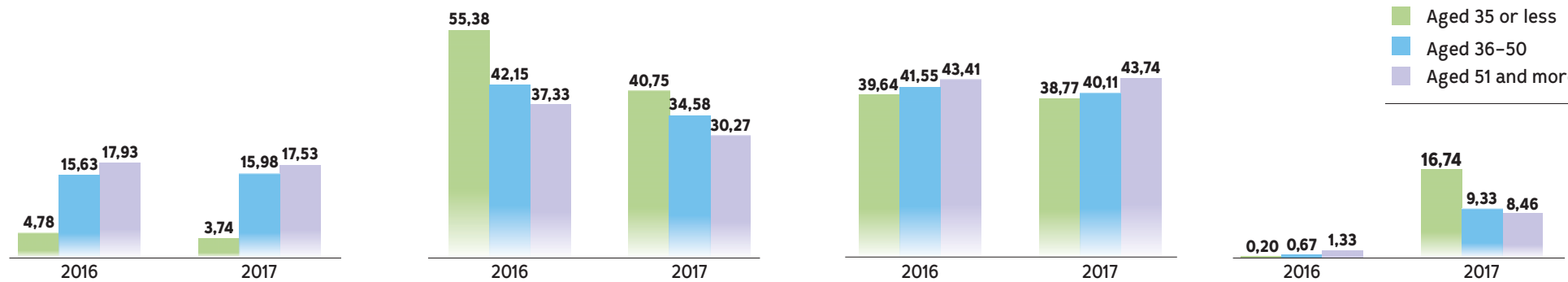
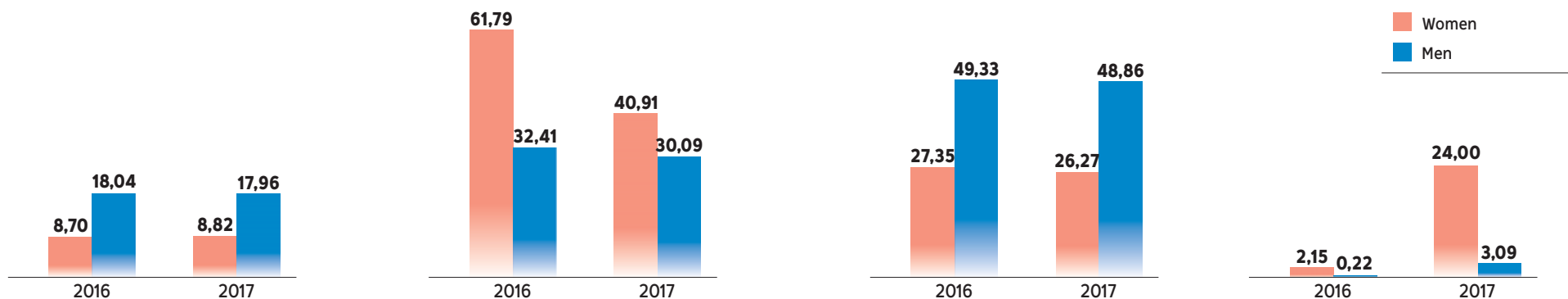
33,67

Workers

41,41

Office workers

10,00



3 333 staff members

54.9 % higher education professionals

25.8 % staff members aged 35 or less

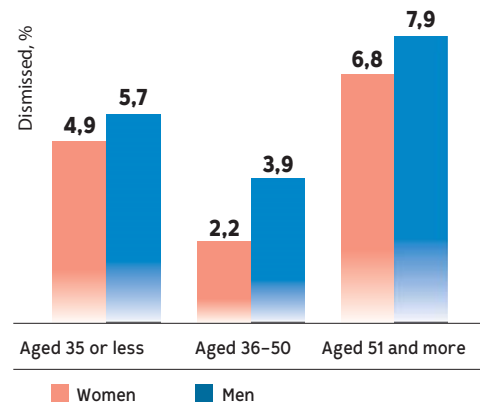
45.9 is the average age of the staff members

In accordance with the labor law, the minimum period to notify the employees about important changes in the company's activities is stated in the labor bargaining agreement making up at least two months.

Remuneration

The remuneration system of JSC "SSC RIAR" and employee benefits are targeted at compensation in exchange of good production and economic outcomes, performance enhancement and professional development. A provision on remuneration in RIAR is based on the Unified remuneration system (URS). One of the remuneration basic principles is providing equal opportunities for different age-sex groups. Salaries of the staff members depend on their position, professional capabilities and outcomes. At that, there is no difference between the men's and women's basic salary. JSC "SSC RIAR" exercises its best efforts to assess the outcomes of its employees in a decent way. RIAR offers competitive minimum and average wages. In accordance with the industry's agreement on nuclear

Staff turnover by age and sex



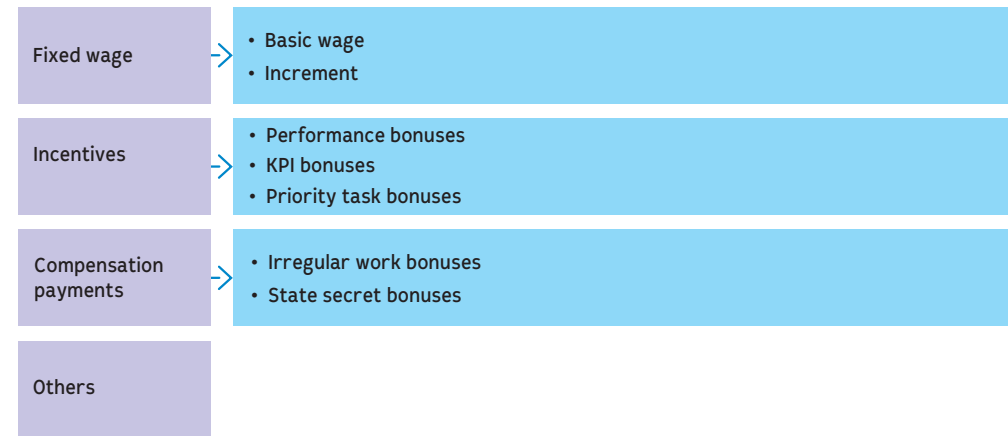
power, industry and science for the period of 2015–2017, RIAR undertakes to set the minimum wages at the 1.3 living wage that made up 12 870 RUB.

One of the key components illustrating social tension among the staff members is a decimal coefficient that describes contrast in wages between 10 % high-paid

and 10 % low-paid staff. The world's best practice considers this coefficient ranged from four to six to be optimal. In recent years RIAR has the optimal decimal coefficient.

In 2017 there was a positive trend in the average monthly wage growth as compared to the previous year (+7.7 %). In 2017 RIAR's staff expenses were 2 260.2 million rubles.

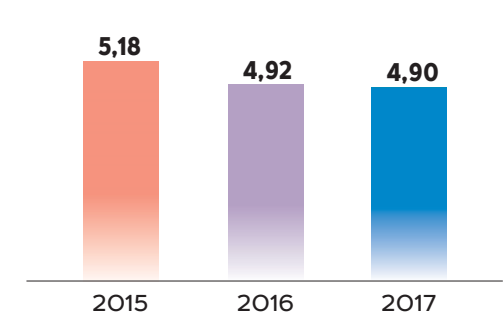
Wage structure at RIAR



Minimum wages averaged

Job	Average, thou. rubles	
	RIAR	Dimitrovgrad
Cleaning manager	17-18	9-12
General worker	18-19	10-12

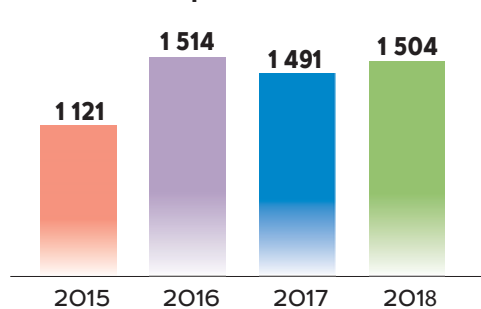
Decimal coefficient by year



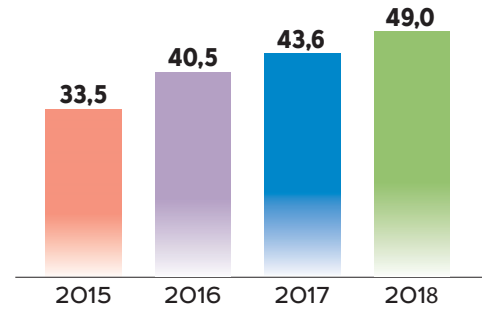
Staff expense structure

Indicator	Value by year, million rubles		
	2016	2017	2018
Staff expenses	2 204,2	2 260,2	2 533,4
Including Payroll	1 652,2	1 688,9	1 874,0
Social expenses	34,5	33,1	41,9
Staff recruitment and development expenses	1,8	5,3	6,2
Taxes (insurances)	514,7	532,1	606,4

Labor productivity by year, thou. rubles/persons



Average wage by year, thou. rubles



Social policy

In compliance with the labor laws, the labor relations at RIAR are regulated by a collective bargaining agreement for all staff members. JSC "SSC RIAR" provides employment for each of its staff members under the employment contract and acts in accordance with the Russian law, the Charter of RIAR, industry's agreement and collective bargaining agreement to keep working positions.

Any change in the activity of RIAR and its subdivisions including liquidation, change in ownership or legal form, full or partial suspension of production resulting in worse working conditions or reduced staff number, could only be possible after prior notice at least three months before such changes take place. Within the framework of the common social policy of ROSATOM and corporate social programs, RIAR annually increases expenses.

Labor relations management goals at RIAR

Establish a system of social and labor relations system contributing greatly to stable and productive work, successful development, social prestige and business reputation

Establish social and labor rights and guarantees improving the position of employees in relation to the current legislation

Raise living standards of employees and members of their families

Create favorable psychological climate

Implement the principles of social partnership and mutual responsibility of the parties

Social expenses in 2017

Indicator	Actual expenses, thou. rubles
Social expenses	26 709
Payments to retirees	4 541
Vouchers to recreation centers for children	1 778
Social payments	16 935
Financial assistance to the staff members	6 864
Payment (partial compensation) for housing rent	2 829
Additional leave (above the standard value established by the Labor Code of the Russian Federation)	6 942
Childcare benefit for children aged 3 or less	299
Cultural and social events	785
Trade union	1 971
Sport events	700
Insurance	4 459
Healthcare	1 951
TOTAL*	33 119

* Excluding healthy meals and charity.

Housing program

In 2017, RIAR continued the implementation of a housing program launched in 2015 to attract young professionals and improve their living conditions. This program enables young professionals and highly-qualified experts to buy flats at reduced rates: 28 000 rubles per square meter (while the average rate in Dimitrovgrad is 36 000 rubles per m²). In addition, the program offers an interest-free loan to make initial payment for those

who want to take out a mortgage to buy a flat. This loan amounts to 300 000 rubles for young professionals and 150 000 rubles for highly qualified experts. The initial payments under the loan can be made in two years, and the whole loan can be paid during 10 years at most. In 2017, two interest-free loans were given to young professionals and five such loans were received by highly-qualified professionals. The total amount of such loans was 1.35 million rubles. During 2015–2017, 157 professionals bought flats under this program in this new housing area.

Health enhancement

Annually, RIAR performs rehabilitation activities in a health resort center under its supervision for its staff members and retirees who need health resort and preventive treatment for medical reasons.

Under the health enhancement program, three health campaigns were arranged for children of the RIAR's staff members to include 129 children. As for children health holiday camps in Dimitrovgrad and Ulyanovsk region, 146 RIAR's staff members were partially paid 1.8 million rubles for vouchers.

Medical services under the voluntary health insurance program

Outpatient care

In-patient care

Rehabilitation and remedial treatment

Medical rehabilitation after serious diseases



1.35 million rubles – interest-free loans

333 staff members and **144** retirees improved their health condition at the RIAR's health resort center

Around **3** million rubles – value of contract with the insurance company "SOGAZ" under voluntary health insurance



Corporate culture

In 2017 the Slavsky Conference Center celebrated the 30th anniversary of its establishment. The Center is the key venue of local cultural, scientific and educational events. It houses the RIAR's Veterans Board, a hobby club, and children's ensembles. To enhance the corporate culture, young professionals meetings take place there, as well as research meetings, festivals, and cultural events including industry-wide events. Particular attention is paid to site improvements such as greening. In 2017 RIAR's staff members, representatives of non-governmental organizations and local and regional authorities planted mountain ash trees, oaks and birch trees. The key event of this year was a gala night attended by RIAR's veterans, staff members, Dimitrovgrad

companies' managers, RIAR's partners, and artistic groups.

In 2017 cooperation with the Ulyanovsk regional philharmonic society continued. Under a signed bilateral agreement there were free tickets given to RIAR's staff members to attend concerts of Ulyanovsk State Academic Symphony Orchestra, folk groups, and international music festival. Such events are very popular among the citizens.

An important event was a children's festival held by RIAR confined to the Children's Day. It was attended by more than 50 young dancers and singers from Dimitrovgrad. All children were given presents; they were supported by their parents, grandmothers and grandfathers. Children's playgrounds were as well arranged.



Another important event initiated by ROSATOM's Public Council was the municipal phase of an All-Russian creativity contest to perpetuate the living history of the emergence and development of the Russian nuclear industry. The contest main objectives were to transfer the knowledge and best practices from older generations to the younger ones and educate young people for allegiance to the country, respect for older generations, and pride in the Russian nuclear industry achievements. Over 150 schoolchildren from Dimitrovgrad took part in this event arranged for the second time. This year three participants were from a social service center, they took bonus prizes. The video clips were interviews of people who made a great contribution to Dimitrovgrad development. Traditionally, a good deal of video clips was dedicated to the nuclear

industry veterans. The clips made by Dimitrovgrad schoolchildren were highly appreciated in the final. The interviewees attended a festive event in Moscow.

In 2017 a second updated edition of the book "RIAR: People, Years, Achievements" was published. More than 50 authors were involved in making this book including RIAR's veterans and staff members. This book is given as a gift at different special events.

This year cooperation on science, culture and sport continued between RIAR's young professionals and students of MEPhI (Dimitrovgrad branch). A student forum took place where lecturers and experts were RIAR's young professionals. This forum was attended by more than 60 people. It included lectures and hands-on training.



In 2017 fruitful cooperation continued between RIAR and Nuclear energy information center of Ulyanovsk to include different events, such as film showing, interactive playgrounds, regional forums, tours, and performance of RIAR's staff members.

Traditionally, RIAR continued cooperation with public associations. There was a procession to commemorate 60 years from the day of Kyshtym disaster at Mayak.

A great deal of work was carried out under an education program "ROSATOM'S School". Dozens of Dimitrovgrad schoolchildren and their parents were involved in different projects focused on popularization of science and engineering occupations. By late 2017 in one of Dimitrovgrad schools there was a ceremonial opening of a modern physics laboratory classroom.

In 2017 RIAR's staff members participated in the regional phase of the All-Russian physical culture campaign "Ready for Labor and Defense".



RIAR's staff members who are engaged in sports activities initiated and co-arranged the whole range of sport events. In particular, a Dimitrovgrad minifootball team where there were RIAR's staff members has been very successful.

Particular attention should be paid to success of a RIAR's art and handcraft club. In cooperation with other Dimitrovgrad handcraft clubs several handmade fairs were arranged that became great entertainment events. Some funds received from these fairs were given for charity.

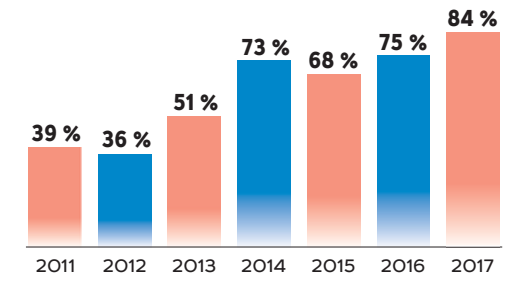
In 2017 the winners of a stage of the best schoolchildren corporate competition aimed at encouraging children and grandchildren of RIAR's staff members who have good and excellent marks at school had a tour to RIAR. These children toured the RIAR's museum and they were awarded with prizes.



Staff involvement

Annually, RIAR conducts an involvement survey, which is the key indicator of how staff members perceive their work in RIAR. In 2017 questionnaires were distributed among 659 staff members from 15 RIAR's subdivisions. The results obtained from these questionnaires and focus groups are used by the RIAR management to compile annual plans on improving the involvement rate.

Staff involvement rate by years



Survey results

Factor	Value by year, %		
	2015	2016	2017
Top management	47	39	49
Line managers	69	71	78
Colleagues	75	72	86
Staff value	49	38	60
Scope of work	74	76	79
Satisfaction with results	76	78	78
Independence	64	62	69
Resources	48	43	57
Processes	52	51	57
Wage	29	31	38
Fringe benefits	47	40	48
Acknowledgement	41	39	52
Career opportunities	50	49	59
Training and development	55	55	57
Feedback	65	64	71
Employer reputation	54	55	65
Employer image concurrence	54	59	58
Work/personal life balance	65	65	69
Working conditions	70	71	77

HR policy

Highly-qualified and skilled professionals.

The key projects on RIAR development require involvement of highly-qualified professionals. Therefore, RIAR management pays much attention to sustainable staffing. There are current programs on interaction with young

people and mentorship development, as well as hands-on training of students at JSC "SSC RIAR". Campaigns involving schoolchildren are targeted at their career orientation and understanding the prospects of training in RIAR-needed specialties. Such campaigns include, for example, open days and career fairs arranged in Dimitrovgrad, Ulyanovsk, and Kazan on the basis of DETI NRNU MEPhI, UISU, UISTU, Kazan State Power Engineering University, etc. RIAR management, HR Office and PR Department professionals are greatly involved in such campaigns. This interaction with young people will provide further RIAR staffing with local population. Keeping this objective in mind, RIAR arranges regular technical visits to its site: annually, schoolchildren and students of Dimitrovgrad, Ulyanovsk and neighboring regions like Samara and Penza region, and the Republic of Tatarstan visit RIAR. In 2009 the Children Nuclear Medical Academy was established in Dimitrovgrad, and since then it has been functioning successfully. The major Academy objective is in-depth learning of practical aspects in Physics, Chemistry, IT and foreign languages. The Academy aims at developing individual's motivation to learning and creativity, providing additional opportunities to meet educational needs of children and teenagers in out-of-school activities and leisure time. Lecturers at the Academy are RIAR researchers, leading Russian scientists and university professors from Dimitrovgrad, Ulyanovsk, and Moscow.



The key indicator describing RIAR interaction with young people is employer-sponsored target enrolment of school leavers in leading higher educational institutions to be trained in RIAR-relevant specialties. Following the 2017 results, 29 persons including 6 postgraduates enrolled eight higher educational institutions of Russia under the employer-sponsored education program. Employer-sponsored training of RIAR employees is performed in accordance with the Collective bargaining agreement for the period of 2014–2017.

An essential in resolving RIAR-sponsored training objective is engagement of higher educational institutions. In addition to RIAR's involvement in major educational programs, such engagement implies joint R&D. There are 50 current agreements on joint activities in different areas signed with 28 Russian higher educational institutions. Besides, there are long-term contracts with Dimitrovgrad schools implementing advanced educational programs and secondary vocational educational institutions.



RIAR collaborates with higher educational institutions as follows:

1. Hands-on training: introductory, on-the-job, research, and undergraduate training. Following the 2017 results, 28 graduates of higher educational institutions including 15 RIAR-sponsored graduates were employed by RIAR. The relation of expenses to support industry-oriented higher educational institutions to the number of young professionals graduated from these educational institutions and employed by RIAR in 2017 made up 2 225 880.9 rubles per person.

2. Engagement of leading RIAR professionals in training. In 2017, 30 RIAR professionals were engaged in training in DETI NRNU MEPhI and Ulyanovsk State University (UISU). To enhance the efficiency and perform RIAR-sponsored training there are basic departments established in these universities headed by RIAR Director (DETI NRNU MEPhI) and Chief Scientist of the Research Reactors Complex (UISU).

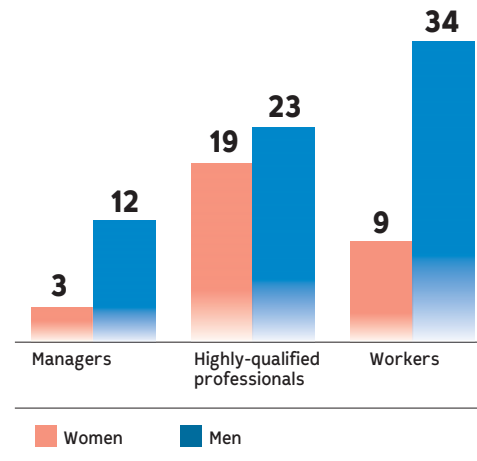
3. Involvement in higher educational institution management. The members of the DETI NRNU MEPhI Academic Board are three RIAR's professionals.

4. Joint R&D. In implementing joint R&D projects there is a unique opportunity to involve students in joint research related to RIAR activities. Such projects enable RIAR to attract young professionals.

The above activities resolve the highly-qualified staffing objective.

Staff development. Performance of the staff is assessed regularly to find out how well the employees match their positions, to enhance their performance, business capacities, and financial incentives, and to further improve staff selection and appointment. The relevant RIAR's provision defines the process and due dates. A corporate competence model and corporate criteria are used to annually assess the staff expertise. There are criteria for each staff category: managers, professionals, workers, and office workers. Building and development of the talent pool provide wider opportunities for career growth, expertise enhancement, and increase

Regularly assessed and developed staff by sex and categories, %



in motivation and involvement, thus helping RIAR to keep unique experts and gifted professionals in the nuclear industry and reducing the dependence on the job market. The talent pool is a priority source for appointment to vacant or newly established management positions.

1 423 staff members underwent training in 2017

5 290.81 thou. rubles were spent in 2017 on training

Outside candidates are appointed only in cases when there is no right candidate in the talent pool. A multistage talent pool is being developed in RIAR to plan career of the key professionals considered for management and critical positions. Managers and professionals are involved in industry's educational and development programs. In 2017, two RIAR managers (middle-level) were included in the program "ROSATOM's Capital", and one manager (bottom-level) was included in the program "ROSATOM's Talents". Establishment of the talent pool development system resulted in a changed attitude towards the leader role in the nuclear industry. The talent pool development programs help those involved to increase their motivation

to change consciousness and behavior models, and give tools to broaden the management portfolio.

Average training hours by employee categories

Category	Men	Women
Manager:		
Top level	32,1	16,8
Middle level	9,1	17,2
Bottom level	35,1	44,9
Professionals:		
Capacity building	24,6	31,4
Compulsory education	51,6	28,4
Workers	39,7	18,5





VOROBAY Andrey

Chief Engineer
of JSC "SSC RIAR"

In accordance with the Decree of the President of Russia, 2017 was declared the Year of Ecology. In this connection ROSATOM issued Order # 1/689 as of July 28, 2016 "On Conducting the Year of Ecology 2017 in ROSATOM". JSC "SSC RIAR" Issued Order #64/86-P as of February 02, 2017 "On Conducting the Year of Ecology at JSC "SSC RIAR" in order to improve the staff's environmental culture, ensure ecological safety of the enterprise, provide respect for the environment, and implement environmental measures. The main goal of the year was to ensure safety of RIAR radiation facilities. To assess the level of public safety and information about the importance of events associated with radiation sources at JSC "SSC RIAR", as well as at other ROSATOM enterprises, the international nuclear events scale (INES) is used. It covers all types of practical activities and is designed to assess events occurring during the implementation of these activities. For the reporting period, no such events happened at RIAR nuclear facilities.

Another confirmation of the high level of safety culture is the recognition of RIAR as IAEA-designated ICERR. This fact also confirms the correctness of chosen direction for the implementation of international management standards in the field of quality and ecology.

Last year the institute successfully passed the inspection audit of the integrated

quality management system to comply with international standards ISO 14001: 2004 (GOST R ISO 14001-2007) and ISO 9001: 2008 (GOST ISO 9001-2011). Despite the fact that this is only the second year of the management system functioning in the field of ecology and use of safety management tools on the basis of the introduced environmental policy and identified significant environmental aspects, in 2017 it was possible to achieve a reduction in the volume of generated low- and mid-level liquid radioactive waste by 12%, the amount of pollutant emissions into the atmosphere – by 26.6%.

In the reporting year, the capital construction was continued under two projects of the Federal Target Program related to the provision of nuclear and radiation safety: "Reconstruction and provision of safety of solid radioactive waste storage facility", and "Reconstruction and rehabilitation of the site storm sewage system" (in particular, treatment facilities were put into operation). These facilities will allow us to modernize the handling of solid radioactive waste and non-radioactive wastewater and to reduce the impact on the environment.

A proof of the due attention of the RIAR Administration to the safe functioning of all facilities is significant funds allocated to implement environmental protection measures. For 2017, current costs and investments of JSC "SSC RIAR" to environmental protection made up about 101.7 M RUB.

4.6. Natural Capital

Environmental policy, system of environmental management

The policy of JSC "SSC RIAR" in the field of ecology (environmental policy) is the main document of the organization that declares high-level guidelines for the environmental protection. It was developed on the basis of the relevant policy of ROSATOM and brought into force by the Order of Director in May 2017. The ecological policy of JSC "SSC RIAR" is aimed at the implementation of the "Fundamentals of environmental development policy of the Russian Federation for the period until 2030" and "Fundamentals of the state policy on nuclear and Radiation Safety of the Russian Federation for the period up to 2025"; its goal is the sustainable ecology-oriented development of nuclear industry as a scientific and technological flagship and compliance with the main principles and commitments in the field of environmental protection and ecological safety. Implementation of the JSC "SSC RIAR" ecological policy is based on the relevant plan for the period up to 2018 developed in accordance with the unified industry-level methodical instructions for implementation of environmental policy of ROSATOM and its organizations. The environmental-related activity of RIAR is conducted regarding the following environmental aspects:

energy, water, bio-diversity, emissions, discharges and wastes, products and services, compliance to requirements transformed into own ecological indicators that are allowable emissions and discharges, limits and disposal of waste, indicators of air and water quality, water discharge and water use standards. To achieve the performance of environmental-related activities, JSC "SSC RIAR" took over commitment to implement and maintain best environmental management practices in accordance with international and national standards in the field of environmental management. This commitment is implemented as an integrated quality and ecology management system. Ecology and quality management systems are supported in action, develop in accordance with the principle of continuous improvement; they are effective and meet the international standards requirements. The next inspection audit of integrated management system carried out in October of the reporting year by "Russian register" (an independent body on management systems certification) proved the system conformity to international standards ISO 14001: 2004 (GOST R ISO 14001-2007) and ISO 9001: 2008 (GOST ISO 9001-2011). In 2017, the renewed version of GOST R ISO 14001-2016 was put into force as well as a new unified industry-level environmental policy of ROSATOM and its organizations.

The need for actualization is conditioned by the adoption of RF-level strategic documents in the field of environmental protection and environmental safety and changes in the environmental legislation. A new system of environmental regulation is put into force, including general and differentiated requirements.

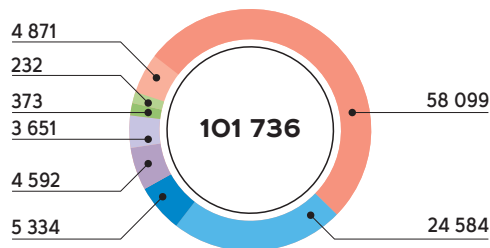
Therefore, the task-in-hand for 2018 is the update of environmental policy of JSC "SSC RIAR" and related documents and the development of related activities.

The text of the environmental policy is available on the RIAR website: http://niiar.ru/?q=ecological_policy. You can get acquainted with the ecological activities reports on http://niiar.ru/annual_report

Total environmental protection expenditures and investments

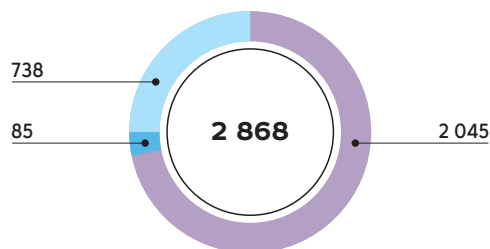
Total expenditures by purpose of environmental activities in 2017, k RUB

Current environmental protection expenditures

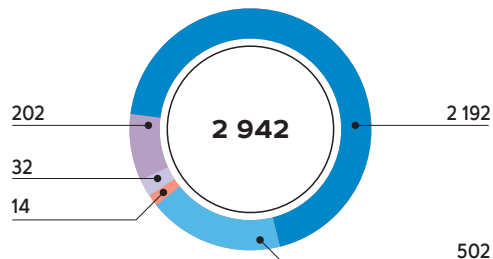


- Radiation safety of the environment
- Air protection and prevention of climate change
- Waste water collection and treatment
- Waste management
- Protection and rehabilitation of lands, surface and subsurface water
- Preservation of bio-diversity and protection of natural territories
- R&D activities and developments to reduce negative man-caused effect on the environment
- Protection and rational use of water resources
- Other areas of environmental activities

Investments into environmental protection and rational use of natural resources*



Payment for services related to the environmental protection



* In the main capital, directed to environmental activities (at the expense of all financing sources).

Waste generation

As a result of RIAR production and economic activities, nearly 50 types of production and consumption waste generated are Class I–V waste. The waste is mostly low-hazardous (Class IV) and virtually non-hazardous (Class V).

Waste to be disposed, decontaminated or emplaced is sent to the organizations that hold a license to conduct waste management activities. The waste is emplaced at special-purpose facilities entered into the State Register of Waste Disposal Facilities. Delivery

of waste to be handed over to special-purpose organizations is made using transport facilities of the organizations licensed to conduct waste transport activities. The ways to dispose waste correspond to the licenses available and types of waste. Data on the amount of waste are generated based on the internal inventory.

RIAR has no imported, exported or reprocessed waste deemed hazardous under the terms of Annex I, II, III and VIII to the Basel Convention. Waste transported between countries is also absent.

Mass of waste transported in the region by type and groups

Waste type	Waste referring to Annex II, VIII to the Basel Convention	Waste mass, t
Mercury, mercury-quartz, luminescent lamps lost their consumption properties	LA1. Metal and metal-containing waste	1,405
Unsorted lead waste		0,398
Garbage from office and domestic facilities that is practically harmless; waste (garbage) from harvesting territory and premises of social-rehabilitation and cultural and sports institutions and from entertainment events	Y46. Waste collected from dwellings	98,289



JSC "SSC RIAR" neither managers hazardous waste covered by the Basel Convention on the Control of Transboundary Movements of Hazardous Waste and Their Disposal nor performs trans-boundary movements of RIAR-owned hazardous waste. The total mass

of waste transported per year (sent for disposal and decontamination to other organizations) deemed hazardous under the terms of Annex I, II, III and VIII to the Basel Convention makes up 100.092 t.

Waste amounts by hazard classes and type of management

Waste management methods	Waste amount by hazard classes, t					
	I	II	III	IV	V	Total
Transfer from other organizations for disposal	0	0	0	0	519,000	519,000
On-site incineration	0	0,053	0,400	0	0	0,453
Transfer to other organizations for decontamination	1,405	0	0,398	26,000	122,384	150,187
Transfer to other organizations for emplacement at waste landfills	0	0	0	264,668	241,946	506,614
On-site storage	0	0	0	0	519,000	519,000
On-site accumulation	1,120	0	1,156	49,670	0	51,964

Consumed materials

In 2016, the total mass of materials in the form of either processed or reused waste made up 0.453 t (sulfuric acid waste from technical testing and measurements, waste of motor and industrial mineral oils). In 2017, the percentage of the reused materials from the total amount of all materials used in production is not significant.

The share of purchased or used materials, of which the stability was certified by a third party is 100%. No significant impact on the environment was revealed regarding the transportation of RIAR activities-related products and other goods and materials, and labor transportation. The transportation services are performed using equipped motor roads and modern vehicles.

Amount of Materials Consumed

Product type	Indicator value
Rolled steel, t	56
Pipes, t	16
Protective means, pc.	407 209
Diesel fuel, t	105 235
Oil and lubricants, kg	212
Petrol, l	26 337
Filter elements, pc.	281
Industrial gases, m ³	6 896
Paper, sheet	5 000 000
Starting materials, g	130
Ion exchange resin imported, m ³	53 059



Energy consumption efficiency

The RIAR power supply system includes production and consumption of energy produced by RIAR, as well as energy resources purchased from third-party organizations. JSC "SSC RIAR" does not consume renewable sources; in 2017 non-renewable fuels were used for motor transport and reactor facilities VK-50 and BOR-60. The reduction in fuel consumption is conditioned by the optimization of expenses for own

needs; a reduction in consumption of fuel oil is conditioned by the conservation of the recreation center boiler. The consumption of heat energy in 2017 decreased by 2.38%; the consumption of electricity remained at the same level. The reduction in the consumption of energy resources was achieved through the optimization of the operation modes of reactors VK-50 and BOR-60: combined production of electric and thermal energy, repair of building contours, optimization of coolant flowrate in heating and ventilation systems, and replacement of obsolete power meters.

-8.37 % – Purchased energy

+16.59 % – Sold energy

Total fuel consumption from non-renewable sources

Fuel type	Energy, GJ			Costs, k RUB			Relative index 2017 / 2016, %	
	2015	2016	2017	2015	2016	2017	Energy	Cost
Nuclear fuel	5 244 200	5 169 597	5 092 631	77 244	67 760	102 452	1,49	-51,20
Industrial fuel oil	23 600	7 301	0	5 604	1 064	0	100,00	100,00
Diesel fuel	1 900	7 504	6 042	2 523	5 601	4 969	19,48	11,28
Petrol	3 500	2 845	2 207	2 145	2 250	2 008	22,45	10,78
Total	5 273 200	5 187 247	5 100 880	87 516	76 674	109 429	1,66	-42,72

Consumption as compared to 2016

-22 % – Petrol

-19 % – Diesel fuel

-1.5 % – Nuclear fuel

-100 % – Industrial fuel oil

Total Energy Consumption, GJ

Energy type	2015	2016	2017	Relative index 2017 / 2016, %
Bought for consumption	161 400	289 122	264 915	8,37
Own generation	1 137 700	581 640	1 253 691	-115,54
Sold to other organizations	453 400	460 303	536 684	-16,59
From non-renewable sources	5 273 200	5 187 247	5 100 880	1,66

Consumption of energy resources per years

Energy type	Energy, GJ			Costs, k RUB (excluding VAT, reference price 2015)			Relative index 2017 / 2016, %	
	2015	2016	2017	2015	2016	2017	Energy	Cost
Thermal energy	422 305	384 142	375 012	134 848,13	124 449,64	120 426,62	2,38	3,23
Electricity	477 000	461 272	461 381	268 561,96	259 577,19	259 222,01	-0,02	0,14
Total	899 305	845 414	836 393	403 410,09	384 026,83	379 648,63	1,07	1,14



Water intake and waste water discharge

The RIAR's water sources are the Cheremshan Bay of the Kuibyshev reservoir and mineral resources, which provide RIAR with technical and drinking water, respectively. The largest volume of the water intake (97.65 %) is water for technical water supply and cooling. The volume of water consumption in RIAR does not exceed the limited values of water intake. To get information on water intake, water meters are used as well as data from the water supplier LLC "RIAR – GENERATION" (wells are in lease).

The Cheremshan Bay of the Kuibyshev reservoir is formed by a wellhead of the Great Cheremshan River,

the left feeder of the Volga River, and rivers and streams flowing into it. The total length of the Cheremshan Bay is 42 km, width is from 3 to 27 km, the average depth is 6,8 m, up to 15 m in some places (according to the data for 2016). The water intake area (well #3) consists of a number of water intake wells located along the Cheremshan Bay. Usually, there is no significant influence of technical water intake on the Cheremshan Bay. In the summer season, there is a significant impact on underground drinking water (well #3).

The RIAR water use system provides for a multiple use of water in the production process. For certain types of production, a water reuse is provided with a periodical feeding to compensate water losses because of evaporation.

Water consumption by sources, thou. m³

Water source	Location	Water consumption by years			Allowable water intake
		2015	2016	2017	
Surface water used for technical water supply and cooling	Cheremshan Bay of the Kuibyshev Reservoir	9 191,99	7 633,51	8 667,46	12 633,0
Underground water used for drinking, household and practical needs from another water supply system	Subsoil plots along the banks of the Cheremshan Bay (well #3)	216,232	193,242	207,544	-
	Recreation center	0	2,04	0,601	24,63
Sewage from other organizations	LLC "RIAR – GENERATION"	610	562	-	-
Total		10 018,222	8 390,792	8 875,61	-

221 103 thous.m³ –
water flowrate
in the reuse water systems

3.92 % –
total volume of intake water
from the reused one



For a part of the technological processes, when there is a need in cooling water, a straight flow system is used according to the following scheme: surface water (water intake) – a cooled object – surface water (water discharge). In water recycling and direct-flow cooling systems technical water from Cheremshan Bay of the Kuibyshev reservoir is used.

Wastewater disposal of JSC "SSC RIAR" is carried out by separate sewerage: industrial-storm, household and special (for waters contaminated with radionuclides). Radwaste contaminated with radionuclides enter the repository of the experimental

underground landfill for the isolation of liquid radioactive waste (FSUE "National Operator for Radioactive Waste Management"). The domestic wastewater is discharged by LLC "RIAR – GENERATION" to the municipal sewerage system and is not accounted here. Discharge of sewage industrial storm water is carried out in the open hydrographic network, which is part of the Volga River basin, through the output wells. Most water is discharged to the Cheremshan Bay of the Kuibyshev Reservoir. The discharged water is untreated. Treated wastewater is discharged to the Erykla Stream. Before discharging to the Bolshoy Cheremshan River, wastewater is treated with biological methods.

In 2017, the hydro-chemical index of water pollution for Cheremshan Bay of the Kuibyshev reservoir was 2.87, which corresponds to water quality class IV and is classified as "contaminated"; for the rivers Yerikla and Bolshoy Cheremshan, the indices are 1.91 and 1.12 respectively, that corresponds to water quality class III and is classified as "moderately contaminated". No radioactive contamination was detected for sewage water discharged into the Cheremshan Bay from the RIAR site.

Wastewater discharge and runoff from the RIAR territory is done through the stormwater drainage system into the Cheremshan Bay that is a part of the Cheremshan State Ichthyological Reserve.

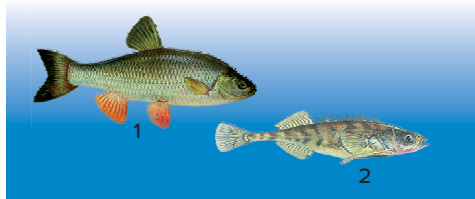
Overall wastewater discharge

Receiving water body	Discharge volume, thou. m ³
Cheremshan Bay	2 631,00
River Erykla	5,53
River Bolshoy Cheremshan	0,42
Total	2636,95

The Reserve is intended for the preservation and restoration of the fishing stock of the Kuibyshev reservoir. It is a shallow well-warmed area rich in forage reserve and feeding areas for young fish. Ichthyofauna is represented by more than 50 fish species, of which 23 is of commercial value.



Some representatives of the ichthyofauna are listed in the Red Book of the Ulyanovsk region (nine-spined stickleback and chub). The Cheremshan Bay fauna is also represented by 140 taxonomic groups of phytoplankton, 30 zooplankton species, 25 zoobenthos species. Water ecosystems located within the JSC "SSC RIAR" territory are water use areas on the rivers Yerikla and Bolshoy Cheremshan, in Cheremshan Bay of the Kuibyshev reservoir. The impact of RIAR discharges is insignificant and does not cause any contamination of habitats as well as any changes in the biodiversity. However, the object of protection is quite vulnerable since the RIAR's water use area is directly located in the Reserve territory.



1 – chub; 2 – nine-spined stickleback

The land area of JSC "SSC RIAR" takes 3 156.97 hectares, of which 242.29 hectares are property and 2 914.68 hectares are in rent. Within the RIAR territory more than 360 species of higher vascular plants are identified, twelve of them are listed in the Red Book of the Ulyanovsk Region.

The Cheremshan State Ichthyological Reserve

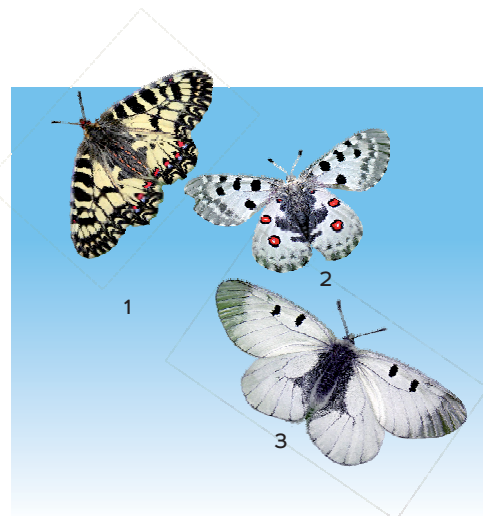
Administrative area	Melekes district, Ulyanovsk region
Location	North-eastern part of the water area of Cheremshan Bay, Kuibyshev reservoir (coordinates: 49°5'13 E and 54°14'9 N)
Type of object	State Reserve
Area, hectares	2 902,0
Status	Regional-level reserve to preserve the fish stock
Related regulatory authority	Regional-level Inspectorate of the Fishery Protection
Status document	Decree # 216 as of March 28, 1985 and decree #303 as of August 07, 1990 of the Regional Executive Body
Purpose of establishment	Spawning and feeding grounds for commercial fish species



The animal world includes 500 species of vertebrate and invertebrate animals inhabiting ground and water environment. The reptiles and amphibians fauna includes 16 species, of which 2 species are listed in the Red Book of the Ulyanovsk region.

The bird fauna includes 183 species, of which 32 species are listed in the Red Book of the Ulyanovsk region and 13 species are included into the Russian Red Book. Three species are in the IUCN Red List: spotted eagle, imperial eagle and black-winged pratincole.

The invertebrate fauna is rather rich. One of the largest groups of the invertebrate animals is the insect group. The list of most widespread and frequent insects includes 207 species. Some species are listed in the Red Book of the Ulyanovsk region and two species of butterflies are in the Red Book of Russia.



1 – Polyxena; 2 – Apollo; 3 – Mnemosyne

There are no production sites that are owned, leased or managed by JSC "SSC RIAR" and located in protected natural areas and territories with high biodiversity value that are outside the boundaries of protected natural territories or adjacent to such territories; there is no significant impact of activities, products and services of JSC "SSC RIAR" to such territories. The enterprise is allocated one water use site in the protected natural territory: the north-eastern border of the Cheremshan State Ichthyological Reserve is located in the area of the RIAR water intake. The annual discharge of sewage in this water use area is 2 029.0 thous. m³; 44.8 tons of pollutants are discharged together with sewage water, including 33.0 tons of chlorides, 2.8 tons of organic and 8.1 tons of suspended substances.

The implemented measures to manage the impact on biodiversity include reforestation and cleaning of the sanitary protection zones of the Cheremshan Bay of the Kuibyshev reservoir from unauthorized landfills. It is planned to introduce mechanical cleaning of waterstorm sewage discharged into the Bay. Control of the impact includes continuous monitoring of the state of the environment and environmental risks and periodic assessment of the impact of the enterprise on the environment.

The habitats of flora and fauna in the RIAR-impacted zone are in a satisfactory ecological state.

The RIAR activity potentially affects the neighboring area 12.5 km in radius. Based on the many years' experience, it can be stated about no threat to the existence of flora and fauna.



1 – white-tailed eagle; 2 – large spotted eagle; 3 – Levant sparrow-hawk; 4 – great black-headed gull; 5 – imperial eagle; 6 – pale harrier; 7 – eagle owl; 8 – snake eagle; 9 – large curlew; 10 – sea parrot; 11 – yellow-breasted tit (white azure); 12 – stilts; 13 – black-winged pratincole

The gamma-radiation exposition dose from the ground surface is 4.644 nC/kgH (18 µR/h). The specific activity

of radionuclides in plants, water and soil is in accordance with the sanitary standards.

Average pollutant concentration in water bodies

Index	Place of control						Max acceptable concentration*, mg/dm ³
	Cheremshan Bay		River Erykla		River Bolshoy Cheremshan		
	Background traverse	Control traverse	Background traverse	Control traverse	Background traverse	Control traverse	
Concentration, mg/dm ³ of: suspended substances	7,1	15	4,0	10	11,5	14,8	Background value 0,25 + 0,75*
dissolved oxygen	8,3	5,4	8,2	8,3	9,3	-	Less than 4,0
dry residue	487	468	219	524,3	531	480	1 000
oil products	0,027	0,037	0,059	0,092	0,014	0,007	0,05
sulfates	104	66	0,000	71	114	83,8	100
SAS	0,021	0,027	0,022	0,023	0,017	0,041	0,50
iron (total)	0,21	0,35	0,57	0,102	0,20	0,128	0,100
chromium (total)	0,000	0,000	0,000	0,07	0,000	0,000	-
nitrate-ions	4,9	2,5	1,4	1,9	5,8	2,02	40,0
nitrite-ions	0,095	0,23	0,059	0,000	0,045	0,233	0,08
chloride-ions	15,7	32	0,000	60,2	12,6	42	300
phosphate-ions (by P)	0,127	0,151	0,074	0,059	0,088	0,268	0,2
ions of:							
ammonia	0,56	0,47	0,56	0,07	0,15	3,35	0,5
cooper	0,002	0,0030	0,000	0,004	0,001	0,003	0,001
zinc	0,011	0,000	0,000	0,021	0,006	0,012	0,010
chromium (III)	0,000	0,000	0,000	0,072	0,000	0,000	0,07
chromium (VI)	0,000	0,000	0,000	0,020	0,000	0,000	0,02
Oxidability, mg O ₂ /dm ³ :							
permanganate	6,0	9,7	9,4	2,0	6,0	1,8	-
dichromate	17,2	28,5	21	18,3	22	-	-
Biochemical consumption of oxygen, mg O ₂ /dm ³ :							
for 5 days	1,6	2,1	2,4	0,62	1,6	-	2,1
for 20 days	3,5	4,9	5,2	1,15	3,8	4,7	3,0
pH index	7,8	7,7	7,6	7,8	8,1	7,7	6,5-8,5
Water t, °C	9,4	17	10	19,5	13,7	16,8	-

* For water objects of commercial fishing importance.

Amount of polluting substances in discharges, t

Polluting substance	Location of discharge		
	Cheremshan Bay	River Erykla	River Bolshoy Cheremshan
Organic compounds (total biochemical consumption of oxygen)	3,683	-	0,002
Suspended substances	10,524	-	0,006
Dry residue	-	0,205	0,202
Ammonia nitrogen	-	-	0,001
Nitrate-ions	-	-	0,0008
Nitrite-ions	-	-	0,0001
Sulfates	-	-	0,035
Chloride ions	43,412	0,245	0,018
Iron	0,360	-	0,0001
Copper ions	0,0013	0,00001	0,000001
Zink ions	-	0,0001	0,00001
Chromium ions (III)	-	0,0002	-
SAS	0,042	0,0001	0,00002
Phosphate ions (by P)	0,061	-	-
Total	58,0833	0,45041	0,26503
Grand total		58,79874	

Emissions of Hazardous Substances into Atmosphere

The United Nations Organization has identified a list of greenhouse gases which emissions are subject to regulation. These are primarily carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, sulfur hexafluoride and nitrogen trifluoride. Direct emissions of greenhouse gases into the RIAR atmosphere resulted from the combustion of fuel oil in the boiler units and operation of sewage water treatment plants of the recreation center, and also due to fuel consumption by mechanisms and vehicles.

The quantitative determination of the direct emission of carbon dioxide from the stationary combustion in the boiler is carried out according to the guidelines for the quantification of greenhouse gas emissions volume by organizations engaged in economic

and other activities in the Russian Federation. The calculation method is based on the use of release coefficients and direct measurement of fuel consumed (fuel balance) and ignores methane and nitrous oxide emissions arising potentially during the stationary combustion of fuel. The quantitative determination of the direct methane emissions from sewage water treatment is carried out according to the guidelines on the calculation of pollutants emissions into the air from the fugitive sources from sewage water aeration stations. In 2017, there were no direct emissions of carbon dioxide and methane from the boiler of the recreation center.

The heat balance is affected by water vapor and ozone. RIAR annually emits about 600 thous. m³ of water vapor, which is formed in the cooling towers of nuclear installations. In 2017, the ozone emission was 0.0714 kg.

Indirect greenhouse gas emissions are generated by the producer of electricity and heat by "RIAR – GENERATION", LLC. Other indirect greenhouse gas emissions originate from sources under the management of JSC "Alliancestransatom", which carries out transportation of employees and cargoes. The estimation of volume releases is quite challenging since there are no data on the consumption of electricity, heat and use of vehicles by these organizations.

To reduce greenhouse gas emissions, it is necessary to reduce energy consumption, transportation, uncontrolled leaks from refrigeration equipment and air conditioners. The location of RIAR in the settled land allows implementing rational methods of forest management and reforestation on a sustainable basis with a view to protecting and improving the quality of sinks and storage of greenhouse gases.

From the list of ozone-depleting substances, the treatment of which is regulated

by the Montreal Protocol on Substances that Deplete the Ozone Layer, the RIAR emissions contain carbon tetrachloride and difluorodichloromethane. The release of carbon tetrachloride is due to technological processes: laboratory tests, cleaning and degreasing of equipment. The source of CFC emissions is compressing-condensing units (refrigerators) and multi-split systems, which use ozone-depleting substances. The mass of the difluorodichloromethane in the equipment is 1.89 kg.

Mass of ozone-depleting substances for 2017

Substance	Mass, kg		
	At the beginning of year	Consumed	At the end of year
Carbon tetrachloride	591,2	228,4	398,0
Difluorodichloromethane	4,3	0,0	4,3

Pollutant Emissions into Atmosphere

Substances	Hazard class	Amount of emissions per years, kg		
		2015	2016	2017
Gaseous and liquid:		25,354	4,496	4,496
Incl.:				
Sulfur dioxide	III	16,837	0,096	0,096
Carbon oxide	IV	2,762	1,577	1,577
Nitrogen oxides (in NO ₂ equivalent)	III	2,526	1,298	1,298
Volatile organic compound	-	1,873	1,421	1,417
Others	-	-	0,104	0,108
Solid:		11,810	3,356	1,267
Incl. suspended substances	III	0,013	3,356	0,017
Total		37,164	7,852	10,276

In 2017, the average annual indicator of cleaning of atmospheric emissions of the enterprise received at gas-cleaning and dust-collecting installations, from polluting substances made up 88 %. There were no peak and emergency emissions of pollutants into the atmosphere. The quantitative determination of emissions is based on calculation methods using specific indicators and the balance method.

Fines and penalties for breaching environmental legislation and regulatory requirements

In 2017, the following administrative measures were applied to JSC "SSC RIAR": administrative liability for violating

the requirements of the environmental legislation of the Russian Federation that cover the protection of water body and atmospheric air and handling of production and consumption waste; an administrative fine was imposed on a legal entity and officials.

In 2017, there were no non-financial sanctions imposed on JSC "SSC RIAR" for non-compliance with environmental legislation and regulatory requirements. In the reporting year, the payment for negative impact on the environment amounted to 1970.4 thousand rubles, while emissions of pollutants into the air amounted to 0.4 % of the total, discharges to water facilities – 0.5%, waste disposal – 99.1 %. JSC "SSC RIAR" does not dispose waste into underground horizons.

Fees for adverse environmental impact

Type of fees	Amount of fees per years, k RUB		
	2015	2016	2017
Fees for allowable emissions (discharges) of pollutants and emplacement of production and consumption waste:			
to water bodies	138	104	5,2
to air	8	8	5,2
for emplacement of waste	2	-	-
Fees for excess emissions (discharges) of pollutants and emplacement of production and consumption waste:			
to water bodies	128	96	-
to air	266	365	1 965,2
for emplacement of waste	165	165	4,4
Total	94	103	7,4
including:			
to water bodies	7	97	1 953,4
to air	404	469	1 970,4
for emplacement of waste	173,0	173	9,6
Total	96,0	103	7,4
including:			
to water bodies	135,0	193	1 953,4
to air			
for emplacement of waste			

4.7. Occupational and Industrial Safety

Since the level of occupational injuries and occupational diseases has a significant impact on both the economic and social component of the enterprise's activities, JSC "SSC RIAR" takes great care to prevent injuries and occupational diseases. RIAR has introduced the ROSATOM unified industrial policy in the field of occupational safety, which defines the goals, objectives and main activities in terms of ensuring safe working conditions and protecting the health of personnel; the OSH management system is aimed to prevent occupational injuries and occupational diseases, and to improve the working conditions of the RIAR employees. For the seconded persons and sub-contractor's workers that perform work at radiation hazardous areas and facilities of JSC "SSC RIAR", individual dosimetric control is organized. Contracts concluded with sub-contractors reflect their obligations in the field of compliance with labor protection requirements; relevant agreements are concluded and questionnaires on labor protection are filled out. Regular checks are conducted to ensure compliance with safety requirements when fulfilling works together with sub-contractor's representatives. A purposeful activity in this area allows us to talk about reducing the risks associated with the occupational and industrial

safety in recent years (see Sub-section 2.4. "Risk management"). Insurance is actively used for risk management.

Insurance of the reporting period

	Voluntary health insurance
	Accident insurance
	Civil liability insurance:
	• Operators of nuclear facilities
	• Owners of hazardous production facility
	• Operators carrying out transportation of radioactive substances and nuclear materials
	• Operators and owners of hydrotechnical facilities
	• Objects under capital construction and under design
	• Owners of vehicles

17 576 RUB – insurance bonus

Over the past few years JSC "SSC RIAR" has recorded a reduction in occupational injuries: in 2014 there was one accident categorized as light, and since 2015 there have been no accidents. Since 2002, there have been no fatal accidents. In 2017, no accidents and cases of occupational diseases were registered for the representatives of contractor and subcontractor organizations performing work at the sites of JSC "SSC RIAR".

At present, JSC "SSC RIAR" has adopted a comprehensive plan of measures to prevent personnel injuries during construction and installation works at the ROSATOM's facilities, of which requirements apply to all enterprises of the corporation. The objectives of implementing a comprehensive plan of measures are to ensure a high level of production culture; minimize the incidence of occupational injuries and occupational diseases; preserve the health of workers; increase labor productivity, motivation and attractiveness of labor. RIAR also developed its own plan of measures to prevent injuries

628 persons received training in the occupational safety

5.9 M RUB – insurance amount

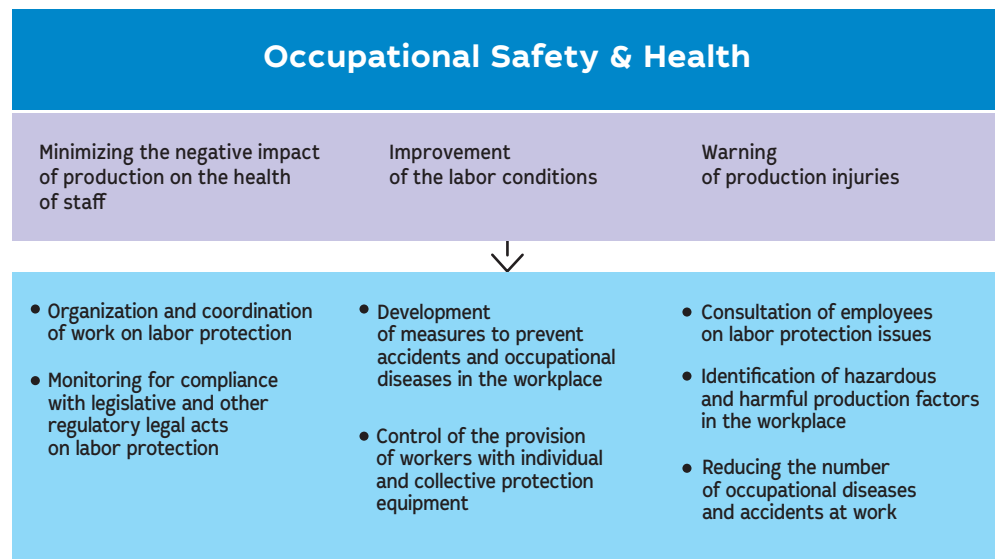
of personnel during construction and assembly works in subdivisions and on the territory of JSC "SSC RIAR". Within the existing organization programs of education, training, consulting, prevention and control of occupational accidents risk.

In 2017, as in previous years, people received training in OS&H, counseling, prevention and control of the risk of occupational injuries. The Institute pays great attention to health and safety issues which are reflected in both the Industry-Specific Agreement on Nuclear, Energy, Industry and Science for 2015–2017 (http://www.pub.niiar.ru/system/files/sites/soglashenie_2015-2017.pdf), and in JSC "SSC RIAR" CBA for 2014–2017 (http://niiar.ru/sites/default/files/pgo2014_in_29062015_c_ssytkami_O.pdf)

Over the past three years the indicators of injuries for JSC "SSC RIAR" and its subcontractors, – coefficients of production injuries, occupational diseases, lost days, absence at the workplace – are equal to zero.

1 032 k RUB was allocated for occupational safety training

Key tasks of OS&H



Employees' Health Controls

Annually JSC "SSC RIAR" employees go through periodic medical examinations. Medical examinations are performed strictly in compliance with the Order of the Ministry of Healthcare and Social Development of the Russian Federation # 302n of 12 April 2011 "On approval of the lists of harmful and / or hazardous occupational factors and works which require mandatory pre-work and periodic medical examinations and the procedure for conducting mandatory pre-work and periodic medical examinations of the workers engaged in heavy work and work in harmful and / or dangerous labor conditions". In 2017, 2 730 RIAR employees who worked in contact with harmful and / or dangerous

substances and occupational factors underwent medical examinations. Occupational safety activities in JSC "SSC RIAR" were implemented in compliance with the Industry Agreement on Nuclear Power, Industry and Science and Collective Bargaining Agreement of the enterprise.

In accordance with the system of the three-stage administrative-public control, schedules of activities to control the state of occupational safety at the enterprise were developed:

- checks to examine compliance with the health, radiation, industrial and fire safety requirements;
- meetings with representatives of the RIAR divisions as a result of the above checks;
- inspections by occupational health and safety specialists.

Personnel's Exposure Control

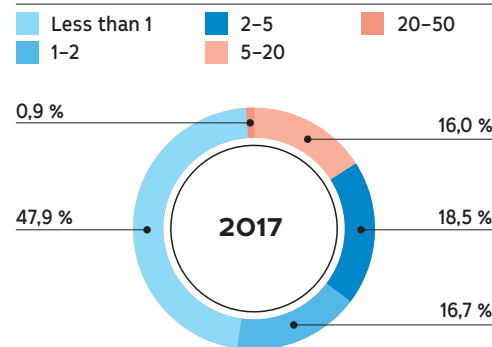
In 2017, all Group A personnel was subject to individual dosimetric control. In the reporting period, the average annual effective dose of the personnel is 2.84 mSv. In the year 2016, it was 2.78 mSv (for more details, please see annual report for the year 2014 http://niiar.ru/sites/default/files/pgo2014_in_29062015_c_ssyilkami_O.pdf).

An increase in the average effective dose of the personnel is explained by the reduction in its number while maintaining the volume of radiation hazardous work at reactors SM and RBT-6 (replacement of two removable pumps) and unscheduled unloading of spent nuclear fuel (66 items) from reactor VK-50. No cases of exceeding the basic dose limit for personnel established by radiation safety norms (50mSv) were recorded among the RIAR employees in 2017. Data on the effective dose received

by the Group A personnel are consistent with the data for 2016 and with the similar indicators for the industry as a whole. There were no cases of exceeding the effective dose of 50 mSv per year or 20 mSv on average for five consecutive years that indicates the implementation of the principles of radiation safety personnel at RIAR.

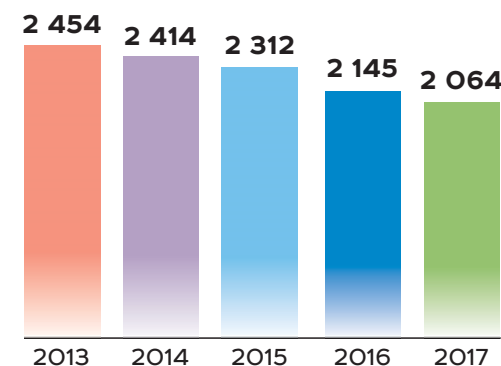
Based on the results of the individual dosimetric control of the personnel, an individual life risk was calculated using the program complex ARMIR-5 related to occupational exposure of personnel. The absolute majority of workers (99.27 %) is in the radiation risk zone less than 10^{-3} . Individual lifelong risk increased in comparison with the value established by the radiation safety norms is observed only for 15 employees (0.73 %). In 2017, a specialized medical examination of these employees was organized, the results of which showed that these employees had no radiation-induced diseases.

Effective dose for Group-A personnel, mSv*



* Limited value is 50mSv according to the radiation safety norms.

Number of JSC "SSC RIAR" employees under the individual dosimetric control



In 2017, under the implementation of the program on reducing doses of personnel, 185 individual dosimeters were purchased and are now used during radiation hazardous activities to control radiation doses of personnel working under mixed gamma-neutron radiation with the help of an automated complex of individual dosimetric control.

The system of ensuring nuclear and radiation safety of facilities is constantly being improved. In 2017, JSC "SSC RIAR" introduced new guidelines on the radiation monitoring developed by the Federal Medical and Biological Agency of Russia, as well as the new Federal Rules and Regulations in the field of nuclear energy use "Nuclear Safety Rules for Research Reactors" (NP-009-17) and the Standard of the state corporation

"General Rules for the design and operation of alarm systems for the emergence of a self-sustained chain nuclear fission reaction and provision of measures to limit its consequences" (STO-95-12004-2017 (PBVa-06-10-2017)).

Criteria testifying to the absence of a significant impact of JSC "SSC RIAR" on personnel, population and the environment are as follows:

- not exceeding the basic dose limits for personnel exposure;
- compliance with emission standards for radioactive substances in the atmosphere;
- absence of violations in the work of the RIAR facilities characterized by level 1 and higher according to INES scale.

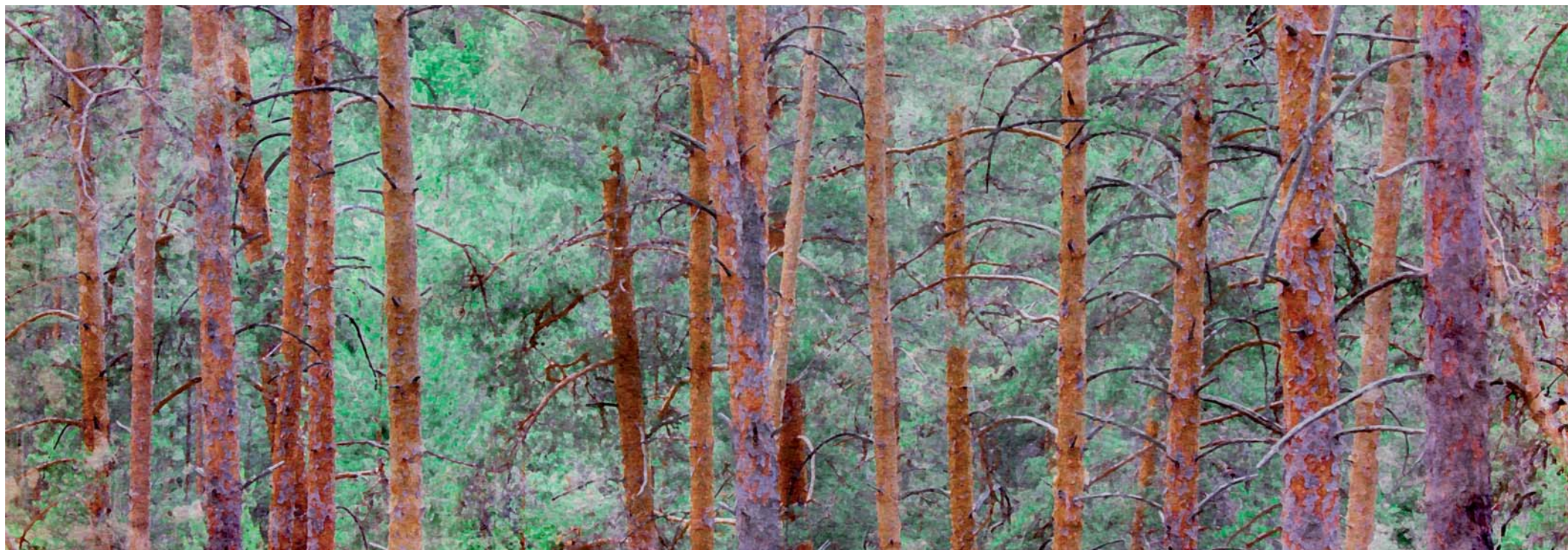
JSC "SSC RIAR" annually issues:

- a report containing information on individual and collective doses of external and internal exposure of personnel and public, the results of monitoring of radioactive substances emissions into the atmosphere, as well as other information; based on the report results, measures are being developed to improve the radiation safety system and reduce the risks of nuclear and radiation safety;
- a nuclear safety report for nuclear facilities and nuclear-hazardous objects of JSC "SSC RIAR", which analyzes comments on the state of nuclear safety in accordance with the guidance on safety when using nuclear energy "Determination of the causes and conditions of the occurrence of violations of safety requirements when using nuclear energy" (RB-083-13).

The level of nuclear and radiation safety achieved in RIAR is acceptable. This is confirmed by inspections of RIAR-level commissions on nuclear and radiation safety, and by the ROSATOM general inspection commission

Improving the safety and efficiency of the reactor experimental base

Provision of accident-free, safe and sustainable operation of nuclear and radiation hazardous objects is the main goal of RIAR activities. RIAR systematically monitors their state and implements a set of engineering measures to ensure accident-free operation of nuclear research facilities and nuclear hazardous areas (modernization of the technological



equipment and compliance with current standards in production and technological processes when operating nuclear facilities); activities are carried out in full compliance with standards and taking into account changes in the existing Russian legislation. In 2017, activities at the nuclear hazardous areas of JSC "SSC RIAR" as well as the operation of nuclear research facilities were conducted without accidents. Information on the risks of nuclear and radiation safety can be found in Sub-section 2.4 "Risk management".

The project "Improving the safety and effectiveness of the experimental base of JSC "SSC RIAR" ensures the modernization of the reactor experimental base, of which improvement is necessary not only because of physical and moral obsolescence of equipment, but also in connection with the new

requirements of Federal Norms and Rules for ensuring safe operation of nuclear facilities. In 2017, the following activities were implemented under the project:

- replacement of obsolete equipment of safety systems;
- replacement of electrical equipment and repair of the electrical substation transformer;
- start-up and commissioning of the emergency control and protection system at the RBT-10/2 reactor facility;
- work to confirm the accreditation criteria of the laboratory for chemical and radiation monitoring of environmental protection management and equipping additional workplaces for monitoring of microbiological parameters, acute and chronic toxicity of sewage and surface water in the RIAR location area;

- purchase of materials and equipment to modernize the laboratory hot water supply system;
- purchase of alarm system equipment;
- modernization of the compressor cryogenic plant.

Part of the activities started in 2017 will be completed in 2018, namely:

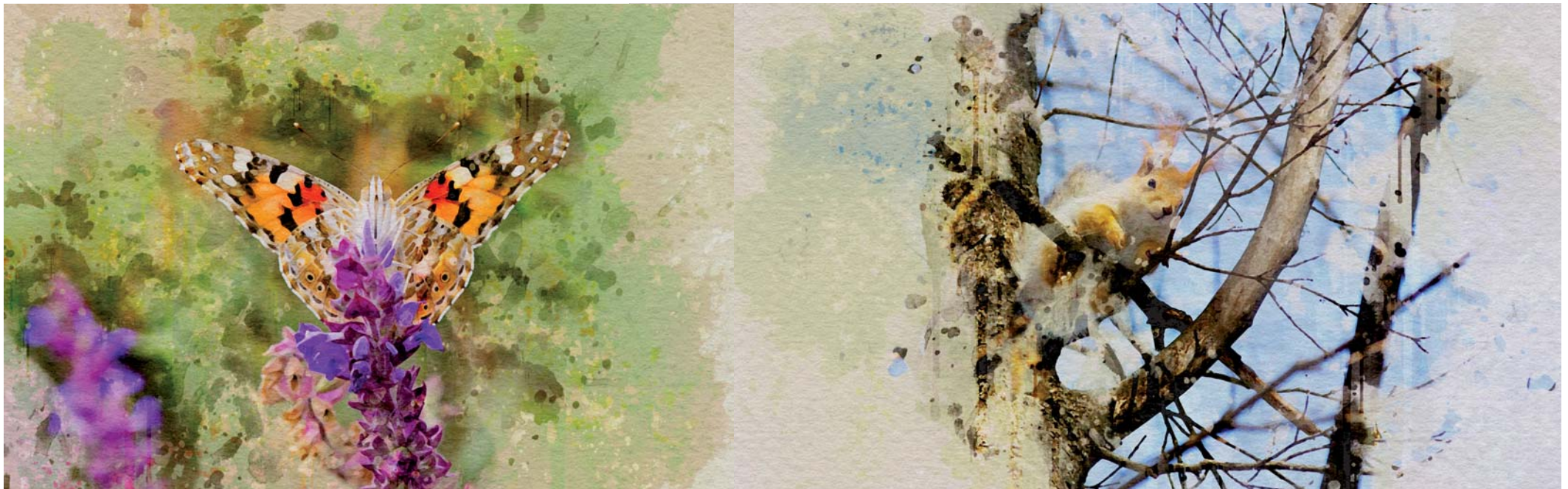
- modernization of the compressor cryogenic plant;
- purchase of:
 - three beryllium blocks for the MIR reactor;
 - compressed air preparation equipment;
 - reference sources of ionizing radiation;
 - alarm system equipment.

The investment project "Improving the safety and effectiveness

of the experimental base of JSC "SSC RIAR" allowed increasing the level of nuclear and radiation safety of nuclear research facilities, scientific and methodical and instrumental support of their operation, and research-and-development activities carried out to contribute to the industry and international cooperation.

Minimized Environmental Impact

To minimize the environmental risks resulted from the RIAR activities, the Environmental Policy was brought into force. More details can be found in Sub-section 4.6 "Natural Capital" of Section 4 and in Reports on Ecology of JSC "SSC RIAR" on http://niiar.ru/annual_report.



SECTION 5

Stakeholders' Engagement



5.1. Approaches to the Stakeholders' Engagement

The stakeholder major groups, interests and principles of interaction are given in the Annual Report 2014 (<http://niiar.ru>)

The system of interaction with stakeholders affects and will affect significantly the development of JSC "SSC RIAR". Therefore, consideration of stakeholder interests in strategic planning is an important condition of sustainable development. Stakeholder engagement is an integral part of the international standards requirements: AA1000SES Account Ability, Global Reporting Initiative (GRI SRS), International standard for integrated reporting (IR International Framework). The development of stakeholder engagement forms and methods, analysis and consideration of their requests enable timely feedback to any possible risk related to stakeholder engagement, particularly in view of social aspects and reputation. In the reporting year a ranking map was updated based on the survey conducted among top

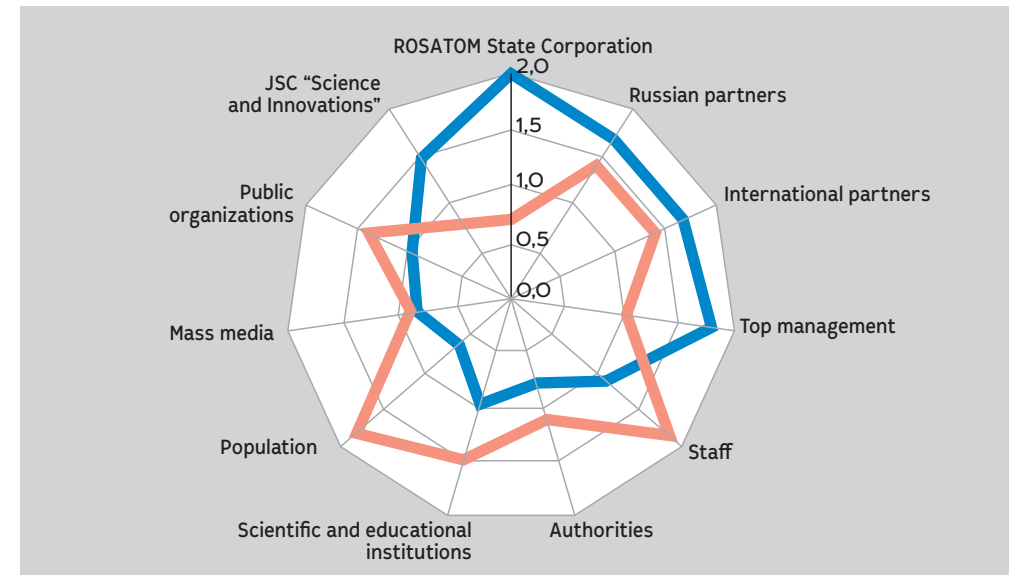
and senior managers of JSC "SSC RIAR", and representatives of the major groups of stakeholders.

The analysis of a change in the reciprocal influence between the stakeholders and RIAR is conducted from the beginning of integrated reports drafting. The analysis results show that the partners, including international partners, have a great influence on the directions of RIAR's activities (Section 2 "Strategy" and Section 4 "Management of Capital and Performance"). This is resulted from improved transparency, openness and public acceptance of RIAR activities.

Thanks to close cooperation with the stakeholders and their interest in company activities within the engagement framework we reach the understanding of perspectives of future collaboration and RIAR activity trends.

The members of RIAR Committee for Public Reporting express their gratitude to those who have shown their interest in company activities and read this Report

Ranking map of RIAR's stakeholders



— Index of the stakeholder influence on the company

— Index of the company influence on the stakeholder



5.2. Information sharing and Communication Lines

JSC "SSC RIAR" cooperates actively with interested parties: customers, partners, local media, public and environmental organizations, authorities and other stakeholders; the communication is carried out in the form of regular meetings, forums, conferences, exhibitions, roundtables and press tours, thus informing the public through all possible communication channels, including the site, corporate radio and publications.

Internal lines of communication

In 2017, JSC "SSC RIAR" continued work on improving the feedback channels: there is a forum with the possibility to an anonymous question; service "Ask Director"; messages from specially installed mail-collecting boxes are analyzed; personal methods of management are conducted. Among the existing channels of communication there is RIAR's site, radio, television panels and information boards, printed communications.



In 2017, two Information Days and two Director Days were held within the framework of the industry-level project, where the work results were summed up. The cascading of information, involvement of the corporate radio and the site, more than 90% of the Institute's employees were covered.



Additionally, every year, in the second quarter, Director of RIAR meets with the RIAR's staff to report on the results of the current activity, identify key tasks and answer questions. Thanks to the announcement of the event, interest in these meetings is traditionally high: in 2017, over 70 questions were received in various areas of activity, each of which was answered.

100 % – employees' questions are responded by Director

More information about corporate events is provided in Section 4.5 "Human Capital"



At the end of the year, RIAR's Director also initiated meetings with young employees and heads of various departments of the Institute. In particular, these meetings held in a festive atmosphere and involving an informal format of communication, summed up the results of the contest for the best engineering and technological, as well as scientific division of the enterprise.

90 % – coverage of participants in information activities



In addition to the traditional research of employees' involvement and loyalty, Chief Engineer initiated an anonymous survey among the employees. The questionnaire included questions, comments and proposals concerning the activities of both the divisions of the institution and RIAR as a whole. The survey results will be taken into account by RIAR managers in their further work.

320 press releases were issued for the website



In 2017, a project was launched to update the information panels in the RIAR's museum exposition: RIAR's specialists added the panels with new archival materials, including photography, and improved the interface. The project is planned to be fully completed in the first quarter of 2018. The interactive "RIAR Honor Board" is also used: photos and achievements of the RIAR's best employees is updated on the site twice a year — on the Institute Day and Nuclear Worker Day. Radio programs are broadcasted three times a week; there are more than a thousand radio stations on the RIAR's site. Four art and photo exhibitions were held at RIAR within the framework of cooperation with local and regional cultural organizations. The PR Department provides information support for corporate events; projects implemented by ROSATOM within the RIAR's habitat; regional events of different focus. More than 320 press releases have been prepared for the internal portal.

1 500 visitors
toured RIAR



External lines of communication

During the year, within the framework of JSC "SSC RIAR" communication activities, more than 280 printed and video materials on the activities of the enterprise were posted in federal and industry-level mass media (sites of ROSATOM and Scientific Division, industry-level Internet resources and printed publications). In general, in 2017, the Russian media recorded more than 300 references to the activities of JSC "SSC RIAR". In 2017, the number of publications increased by 13 % compared with 2016. The PR Department prepared 63 official press releases. The staff of the PR Department has always assisted in the preparation of videos for regional and federal TV channels, including foreign media. In particular, in 2017 representatives of the Japanese TV and radio company NHK were working at the RIAR's site for three days to shoot a documentary film dedicated to the ROSATOM's tenth anniversary; journalists of the federal channel "Russia" prepared materials for the television project "Horizons of Atom".

+13 % – increase
in publications for mass media



Active interaction with the industry-level press continued — newspaper and radio "Country ROSATOM", magazine "Vestnik Atomprom". In 2017, the RIAR became one of the enterprises where the ROSATOM PR department arranged a tour for regional and federal mass media. It should be noted that the journalists of Dimitrovgrad actively joined the project and toured several key enterprises of the domestic nuclear industry. For several years cooperation is held with the Information Center for Atomic Energy of the city of Ulyanovsk: educational and research projects are being implemented, excursions are organized, joint competitions are held among schoolchildren and students. In 2017, more than 1,500 people visited RIAR with excursion purposes.

280 materials were
placed in mass media

300 references to RIAR
in mass media



Our plans:

- mobile application for RIAR's staff;
- improve the visualization of information on the RIAR's official site;
- increase the citation of materials;
- expand the formats of events organized in the RIAR's museum.

Information on publications is presented in more detail in Section 4.2 "Intellectual Capital"; information on editorial and publishing activities can be found in RIAR's scientific reports (reports on the key research activities carried out in the reporting year); http://niiar.ru/annual_report

63 press-releases were issued
by the PR Department

13 issues were published



5.3. Public Reporting System

For more details related to the public reporting system development see Public Reports 2011-2016 (<http://niar.ru>)

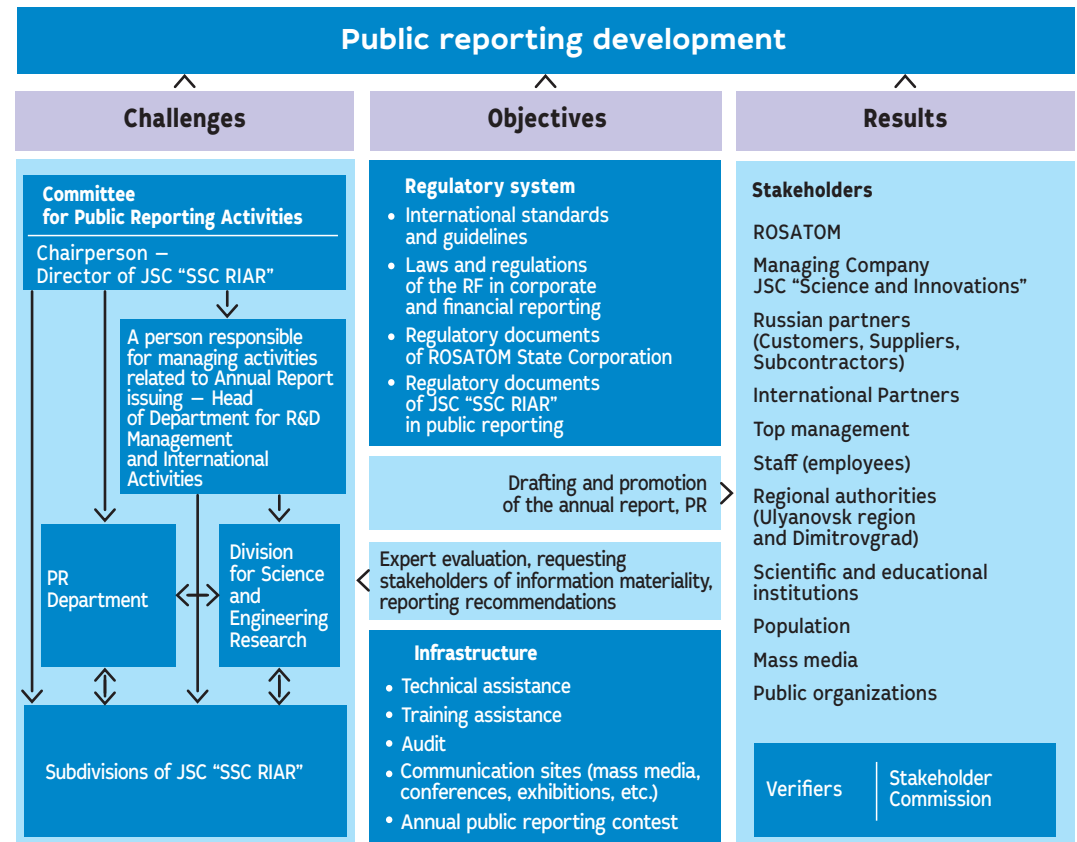
RIAR has set forth its public stance on all activity aspects to provide a high level of openness and transparency of its activities to stakeholders. During these years a public reporting system has been developed and is still being enhanced.

Functioning of the public reporting system is generally provided by the Committee for Public Reporting Activities, Division for Science and Engineering Research under the Department for R&D Management and International Activities, and PR Department. The responsibility for drafting annual public reports is not

documented in the KPI maps of all division heads. More than sixty RIAR professionals are involved in the Report development including those who are responsible for source data release.

In the course of Report drafting a great deal of work has been done both by RIAR professionals and stakeholder representatives. RIAR communicates effectively with all stakeholders by providing in time important information about all activity aspects and responding to stakeholders' requests and wishes.

Schematic representation of the public reporting system



Regulatory system of public reporting

Provision on the Stakeholder Commission in Public Reporting of JSC "SSC RIAR".

Provision on the Committee for Public Annual Reporting of JSC "SSC RIAR".

Standard of Enterprise STO 086-202-2016 "Integrated Management System of JSC "SSC RIAR". Integrated Annual Report Drafting Procedure"

For more detailed information about the activities and involvement of the Committee for Public Reporting Activities, Stakeholder Commission and authorized RIAR subdivisions in the public reporting system development please refer to Annual Report 2014 (http://niar.ru/sites/default/files/pgo2014_in_29062015_c_ssykami_0.pdf)



Public reporting improvement

Activities	2017 results
Enhancement of the regulatory system and methodology	<p>An Order on activities for drafting JSC "SSC RIAR" Annual Report 2017 has been issued. It has been approved the Report concept for the reporting year, work plan, schedule, and terms of reference to provide information for the Report.</p> <p>A work plan for the development of the public reporting system for 2017-2018 has been developed and approved.</p> <p>An Order on approval of the updated (broadened) Stakeholder Commission membership and schedule of activities involving stakeholders for 2017 has been issued.</p> <p>Activities to develop a system for information collection and treatment were carried out in order to file reporting data in accordance with the international integrated reporting standards</p>
Advanced training course for the staff	<p>Best practices of Russian and foreign annual reports have been analyzed; analytical reports of the Russian regional network in public reporting have been used in report drafting.</p> <p>RIAR has taken part in public reporting consultative workshops arranged by different ROSATOM's organizations involving other organizations' representatives engaged in public reports drafting, promotion and assessment</p>
Report drafting	<p>Conducted dialogue with stakeholder representatives on the Report key topics "in praesentia"</p> <p>Increased involvement rate of the stakeholder representatives in drafting the Report.</p> <p>Improved utility of the information presented in the Report.</p> <p>Applied new reporting formats (short presentations of Russian and English Report versions).</p> <p>Increased quality of Report design and wording.</p> <p>Switch to earlier start of the reporting campaign (July – October)</p>
Broadening the range of stakeholders involved in Report drafting	<p>The Report has been used as a reference and analytical information source for the stakeholders.</p> <p>A range of stakeholders including foreign stakeholders has been broadened in the course of the questionnaire surveys (to identify significant aspects of RIAR activities) and the Report promotion.</p> <p>Long-term partnerships have been established with major stakeholders.</p> <p>The rate of stakeholder Commission involvement in Report drafting activities has been increased.</p> <p>A list of major stakeholder groups has been updated</p>
Surveys and questionnaires	<p>Survey has been conducted among stakeholders to identify significant aspects of RIAR activities as well as reciprocal influences between RIAR and stakeholders.</p> <p>Surveys on utility and quality of the information contained in the Report have been conducted among the staff, top managers, and external stakeholders including international partners.</p> <p>Questionnaires and surveys on updating the Report priority topics have been carried out.</p> <p>Surveys have been conducted among the RIAR staff to identify the Report readability index.</p> <p>Questionnaires to identify stakeholders' expectations and wishes have been conducted.</p> <p>Testing of best practices in drafting and designing public reports as well as in the interaction with stakeholders.</p>

Activities	2017 results
Promotion	<p>Switch to earlier period of the Russian version report publication (May).</p> <p>Methods of Report short and full versions promotion among stakeholder main groups (publication of information at RIAR's official website (http://www.niar.ru/annual_report), addressed mailing, distribution at forums, scientific conferences, exhibitions, meetings with business partners, etc.) have been improved.</p> <p>Report-related information has been distributed through mass media.</p> <p>Participation in Russian public reporting contests:</p> <ul style="list-style-type: none"> • Rating of Annual Reports among ROSATOM's enterprises: <ul style="list-style-type: none"> - Diploma for creative interaction with different stakeholder; - 2nd place in the category Best Annual Public Report of ROSATOM Division Organizations; - 6th place in the overall rating; - 4th place in the category Public Reporting Efficiency; - 8th place in the nomination "The best Public Report according to the Stakeholders' opinion"; • Survey of Corporate Transparency of the Major Russian Companies 2017 conducted by the Russian regional reporting network: <ul style="list-style-type: none"> - 14th place, transparency level II (54.69 points)

Our plans

- Issue Reports according new GRI.
- Update corporate documents in public reporting taking into account new international and corporate standards and provisions of public reporting committee and stakeholders' commission.
- Increase the rate of stakeholders' involvement in Report drafting activities.
- Testing best practices in drafting and designing public reports.
- Increase the Report usefulness for readers.
- Introduce new reporting formats (short video with key events, facts and figures of the reporting period).
- Participate in international and Russian corporate reporting competitions.
- Report promotion in social media, forums, exhibitions and mass media.
- Participation of report-related specialists in workshops and testing of best practices in drafting the report (including international ones).
- Switch to earlier period of the Russian version report publication (April-May).

5.4. Engagement in Report Drafting

The stakeholders were involved in all milestones of Annual Report 2017 drafting from shaping its concept to discussions of the final draft. They had an opportunity to give their requests and recommendations as well as ask questions. In the course of Report drafting in accordance with the AA1000 SES Stakeholder Engagement Standard the following activities were arranged involving the representatives of all groups of stakeholders:

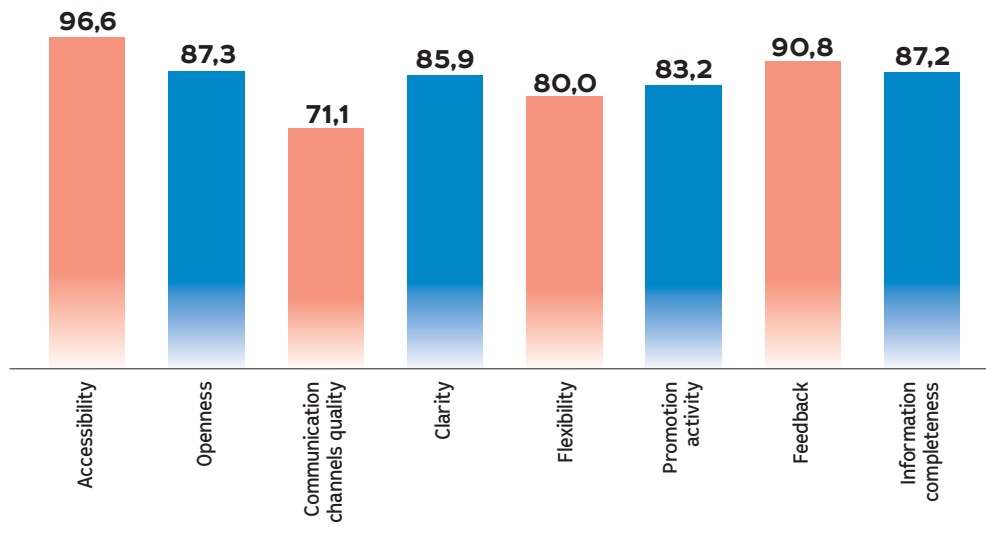
- Surveys:
 - to investigate the reciprocal influence between the stakeholders and JSC "SSC RIAR",

- to identify significant aspects of RIAR activities, (more than 100 respondents were surveyed),
- to assess the Report with respect to criteria;

- Discussion of the Report concept (in absentia, 22 participants);
- Dialogue in Report drafting (more than 1 500 participants);
- Public consultations on the Report draft (in absentia, 40 participants).

RIAR regularly informs its target audiences about all important events related to its primary activities.

Assessment of JSC "SSC RIAR" Report by stakeholders with respect to criteria, %



Concept of Annual Report 2017

During the reporting year RIAR continued discussions of the Annual Report concept in absentia. The members of the Committee for Public Reporting Activities and Stakeholder Commission participated in these discussions. The Report concept was introduced to the participants based on questionnaire surveys conducted among the external and internal stakeholders. The results of these questionnaires were used to compile a relevance matrix and a ranking map that reflects the interrelationship between stakeholders and RIAR, and take into account wishes related to Report drafting and public

For more information, please see Sub-section 5.2 "Information sharing and communication lines"

reporting system enhancement of those who were polled. The discussants voiced their recommendations that contributed to specify and finalize the Report concept. The concept was approved by RIAR order issued on December 15, 2017.

Events with stakeholders

For the first time, when drafting the Public Report for 2017, in order to improve transparency and meet the requirements of international standards, expand the coverage of stakeholders involved in the preparation and discussion of the information provided in the Report, the RIAR's management did not organize separate dialogues on public reporting issues, but brought these issues



to the discussion at the events with the participation of a wide range of stakeholders, during which the main results of the reporting year, information on the social and environmental policy and plans for the future were presented, socially significant aspects of RIAR's

activities planned for disclosure in the report, and the priority topics of the report were discussed. The members of the public highly appreciated the quality of the presented information and the level of the event organization.

Report drafting events

Event	Location	Date	Number of participants
Interregional Nuclear Medicine Forum "Health and Nuclear Medicine in the 21 st Century"	Slavsky Conference Center	22–23.11.2017	70
ROSATOM Career Day	MEPhI, Dimitrovgrad Branch	27.11.2017	600
Annual meeting of organizations participating in the Nuclear Innovation Cluster in Dimitrovgrad, Ulyanovsk Region	Slavsky Conference Center	01.12.2017	70
Meeting of the territorial tripartite commission on labor protection	Dimitrovgrad Administration Office	01.02.2018	30
Meeting within the framework of the visit of the Plenipotentiary Representative of the President of the Russian Federation in the Volga Federal District, M.V. Babich	Slavsky Conference Center	22.02.2018	100
Meeting with Deputy Minister of Industry and Trade of the Russian Federation S.A. Tsyb	Slavsky Conference Center	05.03.2018	100
Meetings of RIAR Director with the representatives of RIAR's staff	JSC "SSC RIAR"	10–24.04.2018	More than 750

Stakeholders' proposals on the Report drafting

In the course of the dialogue and Annual Report 2017 drafting (surveys and questionnaires, presentations for target audience at the exhibitions, Russian and international conferences, Universities, joint activities) stakeholders

voiced their recommendations on the disclose of this or that information, improvement of the public reporting system and interaction with stakeholders. When drafting this Report, JSC "SSC RIAR" accounted all the comments and recommendations of stakeholders participating in the dialogue.

Stakeholders' proposals accounted when drafting report 2017

Requests / proposals	Implementation
Expand the list of detailed substantive aspects by including in it innovative activities	Information is provided in Section: 4.2 "Intellectual Capital"
Reflect the information on the contribution of safety and environmental tasks solved by RIAR to the development of nuclear energy	Information is provided in Sections: 4.6 "Natural Capital", 4.7 "Occupational and Industrial Safety" and 2.4 "Risk management"
More details of environmental issues	Taken into account in the design of the Report, the information is presented in Section 4.6 "Natural Capital"
Structure the material on risk management	New structure of the material submission is presented in section 2.4 "Risk management"
Present plans and results of ensuring technological development and long-term leadership in the world market	Information is provided in Sections: 1.3 "Position in the Industry", 2.2 "Strategic Goals and Objectives", 4.3 "Production Results", 4.4 "International Activity"
Bring clear examples of projects / works of the year that demonstrate RIAR's key competencies	Information is provided in Sections: 4.1 "Results of Financial and Economic Activities", 4.2 "Intellectual Capital", 4.3 "Production Results", 4.4 "International Activities"
Expand interaction with stakeholders' representatives	Information is provided in sections 4.5 "Human Capital", 5.2 "Information and Communication", 5.4 "Engagement in Report Drafting"
Specify and expand information about communication	Taken into account. Section 5.2 "Information and Communication"
Exclude Appendix "Information on compliance with the Corporate Governance Code" and leave only a brief mention	Taken into account. Brief information on the application of certain norms of the Corporate Governance Code is given in Section 3.2 "Corporate Governance System"
Exclude Appendix "Organizational structure of JSC "SSC RIAR"	Taken into account.
Place information on significant aspects of activities into Appendix	Taken into account. Information is provided in Appendix 1
Exclude Section "Internal Control and Audit" as a separate element, and place information in Section "Control of Financial and Economic Activities"	Taken into account.



Obligations of JSC "SSC RIAR" on accounting stakeholders' requests and proposals in the preparation of Report 2017, which will be considered in the preparation of Report 2018

More detailed information on the capital and the effectiveness of its use

Correlate the verbiage of RIAR's strategic goals with those of UN sustainable development

Focus on the leading positions of RIAR among the ROSATOM enterprises

Issue a short version of the Report prior the full one

Consider the possibility of either quantitative or qualitative comparison of the results of competing companies in the Russian and international markets

Consider the possibility of issuing Report 2018 in accordance with the new GRI standards

Expand and specify information on the key performance indicators system and amount of envisaged remuneration



5.5. Public Assurance Statement

The management of Joint Stock Company "State Scientific Center – Research Institute of Atomic Reactors" (hereinafter JSC "SSC RIAR") offered us to verify integrated Annual Report 2017 (hereinafter Report) in terms of completeness and materiality of the disclosed information related to the most important issues for the stakeholders. In doing so, we and our representatives were given an opportunity to participate in discussions of the Report concept (in absentia), dialogue with stakeholders and public consultations on the Report draft during November 2017 – April 2018, and freely express our opinion on the issues under discussion. We also took part in identifying important aspects / topics to be disclosed in the Report. Our statement is based on a comparative analysis of two Report revisions: Report draft and Report final revision, as well as comments made by RIAR managers and employees during the dialogue and assurance statement. During this assurance procedure we were not focused on checking the data acquisition and analysis system, nor did we study in a special way the data and management processes. The reliability of the actual data presented in the Report was not as well the subject of public assurance. All the undersigned persons had all opportunities to freely express their opinion, and did not receive from RIAR any reward for participation in the Report assurance procedure.

Assessments, comments and recommendations

We share a common positive attitude to Annual Report 2017, its format and scope of the information provided. RIAR has prepared an informative and well-arranged document that meets our expectations. It is particularly important that the Report has been issued on a voluntary basis, and is a good illustration of a transparency and openness principle of RIAR policy, thus showing both a high level of information disclosure and willingness to conduct an open dialogue with the stakeholders on different issues related to multiple activities including safe operation of research reactors and other facilities. We consider that due to more detailed information about RIAR risk-management model, the Report could clearly reflect a control system, management strategic objectives and approaches. A full picture of RIAR activities including socially important activity aspects, social, ecological and economic impact factors, challenges and mid- and long-term plans is presented to the Report readers.

The Report has an indisputable advantage that lies in applying Russian and international standards as well as ROSATOM's unified policy in public reporting. We have a positive attitude towards the RIAR's management decision to continue issuing annual reports in Russian and in English as well as

in a short (presentation) version. It was highlighted that in contrast to public reports issued by different ROSATOM's enterprises, the Annual Report of JSC "SSC RIAR" is an official publication: it was assigned an ISBN; the information presented in the Report was edited, thus ensuring high quality of published information and fulfillment of all editing standards.

We believe that the information has been disclosed sufficiently both in terms of taking into consideration the recommendations made by the stakeholders during the Report drafting activities. In our opinion, it is an integrated Report that should present an official viewpoint of RIAR's management on all key issues and activities. The following conclusions can be drawn from our analysis.

Materiality of information

We believe that RIAR has taken into consideration international standards to identify materiality of information. After conducting a questionnaire survey among top managers and Stakeholder Commission members, and identifying the material aspects of its activity, RIAR has fully and comprehensively disclosed the relevant information in the Report. The Report provides the information important both for RIAR and its stakeholders. We consider the priority topic of the Report "Safety and Ecology" has been rightly chosen because they have been attracted the most readers' interest.

Completeness of information

In our viewpoint, the information related to the key aspects and provided

in the Report is complete and allows the readers to draw the conclusions on RIAR performance. We believe that the reduced Report scope in disclosing all material aspects complies with best international reporting practices and gives an opportunity to show a complete picture of RIAR activities. References to other information sources enable obtaining all the necessary data. At the same time, they do not unduly burden the Report with extra data presented both on RIAR's official website and in recent annual reports.

Response to requests, offers and recommendations of the stakeholders

We believe that RIAR has shown major progress in arranging stakeholder engagement and establishing the public

reporting system. We consider it a good tradition that the stakeholders become engaged at the stage of concept development before Report drafting. The stakeholders had an opportunity to voice their proposals and recommendations on information disclosure and public reporting system development. Upon the stakeholders' request RIAR has updated and provided additional information in the final revision of the Report, or it has explained the reasons why the requested information can't be disclosed. In Report drafting RIAR has shown its readiness to provide a constructive response to the stakeholders' requirements and proposals. We hope that RIAR will continue implementing the principles of good corporate conduct by developing the public reporting system and stakeholder engagement.



Annual Report 2017 assurance statement approvals page

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Rector of Dimitrovgrad Engineering and Technological Institute, Branch of NRNU "MEPhI" in Dimitrovgrad

I.A. Sagan

Deputy Head for Research Management of Ulyanovsk State University, Director of USU – RIAR Consortium

V.M. Plottsev

Chairperson of Organization of Veterans of War and Labor in Dimitrovgrad

A.D. Voronin

Head of Department for the main activities of the regional autonomous agency «Information Agency" East-Media "»

S.E. Knyaginina



LIST OF ABBREVIATIONS



AA1000 – Series of Standards are principles-based Standards and Frameworks used by a broad spectrum of organizations – global businesses, private enterprises, governments and civil societies – to demonstrate leadership and performance in accountability, responsibility and sustainability.

AA1000 APS – AccountAbility Principles Standard.

AA1000 AS – Assurance Standard.

AA1000 SES – Stakeholder Engagement Standard.

AE – an absorber element.

ARBUS – an arctic reactor unit-type facility.

ARMIR – Industry-level system for assessing the individual radiation risk of occupational exposure.

BN – fast sodium-cooled reactor.

BOR-60 – fast test reactor (60 MW).

BREST-OD-300 – inherently safe fast reactor (300 MW).

CIAE – China Institute of Atomic Energy.

CIS – the Commonwealth of Independent States.

CJSC – Closed Joint Stock Company.

E110 (3110) – alloy based on zirconium.

E110-M (3110-M) – modified Zr-based alloy (e.g., with increased O and Fe content).

E125 (3125) – Zr-based alloy with increased Nb content.

E635-M (3635-M) – modified Zr-based alloy (e.g., with optimized Nb and Fe content and decreased Sn content).

EBITDA – Earnings before Interest, Taxes, Depreciation and Amortization.

EFA – experimental fuel assembly.

EK181 (ЭК181) – heat-resistant ferritic-martensitic Cr-containing steel.

EMS – Environmental Management System .

EP823-Sh (16Kh12MVSFBR-sh) (ЭП823-Ш (16Х12МВСФБР-ш)) – heat-resistant highly-alloyed steel for specifically-coated thin-wall tubes and pins, and special-purpose components.

FA – fuel assembly.

FA-2 – fuel assembly with a rigid frame made of twelve spacer grids welded on guide tubes.

FA-2M – FA-2 upgraded version containing shortened end pieces, extended core fuel column, enhanced spacer grids to reduce hydrodynamic resistance (the thirteenth grid in the bottom fixes the beam in the hydrodynamic instability area); it is intended for eighteen-month fuel cycle.

FA-5M – new-generation fuel assembly with increased lifetime and burnup having highly-precise Zr arch-type spacer grids to provide increase bending stiffness.

FA-KVADRAT – fuel assembly with square spacer grids and UO₂ fuel increased in U-235 up to 5 % and added Gd.

FAA – fuel assembly of an alternative design with a rigid skeleton formed by six corners and spacer grids. It has an increased fuel burn-up, improved operational reliability and enhanced bending stiffness.

FAA-ALFA – fuel assembly consisting of eight spacer grids of increased height and optimized cell geometry and with fuel rods with thinned cladding and no-hole pellets.

FAA-PLUS – FAA to be operated for 18-month fuel cycle at a power achieving 104 % from the nominal one.

FE – fuel element.

"FBK", LLC – Limited Liability Company "Financial and Accounting Consultants".

FSUE – Federal State Unitary Enterprise.

FSUE 'NII NPO "Luch" – Federal State Unitary Enterprise 'Research Institute – Research and Production Association "Luch".

FSUE 'PA "Mayak" – Federal State Unitary Enterprise 'Production Association "Mayak".

GOST – a set of state standards of the Russian Federation.

GOST RV – a set of state military standards of the Russian Federation.

GRI – Global Reporting Initiative.

HTGR – high temperature gas-cooled reactor.

IAEA – International Atomic Energy Agency.

IIRC – International Integrated Reporting Council.

INES – International Nuclear Event Scale.

International <IR> Framework – International Standard Integrated Reporting.

ISBN – International Standard Book Number.

ISEA – Institute of Social and Ethical Accountability.

ISO – International Organization for Standardization.

JSC – Joint Stock Company.

JSC "Afrikantov OKBM" – Joint Stock Company "Afrikantov Experimental Design Bureau for Mechanical Engineering".

JSC "ATA" – Joint Stock Company "Alyanstransatom".

JSC "Atomenergoprom" – Joint Stock Company "Atomic Energy Power Corporation".

JSC "OTEK" – Joint Stock Company "Integrated Thermal Power Company".

JSC "Rosenergoatom Concern" – Joint Stock Company "Concern for Generation of Electric and Thermal Power at NPPs".

JSC "SSC RIAR" – Joint Stock Company "State Scientific Center – Research Institute of Atomic Reactors".

JSC "TVEL" – Joint Stock Company "TVEL".

JSC "VNIINM" – Joint Stock Company "A.A. Bochvar High-Technology Research Institute for Inorganic Materials".

LLC – Limited Liability Company.

LTIFR – Lost Time Injury Frequency Rates.

MBIR – a multi-purpose fast reactor.

'MC "UES", LLC – Limited Liability Company "Management Company "Uralenergostroy".

MIR – a multi-loop research reactor for material testing.

MOX-fuel – mixed uranium plutonium oxide fuel.

NNEGC "ENERGOATOM" – State Enterprise "National Nuclear Energy Generating Company "Energoatom".

NOPAT – Net Operating Profit after Tax.

NPP – a nuclear power plant.

NRB – Radiation safety norms.

NRHF – a nuclear- and radiation-hazardous facility.

NSR – nuclear safety regulations.

OGRN – primary state registration number.

OST – a set of industry-specific standards.

PJSC – Public Joint Stock Company.

PJSC "IDGC of Volga" – Public Joint Stock Company "Interregional Distribution Grid Company of Volga".

PJSC "MSZ" – Public Joint Stock Company "Mashinostroitelny Zavod".

PJSC "TGC-14" – Public Joint Stock Company "Territorial Generating Company No.14".

PRC – the People's Republic of China.

PUREX – Plutonium and Uranium Regeneration through Extraction.

PUREX process – plutonium-uranium recovery by extraction; nuclear fuel recycling procedure.

PV – water-cooled loop.

PVK – water-cooled boiling loop.

QMS – Quality Management System.

R&D – Research and development.

RBMK – a high-power channel-type reactor.

RBT – a pool-type reactor.

RS – radiation safety.

RSCI – Russian Science Citation Index.

PWR – pressurized water reactor.

REMIX (regenerated mixture) – Russian innovative nuclear fuel for the VVER type reactors; it is produced from a non-separated mix of recycled uranium and plutonium from reprocessing used fuel.

RF – Russian Federation.

RIAR – Research Institute of Atomic Reactors.

RITM – modular integral reactor.

Rosatom State Corporation – Rosatom State Nuclear Energy Corporation.

Rostekhnadzor – Federal Environmental, Industrial and Nuclear Supervision Service of Russia.

RW – radioactive waste.

TIN – a taxpayer identification number.

SAP – System Analysis and Program Development; German Company producing software for organizations; the most famous is SAP ERP.

SFA – spent fuel assembly.

SHF – super-high frequencies.

SM – high-flux vessel-type pressurized-water reactor; according to its name in Russian it is translated as the most powerful reactor due to a high density of thermal neutron flux.

Solid Works – computer-aided design systems software for automation of works of an industrial enterprise at the stages of design and technological preparation of production.

STO – company standard.

TchS139 (20Kh12NMVBFAR) (4C 139 (20X12HMB5ΦAP)) – high-Cr-content ferritic-martensitic steel to manufacture bars, pipe materials and tubes used for core components of fast and fusion reactors.

USSR – Union of Soviet Socialist Republics.

UDC – universal decimal classification of books used worldwide; its index is an obligatory imprint element .

"Uralenergostroy", LLC – Limited Liability Company "Managing Company "Uralenergostroy".

USA – United States of America .

VAT – value added tax.

VK-50 – boiling water reactor.

VVER – water-water energy reactor.

GLOSSARY



Absorbing element – a) an assembling unit of a nuclear reactor that has a strong sealed cladding, usually in the form of a cylinder or ball, and an absorbing material embedded into it to control the reactor reactivity; b) a key construction part of a control rod that contains absorbing material.

Activity – a measure of radionuclides radioactivity equal to the number of radioactive decays occurred in the given amount of a radionuclide per time unit.

Brownfield – used to refer to an area of land in a town or city that was previously used for industry and where new buildings can be built.

Business model – a plan for the successful operation of a business, identifying sources of revenue, the intended customer base, products, and details of financing.

Closed nuclear fuel cycle – a nuclear fuel cycle, in which spent nuclear fuel is reprocessed to recover uranium and plutonium to refabricate nuclear fuel.

Discharge of radioactive substances – controlled discharge of radionuclides to tanks with liquid radwaste at a nuclear facility.

Division – a business entity that has an established procedure of relationships with the corporation; according to this procedure this entity is defined as a division managing other business entities within the management circuit of such division.

Enrichment – a) is a content of atoms of a specific isotope in a mixture of isotopes of the same element if this content increases the fraction of this isotope in a mixture occurring in nature (expressed in percentage); b) process resulting in the increase of a specific isotope in a mixture of isotopes.

Enterprise value – is an economic measure reflecting the market value of a business. It is a sum of claims by all claimants: creditors (secured and unsecured) and shareholders (preferred and common). Enterprise value is one of the fundamental metrics used in business valuation, financial modeling, accounting, portfolio analysis, and risk analysis.

Fast neutrons – neutrons with kinetic energy exceeding the given value. In reactor physics this value is usually equal to 0.1 MeV.

Fuel assembly – a set of fuel elements (rods, rodlets, plates, etc.) fixed together by a spacer grid and other structural components that are non-dismountable during the transportation and irradiation in a reactor. Fuel assemblies are inserted in the nuclear reactor core.

Fuel element – the smallest structural unit of a reactor or fuel assembly containing nuclear fuel and/or breeding material and located either in the reactor core or breeding zone to produce thermal energy and transfer it to coolant as well as accumulate secondary nuclear fuel.

Global Reporting Initiative (GRI) – a reporting system accepted in international practice and concerning economic, environmental and social efficiency; it is based on Sustainability Reporting Guidelines.

Greenfield – An area of agricultural or forest land, or some other undeveloped site earmarked for commercial development or industrial projects.

Hirsch index (h-index) is an author-level metric that attempts to measure both the productivity and citation impact of the publications of a scientist or scholar.

IAEA Safeguards – a system of inspection and verification of the peaceful uses of nuclear energy established under the international non-proliferation policy and supervised by the International Atomic Energy Agency.

Impact Factor (IF) – is a measure reflecting the yearly average number of citations to recent articles published in that journal.

Internal control and audit system – is a process for assuring achievement of an organization's objectives in operational effectiveness and efficiency, reliable financial reporting, and compliance with laws, regulations and policies. A broad concept, internal control involves everything that controls risks to an organization.

International Standard Book Number (ISBN) – a unique identification number of an edition used worldwide in book business, publishing and librarianship.

Isotopes – variants of atoms and nuclei of a chemical element which have the same atomic (ordinal) number and different mass numbers.

Mission – one of the basic terms used in strategic management; the main objective of a company, reason for its existence from the viewpoint of meeting customers' needs, competitive advantages and motivation of company's employees.

MOX fuel – a nuclear fuel that contains several oxides of fissile materials.

Natural radiation background – ionizing radiation formed by space and ionizing radiation of natural radionuclides.

Nuclear fuel – a material containing fission radionuclides that allows a nuclear chain reaction loaded in a nuclear reactor.

Nuclear fuel cycle – a chain of operations to ensure nuclear reactor operation from mining of uranium to radwaste disposal.

Nuclear medicine – a branch of medicine involving the application of radioactive pharmaceuticals in diagnosis and treatment of a disease; methods of remote X-ray therapy.

Nuclear power engineering – a branch of power engineering concerned with the application of nuclear energy for heat and electricity supply purposes.

Nuclear safety – a general term describing the characteristics of a nuclear facility under normal operation and accidental conditions to minimize the radiation exposure on personnel, population and environment within the admissible limits.

Operator – an organization that has an approval from the regulatory authorities to operate a nuclear facility.

Radiation burden – the total of individual radiation doses obtained or to be obtained in the course of operation, maintenance, repair, replacement or dismantling of nuclear facility equipment.

Radiation monitoring – obtaining data on radiation situation in an organization, environment and people irradiation levels (includes dosimetric and radiometric control).

Radiation safety – activities to minimize radiation exposure on personnel and population to the lowest possible values using the means acceptable to the public in order to prevent early radiation effects and minimize late radiation effects to the admissible level.

Radioactive waste – is waste that contains radioactive material. Radioactive waste is usually a by-product of nuclear power generation and other applications of nuclear fission or nuclear technology, such as research and medicine. Radioactive waste is hazardous to all forms of life and the environment, and is regulated by government agencies in order to protect human health and the environment.

Radionuclide – an atom with a specific mass number, atomic number and nuclei energy state that has the lifetime sufficient for observations.

Release of radioactive substances – release of radionuclides in the atmosphere as a result of a nuclear facility operation, from a radiation source or nuclear materials storage facility.

Reprocessing of spent nuclear fuel – a set of chemical and technological processes to remove fission products from spent nuclear fuel and regenerate fissile material for re-use.

Reprocessing of radioactive waste – process operations to change the aggregate state and/or physical and chemical properties of radioactive waste to convert them to conditions acceptable for transportation, storage and/or disposal.

Research reactor – a nuclear reactor intended for generating data on reactor physics and technologies required to design and develop reactors of such type or their components.

Risk management – a process to make and implement management decisions focused on minimizing a probability of unfavourable results and potential losses caused by its implementation.

Russian Science Citation Index – is a national information and analytical system accumulating more than 2 million publications of Russian authors, as well as information on citing these publications from more than 2,200 Russian journals; the main criterion for assessing is the relative index of citations of articles published in a particular journal – impact factor.

Safety of nuclear facilities – a property of nuclear facilities to provide radiation safety both under normal operation and in case of accident for the personnel, population and environment within the designed limits.

Science Citation Index – is the scientifically accepted indicator of the significance of the scientist's works, which is the number of references to scientific publications in the refereed scientific periodicals.

Science Index – is the information-analytical system built on the basis of data from the Russian Science Citation Index and offering a whole range of additional services for authors of scientific publications, scientific organizations and publishing houses.

Scopus – is the world's largest multi-disciplinary bibliographic and abstract database, created by the Elsevier publishing corporation; one of its main functions is information on quoting built into the search system.

Scopus covers more than 18 thousand scientific journals from 5 thousand scientific publishing houses of the world, including about 200 Russian magazines, 13 million patents of the USA, Europe and Japan, materials of scientific conferences. Scopus does not include publications on humanitarian disciplines and art, much more reflecting natural science and technology in percentage terms (83 %).

SMART – is a mnemonic abbreviation used in management and project management to determine goals and objectives:

S – specific;

M – measurable;

A – attainable;

R – relevant;

T – time-bounded.

The very word "smart" in Russian means "very clever". Thus, the correct goal setting means that the goal is concrete, measurable, achievable, meaningful and correlates with a specific time frame.

Stakeholder – physical and/or legal persons and groups of persons who affect or can be affected by organization's activities.

Supply chain – system of relations with counterparties (suppliers, contractors and consumers), which is an integral component of the business model of the enterprise and has a direct impact on the process of creating value (value added) in the short, medium and long term.

Web of Science – is a multi-disciplinary abstract-bibliographic database of the Institute for Scientific Information (ISI), which is based on: Science Citation Index Expanded (natural sciences) – the citation index for natural and exact sciences (natural sciences, technical and medical journals); Social Sciences Citation Index (social sciences) – index citation in social sciences (journals in economics and social sciences); Arts & Humanities Citation Index (Humanities) – the index of citation on art and humanities (magazines on archeology, architecture, all kinds of art, literature, history, philosophy, religion).



Feedback Questionnaire

Dear Reader,

You have read the public annual report of JSC "SSC RIAR" intended for a wide audience of stakeholders. It is highly important to us to receive your opinions. Your comments and suggestions will contribute to improving the quality, informativity and relevance of our future reports.

We would appreciate your sending the completed questionnaire by mail (9, Zapadnoye Shosse, Dimitrovgrad, Ulyanovsk region, 433510, Russian Federation) or e-mail adm@niiar.ru, marked "Public Report".

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Please, specify sections useful and essential for you

What information would you add to the next Report?

Your comments and recommendations:



Information Edition

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