JOINT STOCK COMPANY
"STATE SCIENTIFIC CENTER –
RESEARCH INSTITUTE
OF ATOMIC REACTORS"

ANNUAL REPORT
2013

Dimitrovgrad
2014

UDC 621.039=161.1=111

JSC "SSC RIAR" Annual Report 2012 [Electronic resource]. – Electronic data sheet (512 MB) – **Dimitrovgrad: JSC "SSC RIAR", 2013.** – 426 pages. – 1 RAM disk (CD-ROM); 12 cm. – Hardware requirements: PC at least equal to Pentium I; 32 MB RAM; free space on HDD 16 MB; Windows 95/98/XP/7/8; Adobe Arcobat Reader; disk drive CD-ROM 2x and higher; mouse. – Heading from the title screen.

The Report covers the key financial, economical and production results of JSC "SSC RIAR" activities for the year of 2012 as well as the results of the sustainability-related activities. The Report also describes the management approaches allowing prominent results to be achieved as well as medium- and long-term plans which are prognosticative and may differ from actual ones. The Report has been issued on a voluntary basis and is addressed to a wide audience.

Approved by the Annual General Meeting of Stockholders of JSC "SSC RIAR" (Protocol as of June 30, 2014, #27).
Pre-approved by the Resolution of Board of Directors of JSC "SSC RIAR" (Protocol as of May 29, 2014 #210).

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CONTENTS

CONTENTS

1 INFORMATION ABOUT REPORT

INFORMATION ABOUT REPORT AND ITS ISSUING

1.1.

The present Report is the third integrated public report that covers financial and non-financial aspects of the Joint Stock Company "State Scientific Center – Research Institute of Atomic Reactors" (JSC "SSC RIAR", Company, Institute) performance. The Report has been issued on a voluntary basis and is addressed to a wide audience.

REPORT OUTLINE

The Report covers the whole scope of the JSC "SSC RIAR" activities and to maximum discloses information about the Company, state and commercial secrets being kept.

The Report is based on the activity results for the year of 2013 and presents the dynamics of key indicators for a three-year period as well as contains plans and purposes for the year of 2014 over the medium and long term.

International and Russian standards and recommendations applied to issue the Report

- Federal Law of the Russian Federation No. 208-FZ "On Joint Stock Companies" dated December 26, 1995;
- Order of the Federal Service for Financial Markets No. 11-46/pz-n "On Approval of the Provision on Disclosure of Information by Registrable Security Issues Bodies" dated October 04, 2011;
- Global Reporting Initiative Guideline (GRI, version G3.1) [1];
- Recommendations of the International Council of International Reporting;[2]
- Stakeholder Engagement Standard AA1000SES (Institute of Social and Ethical Accountability) [3]
- ROSATOM's policy in public reporting [4];

[1] Global Reporting Initiative Guideline – "EcoRussia.info 2009–2011": http://ecorussia.info/ru/ecopedia/global-reporting-initiative. Last accessed date: 29.05.2014.

[2] International Integrated Reporting Structure Draft. – IIRC web-site. – 40p.: http://ir.org.ru/attachments/article/59/Consultation-Draft-of-the-InternationalIRFramework-Russian.pdf. Last accessed date: 29.05.2014.

[3] Stakeholder Engagement Standard – London: Institute of Social and Ethical Accountability. – 58 p.: http://www.urbaneconomics.ru/download.php?dl_id=2526. Last accessed date: 29.05.2014.

[4] ROSATOM's policy in public reporting – ROSATOM web-site – 14 p.: http://www.rosatom.ru/resources/8673558046e9bff89511fd66e555bee1/Policy_11.pdf. Last accessed date: 29.05.2014.

- Standards in public annual reporting of ROSATOM's enterprises;
- ROSATOM's Code of Conducts No.39 approved by the Board of Directors on October 26, 2009[5];

The integrated Report covers the key financial, economical and production results of JSC "SSC RIAR" activities for the year of 2013 as well as the results of the sustainability-related activities. The Report also describes the management approaches allowing prominent results to be achieved and efficiency to be improved in accordance with the ROSATOM's strategic objectives.

The Report contains medium- and long-term plans which are prognosticative and may differ from actual ones since their implementation depends of the economical, political and legal factors being beyond the JSC "SSC RIAR" liabilities (world's economical and political situation, conditions of the market, changes in the tax, customs and environmental legislation, etc.).

Priority topics of the Report:

- JSC "SSC RIAR"s input to the nuclear power engineering development;
- JSC "SSC RIAR" and company habitat: unity of purposes of the sustainable development.

The priority topics of the Report have been selected by the results of survey conducted among the members of the JSC "SSC RIAR" Administration and stakeholders' representatives.

The priority topics are considered in Section 3 "Results of Key Activities" and Section 4 "Results of Sustainable Development" as well as in other Sections of the Report.

Based on the experience in issuing the recent Public Annual Reports, the quality of Public Annual Report 2013 has been significantly improved.

The Report quality has been improved due to:

- analysis of the best Annual Reports of nuclear engineering enterprises;
- improvement of staff qualification engaged in public reporting;
- more information about the results of key activities and social politics;
- new Report design;
- Application of the IIRC recommendations.

[5] ROSATOM's Code of Conducts. – ROSATOM web-site – 16 p.: http://www.rosatom.ru/wps/wcm/connect/rosatom/rosatomsite/resources/232808004351208db8a7fec5687e4a83/kodeks_091209.pdf. Last accessed date: 29.05.2014.

Comparative characteristics of Public Annual Reports

Criterion	Public Annual Report	
	2012	2013
Number of GRIs involved	23	32
Application level	C	B

Interaction with stakeholders

According to the *ROSATOM's Policy in the Public Reporting*, the principle of interaction with the stakeholders was implemented when preparing the Report. "JSC SSC RIAR" has the following target audience:

- ROSATOM;
- JSC "Science and Innovations";
- Partners (Customers, Suppliers, Subcontractors);
- Employees and Administration of JSC "SSC RIAR";
- Federal and regional authorities and local government authorities;
- Regulatory bodies;
- Public organizations;
- Educational organizations of different levels;
- Local population;
- Mass media.

Three Public Hearings were held when preparing the Report. Chapter 5 "Interaction with Interested Parties" covers in detail the interaction with interested parties and reporting materials.

LEVEL OF INFORMATION DISCLOSURE

The Report is prepared in accordance with the recommendations of the Sustainable Development Reporting Guideline: there is analysis of significant impacts in the context of the sustainable development; applied performance indicators correspond to version GRI G.31; information disclosure corresponds to level B.

The reliability of information published in the Report is confirmed by:

- Conclusion of audit commission;
- Audit of annual financial reports done by an independent auditing company;

The Report is issued both in Russian and in English and can be found on JSC "SSC RIAR" web-site (http://www.niiar.ru).

Statement on liability limit for publishing prognostic information

Some information published in the JSC “SSC RIAR” Public Annual Report may contain prognosticative statements regarding future events or financial indices of the Institute.

The following verbiage is used for such prognosticative statements: *to plan, to expect, to suppose, to assume, to estimate, to intend, will, possibly, probably, may* etc. These statements are prognosticative and may significantly differ from the actual events or results.

JSC “SSC RIAR” does not intend to correct the above-said statements with the purpose to reflect events taken place after either such statements or unforeseen events and does not bear any responsibility to introduce such corrections.

There are many factors, including general economical conditions, competitive environment, activity-related risks, change of situation in the nuclear power engineering, which may cause a significant difference between the real events and prognosticative statements done by JSC “SSC RIAR”.

It should not be relied on the prognosticative statements done in this Report regarding any agreement and related investment decision.

1.2. APPEAL OF DIRECTORS

DUB Alexei V.

Director General of JSC
"Science and Innovations",
managing company of JSC "SSC RIAR"

Dear Colleagues, Partners and Readers!

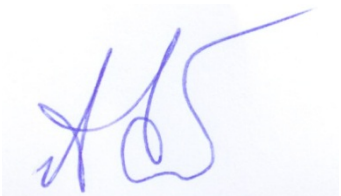
JSC "SSC RIAR" is a unique experiential site of ROSATOM. RIAR's research reactors, up-to-date material testing laboratory, mature radiochemistry and high-skilled personnel allow us to implement complicated and ambitious projects ranging from investigating characteristics of structural materials to justifying the core components and fuel performance for both today and next generation nuclear engineering.

It is the RIAR's site, which has been chosen to implement ROSATOM's important research projects; the following facilities are going to be constructed: a multi-purpose fast reactor (MBIR) – a future International Center of Excellence and a poly-functional radiochemical research complex to test fuel cycle back-end technologies.

In 2013, JSC "SSC RIAR" confirmed its status of the State Scientific Center and became the base organization of the Commonwealth of Independent States Research Reactor Coalition.

As of the end of the year, the increase in RIAR's revenue achieved 30 % not only due to the Federal Target Programs support but also due to the widening the scope of applied research and increase in the isotopes production. RIAR's first steps on the Molybdenum-99 world's market showed it as a reliable supplier of the unique chemical.

I am sure that the Institute has a solid footing for the further development that is demonstrated by its recent research and production performance.



A.V. Dub

PAVLOV Sergey V.

Director General of JSC “Science and Innovations”, managing company of JSC “SSC RIAR”

Dear Ladies and Gentlemen!

For your attention is Public Annual Report of JSC “SSC RIAR”, the largest research nuclear center in Russia that carries out activities within the whole scope of civil nuclear engineering: fabrication of nuclear fuel, its tests in nuclear reactors, material science and radiochemical examinations and reprocessing of spent nuclear fuel.

All the priority tasks that Institute faces are covered by the strategy of the Russia’s nuclear engineering development, which is aimed at the creation of a new technological platform based on fast reactors and closed fuel cycle. These technologies will significantly reduce the amount of spent nuclear fuel and make it possible to dispose radwaste with the background close to the natural one. ROSATOM has entrusted our Institute to be one of the key experimental sites to carry out research and tests aimed at the creation of a new technological platform of Russia’s nuclear engineering.

The results of the year 2013 show that RIAR not only coped with tasks faced but also demonstrated a significant potential for further development. Over the past year, the manpower productivity grew by more than 25% and the involvement factor increased by 12%.

At present, RIAR’s employees are focused on the implementation of important projects, namely, construction of the research reactor MBIR and poly-functional radiochemical complex. We understand that the implementation of these projects is of great importance for the future of both Institute and Russia’s nuclear engineering.

This Public Annual Report tells you not only about our research achievements and production results but also about our social politics toward our employees and development of the company habitat. Improving work quality and social protection is as important for us as providing safe operation of reactor facilities and efficiency of the RIAR’s activities.

S.V. Pavlov

1.3. KEY RESULTS

Key results regarding the core activities and those related to the sustainable development, %

Indicator	Value
Total revenue growth	32
Labor efficiency growth	44
Wage growth	25

Performance indicators for 2011-2013

Indicator	Year				Relation 2013/2012, %
	2011	2012	2013	2014*	
Sales proceeding, mn RUR	3 120.9	4 458.8	5 882.9	5 040.2	132
Net asset, mn RUR	3 995.7	6 482.6	8 277.4	1 2125.9	128
Labor efficiency, thousand RUR/man	661	928	1 335	1 266	144
Including insource	549	683	1 014	1 011	148
Average headcount, persons	4 839	4 882	4 430	3 990	91
Average monthly salary, thousand RUR	19.1	24.1	30.1	32.3	125

* The information is of forward-looking character.

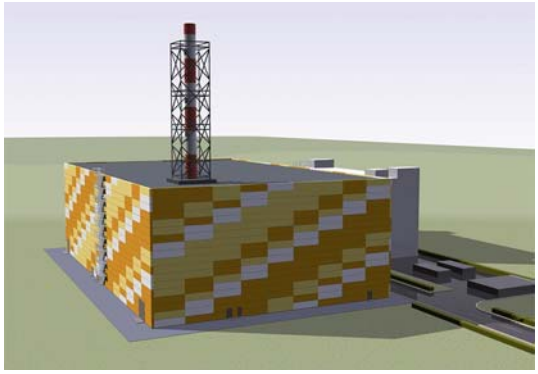
KEY EVENTS

1.4.

February

On February 1, The RF Presidential Council for Grants took a decision to award Russian young specialists and post-graduates. RIAR's researches Anna Belyaeva and Artem Varivtsev became the finalists and awardees of the RF President Award.

April



On April 5, the Federal Autonomous Establishment "General Office of State Expertise" issued a positive conclusion about the design documents of the poly-functional radiochemical complex. JSC VNIPIET fulfilled this work for RIAR within a short time. The construction of the poly-functional radiochemical complex is one of the key projects implemented under the Federal Target Program "Nuclear Power Technologies of New Generation for the Period 2010–2015 and until 2020".

RIAR has started the second project stage – development of design documents for the construction.

On April 16, JSC "SSC RIAR" and Dimitrovgrad Branch of MEPhI signed a memorandum of cooperation.

The document declares interest of the Parties involved in the mutually beneficial cooperation, innovative development, creation of breakthrough technologies for nuclear engineering and development of the scientific potential.

May

On May 27-31, RIAR hosted the X Russian Conference on Reactor Material Science. Dimitrovgrad welcomed specialists from practically all institutes engaged in research and development of technologies and materials in the field of reactor material science. The number of papers presented – 178 – was the record throughout the Conference history.

On May 31, The Council of the CIS Government Executives entrusted JSC “SSC RIAR” to be the base organization in the frame of information exchange on the CIS research reactors safety. The priority activities of the base organization are the inter-governmental exchange of information and implementation of projects for peaceful use of nuclear energy within CIS to provide safe operation of the nuclear facilities of the member-states.

June

On June 4–7, RIAR hosted the meeting of the Commonwealth of Independent States Research Reactor Coalition. Participants from Russia, Belorussia, Kazakhstan, Ukraine, Uzbekistan, Tajikistan, Kirgizstan and IAEA took part in the meeting.

July

On July 5, JSC “SSC RIAR” held a meeting on molten salt reactors under the International Forum “Generation-IV”.

The long-term result of the meeting is that Russia changed its status of an associate member into a full-scale participant to take part in managing the International Forum “Generation-IV” on molten salt reactors.

In July, RIAR’s young specialists became the awardees of the Contest “Innovative Leader in Nuclear Engineering”, which was held under the “Boost-2013 Innovative Forum. Irina Butkalyuk, a researcher from Radionuclide Sources & Radiochemicals Division, became the Contest awardee for the second time. She presented a paper “Ways to Extract Samarium-152 from Gadolimium-153 Production Waste. Artem Varivtsev, senior researcher from Research Reactors Complex, got an incentive award for his paper “High-Effective Neutron Protection for Fast Reactors”.

September

On September 2, acceptance of the technical upgrading of the JSC “SSC RIAR” fuel production facility was carried out. The ROSATOM Acceptance Commission stated that the production site meets the design, sanitary and epidemiological requirements as well as ecological, fire and building codes and standards. A large-scale work on the technical upgrading of the JSC “SSC RIAR” fuel production facility was completed so as to produce MOX fuel rods and fuel assemblies for reactors BN-600 and BN-800. The work was done under the Federal Target Program “Nuclear Power Technologies of New Generation for the Period 2010–2015 and until 2020”.

On September 20–22, Dimitrovgrad hosted Forum “Energy of Generation” held in the frame of Festival “New Horizons”. The Forum focused on the realization of potential in profession and career of the RIAR young specialists and students from the Dimitrovgrad Branch of the Moscow Engineering and Physics Institute who will be employed by RIAR.

РОСОБОРОНЗАКАЗ, ФСВТС РОССИИ, РОССТАНДАРТ,
ГОСКОРПОРАЦИЯ «РОСАТОМ», РСПП, АНО «ВОЕННЫЙ РЕГИСТР»

СИСТЕМА ДОБРОВОЛЬНОЙ СЕРТИФИКАЦИИ
«ВОЕННЫЙ РЕГИСТР»

Свидетельство № РОСС RU.О547.04ГШ01

Орган по сертификации систем менеджмента качества
Автономная некоммерческая организация
«Институт испытаний и сертификации вооружения и военной техники»
(наименование органа по сертификации,
(115184, г. Москва, ул. Б. Татарская, д. 35, № ВР АА.1.02.0070-2011)
адрес, № Свидетельства о регистрации)

СЕРТИФИКАТ СООТВЕТСТВИЯ

№ ВР 02.1.6513-2013

Срок действия с «27» сентября 2013г. по «30» сентября 2015г.

Выдан Открытому акционерному обществу
«Государственный научный центр – Научно-исследовательский
институт атомных реакторов»
(ОАО «ГНЦ НИИАР»)
(полное наименование организации)
433510, Россия, Ульяновская область, г. Димитровград-10
(юридический адрес)

Сертификат удостоверяет, что система менеджмента качества, распространяющаяся на
проектирование, разработку (выполнение НИОКР), транспортирование
продукции для оборонных целей в области использования атомной энергии
(наименование видов деятельности организации)
в соответствии с кодами ЕКПС: гр. 11, 4470, 4480, гр. 97
[указывают классификаторы (ЕКПС, ОКП или ОКВЭД) и
соответствующие коды продукции по этим классификаторам]
соответствует требованиям ГОСТ РВ 0015-002-2012
(стандарты, на соответствие которым проводилась сертификация СМК,
другие нормативные документы)

Дополнительная информация _____
(заполняется при необходимости описания сделанных исключений)

ВР № 113074

Руководитель органа по сертификации СМК (подпись) А.Г. Федотов (инициалы, фамилия)

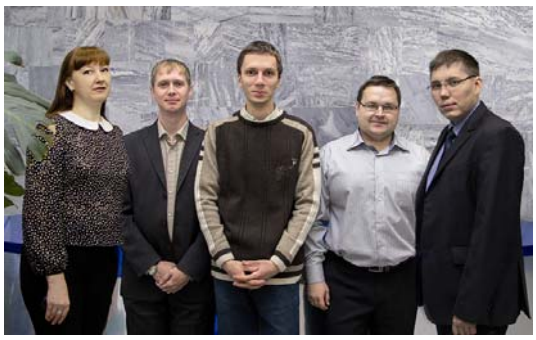
On September 27, experts from the Independent Non-Commercial Organization “Institute for Testing and Certification of Military Equipment” carried out an audit of the JSC “SSC RIAR” Quality Management System”. By the audit results, a Certificate was issued to confirm that the RIAR QMS meets the requirements of the State Military Quality Standard GOST RV 0015-002-2012.

October

On October 1, public hearings were carried out devoted to the construction of a new residential district for the RIAR's employees. The decision about it was taken at the joint meeting between the Government of Ulyanovsk region and ROSATOM representatives in 2010.

On November 19, young specialists from JSC "SSC RIAR", Pavel Butkalyuk and Eugene Makarov, were awarded by grants by the results of the Annual Contest of ROSATOM aimed to support young scientists.

November



On November 11, the JSC "SSC RIAR" employees became awardees of the Contest "Engineer-2013". This Annual Contest is held by the Ministry for Strategic Development and Innovations of the Ulyanovsk region together with the Ulyanovsk Scientific and Engineering Association. Larisa Ermoleva, Marat Latypov and Yury Naboishchikov became the awardees of category "Professional Engineers". Anton Dolgov and Semen Mainskov became the awardees of category "Youth's Art of Engineering".

On November 25–29, JSC "SSC RIAR" hosted the International Workshop to exchange experience in stress tests at research reactors performed after the Fukusima-1 accident. The Workshop was also devoted to the extension of the research reactors lifetime. The Workshop participants were reactor operators from ROSATOM, the Czech Republic, Ukraine and Uzbekistan

December

On December 18, JSC “SSC RIAR” was awarded by the All-Russia Prize “National Quality Brand”. RIAR was awarded a Title of Honor “Guarantor of Quality and Reliability”; Director Sergey Pavlov got a Badge of Honor “For the Quality of Managerial Decisions”. The National Prize “National Quality Brand” marks the merits and achievements of companies producing high-quality and competitive goods and improving the quality of production and services to maximum satisfy the customers.

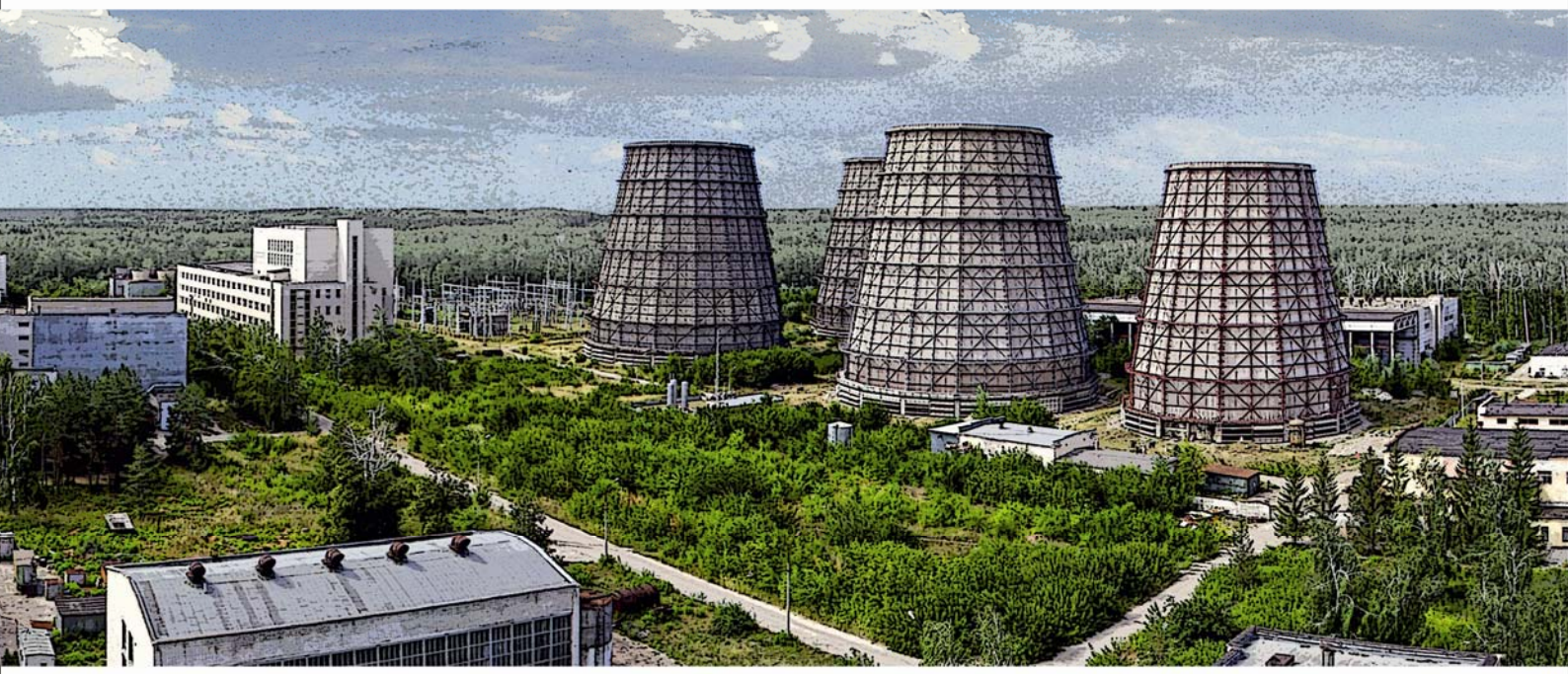
On December 26, JSC “SSC RIAR” became the awardee of the ROSATOM’s Contest-2013 devoted to the Year of Environmental Protection. At the Public Council Meeting, ROSATOM Director General Sergey Kirienko handed out RIAR’s Director an award “Ecologically Reference Organization of the Innovations Management Block” and thanked RIAR for the activities it carries out to protect the environment.

AWARDS HONORED FOR THE REPORTING PERIOD

In 2013, the RIAR's employees were honored with the following awards for high achievements in work and research activities, contribution to the personnel training and on the occasion of the professional holidays:

- Industry Awards:
  - Badge of Merit "Academician I.V. Kurchatov" of the 4th grade – 6 employees;
  - Badge of Merit "For Services to the Nuclear Power Industry" of the 3rd grade – 10 employees;
  - ROSATOM Certificate of Honor – 13 employees,
  - Gratitude of ROSATOM Director General – 21 employees;
  - Letter of Gratitude of ROSATOM Director General – 10 employees,
  - Labor merit badge "Veteran of the Nuclear Power Industry" – 103 employees;
- Regional Awards:
  - Badge of Merit "For Services to the Ulyanovsk Region" – 1 employee,
  - Medal of Honor of Ulyanovsk region– 1 employee,
  - Honorary Title "Honorary Scientist of Ulyanovsk Region" – 3 employees;
  - Certificate of Honor of Governor for Ulyanovsk region – 7 employees;
  - Merit Certificate of the Ulyanovsk Region Ministry of Building, Transport and Housing – 7 employees;
  - Letter of Gratitude of Governor for Ulyanovsk region – 14 employees,
  - Annual Award "Engineer of the Year" handed out to attract attention to the quality of engineering staff, to improve the attractiveness of labor and professionalism of workers and to mart the best engineers of the Ulyanovsk region – 7 employees;
  - M.I. Limasov Annual regional Award aimed at the promotion of trade, improvement of trade prestige and propaganda of trade achievements – 1 employee;

- Town Awards:
  - Merit Certificate of Mayor of Dimitrovgrad – 15 employees;
  - Honors Board “The Prominent People in Dimitrovgrad” – 2 employees
  - Letter of Gratitude of Mayor of Dimitrovgrad – 6 employees;
- RIAR Awards:
  - Honorary Title “Honorary Worker of RIAR” – 11 employees;
  - Honors Board “Eminent People of RIAR” – 10 employees;
  - RIAR Honorary Board – 44 employees;
  - RIAR Certificate of Honor – 128 employees;
  - Gratitude of RIAR – 581 employees;
  - RIAR Trade Union Committee Letter of Gratitude – 9 employees
  - Diplomas of the Annual Contest of JSC “SSC RIAR” Young Specialists for the high quality of scientific development»:
  - 1st Grade Diploma – 10 employees,
  - 2nd Grade Diploma – 22 employees,
  - 3rd Grade Diploma – 26 employees;
- Other Governmental Awards:
  - Title “Professional Engineer of Russia” aimed to improve the staff quality for the industries being of strategic importance for the economical development of Russia (Merit Certificate and Badge of Merit are awarded) – 7 employees;
  - Merit Certificate of the Ulyanovsk State University for active participation in its establishment and development – 2 employees.



2 GENERAL INFORMATION

GENERAL INFORMATION ABOUT JSC “SSC RIAR”

2.1.

Full name	
in Russian	Открытое акционерное общество «Государственный научный центр – Научно-исследовательский институт атомных реакторов»
in English	Joint Stock Company “State Scientific Center – Research Institute of Atomic Reactors”
Short name	
in Russian	ОАО «ГНЦ НИИАР»
in English	JSC “SSC RIAR”
Location and address	
433510, Dimitrovgrad-10, Ulyanovsk region, Russian Federation	
Contacts	
E-mail	niiar@niiar.ru
Web site	http://www.niiar.ru
Phone	+7 (84-235) 3-27-27
Fax	+7 (84-235) 3-58-59

REGISTRAR

According to Resolution No.4 of the Board of Directors of JSC "SSC RIAR" as of December 30, 2008, Joint Stock Company "R.O.S.T. Registrar", being a professional participant of the securities market and carrying out its activities on the basis of License No. 10-000-1-00264 as of December 03, 2002 issued by the Federal Securities Commission of Russia, was approved as a registrar of JSC "SSC RIAR".

Registrar's requisites:
OGRN 1027739216757.

TIN 7726030449.

Short name:	JSC "R.O.S.T. Registrar"
Address:	18/13 Stromynka St., 107996, Moscow
Tel/fax:	+7 (495) 771-73-36; +7 (495) 771-73-34
E-mail:	rost@rrost.ru

The date from which the Registrar has maintained the register of issuer's inscribed stock: January 11, 2009.

AUDITOR

The general meeting of the JSC "SSC RIAR" shareholders approved "Nexia Pacioli" Limited Liability Company as an auditor to carry out annual obligatory audit of JSC "SSC RIAR" for the reporting period. The Company has one of the leading positions in the Russian market of auditing and consulting services and is of high degree of confidence. "Nexia Pacioli" L.L.C. is a member of the self-regulated auditors' organization "Non-Commercial Partnership "Institute of Professional Auditors".

Address: 2 Malaya Polyanka Street, 119180, Moscow, Russia

Phone / fax: (495) 221-24-15

E-mail: pacioli@pacioli.ru

Web site: http://www.pacioli.ru

INFORMATION ABOUT STOCKHOLDERS

Stockholders	Legal/ correspondence address	Number of shares		Share in the charter capital, %	
		by December 31, 2012	by December 31, 2013	by December 31, 2012	by December 31, 2013
Joint Stock Company "Atomic Energy Power Corporation"	24 Bolshaya Ordynka St., 119017, Moscow	4408245584	6320505 675	81,2201	90,1448
Russian Federation represented by ROSATOM State Nuclear Energy Corporation	24 Bolshaya Ordynka St., 119017, Moscow	589200000	691000 000	10,8558	9,8552
ROSATOM State Nuclear Energy Corporation	24 Bolshaya Ordynka St., 119017, Moscow	430085091	0	7,9241	0

SUBSIDIARY COMPANIES AND JOINT VENTURES

Company	Purpose of activities
"RIAR – GENERATION" Ltd.	Production and supply of energy: electric energy, heat, steam, hot water, drinking water, rendering services in water discharge
Belorussian-Russian Joint Venture JSC "Isotope Technologies"	Production, storage, receiving, usage, transportation of radioactive materials and radioactive products, design engineering, production, mounting, adjustment, failure assessment, operation, repair and maintenance of radioisotope-based devices and facilities
Chinese-Russian Joint Venture "Beijing CIAE-RIAR Radioisotope Technology Co., Ltd."	Production of Cf-252 neutron sources and other radionuclide sources, their integration in devices and equipment, selling at the territory of the People's Republic of China, promotion of Cf-252 neutron sources and other radionuclide sources for their use in the industry of the People's Republic of China, service of consumers, export of products to the countries of South East Asia and some countries of Asia region (Japan, South Korea, Australia and etc)

BACKGROUND

The origin of Research Institute of Atomic Reactors dates back to March 1956 when it was decided to build a pilot plant in the Town of Melekess, Ulyanovsk region, to provide R&D support for the development of a wide range of nuclear reactors for nuclear power industry according to the Decree of the USSR Council of Ministers. By the time the Decree was issued, a unique high flux research reactor with super high neutron flux density had been nearly developed. The development work was led by Academician I.V.Kurchatov. Under his initiative, it was decided to locate at a new pilot plant a reactor with a large research complex to perform work in the field of reactor material science, solid-state physics, nuclear physics, accumulation of transuranium elements and radiochemistry. In 1959, according to the Decree of the Council of Ministers of the USSR the Research Institute of Atomic Reactors was established at the base of research and test reactors, facilities and laboratories under construction.

Several reactors of different types were constructed at the RIAR's site:

- **SM** high flux vessel-type water-cooled reactor is the first reactor commissioned at RIAR in October 1961 and reconstructed in 1992 in compliance with safety requirements;
- Organic cooled **ARBUS** nuclear power facility was commissioned in 1963, renamed to AST-1 after reconstruction in 1978 and decommissioned later;
- **VK-50** reactor is a pilot boiling water-cooled power plant. It is the one and only facility in Russia. The first criticality was achieved in December 1964, power startup – in October 1965;
- **MIR** multi-loop materials test reactor is a channel-type reactor, one of the largest research reactors in the world; first criticality was achieved in December 1966, power startup – in August 1967, it was reconstructed in 1976; it is designed to test new designs of fuel rods for promising power reactors;
- **BOR-60** fast sodium-cooled reactor is a unique multi-purpose reactor designed to solve tasks assigned to fast reactors and nuclear power facilities of other types, including those with fusion reactors; is was commissioned in December 1969;
- **RBT-6, RBT-10/1, RBT-10/2** pool-type research reactors of in-house design commissioned in 1975, 1983, 1984, respectively; RBT-10/1 was decommissioned later.

To perform engineering and scientific research related to various tasks of nuclear power engineering the RIAR has developed the following:

- the largest material testing complex to perform post-irradiation examinations and testing of nuclear reactor core components, irradiated material and nuclear fuel samples;
- radiochemical and chemical engineering complexes to perform research activities in the field of nuclear fuel cycle;
- purpose-oriented complex to analyze properties of transuranium elements, radionuclides of high specific activity; development and production of ionizing radiation sources;
- radwaste processing and disposal complex.

In 1994, RIAR got a status of State Scientific Center, in 2008 it was reorganized and became Joint Stock Company "State Scientific Center – Research Institute of Atomic Reactors ", a part of the ROSATOM State Nuclear Energy Corporation.

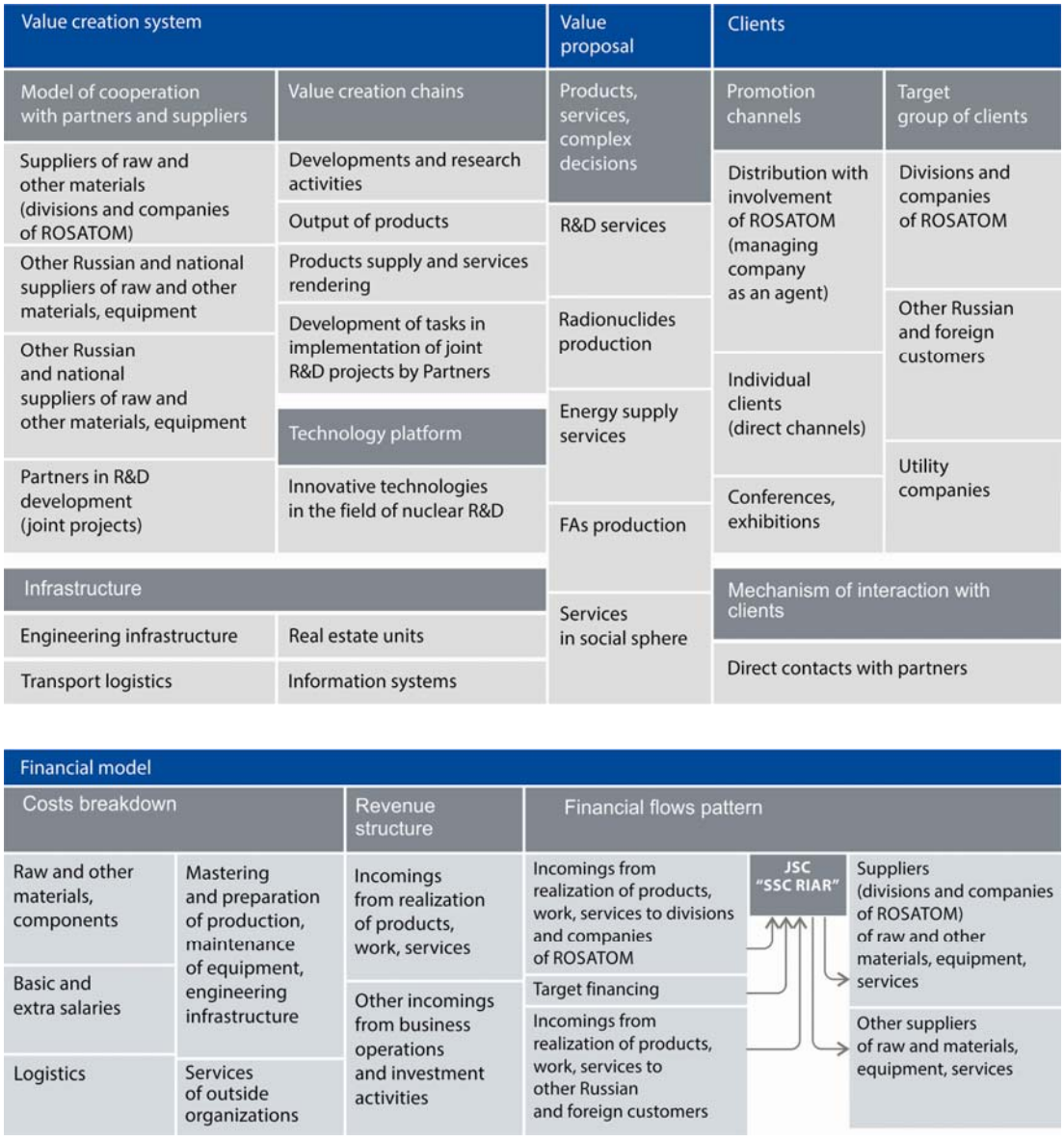
Since its establishment and so far, RIAR is the biggest Russia's research center whose experimental capacities provide investigations in the following trends:

- physics, engineering, irradiation techniques and safety of nuclear reactors;
- reactor material science and methods for testing materials and components of nuclear power facilities;
- radiochemistry and fuel cycles of nuclear power engineering;
- radionuclide sources and radiochemicals.

2.2. PRODUCTS AND RENDERED SERVICES

The main products produced at JSC “SSC RIAR” are as follows:

- scientific, research and development, engineering work;
- production, sales and distribution of radioisotope products;
- generation, transportation and selling of energy resources at the regional market.



Business model of JSC “SSC RIAR”

SERVICES ASSOCIATED WITH SCIENTIFIC AND R&D WORK

The main commercial consumers of R&D are the enterprises subordinated to ROSATOM – research and design companies and organizations involved in development of materials, fuel and nuclear facility components, the owners and the NPP maintenance contractors, as well as some industrial and scientific enterprisers of other industries and departments such as:

- ROSATOM State Nuclear Energy Corporation;
- FSUE “FC NRS” specifically pertaining to nuclear and radiation safety, extension of reactor operation;
- JSC “TVEL”;
- JSC “Rosenergoatom” Concern”;
- JSC “VNIINM”;
- JSC “Afrikantov OKBM”;
- JSC “NIKIET”;
- JSC “OKB “GIDROPRESS”.

R&D services in the field of production and post-irradiation examinations of fuel and structural materials are also in demand of foreign customers from USA, Korea, Japan, China and France.

PRODUCTION AND SALES OF RADIOISOTOPE PRODUCTS

The main consumers of radioisotope products are:

- manufacturers of medical radiopharmaceuticals and medical companies, manufacturers of medical equipment;
- education institutions and research institutes to conduct experiments using ionizing radiation, for example: National Research Nuclear University MEPhI", "NIITFA", JSC, RSC "Kurchatov Institute", JSC "SNIIP" etc;
- companies producing devices with the use of ionizing radiation (for example, density gages, moisture gages, etc.): JSC "NIITFA", JSC "SNIIP", JSC "EMI", etc.;
- joint enterprises:
  - JSC "Isotope Technologies";
  - Beijing CIAE-RIAR Radioisotope Technology Co., Ltd.

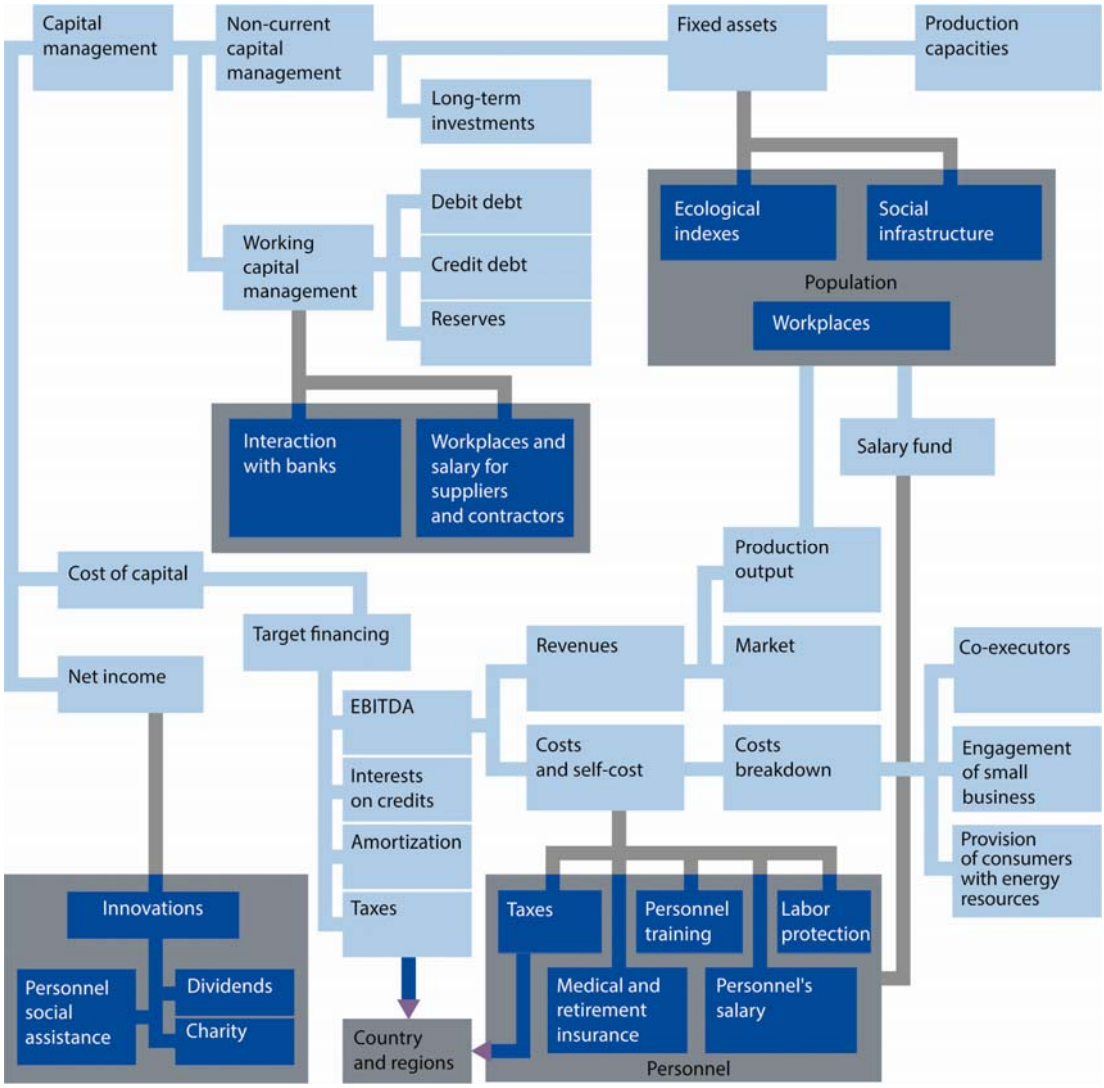
GENERATION, TRANSPORTATION AND SELLING OF ENERGY RESOURCES IN THE LOCAL MARKET

JSC "SSC RIAR" is the company supplying energy resources and renders services associated with production and transfer of electric power, process water, and energy resources. Besides, JSC "SSC RIAR" sells energy resources.

Since April 1, 2013 a part of energy assets has been managed by the subsidiary company – "RIAR – GENERATION" Ltd. functioning as a company supplying resources in the following areas:

- electric power generation (from the heating and power plant);
- generation and transfer of heat energy and steam, as well as hot water supply;
- generation and transfer of general-use water;
- water discharge.

The generated electric power is supplied to the utility companies of the region.



Business diagram of economical, environmental, and social influence of JSC “SSC RIAR” on the parties involved

JSC "SSC RIAR" POSITION IN INDUSTRY

2.3.

Primary activities of the Institute and sales markets for its products have been influenced by a long-standing distribution of functions in the industry. First of all, it is a market of the hi-tech services related to R&D and process-oriented work in the field of nuclear power engineering with the use of in-pile and out-of-pile facilities at the Institute. It is also a market of radioisotopes where the Institute acts as a supplier of a wide range of radioisotopes.

The Institute constantly develops its own technologies related to the key areas of activities:

1. **"Physics and Engineering of Nuclear Reactors and Safety"**: RIAR develops simulation methods as to operating conditions of core components for advanced power and propulsion reactors with the use of research reactors as well as performs testing of their operational capabilities.
2. **"Reactor Materials Science and Techniques to Test Materials and Elements of Nuclear Power Plants"**: RIAR advances approaches, develops techniques and manufactures irradiation rigs for irradiation tests of materials, and upgrades its technical facilities.
3. **"Radiochemistry and Fuel Cycles of Nuclear Power Engineering"**: RIAR develops experimental methods to obtain data on physical and chemical processes to be used and have been used for processing of irradiated materials and spent nuclear fuel, their fractionation, fuel refabrication and utilization of fission products. These experiments are usually aimed at new technologies or parts of technological process, which have passed the stages of laboratory-scale and/or full-scale testing.
4. **"Production of Nuclear Fuel and Reactor Materials"**: RIAR develops and advances promising production methods of nuclear fuel, including refabricated fuel, and control and safety rod components for nuclear reactors.
5. **"Radionuclide ionizing radiation sources and preparations"**: RIAR develops technologies of producing various radionuclides and ionizing radiation sources for medical, technical and scientific purposes.

Experimental capabilities of the Institute define its expected contribution to Rosatom's strategic objectives. It can be summarized as follows:

- Development of technologies in support of nuclear fuel cycle closure based on fast reactors: production of advanced fuels, reprocessing of irradiated materials and spent nuclear fuel, their fractionation, refabrication of fuel and utilization of fission products.
- Scientific and engineering support to promote the use of nuclear technologies: new structural materials, space power engineering, and radioisotopes.
- Scientific and engineering feasibility tests aimed at enhancing the VVER fuel performance and safety: increase of target power output, efficiency factors, fuel burnup, operation period, and licensing abroad.
- Accomplishment of State defense orders: fuel performance tests for nuclear reactors of special purpose.
- Development of experimental research and engineering capabilities for the nuclear industry: construction, reconstruction, and technical re-equipping.
- Development of engineering infrastructure for nuclear facilities related to nuclear radiation safety, spent nuclear fuel and radioactive waste management, physical protection: development of technologies, decommissioning, transportation for processing, and rehabilitation of territories.

2.4.

MANAGING BODIES

According to the Charter, JSC “SSC RIAR” managing units are as follows:

- General shareholders meeting;
- Board of Directors;
- Sole executive body.

The auditing commission is a managing body for financial and operational activities of the company.

The general shareholders meeting is a supreme managing body of the company.

According to the decision of the general shareholders meeting (protocol No. 5 as of December 01, 2011), the executive body authorities of the company are transferred to the managing company – Joint Stock Company “Science and Innovations” (OGRN 1117746621211).

The Director General of JSC “Science and Innovations”:
by January 1, 2013 – Nikolay A. Kondratyev
since October 15, 2013 – Alexey V. Dub

Background profile of Alexey V. Dub, the Director of the Managing Company JSC “Science and Innovations”

Parameter	Personal data
Year of birth	1960
Place of birth	Moscow
Education	Higher professional
Educational institution	1983 – Moscow Institute of Steel and Alloys, specialty “Physical and chemical studies of metallurgical processes”, qualification “metallurgical engineer”. 1996 – Academy of National Economy under the Government of the Russian Federation, specialty “Technological business”
Titles	Dr. Sc. in Engineering. Professor
Employment	Moscow Institute of Steel and Alloys: 1983–2000 – engineer, junior researcher, assistant professor; 2000–2005– deputy pro-rector for science, department chair; since 2005 to the present – department chair (external secondary job). JSC “Scientific and Production Association „Central Research Institute of Machine Building Technology”: since 2005 to the present – Director General. JSC “Science and Innovations” : since 2013 to the present – Director General

The sole executive body of JSC “SSC RIAR” does not own the company stocks and has not made any transaction during the period under report.

A Collegial Executive Body has not been formed at JSC “SSC RIAR” during the period under report.

BOARD OF DIRECTORS

The Board of Directors is a collective managing body assigned with the general management of the company's activities, definition of a development strategy, monitoring of financial and operational activities and sole executive body of the company. The Board of Directors takes the central place in the corporate management system.

The Board of Directors of JSC "SSC RIAR" works in compliance with its competence specified by the Federal Law of the Russian Federation No. 208-FZ as of December 26,1995 "Concerning Joint Stock Companies", the Charter of JSC "SSC RIAR" and the Regulations on the JSC "SSC RIAR" Board of Directors.

MEMBERS OF BOARD OF DIRECTORS

The following Board of Directors elected by the annual general shareholders meeting (protocol No.7 dated June 29, 2012) acted from June 29, 2012 to June 27, 2013:

- Nikolay V. Arkhangelsky;
- Nikolay A. Kondratiev;
- Sergey A. Pastukhov;
- Vyacheslav A. Pershukov;
- Vladimir M. Troyanov.

Vyacheslav A. Pershukov was elected the Chairman of the above-mentioned Board of Directors.

The following Board of Directors elected by the annual general shareholders meeting (protocol No.13 dated June 27, 2013) acted from June 27, 2013 to October 17, 2013:

- Sergey P. Kashlev;
- Nikolay A. Kondratiev;
- Sergey V. Pavlov;
- Sergey A. Pastukhov;
- Vyacheslav A. Pershukov.

Vyacheslav A. Pershukov was elected the Chairman of the above-mentioned Board of Directors.

The following Board of Directors elected by the annual general shareholders meeting (protocol No.17 dated October 17, 2013) acted from October 17, 2013 to December 31, 2013:

- Vyacheslav A. Pershukov;
- Sergey P. Kashlev;
- Nikolay A. Kondratiev;
- Sergey V. Pavlov;
- Natalya T. Uspenskaya.

Vyacheslav A. Pershukov was elected the Chairman of the above-mentioned Board of Directors.

Data on Board of Directors Members at JSC “SSC RIAR”

Nikolay V. ARKHANGELSKY

Date of birth: November 22, 1945.

Education: higher, 1970 – graduation from Moscow Engineering Physics Institute majoring in “Nuclear Power Plants”.

Employment and positions over the last 5 years:

- JSC “Atomenergoprom”: June 2008 – Feb. 2010 – Head of Department.
- ROSATOM: March 2010 – May 2011 – Advisor to Department; May 2011 – July 2011 – Advisor to Directorate for Research and Engineering; since Aug. 2011 to the present – Advisor to the Innovations Management Block.

Nikolay A. KONDRATIEV

Date of birth: October 19, 1960.

Education: higher, 1982 – graduation from Tomsk Polytechnic Institute named after S. Kirov majoring in “Engineering Electronics”.

Employment and positions over the last 5 years:

- JSC “NK “Rosneft” – Research and Technology Center”: Feb. 2006 – Oct. 2011 – Director General.
- ROSATOM: Aug. 2011 – Nov. 2011 – First Deputy Head of the Innovations Management Block.

JSC “Science and Innovations”: Nov. 2011 – October 2013 – Director General; since October 2013 to the present – Executive Director.

Sergey A. PASTUKHOV

Date of birth: April 28, 1959.

Education: higher, 1982 – graduation from Lomonosov Moscow State University majoring in “Physics”.

Employment and positions over the last 5 years:

- JSC “AO “Quorum”: Sep. 2008 – Feb. 2011 – Director General.
- ROSATOM: May 2011 – Nov. 2011 – Advisor to Directorate for Research and Engineering
- JSC “Science and Innovations”: Nov. 2011 – July 2013 – Deputy Director General for Infrastructure Activities
- ROSATOM: since July 2013 to the present – Head of the Project Office “Project “Breakthrough” Management”, the Innovations Management Block.

Vyacheslav A. PERSHUKOV

Date of birth: May 20, 1958.

Education: high, 1980 – graduation from Lomonosov Moscow State University majoring in “Mechanics”.

Employment and positions over the last 5 years:

- Representative office of “Alltech Investments Limited” in the Russian Federation: March 2006 – Jan. 2011 – Senior Project Manager of the Business Department.
- “SN-Neftegas LLC”: April 2008 – Jan. 2011 – Director General.
- ROSATOM: Jan. 2011 – April 2011 – First Deputy Director of the Directorate for Research and Engineering; April 2011 – June 2011 – Deputy Director General – Director of the Directorate for Research and Engineering; since 06.2011 to the present – Deputy Director General – Director of the Innovations Management Block.

Natalya T. USPENSKAYA

Date of birth: April 21, 1977.

Education: higher, 2000 – graduation from All-Russian State Distance-Learning Institute of Finance and Economics majoring in “Finances and Credit”; 2012 – graduation from Russian Academy of Entrepreneurship majoring in “lawyer”.

Employment and positions over the last 5 years:

- JSC “M–Registrar”: 2005–2009 – Head of the Department of Issuer Services.
- JSC “R.O.S.T. Registrar”: 2010 – June 2012 – Head of the VIP-client Center Unit.
- JSC “Science and Innovations”: July 2012 – Aug. 2013 – Advisor to the Department of Corporate Management of Legal Groundwork.
- JSC “Science and Innovations”: Aug. 2013 to the present – Project Manager of the Office of the Legal and Corporate Work.

Sergey V. PAVLOV

Date of birth: December 22, 1958.

Education: higher, 1982 – graduation from Moscow Engineering Physics Institute majoring in “Nuclear Power Plants and Facilities”.

Employment and positions over the last 5 years:

- JSC “SSC RIAR”: Sep.2007 – Jan. 2010 – Head (Director) of the Materials Testing Complex;
  Jan. 2010 – Oct. 2010 – Deputy Director for Post-irradiation Examination of NPP Fuel – Director of the Materials Testing Complex;
  Oct. 2010 – March 2011 – Deputy Director for Fuel and Core Components of Nuclear Reactors;
  March 2011 – Oct. 2012 – Head (Director) of the Materials Testing Complex.
- JSC “Science and Innovations”: since Oct. 2012 to the present – Director.

Sergey P. KASHLEV

Date of birth: February 23, 1960.

Education: higher, 1982 – graduation from Novosibirsk State University majoring in “Economic Cybernetics”.

Employment and positions over the last 5 years:

- JSC “YUKOS EP” (Moscow): May 2007 – Sep. 2011 – Vice-President for Economics and Finances;
- JSC “Science and Innovations”: March 2012 – Jan. 2013 – Advisor; since Jan. 2013 to the present – Deputy Director General for Economics and Finances.

Vladimir M. TROYANOV

Date of birth: February 11, 1956.

Education: higher, 1979 – graduation from Moscow Engineering Physics Institute majoring in “Nuclear Power Plants and Facilities”.

Employment and positions over the last 5 years:

- JSC “TVEL”: 2004 – June 2009 – Executive Director.
- JSC “VNIINM”: June 2009 – Jan. 2011 – First Deputy Director.
- JSC “SSC RIAR”: Feb. 2011 – Dec. 2011 – Director.
- JSC “Science and Innovations”: Dec. 2011 – Aug. 2012 – Director.
- Private company of ROSATOM “Innovation and Technology Center of the BREAKTHROUGH Project”: since Aug. 2012 to the present – Chief Process Engineer.

Members of the Board of Directors of JSC “SSC RIAR” do not own the company stocks and have not made any transactions during the period under report.

The Board of Directors does not have any committees.

Nowadays, the company does not pay bonuses to the members of the Board of Directors.

REPORTING OF BOARD OF DIRECTORS ON RESULTS OF JSC "SSC RIAR" DEVELOPMENT IN FOCAL AREAS

According to the resolutions of the Board of Directors, the business priorities of the Company were specified to solve the tasks of the nuclear power engineering complex:

- Development of a multi-purpose fast test reactor with a thermal power of 60 MW;
- Technical upgrading of fast test reactor with a thermal power of 60 MW;
- Development of technologies and launch into production of mixed oxide fuel for fast reactors;
- Enhancement of non-aqueous technologies for spent nuclear fuel reprocessing.

The following substantial advances in 2013 worth mentioning within the framework under the project on creation of the multi-purpose fast test reactor:

1. Some work related to engineering development of the MBIR reactor, updated layout design of systems and equipment, activities aimed at ensuring patent purity of adopted design concepts.
2. An information model of the nuclear research reactor is under development to fulfill the MBIR project in the up-to-date IT environment with a provision made for information management throughout the life cycle of the reactor.
3. A package of design engineering documents and specifications completed with engineering survey on the MBIR reactor construction was produced and submitted to the RF State Expert Evaluation Department "GlavGosExpertise" for state expert examination.
4. A package of necessary and regulatory documents was produced and submitted to the Russian Federal Service for Ecological, Technological and Nuclear Supervision (Rostekhnadzor) for obtaining the license for the MBIR reactor siting.

Technical re-equipment of the fast test reactor with a thermal power of 60 MW is carried out within the Federal Target-oriented Program "Nuclear Power Technologies of the New Generation for 2010–2015 and until 2020" to extend the operation period and carry out modernization and survey of the BOR-60 reactor. The work performed in 2013 enables safe operation and technical upgrading of the BOR-60 reactor, as well as the efficient use of experimental capabilities of the reactor to solve the tasks of the nuclear industry.

In August 2013, JSC “SSC RIAR” accomplished the technical modernization of the fuel fabrication facilities. This project enabled setting up a unique production of mixed uranium-plutonium oxide (MOX) fuel assemblies for fast reactors. Further advances in this focal direction involve R&D activities to provide fuel for the MBIR reactor and develop the minor actinide burning technology that provides their introduction in fast reactors fuel.

A tremendous scope of work was accomplished within the framework of Federal Target – oriented Program "Nuclear Power Technologies of the New Generation for 2010–2015 and until 2020", as well as the projects "New Technological Platform: Fast Reactor-based Closed Nuclear Fuel Cycle" and "Breakthrough". They were aimed at the development and feasibility demonstration of engineering and design concepts of the industrial-scale reactor-based onsite module for fast reactors spent fuel reprocessing. The RF State Expert Evaluation Department "GlavGosExpertise” issued positive findings of ecological appraisal as to the design engineering documents and specifications for the construction of the multifunctional radiochemical complex.

AUDITING COMMISSION

The auditing commission acts in conformity with the *Regulations on the Auditing Commission at JSC "SSC RIAR"* approved by the resolution of the sole stockholder on September 04, 2009. This document establishes the procedure that regulates the election of the auditing commission, sessions and decision-making, audits and engagement of experts and consultants, as well as rights and obligations of the commission members.

The following auditing commission was selected at the annual general meeting of the JSC “SSC RIAR” stockholders (protocol No. 13 as of June 27, 2013):

- Andrey Kladkov;
- Vladimir Nikulin;
- Vladimir Shchennikov.

The members of the auditing commission at JSC “SSC RIAR” do not hold shares of the company and have not made deals with them during the period under report.

KEY COMPANY'S REGULATIONS RELATED TO CORPORATE MANAGEMENT:

Key company's regulations related to corporate management include the following:

1. Charter of JSC "SSC RIAR".
2. Regulations on the JSC "SSC RIAR" Board of Directors.
3. Regulations on the JSC "SSC RIAR" Auditing Commission.
4. Regulations on obligatory information disclosure by JSC "SSC RIAR".

The Code of the Corporate Conduct or any other document of this type is not officially approved by the company, however, JSC "SSC RIAR" provides the stockholders with a possibility to take part in the company management and to get acquainted with the information on its activities in compliance with the Federal Law of the Russian Federation No. 208-FZ as of December 26,1995 "Concerning Joint Stock Companies", Federal Law of the Russian Federation No. 39-FZ as of April 22,1996 "Concerning Securities Market" and laws and regulations on the securities market of the federal executive body.

PAYMENT OF DECLARED (ATTRIBUTED) DIVIDENDS TO SHARES OF JSC "SSC RIAR"

Dividends on shares of JSC "SSC RIAR" were not attributed and paid during the period under report.

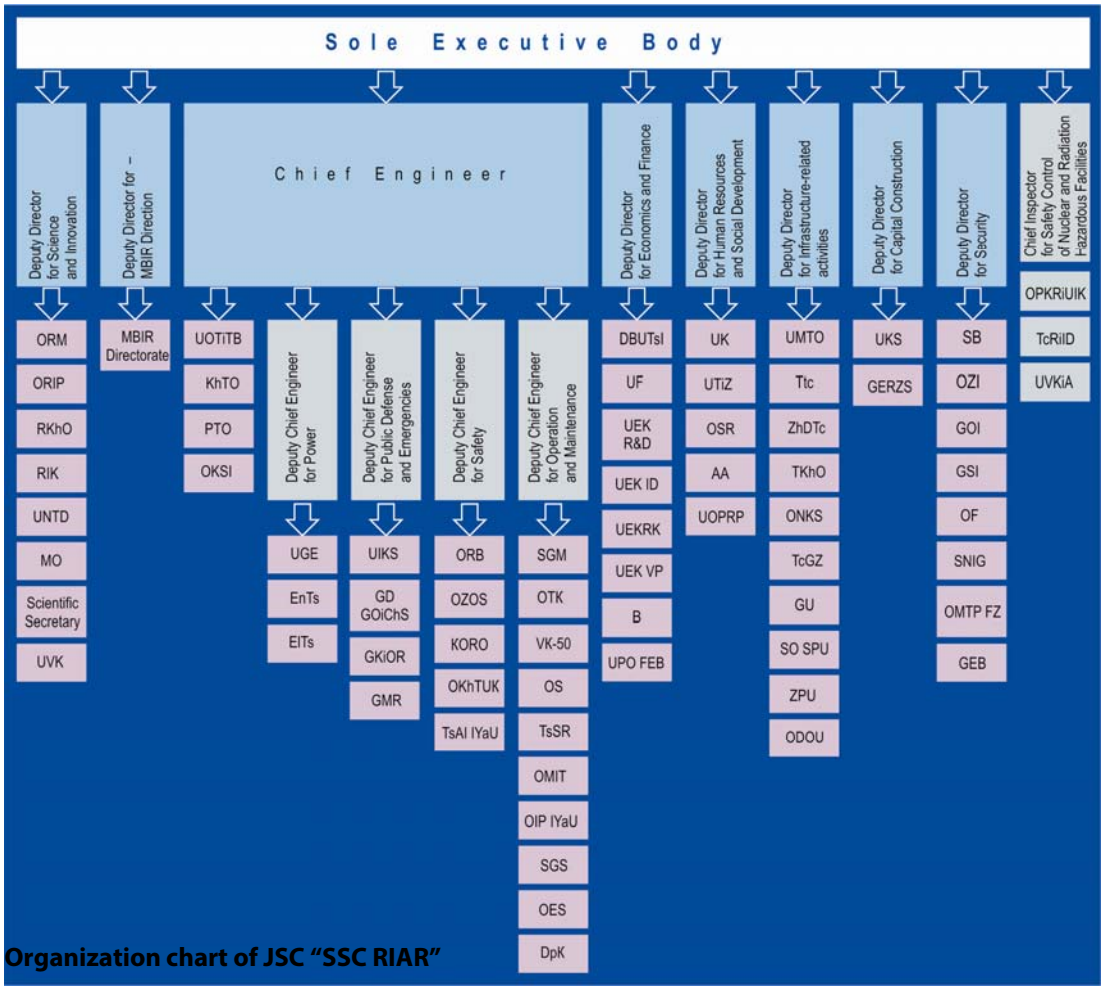
DETERMINATION CRITERIA AND AMOUNT OF REMUNERATION OF SOLE EXECUTIVE BODY

According to the resolution of the general shareholders meeting (protocol No. 5 as of December 01, 2011), authorities of the executive body of the company are delegated to the managing company – Joint Stock Company "Science and Innovations". Determination criteria and amount of remuneration of the sole executive body are stated in the *Agreement on the delegation of authorities of the sole executive body* No. 20 as of December 02, 2012 and additional agreements to it.

In 2013, the company paid the cost of services related to the discharge of functions of the sole executive body at the following amounts: January 01, 2013 – July 31, 2013 - 22776,36 RUR/month; August 01, 2013 – December 31, 2013 - 23915,18 RUR/month.

ORGANIZATION STRUCTURE

Organization chart of JSC “SSC RIAR” was approved by the decision of the Board of Directors of JSC “SSC RIAR” (protocol No.122 as of July 10, 2013) and put into effect by the Decree of the Director of JSC “SSC RIAR” No. 750 as of July 31, 2013.



Organization chart of JSC “SSC RIAR”

JSC "SSC RIAR" STRATEGY AND ITS IMPLEMENTATION

According to the *Strategy of ROSATOM Activities till 2030*[1] developed in 2011, in the long-term prospect the Corporation sees itself as a global leader in technological development in the nuclear industry, one of the three largest players in the world in all the key segments, as well as a recognized leader in application of nuclear technologies on the related markets. In the mid-2013, ROSATOM refined scenario conditions and indicators of achievement as to strategic objectives for the RF nuclear industry, optimized plans for implementation of development programs and strategic projects according to the available investment financing.

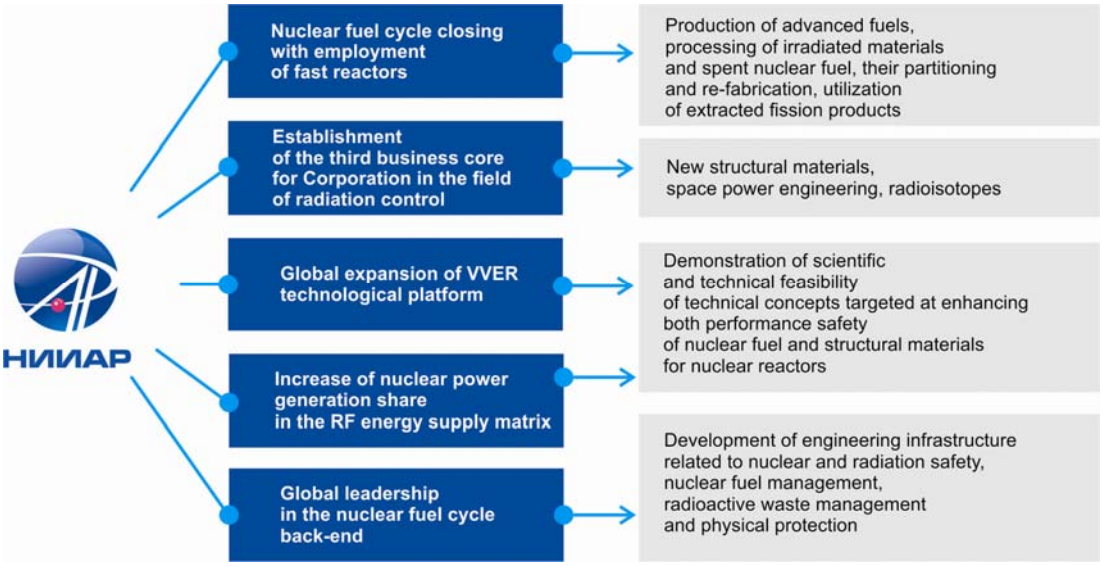
ROSATOM's mission – is to fulfill
the tasks related to the state defense, nuclear and radiation safety, socially reasonable production of nuclear electric power and achievement of the technological leadership on a global scale owing to the advanced competences in the nuclear science[2].

Activities of JSC "SSC RIAR" as one of the leading research institutes in the nuclear industry are directed entirely on the accomplishment of ROSATOM's mission and achievement of the strategic objectives assigned to the Institute since the main purpose of the Institute is to carry out R&Ds using reactor and out-of-reactor experimental capabilities in order to solve the most complex research and engineering tasks at the presently recognized state of the art for the nuclear industry and related sectors of economy.

[1] Public annual report of ROSATOM State Atomic Energy Corporation 2011 [Electronic resource]. – Website of ROSATOM State Atomic Energy Corporation. – 327 p. – Access mode: http://www.rosatom.ru/wps/wcm/connect/rosatom/rosatomsite/resources/22d0a2804e9bed2a9666bf91bc00a112/Rosatom_annual_report_2011_rus_web.pdf. The date of access: May 29, 2014.

[2] Mission of the ROSATOM State Corporation [Electronic resource]. – Publication of materials under the heading "About State Corporation" Website of ROSATOM State Atomic Energy Corporation. – Access mode: http://www.rosatom.ru/aboutcorporation/mission. The date of access: May 29, 2014.

The key decisions points regarding the main activities of JSC “SSC RIAR” in the mid- and long-term framework were approved by the Board of Directors, top management of the industry and were endorsed at the federal level. In December, 2013 RIAR worked out and approved *the Program for innovative development of JSC “SSC RIAR”* that specifies the technological development strategy of RIAR for the main areas of the Company activities and is focused on the achievement of Rosatom’s strategic objectives.



JSC “SSC RIAR” in implementation of ROSATOM’s strategic initiatives

JSC "SSC RIAR" in implementation of ROSATOM's strategic initiatives

Strategic initiative	Main goals and tasks of JSC "SSC RIAR" in the initiative implementation	Outcome of 2013
Nuclear fuel cycle closing with employment of fast reactors	• Development of closed fuel cycle technologies for innovative nuclear reactors • Development and feasibility demonstration of SNF reprocessing technologies, NM recycling and fuel production for fast reactors. • Experiments and verification tests in support of new structural materials and core components for fast reactors, their performance and operational life testing.	• A package of documents related to the "Construction of multipurpose fast research reactor" were submitted to RF State Expert Evaluation Department "GlavGosExpertise" for approval by state experts. • Department "GlavGosExpertise" issued positive findings as to the design engineering documents and specifications and ecological appraisal for the construction of the multifunctional radiochemical complex.
Establishment of the third business core for Corporation in the field of radiation control	• Development of technologies and setting up production of radioisotopes for science, industry, and medicine. • Development and feasibility demonstration of radiation-based technologies for science, industry, medicine, and household use.	Two projects have been launched within the framework of RF Government Decree as of April 09, 2010 No. 218 "On the government measures to support the development of cooperation between Russian higher educational institutes and organizations that implement comprehensive projects aimed at setting up high-technology production": • "Comprehensive modernization, renovation and development of reactor-based production of radionuclides at JSC "SSC RIAR" in order to support the development of nuclear medicine and radiation technologies"; • "Development of Mo-99 production technology from low-enriched uranium"

Strategic initiative	Main goals and tasks of JSC "SSC RIAR" in the initiative implementation	Outcome of 2013
Global expansion of VVER technological platform Increase of nuclear power generation share in the RF energy supply matrix	• Scientific feasibility of new technologies in the field of reactor fuel aimed at increasing ICUF, performance efficiency and other parameters to be important for efficient NPP operation. • Scientific feasibility of Russian fuel performance including the parameters required for its licensing abroad. • Scientific feasibility of new selected reactor materials, components and fuel, scientific demonstration of their performance efficiency and operational life testing.	• In 2013 work was focused on performance testing of optimized VVER fuel rods under the transient conditions, obtaining experimental data on behavior of fuel assembly for floating NPPs, and the experimental data on corrosion stability of VVER - 1000 fuel claddings. • Post-irradiation examinations of advanced irradiated fuel rods and fuel assemblies for VVER-1000 reactors; tests aimed at studying the behavior of irradiated VVER-1000 fuel rods to demonstrate feasibility of safe long-term dry storage conditions for spent nuclear fuel as well as tests aimed at optimization of Zr alloy compositions, which are expected to be used in the cores of floating nuclear power plants and low power reactor NPP.
Global leadership in the nuclear fuel cycle back-end	• Development and feasibility demonstration of spent nuclear fuel management and reprocessing technologies, NM recycling, minor-actinides transmutation and radioactive waste management. • Scientific feasibility demonstration and experiments in support of engineering and design concepts of reconstruction, modernization, service life management, and decommissioning of nuclear facilities. • Development of standard radioactive waste management technologies as to the radioactive waste resulted from decommissioning of nuclear facilities.	A series of actions aimed at a complete removal of the RBT-10/1 reactor to be under decommissioning was accomplished. Engineering and radiation safety surveys were conducted. A package of documents was prepared and submitted to Russian Federal Service for Ecological, Technical and Nuclear Supervision for review and taking a decision on withdrawal from supervision of the Russian Federal Supervisory Inspectorate.

RISK MANAGEMENT

Risk Management Policy of JSC "SSC RIAR"

An important task for the Institute is to establish an effective risk management system and internal control system. The risk management policy is based on the principles and methods of risk management described in the corporate risk management system, including the main processes given in the figure below.

Risk management

These activities are aimed at timely identification of the events, which can have an undesirable influence on the achievement of objectives and application of adequate responses to them. The existing measures for risk minimization are evaluated with reference to each of the identified risks, including procedures of internal control, and their sufficiency for restraining a residual risk level. In order to neutralize some risks, the protection measures are taken as to implementation of the work program. Possible algorithms of actions are developed if any risk arises.

Management of risks is done and supervised in the divisions of the Institute within the assigned area of responsibilities.

Risk management practice of JSC "SSC RIAR"

Risk description	Risk factor	Risk management activities
Operational risk	Uncertain and unforeseen difficulties in the work process (for instance, technological risks, risk of failure, accidental risks, risks associated with repair time elongation etc.)	• Introduction of the state-of-the-art production methods. • Modernization and technical re-construction of hazardous facilities. • Neutralization (elimination) of hazards
Risk of underemployed capacities	Employment of production facilities is directly related to the demand level of the customers: a decrease in demand leads to a risk of underemployed capacities and underemployment of the staff	• Financial and institutional support of innovative products during the market slump. • Of production and sales of general purpose products of industrial grade
Risk of quality	Unconformity of quality to the assigned quality standards or quality specifications as to products, accomplished work, or services rendered	Quality management system.
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, shipping companies etc. • Increase of the minimum subsistence wage etc. • Failure occurrences in the work processes. • Lower machine utilization. • Technological obsolescence	• Implementation of programs aimed at energy conservation and energy performance improvement. • Introduction of the ROSATOM industrial system. • Optimization of production areas. • Headcount optimization
Risk of price changes for procured materials and products due to changes in economic situation	Changes in pricing polices of contractors providing that the contracts for resources supply enables reconsideration of prices. Escalation in prices for any particular resources or services leads to incidental expenditures	• Implementation of new market segments. • Expansion of the range of products and services rendered

Legal risks

JSC “SSC RIAR” undertakes its business in conformity with the standards and with due consideration for changes in the Russian legislation in force. With this objective in view, JSC “SSC RIAR” performs continuous monitoring of changes in the current legislation of the Russian Federation and jurisdictions of its presence in the field of the nuclear energy use, marketing, export control and nonproliferation of mass destruction weapons. It also observes all related recommendations of supervisors and regulators at the international and national levels. All the contracts to be entered are subject to the approval by the legal office at RIAR and independent consultants are engaged in some cases also.

Social risks

Personnel related risks

One of the key resources of the Institute is personnel. Taking into consideration ambitious plans for development of the nuclear industry and medium-term plans of JSC “SSC RIAR”, a shortcoming of employees with necessary qualifications or impossibility to involve them in implementation of new projects, including innovative ones, can have an unfavorable effect on the achievement of strategic objectives by JSC “SSC RIAR”. A number of factors associated with the human resource risk is out of an area of influence of the Institute (for example, decrease in a number of graduates from schools and higher education institutions and, respectively, a number of recent graduates; location of the Institute in the single-industry town when there are serious restrictions in adoption of necessary personnel, etc.).

Risk reduction activities

The operating profit of JSC “SSC RIAR” depends on the relations of the Institute management with its employees. Deterioration of such relations, as well as any restrictions set by the legislation as to employment, can have an undesirable effect on the development of the company. To provide normal labour- management relations at JSC “SSC RIAR”, a trade union agreement is concluded and updated on a regular basis.

JSC “SSC RIAR” undertakes monitoring of the risk factors and takes them into account in the programs related to health care, maternity and childcare support, organization of leisure and recreation activities of the employees, social assistance to the pensioners and employees, personnel retraining and professional advances.

Key social and personnel programs of JSC “SSC RIAR” include the following:

- housing improvements of employees (compensation for house renting);
- voluntary (additional) medical insurance against accidents and diseases;
- health improvement for employees’ children;
- social assistance to unemployed retirees (honorable retired employees);
- cultural and sporting events;
- training of recent graduates;

- additional financial support to employees, including force majeur circumstances, child birth, medical treatment and buying of medicine, burials, as well as to multi-child families;
- introduction of a motivation system with an individual staff performance appraisal;
- training and advanced training of recent graduates of field-specific specialties;
- strengthening of staff competence.

Satisfaction of the personnel is traced by conducting sociological polls. The results related to human resources management are presented in Section "Personnel Management and Social Policy" of Chapter 4 "Sustainable Development Results".

Insurance

A number of insurance contracts were signed during the period under report to provide continuous functioning and obtain the necessary licenses related to operation of nuclear facilities at the Institute:

- compulsory civil liability insurance:
  - of vehicle owners – Mandatory Third Party Liability OSAGO (234 vehicles);
  - of the transportation organization for personal injury and damage to property of passengers;
- civil liability insurance:
  - against the third parties in transportation of radioactive substances, nuclear materials, nuclear products and radioactive waste;
  - of operating companies and owners of hydraulic engineering installations;
  - of operators of hazardous production facilities against injury to life, health and damage to property of the third parties, harm to environment as a result of accident at a hazardous production facility (ten hazardous industrial sites);
  - operators – nuclear power facilities;
  - in case of harm due to inadequate work affecting safety of capital construction buildings and facilities (to obtain a work permission certificate from self-regulated companies "Soyuzatomstroy" and "Soyuzatomproject");
  - in case of damage, theft or hijacking of a transport vehicle– full comprehensive insurance KASKO (one vehicle);
- third party liability insurance in transportation of hazardous cargo;
- casualty insurance.

These contracts provide for full coverage of all the losses upon occurrence of the insured event related to operation of the nuclear and radiation hazardous facilities at the JSC "SSC RIAR" site.

Risks related to labor protection and process safety

Rates of work-related injuries and occupational diseases have a significant influence on both the economic and social component of JSC “SSC RIAR” business. The measures aiming at prevention of work-related injuries and occupational diseases make it possible to increase the labor productivity efficiency and all these measures in total contribute to higher economic benefit of JSC “SSC RIAR”.

The primary goals of JSC “SSC RIAR” related to the occupational health care and safety are as follows:

- minimization of adverse impacts of production processes on the staff health;
- prevention of occupational injures;
- improvement of working conditions at the enterprise.

The following work was done in the reporting year with due consideration for the above-stated goals:

- Occupational safety and health care activities in place;
- Control over the adherence to legislative and other regulatory legal acts related to labor protection;
- Identification of hazardous and harmful production activities;
- Establishing control over provision of employees with individual and group protection equipment;
- Consulting of employees on occupational health and safety;
- Development of preventive measures against occupational accidents and diseases;
- Reduction of work-related injuries, accidents, and diseases.

Risk reduction activities

In conformity with the occupational health and safety management system of ROSATOM State Nuclear Energy Corporation, JSC "SSC RIAR" has implemented its own occupational health and safety management system since 2010. It is major purpose is to prevent job-related injuries and occupational illnesses, to improve working conditions of employees at RIAR.

In 2013 JSC "SSC RIAR" implemented the *Unified industry-specific policy of ROSATOM State Nuclear Energy Corporation and its subordinate companies in the field of occupational health and safety* that defines goals, tasks and main trends of RIAR's activities in terms of occupational safety and health care for its employees.

The individual radiation exposure monitoring is available for the staff on the temporary duty assignment and contractor employees involved in activities at radiation hazardous sites and nuclear facilities at JSC "SSC RIAR".

When JSC "SSC RIAR" enters into subcontracts, they specify obligations and commitments of subcontractors in terms of compliance with occupational health and safety standards. These subcontracts also provide for formalizing appropriate agreements. Occupational safety questionnaires are also filled up. JSC "SSC RIAR" together with the representatives of Contractor undertakes regular inspections to ensure the compliance with occupational safety requirements at the worksites.

The purposeful and goal-oriented activities related to occupational health and safety reveals the reduction of risks attributable to labor protection and occupational safety of the enterprise during the recent years. Details of these activities can be found in Section "Industrial safety" "Results of primary activities".

Nuclear and radiation safety risks

Technological risks related to nuclear facilities operation are minimized by undertaking appropriate preventive actions, which include the following activities:

- Implementation of modernization programs targeted at technical upgrade of the process equipment at the RIAR site;
- Adherence to the applicable regulations and standards in conducting engineering and fabrication activities, operation of research reactors, storage of nuclear and radioactive materials and radioactive waste management.

Trouble-free, safe and sustainable operation of nuclear and radiation hazardous facilities at JSC "SSC RIAR" is the primary goal of the Institute. JSC "SSC RIAR" conducts a condition monitoring at a regular basis and undertakes engineering actions to ensure trouble-free operation of research reactors and nuclear hazardous sites. All the activities are carried out in full compliance with the regulations and with due consideration of the RF legislation in force. In 2013, the work at the nuclear hazardous sites of JSC "SSC RIAR" as well as operation of research reactors was accident-free.

In order to manage radiation hazard risks incurred by the local residents and personnel that result from the operation of nuclear facilities at the RIAR site, JSC “SSC RIAR” developed and implemented the radiological safety system. It is operated in conformity with legislative, regulatory legal acts of the Russian Federation currently in force, sanitary regulations and standards, instructions and other documents with reference to the following fields:

- Monitoring of internal and external radiation dose of the personnel is carried out at JSC “SSC RIAR” in accordance with radiation safety standards NRB-99/2009, basic sanitary regulations for radiation safety OSPORB 99/2010, and recommended practices MU 2.6.1.16-2000;
- Radioactive atmospheric releases are monitored in accordance with the *Regulations for monitoring radioactive atmospheric releases at JSC “SSC RIAR”* subject to the strict observance of permissible releases standards;
- Maintenance of preparedness of special response units in order to prevent and respond to the possible emergencies and nuclear power-related accidents at JSC “SSC RIAR” with the help of accident management units and sites, communication and warning systems, emergency response teams and capabilities, physical and financial resources.

In 2013, basic radiation dose limits of the personnel were not exceeded and atmospheric emissions were within the established norms. All these facts can be a good indication that the radiological safety is satisfactory at the Institute.

RIAR issues an annual report that presents data on individual and collective doses of internal and external radiation exposure for the personnel and the public, radioactive release monitoring data as well as other related information. The resultant report is used as a basis to develop necessary arrangements targeted at radiological safety enhancement.

According to the radiological data obtained in the vicinity of JSC “SSC RIAR”, they do not exceed the similar levels assigned to the similar radiation hazardous facilities of the Upper Volga region: FSUE “RFNC VNIIEF” (Sarov, Nizhny Novgorod region); JSC “Afrikantov Experimental Design Bureau” (Nizhny Novgorod); FSUE “RosRAO” (Nizhny Novgorod region); JSC “ChMZ” (Glazov, Udmurt Republic). This is evidenced in the annual radiological status report on “Radiological Environment on the Territory of Russia and Neighboring States”.

QUALITY MANAGEMENT

A system of quality management at JSC “SSC RIAR” is based on quality management concept stated in International Standard for Business ISO 9001:2008 “Quality Management Systems. Requirements” (hereinafter to be referred to as ISO 9001) and in National Military Standard GOST PB 15.002–2003 “Military product development and pilot production system” (hereinafter to be referred to as GOST PB 15.002–2003).

The quality management system (QMS) is intended to ensure management of organizational performance, scientific work, business concept, and technological work at the Institute and is aimed at meeting the customer requirements (consumer) to the full extent and within a fixed timeframe as well as safety performance.

RIAR executives specified, implemented and keep up to date the procedure of engineering development regarding the processes required for research and development activities and rendering of services, for time response to customer demands and expectations.

The top executive management of the Institute worked out and approved the *Quality Assurance Policy* by order No.45 as of January 24, 2013. Its timely applicability is verified annually when functioning of the RIAR’s quality management system is analyzed.

The quality management system of JSC “SSC RIAR” is under the direct supervision of the Chief Engineer, i.e. the management representative to be in charge of quality as to the management system implementation and guidance it is provided by the Quality & System Engineering Department that is subordinate to the Chief Engineer of RIAR.

In accordance with the requirements of ISO 9001 (GOST ISO 9001) and GOST PB 0015-002 JSC “SSC RIAR”

- Specified and identified the processes required for the quality management system performance (process of governance, basic and secondary processes):
  - Strategic management (Company Standard STO KP 086-412);
  - Research & development. Reactor material science (STO KP 086-413);
  - Nuclear fuel production (STO KP 086-414);
  - Operation of nuclear reactors and plants (STO KP 086-415);
  - Personnel management (STO KP 086-416);
  - Production of radionuclides (STO KP 086-418);
  - Medium-term planning. Budgeting (STO KP 086-419);
  - Research & development. Irradiation experiments (STO KP 086-421);
  - Research & development. Radiation chemistry (STO KP 086-422);
  - Procurement activities (STO KP 086-423);
  - Communications (STO KP 086-424);
- Processes were put in sequence (Enclosure to Order No. 476 of May 22, 2013) and interrelated (process landscape model of the Institute);
- Criteria and evaluation methods were established as to efficiency and effectiveness of these processes;
- Necessary resources and information are provided to implement these processes and monitor them;
- Applicable processes of quality management system are monitored, observed and analyzed;
- Necessary actions are taken in order to achieve expected results and provide continuous improvement of these processes.

RIAR manages these processes in accordance with the requirements of International Standard ISO 9001. Every process provides for actions within the PDCA cycle framework: plan – do – check (study) – act (adjust). There is a process map that establishes the objective of the process, sequence of actions, methods and criteria for assessment of the process output as well as it specifies responsibilities and competences.

The institute entrusts third-party contractors execution of the processes, which affect the quality of product, work or rendered services in accordance with the specific requirements.

РОСОБОРОНЗАКАЗ, ФСВТС РОССИИ, РОССТАНДАРТ,
ГОСКОРПОРАЦИЯ «РОСАТОМ», РСПЦ АНО «ВОЕННЫЙ РЕГИСТР»

СИСТЕМА ДОБРОВОЛЬНОЙ СЕРТИФИКАЦИИ
«ВОЕННЫЙ РЕГИСТР»

Свидетельство № РОСС RU.0547.04ГЦ80

Орган по сертификации систем менеджмента качества
Автономная некоммерческая организация
«Институт испытаний и сертификации вооружения и военной техники»

(115184, г. Москва, ул. Б. Татарская, д. 35, № ВР АА.1.02.0070-2011)

СЕРТИФИКАТ СООТВЕТСТВИЯ

№ ВР 02.1.6513-2013

Срок действия с «27» сентября 2013г. по «30» сентября 2015г.

Выдан Открытому акционерному обществу
«Государственный научный центр – Научно-исследовательский институт атомных реакторов»
(ОАО «ГНЦ НИИАР»)

433510, Россия, Ульяновская область, г. Димитровград-10

Сертификат удостоверяет, что система менеджмента качества, распространяющаяся на проектирование, разработку (выполнение НИОКР), транспортирование продукции для оборонных целей в области использования атомной энергии

в соответствии с кодами ТКВС: гр. 11, 4470, 4480, гр. 97

соответствует требованиям ГОСТ РВ 0015-002-2012

Дополнительная информация

Руководитель органа по сертификации СМК А.Г. Федотов

№ 113074

Certificate of QMS conformity to GOST RV 0015-002-2012

The certification authority i.e. the autonomous non-profit institution “Institute for Testing and Certification of Armaments and Military Equipment” conducted an audit of the JSC “SSC RIAR” quality management system to reveal conformity with National Military Standard GOST RV 0015-002-2012 in the Military Register voluntary certification system and issued Certificate No. VR 02.1.6513-2013 that is valid until September 30, 2015.

The quality management system is applied to engineering development (research and development work), transportation of defense products related to nuclear energy use and complies with the requirements of Military Standard GOST RV 0015-002-2012.

In 2013 certification audit of the quality management system was conducted. Based on the results of this audit the certifying association Russian Register-Baltic Inspection Center, Ltd confirmed the validity of the earlier issued certificates of conformity in the certification system Russian Register. JSC “SSC RIAR” obtained a certificate of conformity with the ISO 9001 (GOST ISO 9001) international standard for the current quality management system.

GOST R CERTIFICATION SYSTEM

QUALITY SYSTEMS REGISTER

QUALITY MANAGEMENT SYSTEM CERTIFICATION BODY
CERTIFICATION ASSOCIATION "RUSSIAN REGISTER"
45/8, Liteyny pr., lit. A, office 6N, 191014, St.-Petersburg, Russia
№ РОСС RU.0001.13НС08

К № 23885

CERTIFICATE OF CONFORMITY

Issue 1. QMS certified since November 2012
is given to
JSC «SSC RIAR»
Dimitrovgrad-10, Ulyanovsk region, 433510, Russian Federation

THIS CERTIFICATE CERTIFIES THAT:

the Quality Management System as applied to design, production and supply of fuel elements and assemblies, radionuclide sources and preparations; R&D related to nuclear energy usage

COMPLIES WITH THE REQUIREMENTS OF
GOST R ISO 9001-2008 (ISO 9001:2008)
The interpretation of certification scope may be received by consulting with JSC «SSC RIAR»

Registration № РОСС RU.НС08.К01665

Date of registration: 2012, November, 02 It is valid until: 2015, November, 02

Head of Quality Management System Certification Body A.V. Vladimirtsev

Audit team leader D.A. Danilov

Registration number of Quality systems register № 18182

СИСТЕМА СЕРТИФИКАЦИИ РУССКОГО РЕГИСТРА

РУССКИЙ РЕГИСТР

СЕРТИФИКАТ
СООТВЕТСТВИЯ СИСТЕМЫ МЕНЕДЖМЕНТА

Настоящим удостоверяется, что система менеджмента

Открытого акционерного общества
«Государственный научный центр –
Научно-исследовательский институт
атомных реакторов»
Россия, 433510, Ульяновская обл., Димитровград-10

была проверена и признана соответствующей требованиям стандарта

ИСО 9001:2008

в отношении проектирования, производства и поставки твэлов, тепловыделяющих сборок, радионуклидных препаратов и источников; выполнения научно-исследовательских и опытно-конструкторских работ в области использования атомной энергии

№: 12.1063.026
от 29 октября 2012 г.

Сертификат действителен до 29 октября 2015 г.

003917

IAF IQNet

СИСТЕМА СЕРТИФИКАЦИИ ГОСТ Р

РЕГИСТР СИСТЕМ КАЧЕСТВА

ОРГАН ПО СЕРТИФИКАЦИИ СИСТЕМ МЕНЕДЖМЕНТА КАЧЕСТВА
АССОЦИАЦИЯ ПО СЕРТИФИКАЦИИ «РУССКИЙ РЕГИСТР»
Россия, 191014, Санкт-Петербург, Литейный пр., д. 45/8, лит. А, пом. 6Н
№ РОСС RU.0001.13НС08

К № 23885

СЕРТИФИКАТ СООТВЕТСТВИЯ

Выпуск 1. СМК сертифицирована с ноября 2012
Выдан
ОАО «ГНЦ НИИАР»
Российская Федерация, 433510, Ульяновская обл., г. Димитровград-10

НАСТОЯЩИЙ СЕРТИФИКАТ УДОСТОВЕРЯЕТ:

система менеджмента качества применительно к проектированию, производству и поставке твэлов, тепловыделяющих сборок, радионуклидных препаратов и источников; выполнению научно-исследовательских и опытно-конструкторских работ в области использования атомной энергии

СООТВЕТСТВУЕТ ТРЕБОВАНИЯМ
ГОСТ Р ИСО 9001-2008 (ИСО 9001:2008)
Разъяснения, касающиеся области сертификации СМК, могут быть получены путем консультаций с ОАО «ГНЦ НИИАР»

Регистрационный № РОСС RU.НС08.К01665

Дата регистрации: 02.11.2012 Срок действия до: 02.11.2015

Руководитель органа по сертификации систем менеджмента качества А.В. Владимирцев

Председатель комиссии Д.А. Данилов

Учетный номер Регистра систем качества № 18182

IQNet

THE INTERNATIONAL CERTIFICATION NETWORK

CERTIFICATE

IQNet and
Certification Association "Russian Register"
hereby certify that the organization

JSC «SSC RIAR»
433510, Dimitrovgrad-10, Ulyanovsk region, Russia

for the following field of activities

design, production and supply of fuel elements and assemblies, radionuclide sources and preparations; R&D related to nuclear energy usage

has implemented and maintains a

Management System

which fulfils the requirements of the following standard

ISO 9001:2008

Issued on : 29th October, 2012
Validity date : 29th October, 2015

Registration Number : **RU-12.1063.026**

Michael Drechsel
President of IQNet

Arkady Vladimirtsev,
General director of
Russian Register

Certificates of conformity with the ISO 9001 international standard of JSC "SSC RIAR" QMS

The quality management system is applied to design, production and supply of fuel elements and fuel assemblies, radionuclide sources and radiochemicals; to scientific, research and development work related to nuclear energy use and is in conformity with the ISO 9001 (GOST R ISO 9001) international standard.

The obtained Certificates of Conformity demonstrate JSC "SSC RIAR" ability to supply products and render scientific and research services in response to needs and expectations of Customers.

INTERNAL CONTROL AND AUDIT SYSTEM

The internal control and audit system is the complex of institutional structure, methods, inspection and monitoring procedures to be adopted by the high-level management of the economic entity as the mechanisms of consistent and efficient pursuit of financial and business operations (business processes), which are conducted by the economic entity and targeted at finding, elimination and prevention of significant errors and misrepresentation of paper records. The internal control and audit system is one of the essential components of the risk management system related to business operations.

The department for internal control and audit has been functioning at JSC "SSC RIAR" since 2012. Its major objective is to maximize the efficiency and reliability of the internal control system and promote the improvement of the corporate governance at the Institute in accordance with the RF legislation, requirements of the state supervisory agencies and international standards. The qualification of one half of the specialists engaged in the department for internal control and audit is confirmed by the certificates issued by the Institute of Certified Financial Managers (Great Britain).

In 2013 the staff members of the department for internal control and audit conducted nine inspections. Six inspections among nine were planned audits under the authority of ROSATOM State Nuclear Energy Corporation and another three audits were conducted by the order of RIAR management.

In 2013 eighty five audits were initiated by external supervisory agencies against JSC "SSC RIAR". Among these agencies were the Federal Oversight Service for Supervision over Natural Resource Management of the Ulyanovsk Region, Regional Administration Office # 172 of the Federal Medical and Biological Agency under the Ministry of Health and Social Development of the Russian Federation; Interregional environmental prosecutor's office of Ulyanovsk Region; autonomous non-profit institution "Institute for Testing and Certification of Armaments and Military Equipment"; State Office for Nuclear and Radiological Safety Oversight of the Ministry of Defense of the Russian Federation, Inspectorate General of the ROSATOM State Nuclear Energy Corporation, the Volga Department for Rail Regulation, Federal state budgetary institution "Special Office of the Federal Fire Safety #87" under the Ministry of the Russian Federation for Civil Defense, Emergencies and Disaster Response, the Volga Interregional Territorial Department for Nuclear and Radiological Safety Supervision of the Russian Federal Service for Ecological, Technical and Nuclear Supervision, Department for Federal Security in Ulyanovsk Region and other oversight agencies and bodies. One of the key factors is that all these inspections and audits did not reveal any fundamental breaches, which could lead to the risk of substantial assets loss or to suspension of work in RIAR's departments and divisions.

MOTIVATION OF TOP MANAGEMENT

The system of top management team motivation is based on the *unified integrated remuneration system of the ROSATOM State Nuclear Energy Corporation*. The salary of senior officers is made up of the defined part and annual remuneration bonus that depends on the key performance indicators (KPI). The KPI-based system is targeted at maximizing efficiency and promoting attainment of RIAR's overriding priorities through setting objectives for responsible executives and employees and establishing interrelation with the RIAR's goals. The KPI-based system has been developed based on the national policy in field of nuclear energy use, competitive principle of work, JSC "SSC RIAR" strategy and expansion programs and provides for economic, environmental and social performance.


2 KM

3 PRIMARY ACTIVITY RESULTS

RESULTS OF FINANCIAL AND ECONOMIC ACTIVITIES

3.1.

Financial and economical indicators

Indicator	Indicator values per year		
	2011	2012	2013
Revenue (sales revenue, financial investment revenues and asset sale revenue), mln RUR.	3 303.0	4 926.8	6676.0
Operating costs, mln RUR	2303.8	3455.4	4607.9
Wage and other payments, allowances for employees, mln RUR	1 125.2	1365.0	1598.5
Payments to capital suppliers, mln RUR	84.0	117.0	33.8
Gross fiscal charges, mln RUR	387.0	403.0	472.7
Investments to associations, mln RUR	75.1	80.1	78.6
Undivided economic value, mln RUR.	–670.0	–493.8	–115.5
Gross profit, mln RUR.	276.6	25.7	265.2
Total income tax charges, mln RUR.	42.2	0	4.8
(NOPAT, mln.RUR.	–448.0	–336.2	–175.7
Revenue (sales volume (activities, services)), mln RUR	3 120.9	4 458.8	5882.9
Labor efficiency, mln RUR/man	0.661	0.928	1.335
Self-efficiency (added value), %	42.9	31.4	34.7
Investments to research infrastructure, mln RUR	268.8	153	118.7

JSC “SSC RIAR” activities are aimed at solving important strategic tasks set by ROSATOM and the 2013 activities were focused on these tasks as well. A significant increase of the revenue resulted from the implementation of the Federal Target Program “Nuclear Power Technologies of New Generation for the Period 2010–2015 and until 2020”, where RIAR is the key executor of the following projects:

- multi-purpose fast test reactor MBIR;
- technical upgrading of fast test reactor BOR-60
- poly-functional radiochemical complex;
- development and justification of design options for industry-scale reactor-adjacent module to reprocess fast reactor spent fuel.

In 2013, the sales revenue made up 5 883 mln RUR that is 31.9 % higher as compared to 2012.

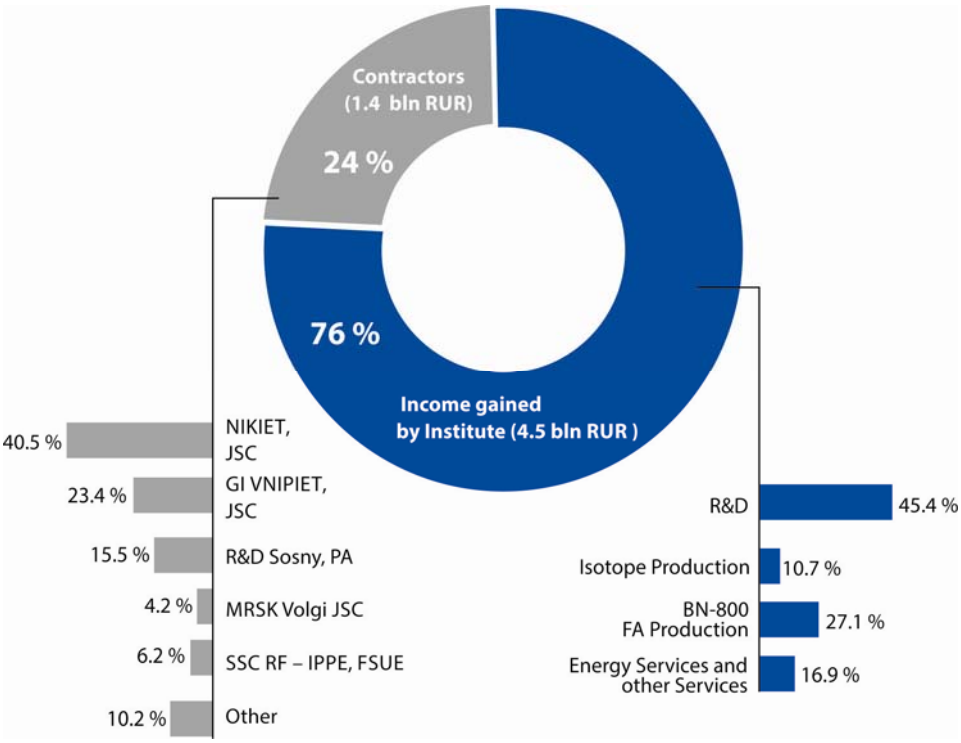
The geographical segment of the output sold preserves a steady tendency and shows the most stable growth of demand among the domestic customers.

Distribution of revenue per geographical segments and activity trends, mln RUR

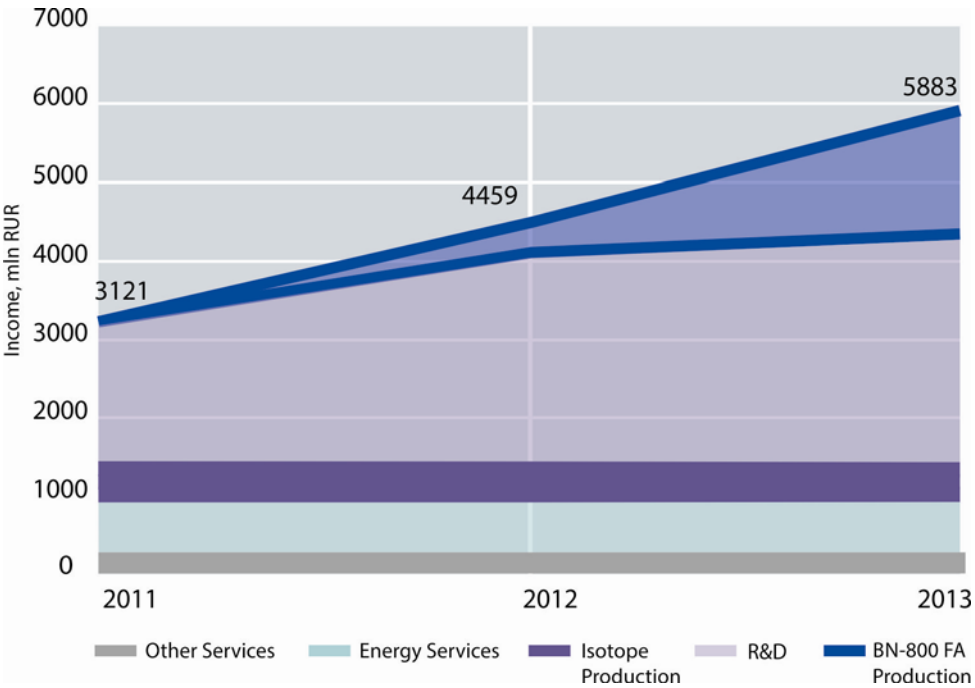
Indicator	Indicator values per year		
	2011	2012	2013
Revenue (sold output, activities, services)	**3 121**	**4 459**	**5 883**
Including Internal turnover	848	1 222	2 495
Distribution by geographical segments:			
Russian Federation	2 802	4 127	5 466
CIS	27	35	20
Non-CIS States	292	296	397
Distribution by activity trends:			
Fabrication of FAs for reactor BN-800	0	270	1 207
R&D	1 774	2 867	3 381
Isotopes production	372	364	479
Energy services	829	799	620
Other services	146	159	197

In 2013, the bulk of revenue was received from R&D activities and made up 57.5 % from the total revenue: radionuclides production – 8.1 %, energy and other services – 13.9 %, fabrication of FAs for reactor BN-800 – 20.5 %. A fraction of activities done through subcontractors made up about 24 % from the total revenue of JSC “SSC RIAR” that is 3 % than in 2012.

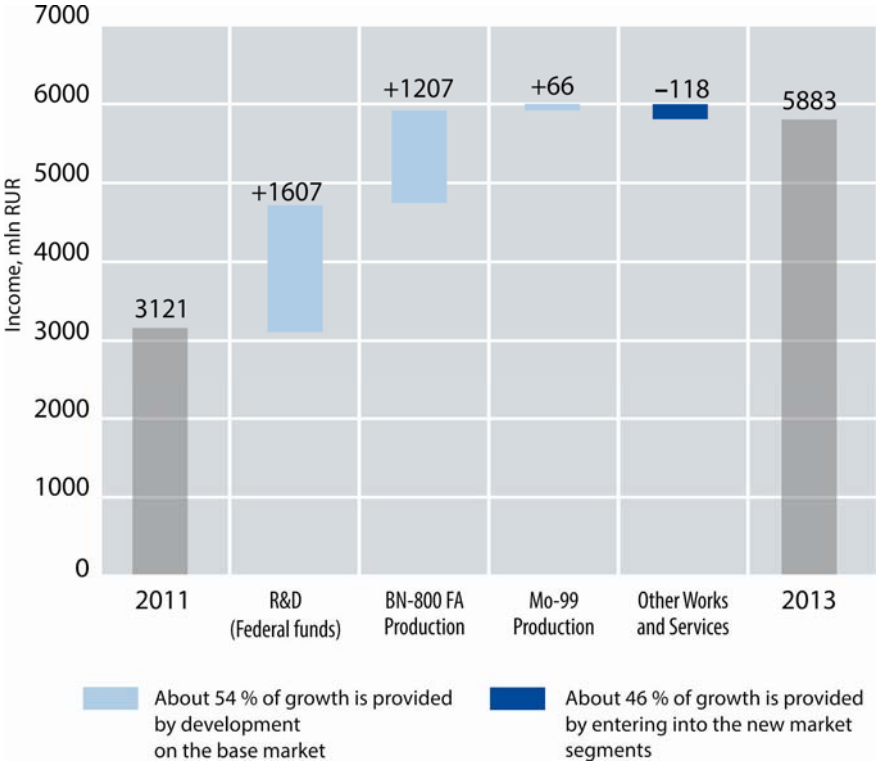
The revenue growth in the reporting period also resulted from the R&D activities. There are several reasons for such growth: increase of funding under the Federal Target Program “Nuclear Power Technologies of New Generation for the Period 2010–2015 and until 2020”, commencement of innovative production and entry to new market segments. Speaking about the dynamics of development, it should be mentioned that about 47 % of the revenue growth in 2014 (as compared to 2011) will be provided by the development at the existing markets and 53 % – by entry to new ones.



Structure of revenue 2014 and fraction of key co-contractors



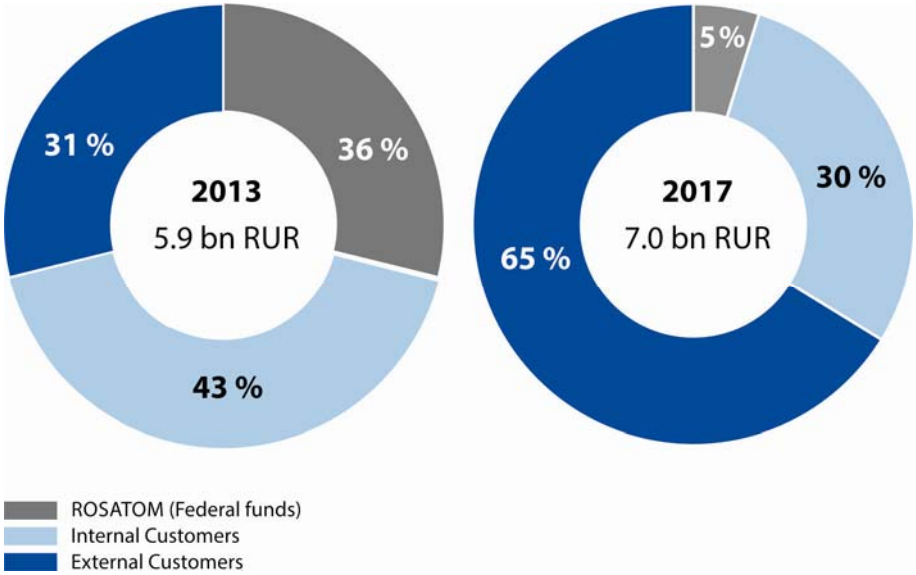
Dynamics of JSC "SSC RIAR" revenue for 2011-2013.



Factors of JSC "SSC RIAR" revenue growth for 2011–2013

The reason for the decrease in the revenue related to the energy services rendered for 2011-2013 is the movement of the service rendering functions to a subsidiary enterprise “RIAR-GENERATION”.

In the long term, JSC “SSC RIAR” plans to develop its activities by increasing the fraction of innovative products output and by the year of 2017, about 65% of all activities will be carried out at the expenses of customers out of the ROSATOM.



Structure of customers per years

Распределение выручки от реализации относительно заказчиков продукции

3.2.

NUCLEAR REACTORS PHYSICS, IRRADIATION TECHNIQUES AND SAFETY OF NUCLEAR FACILITIES

Research Reactors Complex (RRC) of JSC "SSC RIAR" renders comprehensive services to other organizations, including foreign ones. The most important directions of the RRC activities are:

- generation of experimental data on physics, fission gas release, behavior of fuel rods and FAs material required for verification of computational codes and justification of safety of existing reactors and those under development;
- simulation of stationary and transient conditions and examination of fuel rods and FAs characteristics under different conditions, including design-basis accidents;
- development of techniques and hardware components to examine FAs, fuel rods and their fragments under accidental conditions; in reactors and hot cells;
- development and tests of devices for diagnostics of state of nuclear power facilities and their safe operation;
- accumulation of isotopes for medical and industrial purposes and irradiation of materials to change their properties.

Research Reactors Complex comprises five research reactors, of which performance indicators are given below.

Key reactors performance indicators for 2013

Indicator	SM	RBT-6	MIR	RBT-10/2	BOR-60
Max capacity, MW	90	6	53.7	10	53
Utilization factor, rel. unit					
scheduled	0.67	0.59	0.67	0.76	0.59
actual	0.71	0.59	0.67	0.76	0.59
Capacity factor, rel. unit	0.87	0.98	0.34	0.78	0.79
Channels utilization factor, rel. unit					
scheduled	0.76	0.3	0.48	0.32	–
actual	0.77	0.3	0.48	0.32	–
Operating time, days					
scheduled	245	216	244	278	215
actual	259	216	244	278	215
Number of shutdowns	27	33	17	33	9
including unscheduled	1	–	–	–	1

Key activities carried out at the JSC “SSC RIAR” research reactors in 2013 are as follows:

- capsule and loop tests of dummy fuel and absorbing elements, neutron sources and other core components of reactors having different coolants under the stationary, transient and design-basis accident conditions;
- in-reactor examination of the effect of neutron flux and reactor emission on the properties of the structural, absorbing and fuel materials of various-purpose nuclear facilities;
- development of techniques and experimental rigs for in-reactor tests and examinations of mechanical, electro- and thermo-physical characteristics of materials intended for nuclear and fusion reactors;
- development of irradiation techniques for accumulation of transplutonium elements and radioisotopes and transmutation of minor-actinides;
- development of techniques to maintain and control the reactor chemistry, decontaminate equipment from research and power reactors and carry out related experimental research;
- development of techniques for thermo-hydraulic and neutron-physical calculations in support of safety analysis for research reactors and experimental rigs;
- development and fabrication of gauges to control in-reactor temperature, neutron flux and linear displacements;
- development and fabrication of automated systems to collect and process experimental data during in-reactor experiments;
- calculations and experiments to justify safe handling of unirradiated and irradiated nuclear materials.

Reactor MIR

Several fuel rods of the previously tested FA were irradiated up to high burnups under the program aimed at the development and implementation of a cassette-type core for a floating NPP to meet the non-proliferation requirements.

Irradiation of the second batch of samples fabricated from a pilot low-activated titanium alloy PT-542 was completed to test its mechanical properties.

In loop facility PV-2 there were started tests of experimental fuel rods with claddings made of improved zirconium alloys. The fuel rods were tested as a part of the second fuel assembly with square spacer grids (TVS-KVADRAT) under the boric-lithium chemistry with a direct supply of gaseous hydrogen into the primary coolant of the loop facility. During the scheduled reactor outage, interim examinations of these fuel rods were done in the reactor storage pool.

To justify the design criteria of fuel performance under the transient conditions, two more experiments were performed to simulate the power ramping for the full-size fuel and gadolinium rods removed from the spent VVER-1000 FAs.

The following items continued their testing in the reactor:

- FAs with modified advanced fuel elements with a dispersed fuel composition for transport NPPs to justify the components of a new-generation nuclear submarine reactor RITM;
- Experimental fuel rods made of advanced cermet fuel with claddings made of modified zirconium and chromium-nickel alloys.

Preparation of the gas-cooled loop facility PG-1 was continued to perform reactor tests of fuel elements, FAs and structural materials intended for a space NPP.

Below, there is brief information about the key experiments performed in reactor MIR.

Brief information about loop tests and experiments performed in reactor MIR

Purpose of the test	Fuel rod length, mm	No. of fuel rods	Fuel burnup
Generation of the experimental data on the behavior of fuel assemblies with fuel rods made of dispersed fuel composition intended for floating NPPs	1000	9	More than 1 g/cm^3
Generation of the experimental data on the performance of fuel rods of advanced design with intermetallic and uranium dioxide	250	120	0.8 g/cm^3
Generation of the experimental data on the behavior of the FAs with modified advanced fuel elements with a dispersed fuel composition for transport NPPs.	1000	19 31 55	0.3–0.8 g/cm^3
Experimental justification of the performance of modified VVER-1000 fuel and gadolinium rods under the power ramping conditions (two experiments with full-size spent fuel rods and gadolinium rods)	3840 1000	3+1	42–47 MW×day /kgU
Generation of the experimental data on the corrosion resistance of claddings made of improved zirconium alloys in the boric-lithium chemistry	about 1000	12	2.6 MW×day/kgU
Generation of the experimental data on the tension, fracture toughness and static crack resistance of samples made of low-activated titanium alloy under irradiation in ammonia chemistry	–	25	–

Reactor RBT-10/1 and RBT-10/2

Activities to decommission reactor RBT10/1 were completed: the control board was dismounted, including control and protection system racks and control panels, measurement gauges, power cables and connection lines. A dossier was prepared and sent to Rostechnadzor to take reactor RBT10/1 off the register of the State Nuclear and Radiation Safety Authority Control.

Activities to extend the lifetime of reactor RBT10/2 till 2027 were completed. A Statement of Readiness was issued confirming the extended reactor operation.

An automated fire alarm and system of annunciation and management of human evacuation at fire were installed and put into operation.

Reactor RBT-10/2 was used for silicon doping and production of radionuclides: Iodine-131 and Molybdenum-99, which was accumulated on a weekly basis.

Reactor BOR-60

The following experimental activities were performed:

- Irradiation of structural materials (zirconium alloys and structural materials of different reactor components) at 320–450 °C;
- Tests of capsule with dysprosium hafnate at 500–600 °C;
- Tests of dummy absorbers made of highly-enriched boron carbide, fuel rods and antimony-beryllium neutron source and tube claddings for reactor SVBR-100;
- Tests of BREST-OD dummy absorbers made of boron carbide pellets with a lead bound and dysprosium hafnate pellets with a helium bound;
- Tests of dummy fuel rods with nitride fuel and claddings made of steel ЭП823-Ш (EP823-Sh);
- Test of steels ЭП823-Ш (EP823-Sh), ЭП302-Ш (EP302-Sh), 09Г2С (09G2S) and welded joints materials at 425–550 °C for reactor BREST-OD-300;
- Tests of MBIR MOX-containing dummy fuel pins to justify their performance;
- Tests of MBIR dummy absorbers of a ring and cylindrical geometry made of highly-enriched boron carbide ;
- Tests of structural materials under the contracts with CEA and AREVA (France) and TerraPower (USA);

Along with the research activities, the reactor was used to accumulate radionuclide stroncium-89.

Below, there is a brief description of experiments performed in the BOR-60 reactor during the reporting period.

Characteristics of fuel assemblies unloaded from reactor BOR-60

Fuel composition	Number of		Enrichment in U-235, %	Pu-239 mass fraction, %	Fuel type	Maximal test parameters			FA features
	FAs	Fuel rods per FA				Fuel burnup, %	Linear density of fuel flux, kW/m	Neutron fluence (E ≥ 0.1 MeV), × ×10 ^{22} cm^{-2}	
UO_2	22	37	75	–	Vibropacked	19.1	38	14.9	Claddings made of steel ChS-68; wrappers made of steel EP-450
$0.8UO_2 + 0.2PuO_2$	4	37	72	95	Mixed vibropacked	19.2	23	14.7	
(U, Pu)N	1	7	11.5	95	Nitride mixed	1.3	30	3.8	Dismountable; BREST-OD-300 fuel pin dummies; fuel pin tubes made of steel EP-823
$0.8UO_2 + 0.2PuO_2$	1	19	75	Up to 95	Mixed vibropacked	4.8	42	3.8	Dismountable; MBIR fuel pin dummies, fuel pin claddings made of steel ChS-68; wrappers made of steel EP-450

Characteristics of fuel assemblies irradiated in reactor BOR-60

Fuel composition	Number of		Enrichment in U-235, %	Fuel type	Maximal test parameters			FA features
	FAs	Fuel rods per FA			Fuel burnup, %	Linear density of fuel flux, kW/m	Neutron fluence (E ≥ 0.1 MeV), × ×10 ^{22} cm^{-2}	
UO_2	111	37	75	Vibropacked	14.4	36	12.6	Claddings made of steel ChS-68; wrappers made of steel EP-450
$0.8UO_2 + 0.2PuO_2$	7	37	72	Mixed vibropacked	17.2	22	13.1	
UO_2	1	7	10	Pellet	2.3	37	8.1	Dismountable; SVBR-100 dummy fuel rod tubes made of steel EP-823
(U, Pu)N	2	7	11.5	Nitride mixed	0.4	28	1.2	Dismountable; BREST-OD-300 fuel pin dummies; fuel pin tubes made of steel EP-823

Characteristics of material testing assemblies irradiated in reactor BOR-60

Irradiation rig	No. of assemblies	Samples T, °C	Achieved neutron fluence (E ≥ 0,1 MeV), × ×10 ^{22} cm^{-2}	Characteristics of samples
Flow-through, non-instrumented	11	320–450	Up to 11.0	Structural materials of different reactor components, including zirconium alloys
	3	320–550	Up to 11.0	Materials to accumulate strontium-89
	1	–	3.5	SVBR-100 dummy ammonia-beryllium neutron sources
	1	320–360	3.0	BREST-OD-300 dummy boron-carbide and dysprosium hafnate absorbers
Flow-through, instrumented	1	520–550	6.5	SVBR-100 fuel rod tubes samples
	2	420–550	2.6	BREST-OD-300 fuel rod tubes samples

Reactor SM

A great attention was paid to optimize the reactor core and refueling procedures to increase the efficiency of its experimental channels. New rigs were designed for high-dose instrumented irradiation of structural materials. Activities were continued to develop a new more effective fuel with less poison neutron absorption. A technology was mastered to load/unload an experimental channel 24.5mm in diameter into a fuel assembly inserted into the reactor core.

During the reporting period, the following material tests were done under the frame of the space-purpose nuclear facility:

- Irradiation of samples of refractory materials, in particular material TSM-7, in the reactor core;
- Irradiation of samples of promising fuel located in the fuel rod dummies under different power levels as well as absorber materials in the reflector cells;
- Irradiation of a control rod dummy in the reflector cell;
- Justification of a possibility to carry out accelerated tests of a core shell in the specially developed irradiation rig.

Under the contract with AREVA (France) on the investigation of the stress corrosion cracking of samples made of alloy Inconel 718 irradiated at 300 °C and fast neutron (E > 1MeV) flux (0.7–1.6)10^{14} $cm^{-2}s^{-1}$, design documents for the irradiation rigs were elaborated to irradiate samples in the reflector cells located in the middle and close to the core; instrumentation stands were developed as well.

Techniques are being developed to conduct high-dose instrumented irradiation in the upgraded reactor core to test creep, long-term strength and corrosion cracking of structural materials for new generation nuclear power facilities.

The following radionuclides were accumulated: curium-244–248, plutonium-242, americium-243, californium-248, 249, 252; phosphorous-33; gadolinium-153; iridium-192; cobalt-60; tungsten-188; nickel-63; iron-55,59; tin-113, 119m; stroncium-89; iodine-125, 131; lutetium-177.

Reactor RBT-6

Key experiments performed during the reporting period:

- Tests of samples of promising materials for radiation shielding and absorbers under the space facility program;
- Tests of gas-filled samples made of stainless steel 18ХН9 to investigate the effect of irradiation on the long-term strength of steel and welded joint metal at 550–600 °C and fast neutron (E > 0.1 MeV) flux 5×10^{13} $cm^{-2}s^{-1}$ in helium;
- Examination of creep of samples made of alloy ВЖ159-ИД (VZh159ID) under stress ranging from 43 to 96 MPa and fast neutron (E > 0.1MeV) flux $5.6\cdot10^{13}$ $cm^{-2}s^{-1}$; once the tests were completed, there were performed short-term in-reactor mechanical tensile tests at 850 °C at the experimental facility “Neutron-8”;
- Irradiation of new types of targets to accumulate molybdenum-99 in the reactor channels.

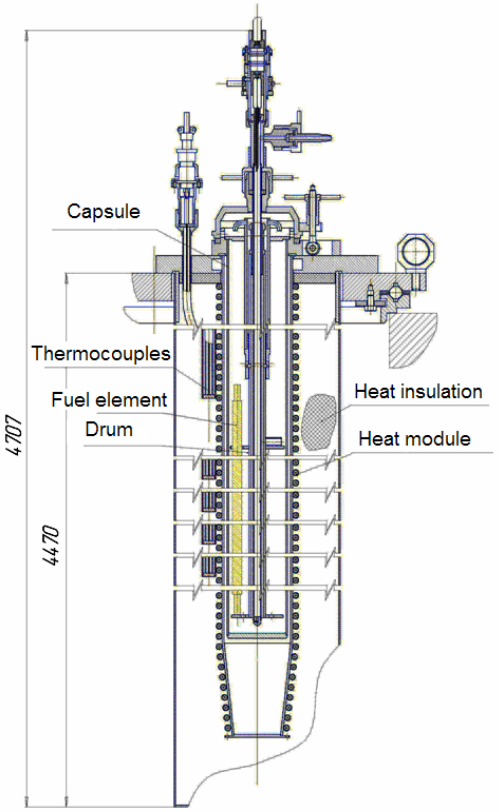
REACTOR MATERIALS SCIENCE; TECHNIQUES TO TEST MATERIALS AND COMPONENTS OF NUCLEAR FACILITIES

The main way to improve the efficiency of the electricity production at NPPs with reactor VVER is to decrease the uranium consumption per a unit of energy. It can be achieved by increasing the uranium mass in the fuel assemblies as well as its enrichment. The uranium mass can be increased by having longer fuel meats and optimization of the fuel pellet dimensions (larger OD and smaller diameter of the central hole); the overall FA dimensions being the same.

In 2013, JSC “SSC RIAR” proceeds with post-irradiation examinations of the improved VVER-1000 fuel rods and fuel assemblies. Experimental data were generated on the condition of fuel rods with longer fuel meats and pellets with OD 7.6 mm and ID 1.2 mm. The fuel rods were spent in the TVS-2M fuel assemblies at the 1st unit of the Balakovo NPP. The conditions of fuel rods with the increased uranium mass were shown to be the same as the standard VVER-1000 fuel rods. Neither of fuel rod performance parameters showed any lifetime exhaustion. A fuel rod from FA TVSA-5M that became leaky because of a tight fuel-to-cladding contact was examined to assess the fuel state and find the effect of the leakage on the fission gas release. It was shown that this leaky fuel rod caused less damage as compared to those keeping a fuel-to cladding gap since the overheating does not cause structural changes and generation of bulk hydrides along the fuel rod length.

To justify the safe dry storage of spent nuclear fuel, JSC “SSC RIAR” examines the behavior of full-size irradiated VVER-100 fuel rods in a hot cell under the conditions simulating the dry storage.

Dry storage stand equipment



Electrically-heated module

The fuel rods are tested in several stages. After each test stage that lasts about a year the fuel rods are removed out of the stand and sent for non-destructive examinations. Then they are returned for further tests. By now, five test stages have been completed and all fuel rods under tests performed their integrity. No changes in the corrosion state and mechanical properties of claddings were revealed that could cause leakage during the dry storage. The experimental data will be used to verify the VVER-1000 SNF behavior models under the dry storage. The fuel rods will be tested for the next several years.

Zirconium alloys are supposed to be used as cladding materials for the floating and low-power NPPs. They are supposed to provide long-term operation at full power keeping their resistance to the uniform corrosion and hydrogen pick-up and showing no sensitivity to the coolant chemistry and pit corrosion. The optimization of the elementary composition of alloys E110 and E635 is considered to be the key way to provide the improved corrosion resistance of the fuel rod claddings. To reveal the advantages of the modified alloys, JSC “VNIINM” fabricated a batch of fuel rods with claddings made of zirconium alloys E110 and E365 with different alloying options. The fuel rods were irradiated in the MIR reactor loop channels. The post-irradiation examinations of fuel rods tested under the same conditions allowed a correct comparison of changes in the structure and properties of different claddings and selecting the most preferable option.

It is known that one of the factors limiting the fuel rod performance is corrosion of claddings caused by their physic-chemical interaction with fuel and fission products. As for fast reactors with liquid metal coolant, this problem is quite urgent because of high temperature of claddings and fuel, high burnup and, consequently, high fission gas amount as well as its intensive release to the cladding. Cladding corrosion was examined of the experimental fuel rods with (U, Pu)N irradiated in reactor BOR-60 up to 12 % burnup. Data were generated on the distribution of fission gas in the fuel rod cross-sections and its migration to the cladding. It was shown that nitride fuel, as compared to oxide fuel, is more inert to the stainless steel cladding. Corrosion of claddings made of steel ChS-68CW spread by a depth of less than tens micrometers in the fuel rod cross-sections and localized on some cladding areas.

Dummies of the SVBR-100 fuel rods were examined after the first irradiation stage in reactor BOR-60. The fuel meats were made of UO_2 fuel fabricated by different technologies (aqueous standard and aqueous nano); claddings were made of steel 16Х12ВМСФБР-Ш (EP-823-Sh). The effect of irradiation on the mechanical properties of the cladding material was studied. The results of the micro-structural examinations (TEM) showed the accumulation fine-dispersed precipitates to be the cause of a reduced plasticity at the fuel rod top and center and accumulation of dislocation loops to be the cause of low-temperature hardening and loss of plasticity. On the whole, the generated experimental data demonstrated a satisfactory state of fuel rods and non-exhaustion of their lifetime. Irradiation is continued.

In 2013, the Reactor Materials Testing Division completed the development and fabrication of a prototype facility for the mechanical puncture of claddings and measurement of the gas parameters inside a fuel rod. The measured gas parameters are needed for the BN-800 reactor process chamber at the Beloyarsk NPP. The technique to measure the gas volume and pressure in the fuel rods was certified by the State Center for Standardization, Metrology and Tests.

In 2013, the Institute developed techniques to examine thermo-physical properties of irradiated materials. These techniques were applied to study the thermal capacity, temperature conductivity and potential energy release rate of irradiated graphite. These results will be introduced into the upgraded database on the RBMK graphite stacking and can be also used for high-temperature gas-cooled reactors.

A technique was developed to prepare oxide films generated on the zirconium cladding surface to examine them by TEM. This technique was used to study the microstructure of unirradiated zirconium oxide films and analyze the phase and chemical composition.

RADIOCHEMISTRY, NUCLEAR FUEL CYCLES

In 2013, RIAR carried out the research and development of closed fuel cycle technologies under the Federal Target Program "Nuclear Power Technologies of New Generation for the Period 2010–2015 and until 2020", state contracts and agreements, namely:

- Development and experimental justification of procedures and equipment for the nitride fuel reprocessing line to be used at the industrial reactor-adjacent module for fast SNF reprocessing under the "Breakthrough" Project;
- Fundamental research of the molten salt system properties for promising nuclear fuel cycles and reactor systems;
- Development of equipment, procedures, engineering systems and design documents for the poly-functional radiochemical complex constructed at the RIAR's site;
- Research work to justify homogeneous molten salt reactor systems;
- Development of analytical methods for closed fuel cycles, radionuclide production and radiochemical support of PIE at JSC "SSC RIAR";
- Arrangement of a new experimental site to master the refabrication of fast reactor nitride fuel using real SNF reprocessing products and minor actinides – neptunium and plutonium.

During the reporting period, RIAR continued the experiments and calculations to study the fundamental issues related to molten salt reactor systems. This work was aimed at the justification of the concept of a burner for long-lived radiotoxic actinides containing in solid spent fuel; this concept should provide safety and efficiency and reduce waste and minimize the proliferation risk. The research is at the design stage to experimentally justify and optimize the selection of the salt composition and design of a molten salt reactor. Probably, in future, the proposed concept could be used in the development of a (Th–U)-breeder as a new element of the nuclear engineering to involve a new raw material – thorium.

In the frame of the international cooperation between JSC "SSC RIAR" and European organizations on the molten salt reactors, Russia entered the International Forum "Generation-IV". In June 2013, JSC "SSC RIAR" hosted an International Forum "Generation-IV" Committee Meeting on the molten salt reactor.

PRODUCTION OF RADIONUCLIDE SOURCES AND CHEMICALS

In 2013, the nomenclature of produced radionuclides changed because of changes in the market situation and technical capabilities of the Institute. Due to a stable decrease in the market demand and evident unprofitability, the production of phosphorous-33 was stopped. The implementation of the Federal Target Program "Nuclear Power Technologies of New Generation for the Period 2010–2015 and until 2020" required re-equipment of a part of hot cells used for gadolinium-153 production to carry out research and design activities related to the SNF reprocessing. So, the gadolinium production was reduced as well. The availability of the BOR-60 cells to accumulate stroncium-89 and gadolinium-153 was also reduced in connection to the increasing demand in reactor BOR-60 to carry out material tests. To keep the production volume of the above radionuclides in 2013, targets were irradiated in reactor SM,

In 2013, RIAR did not produce cobalt-60 since the hot cell used for its production was re-equipped to fabricate MOX fuel. To continue producing cobalt-60, a decision was taken to arrange a new production area. This initiative was supported by ROSATOM and became a part of the Project "Upgrading and Development of Radionuclides Production at JSC "SSC RIAR to Provide the Development of Nuclear Medicine and Radiation Technologies" implemented together with the Ulyanovsk State University under the contract with RF Ministry of Science and Education.

The above decrease was compensated by an increase in producing other traditional radionuclides: iridium-192 supplied in the form of irradiated disks and gamma-sources (the total activity of iridium-191 exceeded 44.40PBq (1.2 million Ci); the production of selenium-75 increased by more than 10%.

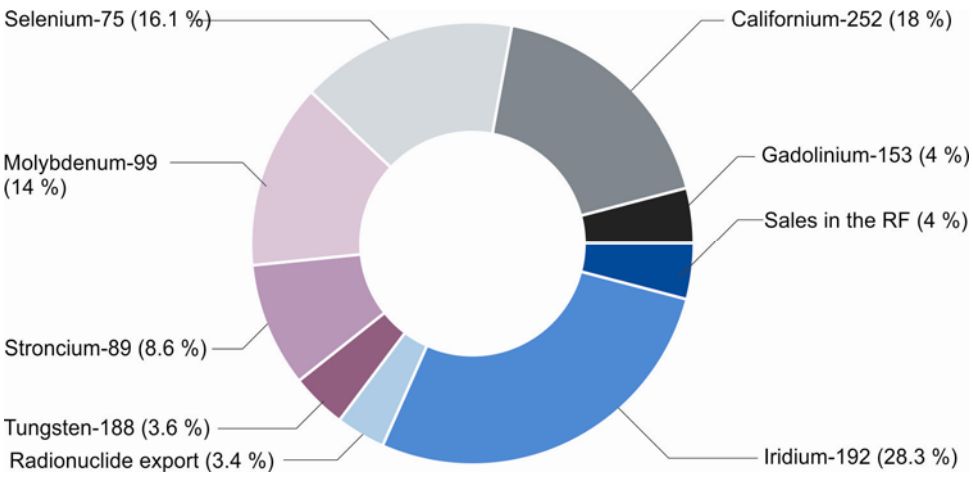
As compared to 2010–2012, the demand in tungsten-188 increased by more than 50 % that is related to its clinical application in the EU countries. The number of contracts signed showed a further increase in the demand in this radionuclide.

A real success in 2013 is a significant increase in the iodine-131 production. However, the achieved activity (accounting the calibration) – 25.05 TBq/year (650 Ci/year) is far from the target one. The further increase in the output requires upgrading of the production facilities regarding both fabrication of targets and their irradiation. This work is done under the ROSATOM's investment project and Project "Upgrading and Development of Radionuclides Production at JSC "SSC RIAR" to Provide the Development of Nuclear Medicine and Radiation Technologies".

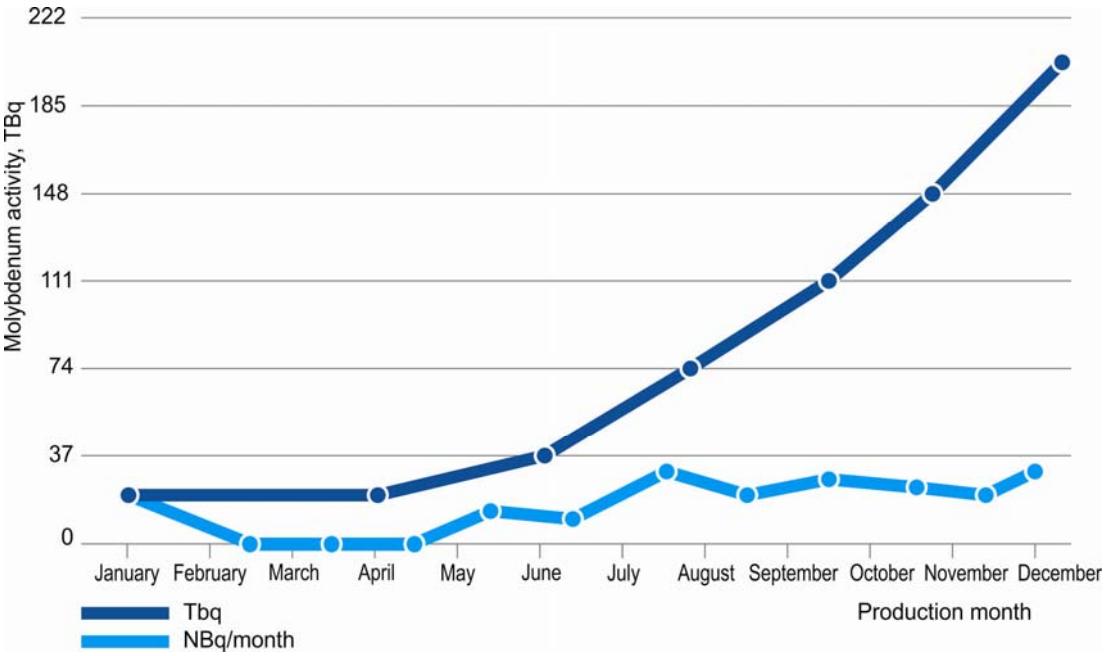
A key point to increase the radionuclides production profit at JSC "SSC RIAR" is to produce molybdenum-99. The primary task of the year 2013 was the commencement of the production on a regular basis and entry into the market to demonstrate our capability to supply the radionuclide on the regular basis and provide its high quality.

The production of molybdenum-99 on the regular basis was started in May 2013. In May-June there were weekly supplies and in July we started supplying twice a week. In total we supplied more than 100 batches with the activity from 259 to 5920GBq (from 7 to 160Ci). We supplied this radionuclide to both Russian and four foreign customers. In 2013, there were no any disruptions and claims on quality.

In parallel, we prepared documents to register the product and completed the Drug Master Files to meet the European requirements.



Structure of radionuclides production; in brackets is the profit faction in %.



Production of molybdenum-99 in 2013 (activity is given as of the calibration date)

PRODUCTION OF MOX FUEL

In 2013, activities were focused on the fabrication of fuel assemblies with uranium-plutonium oxide fuel to provide the initial loading of the BN-800 hybrid core. To fabricate the fuel assemblies, there were used conventional Russian MOX-fuel fabrication technologies:

- technology for pellet fuel fabrication from mechanically mixed uranium and plutonium dioxides produced by aqueous methods;
- vibropacking technology for granulated fuel produced by the co-precipitation of uranium and plutonium dioxides from alkali metal molten chlorides.

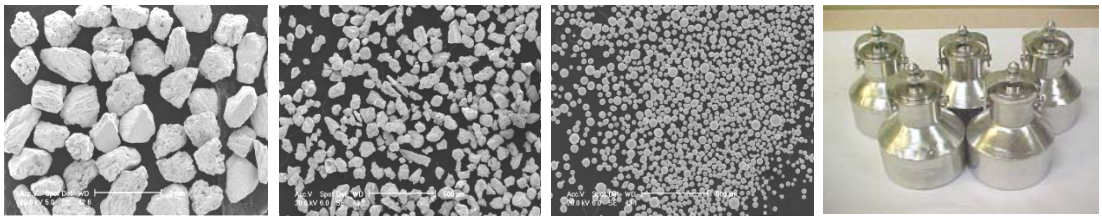
The fuel assemblies with pellet fuel were fabricated together with the Production Association “Mayak”, where pellets were fabricated and fuel pins were assembled; then they were supplied to RIAR for the FAs assembling.

All the procedures (production of granulated MOX composition by pyroelectrochemical granulation, fabrication of vibropacked fuel pins, analytical support and certification) were done in the full scope at RIAR using new and upgraded equipment.

By the end of 2013, there were fabricated 106 fuel assemblies with MOX fuel for the initial loading of the BN-800 reactor, including:

- 66 fuel assemblies with pellet MOX fuel;
- 40 fuel assemblies with vibropacked MOX fuel.

The Figures below show the materials and equipment to produce vibropacked MOX fuel (three FAs with vibropacked MOX compositions).



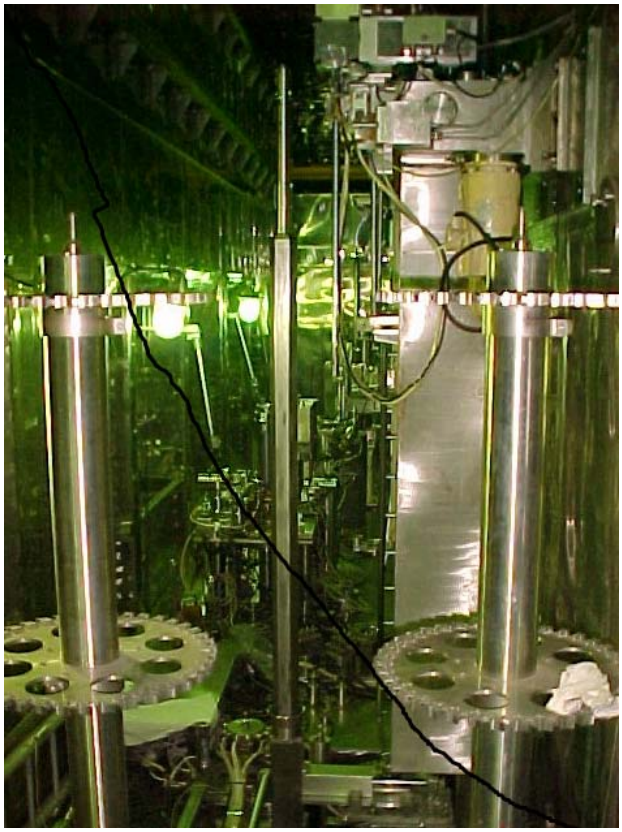
a b c d

MOX granulate fractions for BN-800 FA
Size of granules: from –1000 to 600μm (a); from – 400 to 250μm (b); from – 100μm (c); containers with granulate fractions to be sent to the vibropacking area (d)

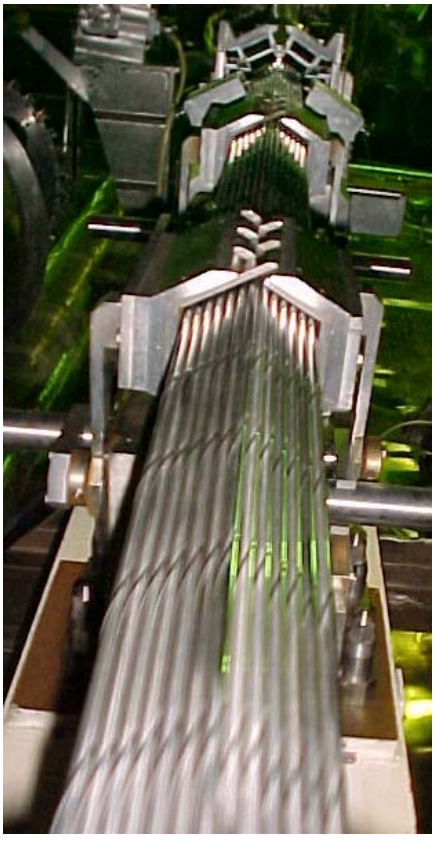
a

b

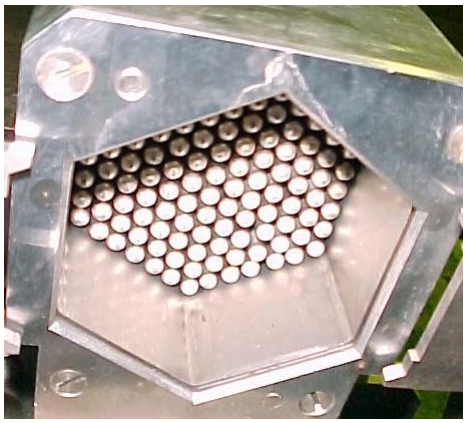
Fuel pins for the BN-800 hybrid core (a) and their marking (b)



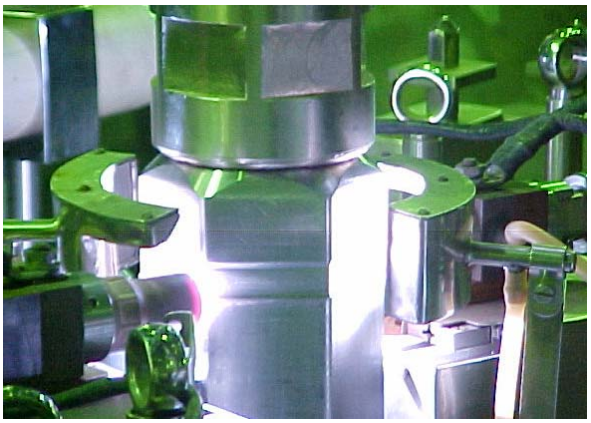
Machine to fabricate fuel assemblies



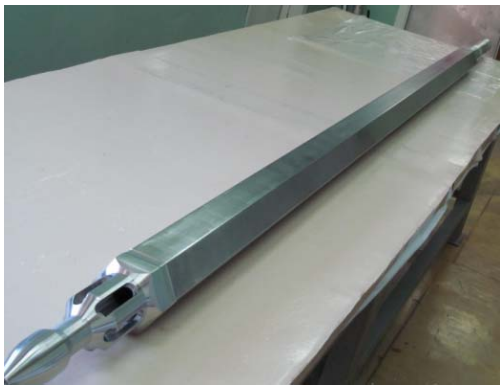
Fuel pin bundle assembling



Insertion of a fuel pin bundle into the duct



Welding of an FA head



BN-800 FA dummy

Transportation of an FA to the warehouse

To provide the fabrication of BN-800 MOX fuel assemblies at JSC “SSC RIAR” and meet the current safety rules, activities covered by the Federal Target Program “Nuclear Power Technologies of New Generation for the Period 2010–2015 and until 2020” were fulfilled by constructing a new facility under the Project “Technical Upgrading of the Fuel Complex to Fabricate Fuel Assemblies”. The facility was accepted by the ROSATOM.

In 2013, three experimental fuel assemblies with MOX fuel were successfully tested in the BN-600 reactor. They were fabricated in 2010 under the support of “Rosenergoatom” Concern under the activities on the justification of the MOX fuel application in the fast reactors. The parameters achieved in the BN-600 reactor exceed the ones designed for the operation of vibropacked fuel in the BN-800 core.

Maximal operating parameters for an FA with MOX fuel

Parameter	Tests of an experimental FA in reactor BN-600	FA operation	
		In the BN-800 hybrid core	In the BN-800 core*
Linear thermal flux density, kW/m	43.7	36	47
Cladding T, °C	697	710	710
Damage dose, dpa	79	68	83
Burnup, % h.a.	10.4	7.4	8.9

*core fully loaded with MOX.

In 2014, under the support of "Rosenergoatom" Concern, there will be performed non-destructive and destructive post-irradiation examinations of fuel pins and fuel assemblies. By the PIE results, there will be issued recommendations on the irradiation parameters of vibropacked fuel pins in the BN-600 that should correspond to the nominal operating parameters of the BN-800 fully loaded with MOX; recommendations on changes in the designed parameters will be issued as well.

In 2013, activities were carried out to provide reactor MBIR with fuel. The activities were carried out in several directions.

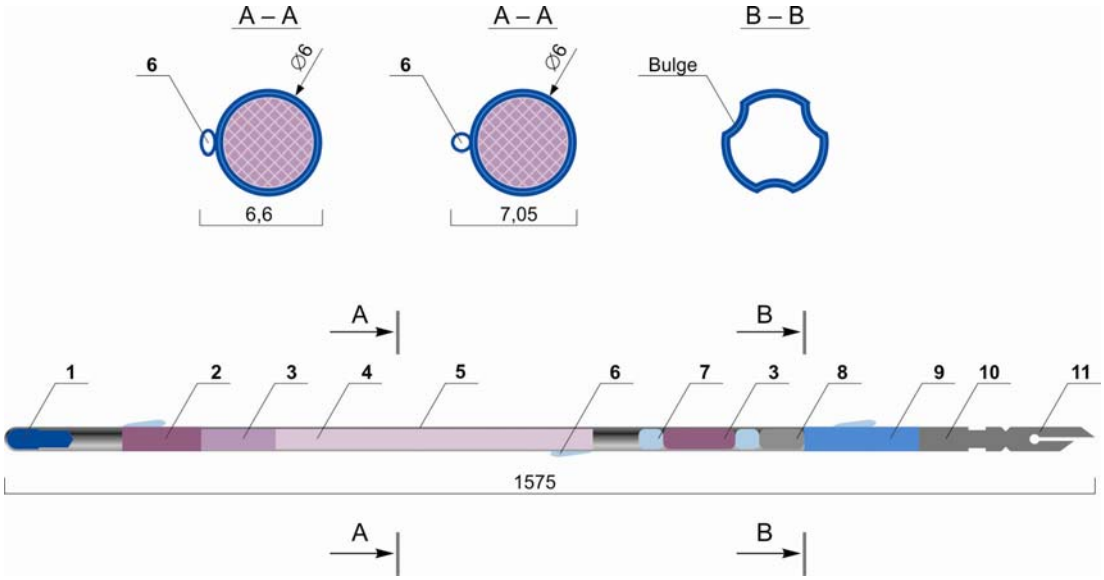
To confirm the performance of vibropacked fuel pins for reactor MBIR, tests of fuel pins with vibropacked MOX fuel were continued in reactor BOR-60. For instance, when testing an experimental FA, the linear thermal flux density achieved 49.3 kW/m for fuel pins containing a mechanical mixture of granulated uranium and plutonium dioxides. By the end of 2013, this FA achieved the maximal burnup of 5 %h.a. at the maximal cladding temperature of 650 °C. The FA was unloaded for the interim inspection and examination of separate fuel pins. The irradiation will be continued.

To confirm the performance of fuel pins with vibropacked MOX fuel with the mass fraction of plutonium dioxide more than 30% in the fuel meat, there were fabricated batches of granulated fuel to be used to fabricate dummy fuel pins of reactor BOR-60.

To provide reactor MBIR with fuel – metallic uranium powder (one of the components of the vibropacked fuel meat), JSC "NZHK" developed a spraying technology to fabricate a new generation getter to meet the RIAR's specifications. The getter was tested to show that its chemical composition corresponds to the specifications and is as good as metallic uranium powder made by a calcoithermal reduction.

The new generation metallic uranium powder will be further tested together with granulated oxide fuel during the comparative reactor tests of an FA containing metallic uranium powder of different origin.

JSC “SSC RIAR” is the designer of the MBIR fuel pin and in 2013 started the calculations of the fuel pin performance. As the initial data, we took the reactor operation mode provided by JSC “NIKIET”, the chief designer of the reactor facility. The calculations were done by software Vikond2 certified by Rostechnadzor. The purpose of the calculations is to select the reactor operation mode allowing achieving the highest temperatures for the fuel meat and the highest stress for the fuel pin cladding. The performance of a fuel pin under these conditions is to be justified by the technical project.



MBIR fuel pin design and cross-sections: 1 – upper plug;
2 – spring-type stopper; 3 – breeder pellets; 4 – fuel meat;
5 – steel cladding; 6 – spacer wire; 7 – insertion in the form of a steel bushing;
8 – gas-permeable plug made of nickel wire; 9 – gas plenum;
10 – lower plug; 11 – cam slot

To implement the “Breakthrough”, one of the most important ROSATOM’s projects, three integrate experimental FAs were fabricated at JSC “SSC RIAR”, each of which contains four fuel pins with uranium-plutonium nitride fuel. The fuel pins were fabricated at JSC “Siberian Chemical Plant” and JSC”VNIINM”.

A large scope of preparatory activities was done, including:

- Issuing of design and process documents;
- Process tests of equipment using dummies of integrate experimental FAs;
- Upgrading of the production line to fabricate experimental FAs and improve the issued design and process documents by the test results.

The fabricated integrate experimental FAs were successfully accepted and sent to the Beloyarsk NPP for irradiation in the BN-600 core.

Under the “Breakthrough” project, some technical proposals were made about the design and fabrication technology of a fuel pin with uranium-plutonium nitride fuel based on the vibropacking technology. The above proposals were issued as an author’s certificate for a useful model.

3.3.

PROJECTS ON MANAGEMENT SYSTEM IMPROVEMENT

Improvement of the quality management system processes

In 2013 the work on operation and improvement of the certified quality management system was continued in compliance with ISO 9001 and National Military Standard GOST RV 0015-002 following the plans approved by Orders:

- as of 25.12.2012 No. 1110 “On activities on operation and improvement of the quality management system of JSC “SSC RIAR””;
- as of 26.02.2013 No.195 “On arrangement of the work on implementation of GOST RV 0015-002-2012”;
- as of 23.08.2013 No. 824 “On recertification audit of the quality management system of JSC “SSC RIAR” for compliance with GOST RV 0015-002-2012”;
- as of 16.10.2013 No. 64/1102-P “On audit of the quality management system of JSC “SSC RIAR” for compliance with ISO 9001:2008”;
- as of 09.12.2013 No. 64/1209-P “On audit of the quality management system of JSC “SSC RIAR” by JSC “TVEL””.

As per Order No. 1110 as of 25.12.2012 the work on improvement of the quality management system processes was performed in 2013 related to reformatting the quality management system process interaction pattern (Order No. 476 as of 22.05.2013) and updating the standards, process maps and quality guidelines of the enterprise.

Due to Order No. 6-st of the Federal Agency for Technical Regulation and Metrology as of 05.06.2012 “On adoption of National Military Standard of the Russian Federation GOST RV 0015-002-2012 “System of military equipment development and putting into production. Quality management system. General requirements” and its entry into force from January 1, 2013 for the certified enterprises (organizations)“, the implementation period for GOST RV 0015-002 was established as one year from January 1, 2013 to January 1, 2014.

Standard GOST RV 0015-002-2012 was implemented in compliance with National Military Standard GOST RV 0001-005-2006 “Defense products standardization system. Implementation procedure for GOST RV 0015-002 (Annex No. 195 to Order as of 26.02.2013), where the main milestones are stated:

- staff training in compliance with the requirements of a new revision of National Military Standard GOST RV 0015-002;
- analysis of the requirements of a new revision of National Military Standard GOST RV 0015-002 and documentation in the departments for compliance with the requirements of a new revision of GOST RV 0015-002, regulatory documents, updating the current documents including the technical ones;

- analysis of the peculiarities of metrological assurance and regulatory documents on metrological assurance (GOST R ISO/IEC17025-2009);
- updating (revision or modification) the quality management system documentation in order to meet the requirements of the implemented standard;
- agreeing the act on implementation with the Military Representative Office and submitting to the certification body.

As per Order No. 353 as of 15.04.2013 "On self-assessment in JSC "SSC RIAR" based on model ISO 10014 "Guidelines on reaping financial and economical benefits"" a comprehensive and systematic analysis of JSC "SSC RIAR" activity was performed.

Self-assessment is based on the expert method (staff opinion): staff members of the Institute fill in a questionnaire containing questions on eight sections representing eight quality management principles on which ISO 9000 series quality management system standards are based. Self-assessment was performed among Director Deputies, Heads of divisions and Heads of subordinated structural units: departments, laboratories, groups, bureaus. The responses to the questionnaire were given by 30 subdivisions, which made up 45 % of the total number of the interviewees, 45 filled questionnaires were received.

The results of the staff questionnaires allowed compiling an integrated view of the organization internal environment, its weak and strong points. Based on the self-assessment results the quality management system of JSC "SSC RIAR" in general complies with the third maturity level: the key management principles inside the organization are implemented, however not for the majority of the areas. The self-assessment results are presented in the *Report on self-assessment results of JSC "SSC RIAR" based on ISO 9004:2009 in 2013*.

In executing Order No. 70 as of 03.02.2012 "On training of Heads of subdivisions" in 2013 the consultants of OOO "TKB "INTERSERFIKA"" completed in full a two-year integrated program of information-consultation workshops for the heads and representatives (specialists) of JSC "SSC RIAR" subdivisions. In the reporting year the information and consultation workshops were held on the following topics:

- "A world class company: key differences";
- "Operational management modern methods. Promising product/service quality planning";
- "Operational management modern methods. Analysis of the types and impact of potential refusals";
- "Operational management modern methods. Statistic management of the processes and management plan";
- "Operational management modern methods. Internal audit adding value. Management system audit, process audit, product audit";
- "Development of the subdivision staff. Mentoring and motivation tools";
- "Management and interaction during organization changes".

In 2013 the information-consultation workshops on the given topics were attended by 82 employees of JSC "SSC RIAR", 232 corresponding certificates were received.

PRACTICES RELATED TO CUSTOMER SATISFACTION INCLUDING THE RESULTS OF RESEARCH TO ASSESS CUSTOMER SATISFACTION

Customer satisfaction assessment

In order to determine the level of conformance of JSC “SSC RIAR” to the requirements of a consumer of the products and services, a customer satisfaction assessment is performed. The arrangement of work, methods and data acquisition frequency, method of analysis of the data characterizing customer satisfaction are described in Enterprise Standard STO DP 086–410–2012 “Quality management system of JSC “SSC RIAR”. Customer satisfaction monitoring and assessment”.

To perform the customer satisfaction assessment questionnaires of two types have been compiled following the results of 2013:

- on service quality (R&D);
- on product quality.

Both questionnaire types can be divided into several parts with questions on contracting, obligations to meet the requirements, interaction with the consumer, cooperation results and product quality.

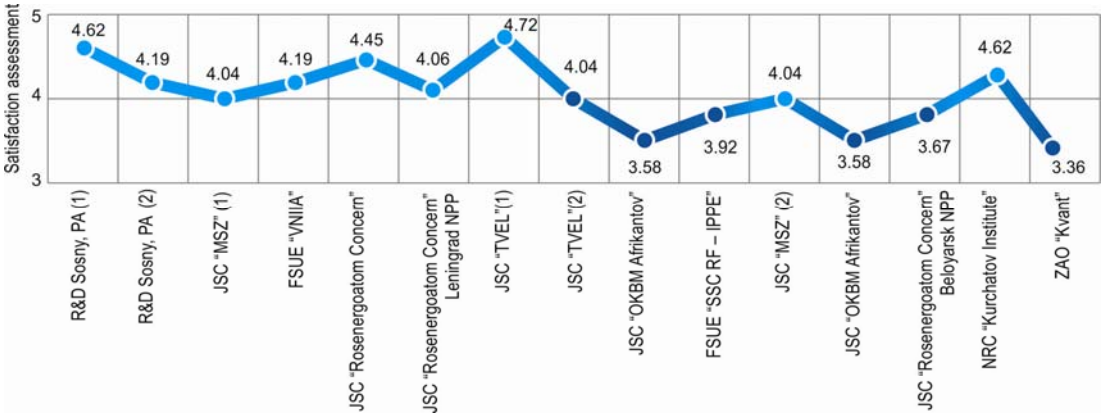
The list of consumers was compiled based on the information by the Financial Department on the existing in 2013 profitable agreements provided. The questionnaire was sent to 5 organizations – the main product consumers and 13 organizations – the main service consumers (R&D) including the organizations cooperating with JSC “SSC RIAR” under agreements on providing services on quality control and acceptance of the products supplied under the State Defense Order.

The percentage of organizations that gave their response made up 52 % of the planned number (11 of 21 organizations that received the questionnaires sent 14 filled questionnaires). The information about the organizations that the questionnaires have been sent to and that sent the filled questionnaires is presented in the table.

Information on the number of the questionnaires filled in 2013

No	Name of the interviewed organizations	Number of the completed questionnaires, pc
1	“ITs KM “Prometey-Atom”, LLC	0
2	NRNU MEPhI	0
3	JSC “AKME-Engineering”	0
4	JSC “MSZ”	2
5	JSC “NIKIET”	0
6	JSC “OKBM Afrikantov”	1
7	JSC “TVEL”	2
8	JSC “Electrovipryamitel”	0
9	R&D Sosny, PA	2
10	FSUE “VNIIA”	1
11	FSUE “SSC RF – IPPE”	1
12	FSUE “RISI”	0
13	FSUE “CRISM ”Prometey”	0
14	JSC “VNIINM”	0
15	JSC “SPB “Izotop”	0
16	ZAO “Kvant”	1
17	FSUE “V.G. Khlopin Radium Inastitute”	0
18	NRC “Kurchatov Institute”	1
19	JSC “Rosenergoatom Concern” Leningrad NPP	1
20	JSC “Rosenergoatom Concern” Beloyarsk NPP	1
21	JSC “Rosenergoatom Concern”	1

Organization satisfaction assessment



Satisfaction assessment of organizations-consumers of R&D and State Defense Order

The average factor of the customer satisfaction on services makes up 83.6 %, i.e., the customer is satisfied in general with the provided services (R&D).

The average factor of the customer satisfaction on product supply makes up 81.2 %, i.e., the customer in general is satisfied with the provided services on product supply.

The average factor of the customer satisfaction on product supply under the State Defense Order makes up 79.72 %, i.e., the customer in general is satisfied with the provided R&D services under the State Defense Order.

The general average factor of the customer satisfaction in 2013 amounted to **81.5 %** of 100 %.

Question positioning matrix

The assessment of the questionnaire results on provided R&D and product supply is done on each question regarding its position in matrix “satisfaction-importance”. To better visualize the importance scale is converted from a three-point scale to five-point one with the corresponding assessment:

1 – indifferent;

2 – unimportant;

3 – should be;

4 – important;

5 – urgently need (very important).

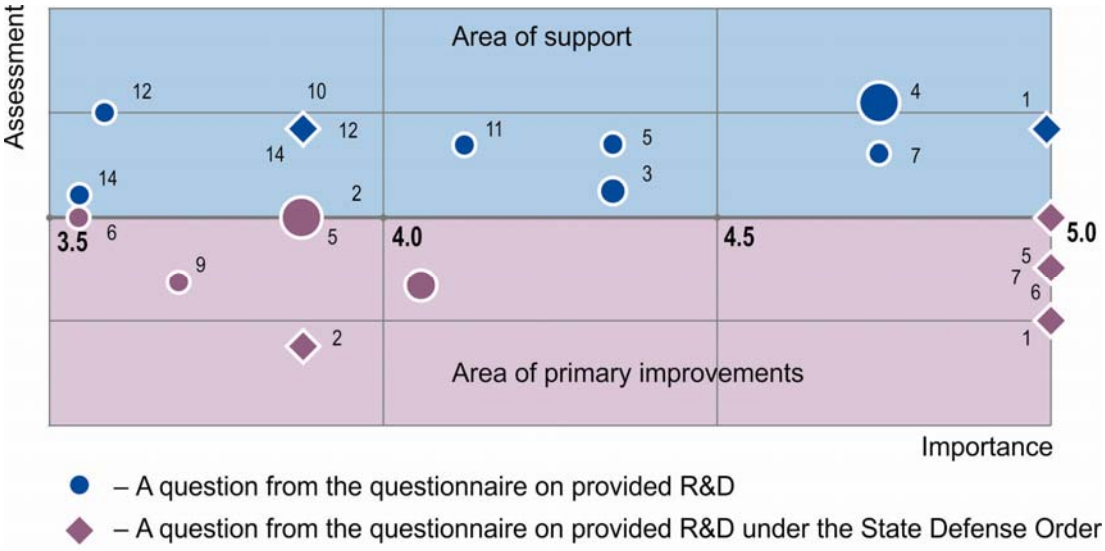
In converting from a three-point scale to a five-point one it is taken into account that “unimportant” criterion corresponds to value “1” of the three-point scale and value “2” of the five-point scale, and values “3” and “5” correspond to “very important” criterion, accordingly.

Values “importance” and “assessment” form a positioning matrix that is used to determine the sequence of activities aimed at improvement of the customer satisfaction.

The positioning matrix can be divided into four areas:

- redundancy,
- support,
- mid-term improvements,
- primary improvements.

The figure below shows the area of primary improvements related to the questions important for the customer but assessed by the customer as not satisfied with, and the area of support covering the questions important for the customers which in their view are done “well” or better.



Areas of primary improvements and support on the provided service consumer assessment positioning map

The area of primary improvements covers the following issues:

- on contracting:
  - period of contract concluding;
  - the completeness of considering the customer requirements in concluding a contract;
- on requirement performance obligations:
  - correspondence of the provided R&D documentation to the contractual requirements;
  - correspondence of the provided R&D documentation to the expectations;
  - quality of research under R&D;
- on interaction with the consumer:
  - the level of information provided to the customer during the contract performance.

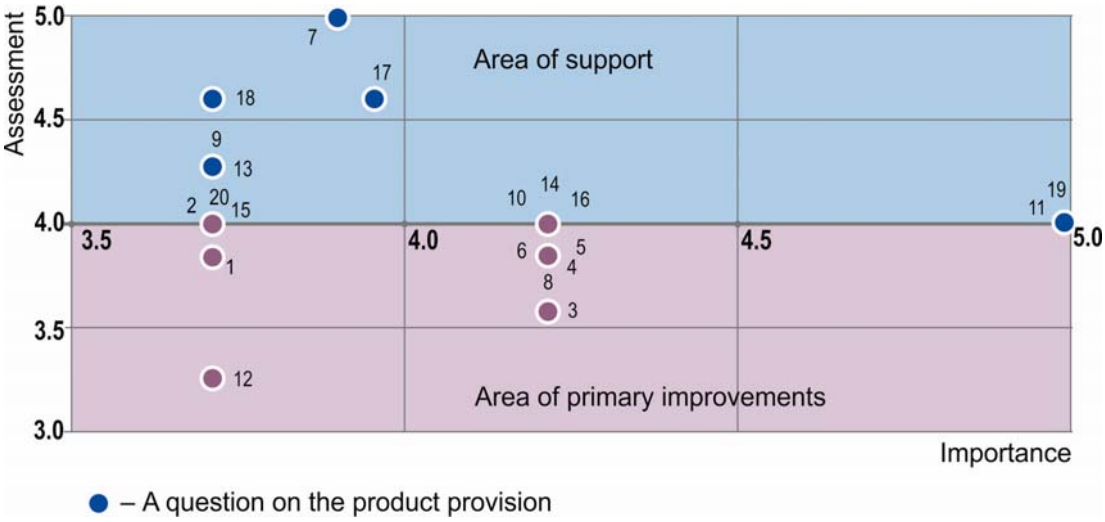
Several questions remained on a boundary between the areas in which the consumer is interested:

- on contracting:
  - promptness in considering the comments during the contract signing;
- on requirement performance obligations:
  - meeting the deadlines of the work performance under the contract;
- on cooperation results:
  - the availability of information about our products and capabilities of our Institute.

The area of support includes the questions on:

- contracting:
  - the completeness of considering the customer requirements in concluding a contract;
  - promptness in considering the comments during the contract signing;
  - meeting the deadlines of the work performance under the contract;
- on requirement performance obligations:
  - correspondence of the provided R&D documentation to the contractual requirements;
  - quality of research under R&D;
- on cooperation results:
  - availability of the Institute staff;
  - promptness in solving the occurring issues;
  - carefulness and agreeableness of the staff in communicating;
  - satisfaction with the services provided by JSC “SSC RIAR”, in general.

Some issues included into the area of primary improvements based on the average assessment results in the R&D quality questionnaire under the State Defense Order have been assessed by the customer higher; therefore they entered the area of support.



Customer assessment positioning map on the product provision

The figure shows that the customer is satisfied in general with the services on the product provision, no question was included into the area of redundancy and area of the mid-term improvements: there are no unimportant questions as well as questions the performance of which can affect the general satisfaction assessment for the customer. Many questions are grouped according to the importance and assessment.

The following questions were included into the area of primary improvements:

- on contracting:
  - period of contract concluding;
  - meeting the deadlines of the order performance /product provision;

- on product quality:
  - meeting the product supply volumes;
  - compliance of the products with the requirements of current technical norms, regulations, standards;
  - compliance of the quality of the supplied products with the agreed requirements (contract terms);
  - quality of the accompanying documentation issuing.

The following questions remained on the boundary between the areas:

- on contracting and product quality:
  - the completeness of considering the requirements in concluding a contract;
  - supplied product package quality (keeping the products safe during transportation);
  - meeting the requirements of reliability and safety of the supplied products;
- on interaction with the customer and cooperation results:
  - promptness in solving the occurring issues;
  - promptness in considering the comments and claims on quality;
  - promptness in considering the comments and claims on the product supply dates;
  - satisfaction with the provided services by the Institute in general;
  - availability of information on the products and capabilities of the Institute.

The area of support included the following questions:

- on the product quality:
  - satisfaction with the terms of product shipment and transportation;
- on interaction with the consumer:
  - carefulness and agreeableness of the staff in communicating with the consumer, staff communication culture.

A consumer of JSC “SSC RIAR” is in general **satisfied** with the provided services on research and development activities including those under the State Defense Order and with the supplied products.

Despite the positive assessment of the JSC “SSC RIAR” activity, **a consumer expects** that the Institute will focus its efforts on eliminating the determined issues and comments and pay attention to the issues mentioned in the area of primary improvements:

- on contracting between the consumer and Institute;
- on the requirement performance obligations.

INTERNATIONAL MANAGEMENT STANDARD IMPLEMENTATION

At present, ISO 9001:2008 “Quality Management Systems. Requirements” is implemented in JSC “SSC RIAR”.

MONETARY VALUE OF THE FINES IMPOSED FOR NON-COMPLIANCE WITH THE LAWS AND REGULATORY REQUIREMENTS RELATED TO PROVISION AND USE OF THE PRODUCTS AND SERVICES

There are no information about fines imposed for non-compliance with the laws and regulatory requirements related to provision and use of the products and services.

IMPLEMENTATION OF THE PROJECTS ON PRODUCTION ACTIVITY EFFICIENCY IMPROVEMENT

In 2013 under the implementation of "ROSATOM" production system in JSC "SSC RIAR" industry project "Improving the usage efficiency of the SM, MIR, BOR-60 and RBT research reactors" was implemented.

The main project objectives are as follows:

- increase of the output per one research reactor complex employee by 5 %;
- decrease in the preventive maintenance periods by 3 %.

All the planned activities were performed. The following indices were achieved in implementing this project:

- increase of the output per one research reactor complex employee by 9 % (from 1 225 thousand rubles/person up to 1 330 thousand rubles/person);
- decrease in the preventive maintenance periods by 3 %.

Economic benefits from the project implementation made up 96.5 million rubles.

PROCUREMENT MANAGEMENT

Tools used to improve openness and transparency of procurement

The main tools used to improve openness and transparency of procurements are as follows:

- decrease in share of procurement from a sole supplier, which allows increase of procurement share using competitive ways of trade;
- publication of the data at each stage of procurement in public official information systems such as ROSATOM State Corporation website and the Russian Federation website for separate types of legal entities to place the information on the purchase.

Volume of savings resulting from open competitive purchase procedures

Over 2013 as a result of open competitive purchase procedures 124.8 million rubles has been saved, which made up 9.9 % in relation to the initial maximum price.

PROJECTS AIMED AT DEVELOPMENT OF COMMUNICATION BETWEEN MANAGEMENT AND STAFF

In developing communication between the management of the Institute and the staff along with the existing opportunity to ask a question to the Director via the internal Institute website and mailboxes located at the Institute, forum “Discussion platform” is implemented in 2013 on the internal site where any employee can address a question not only to Director but to his deputies as well, start discussing any issue related to the Institute life and activity and welfare support of the staff at their workplace: personal vehicle parking lot, cafeteria, wages, etc.

MANAGEMENT INFORMATIZATION

List of projects on information technology implementation

Project name	Project implementation period		
	Project start	Bringing into industrial operation	Project completion
Implementation of ROSATOM State Corporation processing center system	25.12.2009	28.12.2012	30.04.2013
Project portfolio management system reproduction	30.05.2011	24.04.2014	18.09.2014
Reproduction of a generic solution of the Unified industry regulatory and reference information system	26.04.2011	30.03.2013	29.03.2014
Development and implementation of a generic solution on supplier relationship management	01.04.2010	31.12.2012	31.05.2013
Development and implementation of extended capability of a generic solution on supplier relationship management	01.11.2011	31.12.2013	15.03.2014
Development of a generic solution on supplier relationship management	10.01.2014	20.09.2014	30.12.2014
Development and implementation of ROSATOM State Corporation property assets automated control system	01.03.2010	30.12.2011	28.04.2012
Extension of capability of ROSATOM State Corporation property assets automated control system	01.03.2012	12.07.2013	16.09.2013
Development and implementation of a generic solution on NPP major repair based on the solution of major repair management information system for engineering companies (based on SW SAP ERP) and creation of information system on management of the federal targeted investment program performance for ROSATOM State Corporation	13.11.2010	30.06.2013	30.03.2014
Development and implementation of centralized accounting of the capital assets for nuclear power enterprises (based on SW SAP ERP)	25.10.2009	30.05.2011	30.08.2011
Transfer of an information technology function to the Multi-functional general service center	12.05.2013	18.11.2013	18.11.2013

INJURY FREQUENCY RATE

In 2013 one accident was observed in JSC “SSC RIAR” classified as minor. Compared to the previous years there is a reduction in industrial injury frequency rate: in 2011 in JSC “SSC RIAR” there were four production-related accidents, in 2012 – five. Since 2002 there have been no fatal accidents.

In 2013 there were no accidents or occupational deceases observed related to the representatives of contractors and subcontractors performing work at JSC “SSC RIAR” site.

Data on industrial injury frequency rate over 2012–2013

Injury rate	JSC “SSC RIAR”		Subcontractors	
	2012	2013	2012	2013
Industrial injury rate	0.135	0.028	0	0
Occupational diseases rate	0	0	0	0
Lost workdays rate	1.46	1.13	0	0
Absenteeism rate	10.8	8.37	0	0

The data presented above describes positively the efficiency of JSC “SSC RIAR” activity on providing healthy and safe working conditions and preventing industrial injury at the enterprise.

The existing programs on education, training, consulting, and industrial injury risk prevention and management

Under the existing programs on education, training, consulting, and industrial injury risk prevention and management 289 employees underwent training on health and safety at JSC “SSC RIAR” in 2013, 1 616 400 RUB was spent on training.

Staff health monitoring

The staff of JSC “SSC RIAR” undergoes periodic medical examinations annually. The medical examinations are performed strictly in accordance with Decree No. 302n of the Ministry of Health and Social Development of the Russian Federation as of 12.04.2011 “On approval of the lists of harmful and (or) hazardous factors and activities in which mandatory preliminary and periodic medical examinations (surveys) are performed, and procedure to conduct preliminary and periodic medical examinations (surveys) of the staff involved in heavy work and work with harmful and (or) hazardous working conditions”.

In 2013 a medical examination of the JSC “SSC RIAR” staff involved in work with harmful and (or) hazardous substances and production factors was performed amounted to 3631 employees.

Staff exposure dose monitoring

In 2013 2454 employees of JSC “SSC RIAR” were on the registry for radiation monitoring. For comparison, in 2012 there were 2403 employees, 2011 – 2453 employees. A percentage of the total number of the employees registered for individual radiation monitoring in the industry included in the ARMIR system is 55.4 %. The data on the staff radiation monitoring over the period of 2001–2013 are given in the table.

Staff effective exposure dose

Year	Average annual effective exposure dose, mSv
2001	2.15
2002	2.38
2003	2.10
2004	2.38
2005	1.80
2006	2.24
2007	2.42
2008	2.47
2009	2.45
2010	1.98
2011	2.60
2012	2.29
2013	1.91

The percentage of employees who had a dose of less than 1 mSv is 65.2 %. The annual effective dose of more than 20 mSv but less than 50 mSv has not been registered in the reporting period. In 2013 the content of radioactive aerosol and harmful chemicals in the air in the rooms for the staff permanent presence did not exceed the admissible values. The average annual containment with radioactive substances of equipment surfaces, floors, etc. in the rooms for the staff permanent presence did not exceed the admissible value determined in NRB-99/2009 in 2013.

An absolute majority of the staff (98.98 %) is at risk of less than 10^{-3} $year^{-1}$. Only 1.02 % employees has an increased individual lifetime risk (absolute risk) compared to the value determined in NRB-99/2009 (10^{-3} $year^{-1}$).

ENVIRONMENTAL SAFETY AND PROTECTION

3.5.

Environmental safety in 2013 was provided by meeting the requirements and conditions of environmental and quality policy, maintaining the impact of the Institute facilities on the staff, population and environment within the limits of normative values of releases, emissions and waste disposal, limiting this impact by defining the boundaries of the separated areas and meeting the resource consumption standards, performing industrial (environmental) monitoring and implementing environmental protection activity plans as well as environmental policy, staff training and fostering environmental culture.

The Institute activity is accompanied by using various types of substances during production (material mechanical processing, welding, heat and power generation, etc.) and transportation with generating the wastes that have impact on the environment, staff and population health, population living conditions. To limit the adverse impact of the enterprise on the environment sanitary protection zones are established as well as standards of contaminant releases and emissions, limits on production and consumption waste disposal, ozone-depleting and greenhouse gasses are excluded from production, certified materials are used in processes.

GENERAL EXPENSES AND INVESTMENTS ON ENVIRONMENTAL PRODUCTION

In 2013 the total expenses of the enterprise on environmental protection amounted to 145.047 million rubles.

Structure of expenses on environmental protection

Type of expenses on environmental protection		Volume of payments, million rubles	
		2013	2012
Current expenses		121.835	125.576
Including	Current (operational) expenses	111.467	111.060
	Payments on environmental protection services	9.269	11.475
	Major repair expenses	1.099	3.041
Investments in fixed effects		23.212	15.000
Total		145.047	140.576

The largest volume of the current expenses on environmental protection in 2013 was related to air protection – 53.378 million rubles as well as to collection and purification of sewage – 28.712 million rubles.

Investments in the fixed assets in 2013 were used for protection and sustainable use of water resources – construction of waste treatment facilities for purification of industrial and rainwater drain and facility recycling water system within the scope of project “Refurbishment and rehabilitation of industrial and rainwater drain of site No. 1 of JSC “SSC RIAR” under Federal Target Program “Providing Nuclear and Radiation Safety for 2008 and for the period of up to 2015”.

Expenses on waste treatment, purification of releases and environmental remediation action

The expenses on protection and sustainable use of water resources in 2013 made up 23.2117 million rubles from the federal funds.

Payments on the adverse environmental impact

Payment type	Actually paid per year, thousand rubles
Payment on pollutant allowable releases:	
Into the waters	0.0
In the air	30.0
Payment on production and consumption waste disposal	404.0
Including those in the underground layers	0.0
Total	**434.0**

Expenses on preventing impact on environment and environmental management system

Name of environmental protection area	Current (operational) expenses per year, thousand rubles	Including expenses on wages and social needs, thousand rubles
Air protection and climate change prevention	53378.0	19754.0
Collection and purification of sewage	28712.0	10879.0
Waste management	6775.0	4419.0
Protection and rehabilitation of lands, surface and groundwater	5306.0	4959.0
Environmental protection from noise, vibration and other physical impact	0.0	0.0
Maintaining biodiversity and natural area protection	0.0	0.0
Providing environmental radiation safety	15776.0	8263.0
Scientific and research activity and developments aimed at mitigating adverse human impacts on environment	0.0	0.0
Other activity areas in the field of environmental protection	1520.0	1520.0
TOTAL per 2013	111467.0	49794.0
TOTAL per 2012	87038.9	40844.3

Compared to 2012, in 2013 the expenses on wages and social needs as well as current expenses on environmental protection were reduced. The reduced expenses were explained by optimizing the number of operational personnel in the field of environmental protection. In 2013 the payment for the adverse impact on environment amounted to 2.5 million rubles, including releases in the air – 1.7 million rubles (67 %), discharge into the waters – 0.4 million rubles (17 %), waste disposal – 0.4 million rubles (16 %).

PERCENTAGE OF REPROCESSED OR RECYCLED WASTES

In 2013 in JSC “SSC RIAR” 1905.791 tons of nonradioactive wastes have been generated including 2.158 tons (0.11 %) of recycled wastes.

USE OF WATER RESOURCES

The Institute has the following water use areas:

- in the Cheremshan cove of Kuybyshev Reservoir – for water intake and industrial and rainwater (sewage) drain from the site of the Institute;
- in the Erykla river flowing into the Cheremshan cove of Kuybyshev Reservoir – for industrial and rainwater (sewage) drain from site No.2;
- in the Bolshoy Cheremshan river (left tributary of the Volga) – for industrial and rainwater (sewage) drain from the territory of the control point located outside the town.

The water supply sources for the enterprise facilities are as follows:

- underground water sources entrusted to the management of OOO “NIIAR-GENERATSIA” from 01.04.2013 located on the territory along the banks of the Cheremshan cove of Kuybyshev Reservoir and along the banks of the Bolshoy Cheremshan. The underground water is used for drinking and utility needs as well as for production and technical needs of the Institute, it is used by population and enterprises of the western part of Dimitrovgrad.
- water of the surface water – the Cheremshan cove of Kuybyshev Reservoir – is used for own production and technical needs (including hot water supply) and for transfer to production and technical needs for industrial enterprises and other organizations in Dimitrovgrad.

Water consumption system from the surface water is direct flow with water recycling.

The actual water resource intake volume in 2013 from the surface source made up 11 202.09 thou. m^3.

For the separate production types there is a layout with using recycling water supply as closed cycles (nuclear facility cooling, CHP). The volume of water flowing though all cooling towers can serve an efficiency indicator due to the water supply recycling systems making up 335 338 thou. m^3 in 2013, which is 97.7 % of the total volume of the water used for production needs.

The volume of JSC "SSC RIAR" water discharge in the open drainage in 2013 made up 3132.26 thou. m^3 of industrial and rainwater (sewage), including:

- the Cheremshan cove of Kuybyshev Reservoir – 3098 thou. m^3;
- the Erykla river – 26.40 thou. m^3;
- the Bolshoy Cheremshan river – 7.86 thou. m^3.

In 2013 an increase in volume of sewage was observed compared to 2012 explained by the implementation of a range of innovative projects at the enterprise. The volume of water consumption and water discharge in 2013 complied with the established norms on discharging sewage.

MATERIALS USED WITH SPECIFICATION OF THE MASS OR VOLUME

Information on the number of the used materials

Product type	Value
Rolled steel, tons	949
Rolled nonferrous metal, tons	19
Pipes, m	5196
Electrodes, kg	1299
Copperas, tons	268
Protective clothing and equipment, pcs	366762
Industrial gases, tons (m^3)	3 (7900)
Chemical products, tons	127
Lime, tons	450
Salt, tons	205
Industrial oils and greases, tons	37
Petrol, tons	582
Diesel, tons	736
Timber, m^3	25

A percentage of the procured or used materials the resistance of which was certified by the third party makes up 100 %.

ENERGY DIRECT USE WITH SPECIFICATION OF PRIMARY SOURCES

Energy source type	Value	Energy, GJ	Amount, thousand rubles
Electrical power, thou. kWxh	119682.1	$4.309x10^5$	207922.00
Thermal power, Gcal	155300.0	$6.502x10^5$	151476.00
Natural and associated gas, thou. m^3	36796.0	$1.472x10^6$	126677.00
Fuel oil, tons	1115.0	$3.982x10^4$	10500.00
Diesel, tons	761.0	$3.233x10^4$	24485.00
Petrol, tons	708.0	$3.090x10^4$	22058.00

ENERGY INDIRECT USE WITH SPECIFICATION OF PRIMARY SOURCES

Energy source type	Value	Energy, GJ	Amount, thousand rubles
Electrical power, thou. kWxh	27969.3	$10.067x10^4$	47914.24
Thermal power, Gcal	51466.5	$2.155x10^5$	63970.00
Natural and associated gas, thou. m^3	36796.0	$1.472x10^6$	126677.00
Fuel oil, tons	0	0	0
Diesel, tons	724.0	$3.076x10^4$	20285.00
Petrol, tons	656.0	$2.864x10^4$	16897.00

LOCATION AND SIZE OF AREAS OWNED, LEASED, MANAGED BY JSC “SSC RIAR” AND LOCATED ON PROTECTED NATURAL AREAS AND AREAS OF HIGH BIODIVERSITY OUTSIDE THEIR BOUDARIES OR ADJACENT TO SUCH AREAS

On December 31, 2013 there were no areas owned, leased or managed by JSC “SSC RIAR” with a status of protected natural areas and areas of high biodiversity.

The area of water use in the Cheremshan cove of Kuybyshev Reservoir is managed by JSC “SSC RIAR” with a status of “nature reserve”. The size of the area and its location are determined by a decision on sewage discharge of Nizhnevolzhsk Basin Water Management of the Federal Water Resources Agency. In 1985 Cheremshan ichthyologic natural reserve was granted a status of natural reserve based on decisions No. 216 as of 28.03.85 and No. 303 as of 07.08.90 of Ulyanovsk Regional Executive Board, Order No. 170 as of 25.11.99 of Head of Administration of Ulyanovsk region. The reserve has the area of 2902 ha located in the northeast water area of the Cheremshan cove of Kuybyshev Reservoir within the limits of Melekess region of Ulyanovsk region. The center coordinates are 49°51'3 E and 54°14'9 N.

WATER SOURCES THAT WATER INTAKE AFFECTS SIGNIFICANTLY

Water sources that Institute water intake affects significantly are waters located in the Cheremshan cove of Kuybyshev Reservoir, in the Erykla river flowing into the Cheremshan cove of Kuybyshev Reservoir and in the Bolshoy Cheremshan river used for water intake and industrial and rainwater discharge.

AIR POLLUTION

The total actual mass of pollutant releases in the air over 2013 made up 239.738 tons including gas and liquids – 226.142 tons. The average percentage of outlet gas and ventilation air purification from pollutants is 96 %; 178.637 tons of pollutants have been retained.

The wastes are divided into several hazard classes depending on environmental impact:

- extremely hazardous (I class);
- highly hazardous (II class);
- moderately hazardous (III class);
- low hazardous (IV class);
- almost not hazardous (V class).

Air pollutant releases

Pollutant	Class of hazard	Actual mass of pollutant releases, tons		Maximum permissible releases, tons
		2012	2013	
Gas and liquid:	–	489.799	226.142	
Including: sulfur dioxide	III	65.341	48.463	329.31
nitrogen dioxide	III	303.199	118.893	313.501
carbon oxide	IV	111.664	49.191	148.591
other	–	9.595	9.595	
Hard	–	14.072	13.596	
Including black carbon	III	1.630	1.259	4.395
Total	–	503.871	239.738	

The mass of pollutant releases from air pollution sources in 2013 reduced compared to 2012 by 264.123 tons. The major contribution to the Institute total releases in 2013 was made by CHP (154.682 tons) and boiler house of the control point outside the town (48.638 tons). There was no excess of the maximum permissible pollutant release standard values in 2013.

Air pollutant release distribution over 2013 by hazard classes

Class of hazard	Mass, tons	Annual volume percentage, %
I class	5.704	2.4
II class	95.608	39.9
III class	79.11	33
IV class	59.316	24.7
V class	–	–
Total	239.738	100.0

The releases mainly contained II, III and IV hazard class pollutants, which makes up 39.9; 33 and 24.7 % of the total release mass, correspondently. The mass of I hazard class wastes represented by such substances as hexavalent chromium, benzopyrene, ethyl cellulose and other makes up 2.4 % of the total mass of releases.

The total pollutant releases in the air made up 239.738 tons including:

- greenhouse gas releases:
  - methane – less 0.001 tons per year (less 0,0002 % of the total release volume per year);
  - ozone – 0.001 tons per year (0.0002 % of the total release volume per year).
- ozone depleting substance releases:
  - tetrachloromethane – 0.006 tons per year (0.001 % of the total release volume per year).

Other significant greenhouse and ozone depleting gas and substance releases has not been observed. There have been no instant or emergency releases of pollutants in the air.

TOTAL MASS OF WASTES DIVIDED INTO TYPES AND WAY OF TREATMENT

As a result of JSC “SSC RIAR” production activity about forty types of production and consumption wastes of environmental hazard class I–V are generated.

Mass of production and consumption wastes of various hazard classes and their standard values

Class of hazard	Mass per year, tons	Maximum permissible value, tons	Disposal limit, tons
1	1.208	6.924	–
2	2.297	5.1	–
3	10.854	64.313	–
4	222.924	510.831	375.716
5	1668.508	7510.797	7323.391
TOTAL	1905.791	8097.965	7699.107

The mass of the generated wastes does not exceed the standard values of waste generation.

The amount of production and consumption wastes generated at the enterprise in 2013 grouped by hazard classes and ways of treatment are given in the table below.

Production and consumption waste management in JSC "SSC RIAR" in 2013

Class of hazard	Waste mass, tons (%)					
	on 01.01.2013	generated per year	used and neutralized	transferred to other organizations	located at the enterprise	on 31.12.2013
I	1.945	1.208	0.000 (0.00)	0.000	1.208	3.153
II	0.000	2.297	0.000 (0.00)	2.297	0	0
III	28.5	10.854	001.6 (14.74)	4.149	5.605	33.605
IV	46.8	222.924	0.058 (0,.03)	215.026	7.84	54.64
V	45086	1668.508	000.5 (0.03)	486.998	1181.01	46267.01
TOTAL	45163.245	1905.791	2.158 (0.11)	708.47	1195.663	46358.408

In 2013 1905.791 tons of production and consumption wastes were generated including 1668.508 tons of the V class not hazardous wastes. Compared to the previous year, in 2013 (due to restructuring and reorganization of the enterprise) a reduction in waste amount was observed:

- generated – by 807.817 tons (in 2013 1905.791 tons were generated, in 2012 – 2713.608 tons);
- transferred to the external parties – by 135.259 tons (in 2013 708.47 tons were transferred, in 2012 – 843.729 tons);
- accommodated at the enterprise – by 685.746 tons (in 2013 1190.663 tons were accommodated, in 2012– 1876.409 tons).

There was 0.11 % of the total amount of the generated wastes in the reporting year used and neutralized, 37.17 % was transferred to other organizations, the percentage of the wastes accommodated at the operated facilities for storage and disposal made up 62.74 %.

The percentage of class V wastes is 81.724 % of the annual volume of the generated wastes. The major contribution (1630 tons per year) is made by the wastes (precipitation) generated during water purification, which makes up 73.095 % of the total amount of V class wastes.

Construction waste generated during the implementation of innovation projects at the enterprise was transported to a landfill in the Russkii Melekess village.

TOTAL AMOUNT AND VOLUME OF SIGNIFICANT SPILLS

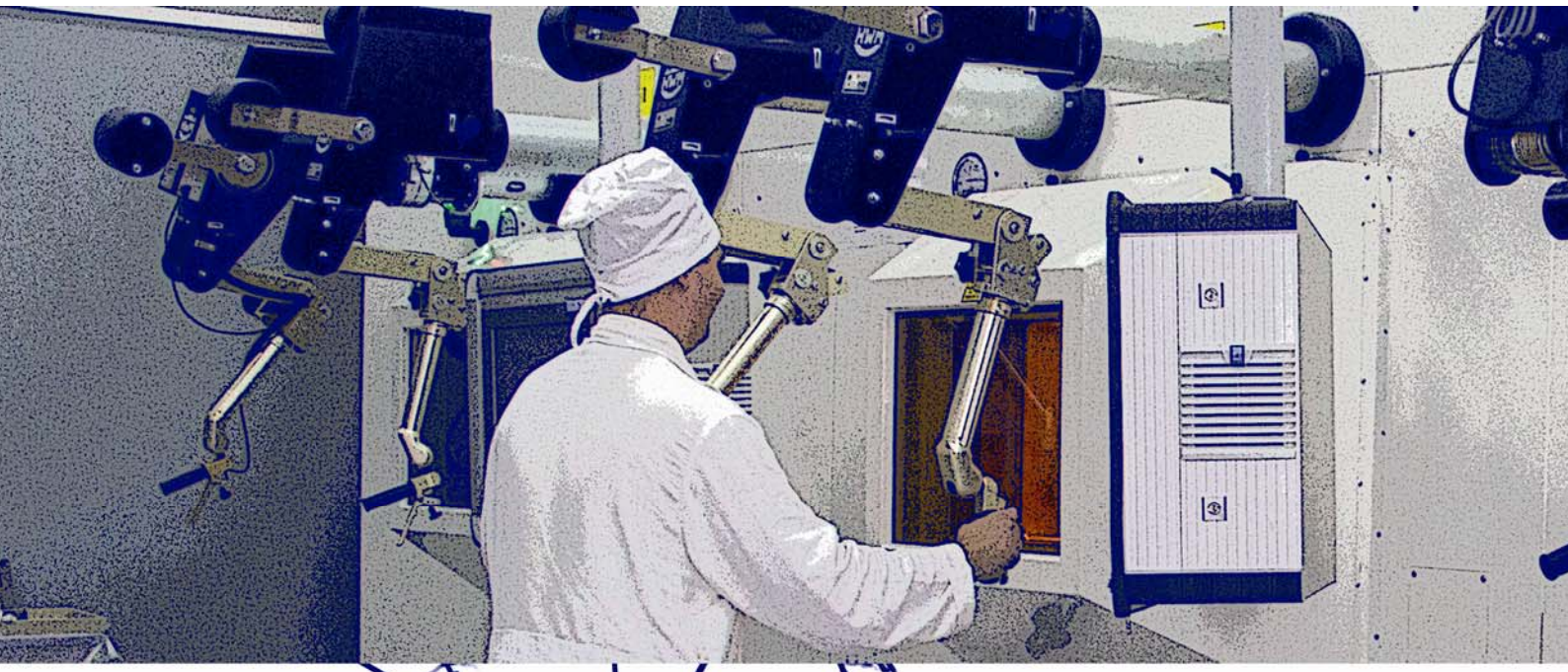
During 2013 there was no fuel, oil and other chemical substance spill observed.

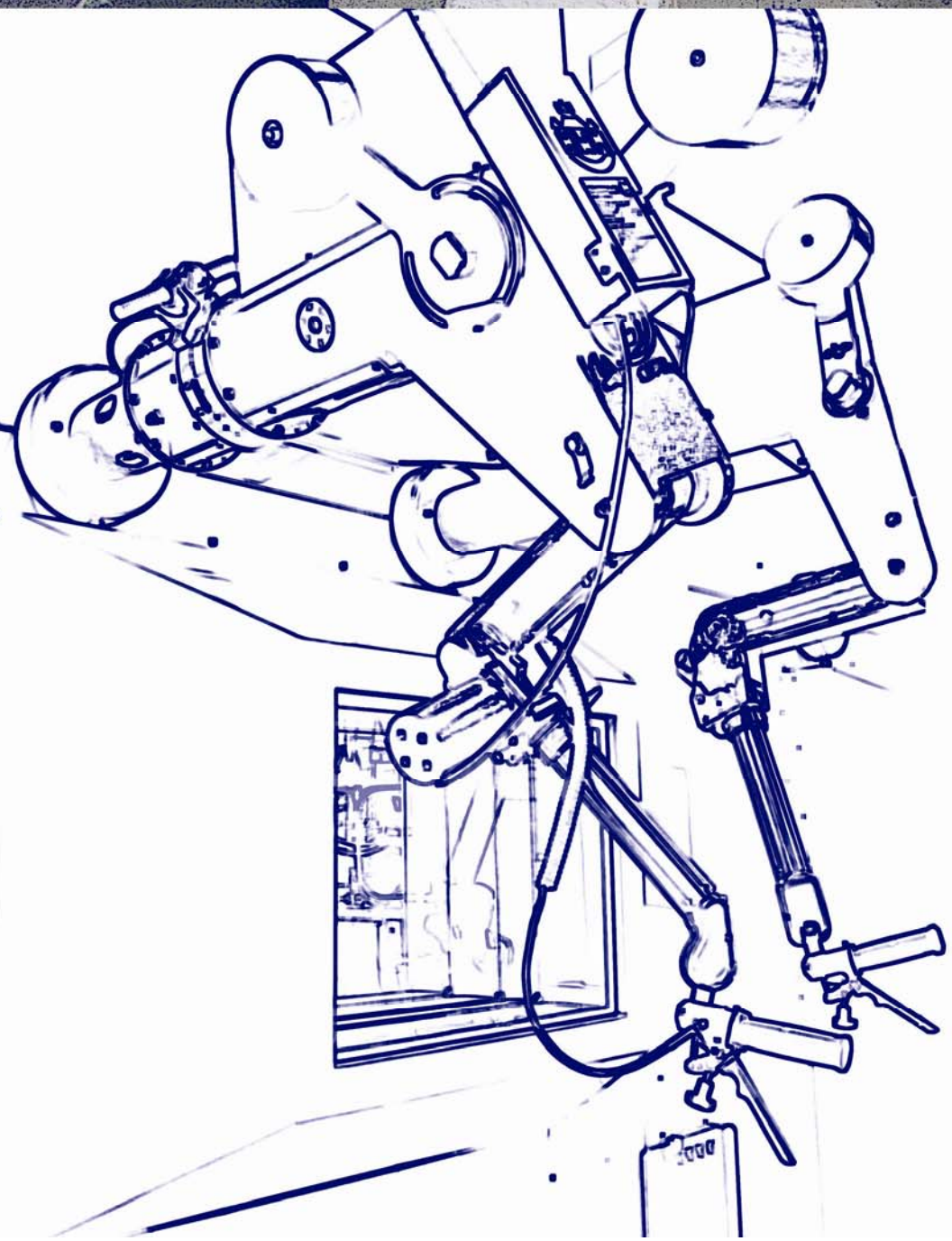
MONETARY VALUE OF SIGNIFICANT FINES AND TOTAL NUMBER OF NONMONETARY SANCTIONS IMPOSED FOR NONCOMPLIANCE WITH THE ENVIRONMENTAL LAW AND REGULATORY REQUIREMENTS

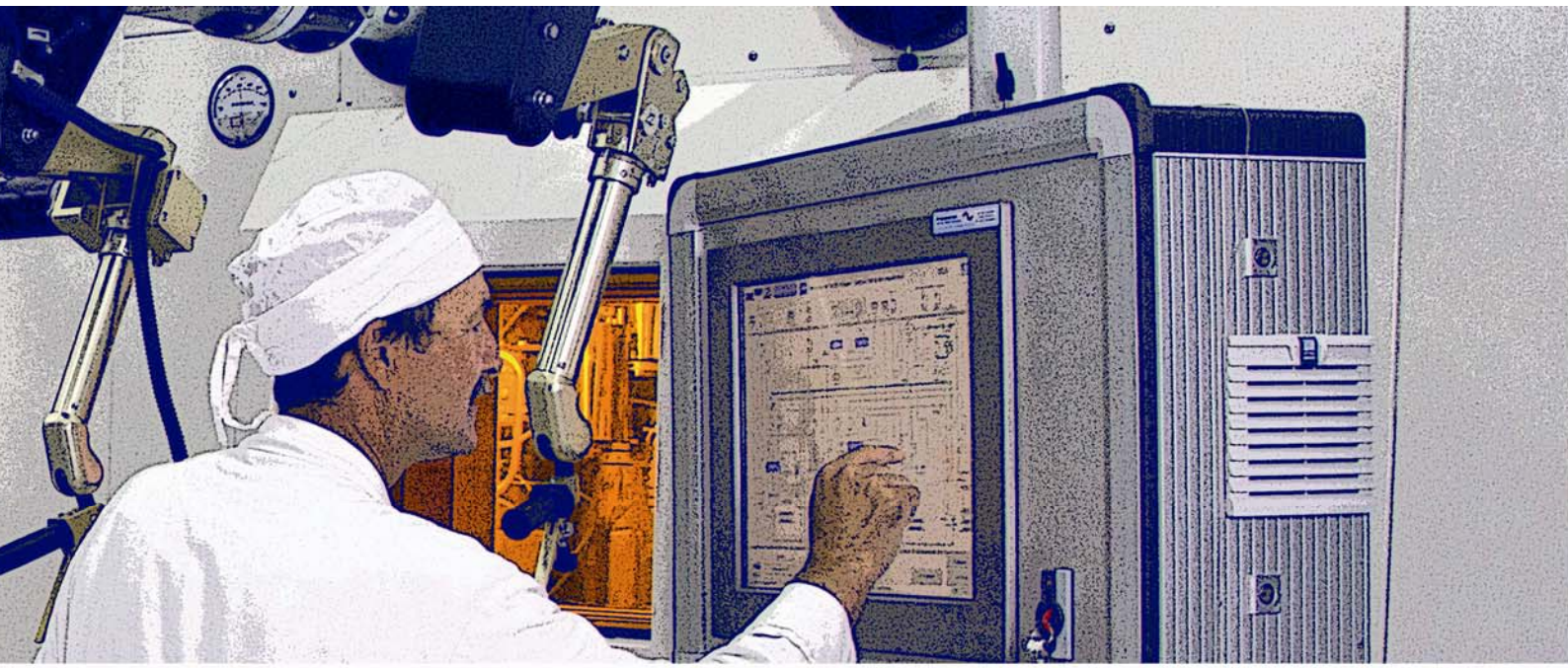
In 2013 there were no fines imposed on JSC “SSC RIAR” by the designated government agencies of the Russian Federation in the field of environmental protection to reimburse the damage caused by the environmental protection law violation (for instant or accidental emission of pollutant in the environment).

There were no fines imposed by administrative means on officials working for JSC “SSC RIAR“. The fine imposed by administrative means on JSC “SSC RIAR” as a legal entity made up 404 000 thousand rubles in 2013.

There were no nonmonetary sanctions imposed on JSC “SSC RIAR” for noncompliance with the environmental law and regulatory requirements in 2013.







4 SUSTAINABLE DEVELOPMENT RESULTS

4.1. INNOVATION-DRIVEN DEVELOPMENT

In December 2013, the *Program for Innovation-Driven Development of JSC "SSC RIAR" for the period through 2020* was worked out and approved. This program is targeted at the strategic priorities of ROSATOM State Nuclear Energy Corporation and is focused on the strategic objectives related to the nuclear industry development. These objectives are stated in the Federal Target-oriented Program "Nuclear Power Technologies of the New Generation for 2010-2015 and until 2020". The target-oriented projects are aimed at establishing the research and trial infrastructure of the new generation to promote the development of new nuclear power technologies with employment of FBR-based closed nuclear fuel cycle for nuclear power plants in order to cover the nation demand for energy and improve the efficiency of natural gas and spent nuclear fuel use. They are focused on creating scientific and engineering potential with the use of available experimental capabilities in order to establish an International Center for Science, Technology and Innovations and carry out such projects as:

- Technical upgrade of fast neutron research reactor BOR-60 with a thermal output of 60 MW;
- Development of multi-purpose fast research reactor;
- Development and feasibility demonstration of technology and engineering concepts for industrial-scale reactor-based onsite module for fast reactors spent fuel reprocessing;
- Setting up the poly-functional radiochemical complex;
- Comprehensive modernization, renovation and enlargement of reactor-based production of radionuclides at JSC "SSC RIAR" in order to support the development of nuclear medicine and radiation technologies;
- Development of Mo-99 production technology from low-enriched uranium;
- Safe operation and efficient employment of experimental capabilities at JSC "SSC RIAR".

TECHNICAL UPGRADE OF FAST NEUTRON RESEARCH REACTOR BOR-60

Fast neutron research reactor BOR-60 of a 60 MW thermal output is a unique multi-purpose facility used to perform irradiation tests of structural, fuel and absorbing materials used and to be used in reactors of different types, including fusion reactors. It is also used for testing the primary and secondary equipment for fast reactors.

The conducted irradiation tests of reactor materials cover practically all the types of existing reactors and reactors under development starting from fast (BN-800, BN-1800, BREST, SVBR, and MBIR) and thermal (VVER-TOI, VVER-1500, GT-MHR, HTGR) to fusion (ITER) and special-purpose reactors.

Reactor BOR-60 has been under operation for more than 40 years and requires technical upgrading. For this purpose, 555.9 million rubles will be allocated for “Development of new experimental facilities and special-purpose equipment, modernization, renovation and enlargement of the test facilities to demonstrate feasibility of physical principles and design concepts, analyze safety concepts and perform safety analysis as to the scientific and engineering priorities of innovation-driven nuclear power engineering” within the framework of the Federal Target-oriented Program "Nuclear Power Technologies of the New Generation for 2010-2015 and until 2020".

Inspection and technical upgrading of the BOR-60 reactor to extend its lifetime is scheduled under the same Federal Target-oriented Program with regard to the Project “Technical Upgrading of Fast Neutron Research Reactor-60 MW”. The activities to be accomplished can enhance the reactor safety and expand its experimental capabilities in order to perform verification tests and demonstrate feasibility of the key parameters of IV Generation reactors, their safety, and fuel cycle. To fulfill this objective the following work was done in 2013 in order to extend the reactor lifetime:

- Replacement of uninterrupted power supply unit ABP-2;
- Replacement of instrumentation in accordance with the metrological re-equipment plan;
- Developments related to updating of control and monitoring systems of the third circuit, control and safety systems as well as replacement of transformers at the substation and dynamotor with inverter in the emergency electrical system;
- BOR-60 reactor building survey and structural assessment;
- Preparation of a package of necessary documents to be submitted to the Russian Federal Service for Ecological, Technical and Nuclear Supervision (Rostechnadzor) to obtain the license for reactor operation beyond 2014.

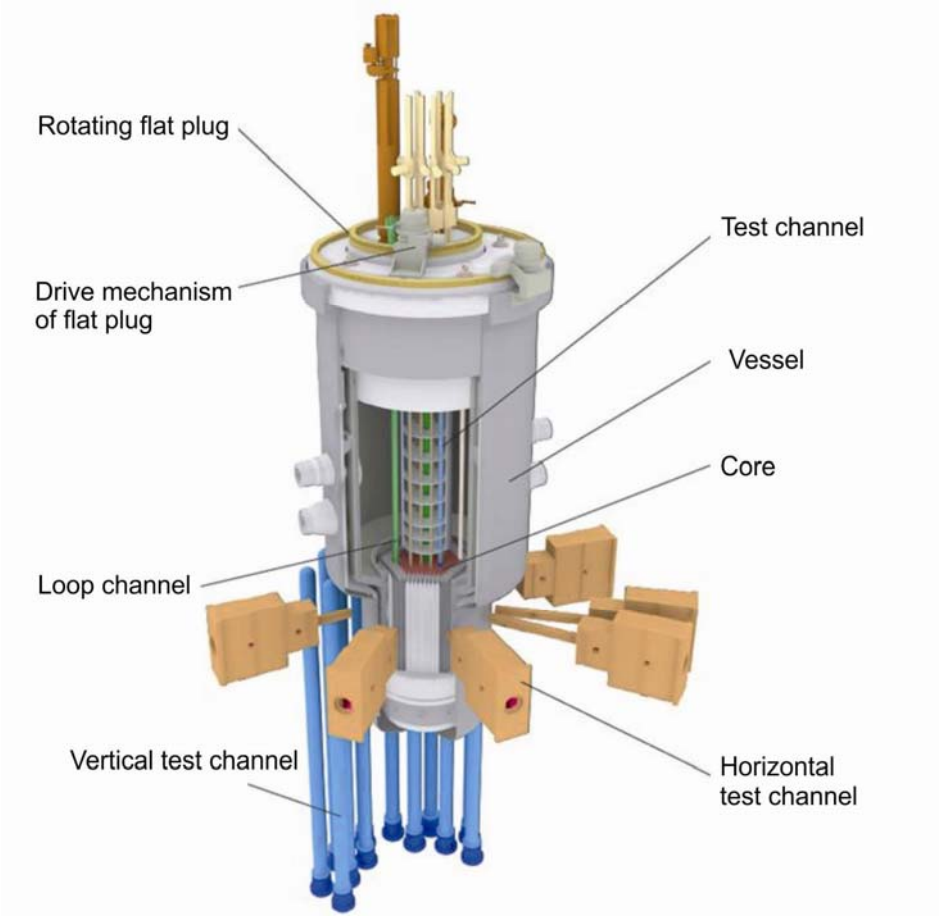
Implemented work would enable safe operation and technical upgrading of the BOR-60 reactor as well as ensure the best possible use of its experimental capabilities to meet the challenges of nuclear power engineering.

DESIGN ENGINEERING OF MULTI-PURPOSE FAST NEUTRON RESEARCH REACTOR

The construction of the multi-purpose fast neutron research reactor is underway within the framework of the Federal Target-oriented Program "Nuclear Power Technologies of the New Generation for 2010-2015 and until 2020". This Project is a constituent part of the national concept for the new technological platform establishment “Closed Fuel Cycle and Fast Neutron Reactors”.

In 2013 the MBIR multi-purpose fast neutron reactor construction project was in the list of the pilot projects under the program for the sectoral motivation of the participants engaged in Investment and Construction Projects of ROSATOM State Nuclear Energy Corporation.

The tripartite working meeting related to establishment of the MBIR reactor-based International Center of Excellence was held in Saint Petersburg on June 27, 2013 within the framework of International Nuclear Industry Forum ATOMEXPO-2013. This meeting was attended by the representatives of the ROSATOM Nuclear Energy Corporation, the US Department of Energy and French Alternative Energies and Atomic Energy Commission. The outcome of this meeting was the Memorandum of Understanding on International Cooperation for establishing the International Center of Excellence based on the multi-purpose fast neutron research reactor.



Main view of the MBIR reactor

The purpose of research reactor MBIR is to enhance experimental capabilities of the research facilities in the field of nuclear energy in order to conduct a wide scope of research and irradiation experiments to accomplish the following high priority tasks:

- Irradiation of advanced fuels, absorbers, and structural materials intended for different nuclear reactors, including innovative reactors and fusion reactors under high neutron irradiation conditions;
- Irradiation tests of fuel pins, fuel assemblies, absorber rods and other components of the core under the steady-state, transient and emergency conditions with the focus on the next-generation innovative nuclear reactors with advanced reactor coolants: sodium-cooled, heavy metal cooled, gas cooled and molten salt-cooled reactors;
- Irradiation tests with the focus on feasibility demonstration of new and modified liquid metal coolants;
- Comprehensive experiment-based and numerical estimation activities aimed at obtaining necessary data for development and verification of computer codes;
- Testing of different equipment for different industrial process systems, instrumentation and control systems, malfunction diagnostic equipment;
- Experiments in support of closed nuclear fuel cycle concept;
- Development and introduction of radioisotope production methods including radioisotopes of different application, production of modified materials;
- Applied in-pile research projects including the employment of neutron beams for medical application.

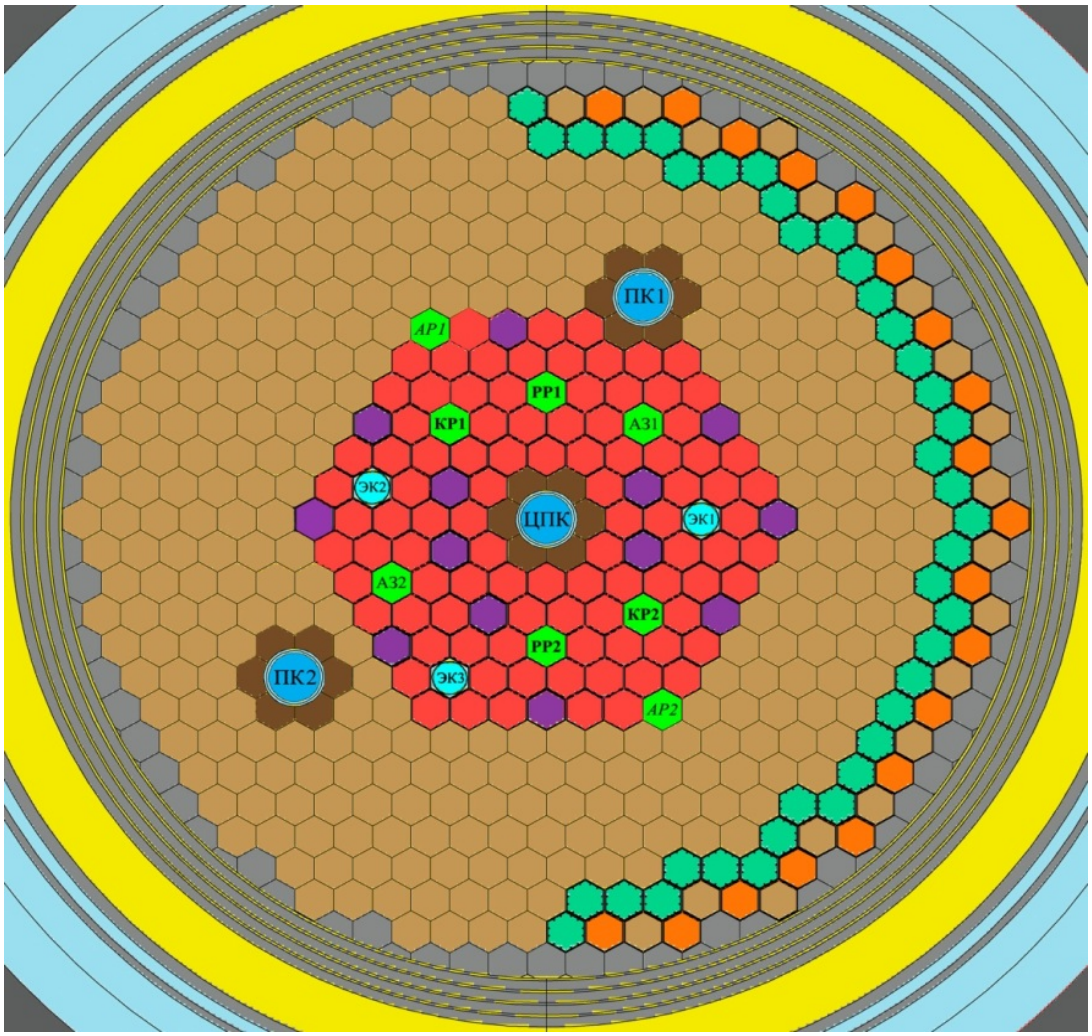
Experimental capabilities of the reactor will make it possible to conduct irradiation experiments with the focus on national nuclear energy development as well as to perform experiments under the contracts with foreign partners.

Research and development work

A large scope of work was done in 2013 within the framework of the MBIR construction project including entering into the central government contract and its fulfillment. The following work was undertaken within the framework of this contract:

1. Within the design engineering work scope related to the MBIR research reactor:

- Multiple calculations of neutronic parameters to demonstrate feasibility of the reactor core design within the framework of detailed design engineering of the reactor, calculations of the main parameters of the core and their presentation, core schematic arrangement;



Картограмма активной зоны реактора МБИР:

- **– Fuel Assembly;**
- **– Control And Safety Rods:**
  PP – Manual Control Rod; **AP – Automatic Control Rod;**
  KP – Reactivity Control Rod; **A3 – Safety Rod;**
- **– Materials Test Assembly or Radioisotope Capsule;**
- **– Breeding Blanket Assembly;**
- **– Spent Fuel Assembly;**
- **– In-Reactor Storage Shielding;**

ЭК – **Test Channel;**
ПК – **- Loop Channel;**
ЦПК – **Central Loop Channel**

- The in-depth design engineering of the core made it possible to optimize a flow rate of coolant through the reactor, increase a diameter of the suction pipeline in the reactor, specify performance data for the chosen circulation pumps and update performance data of the shutoff valves;
- Operational performance of dummy fuel assemblies was verified during strength analysis, hydraulic and vibration tests conducted in the BOR-60 reactor. Irradiation tests of dummy vibropac MOX fuel elements have been launched to verify operational performance of the MBIR fuel elements;
- Control power and functional arrangement of the control and safety rods were specified for different periods of the reactor operation cycle;
- Calculations of reactivity worth demonstrated that all the effects can be negative and that is the evidence of a high-level inherent safety of the MBIR reactor;
- According to the results of safety analysis of the research reactor, the parameters of subcriticality control and safety systems are good enough for safe operation. Safety systems of the reactor were included in the list with due consideration for the principles of diversity, backing-up and safe failure.

2. Within the scope of work related to layout arrangements of systems and equipment:

- Strength analysis of the primary and secondary piping brought out the necessity of significant changes in equipment arrangement and piping layout as opposed to the draft design. As a result, the rooms intended for the reactor unit and steam generators re-arranged as well as the rooms for emergency heat removal systems;
- Layout concept is available for the rooms intended for materials handling and support equipment in order to perform technical operations such as nuclear fuel handling, manipulations with loop channels and replacement of reactor equipment and its systems;
- A concept of radioactive waste management system was put forward for the MBIR reactor as well as its operation principle. The radioactive waste management system is being developed for the MBIR fast neutron research reactor in accordance with the standards established in the Russian Federation.

3. Infringement search was done in support of agreed design concepts.
4. Computer codes, which can be used for experimental and numerical data analysis were verified and validated to perform calculations of the major reactor characteristics and processes.

5. The conceptual representation (information model) of the MBIR research reactor is being under development in order to implement the project in the up-to-date IT environment and provide for information management during the whole lifetime of the reactor.

Model of the MBIR main building

Design work

In 2013 a series of work related to the MBIR test reactor construction was accomplished successfully, i.e. a package of documents was prepared and submitted to the Federal Autonomous Institution “Main Directorate of State Expert Evaluation” for the state expert review of design documents and engineering survey data of the facility under construction.

Licensing – related activities

A package of mandatory and necessary documents was prepared and submitted to the Russian Federal Service for Ecological, Technical and Nuclear Supervision in order to obtain the license for siting the MBIR test reactor within the licensing framework in the field of peaceful use of nuclear power energy.

DEVELOPMENT AND FEASIBILITY DEMONSTRATION OF TECHNICAL AND DESIGN CONCEPTS FOR INDUSTRIAL-SCALE REACTOR-ADJACENT MODULE FOR SPENT NUCLEAR FUEL REPROCESSING FROM FAST NEUTRON REACTORS

A tremendous scope of work was accomplished within the framework of the Federal Target-oriented Program "Nuclear Power Technologies of the New Generation for 2010–2015 and until 2020" under the projects "New technological platform: "Closed Fuel Cycle and Fast Neutron Reactors"" and "PRORYV" with the focus on development and feasibility demonstration of technical and design concepts for the industrial-scale reactor-adjacent module for spent nuclear fuel reprocessing from the fast neutron reactors.

In 2013 some notable successes were achieved as a result of project implementation:

1. Testing of prototype process equipment with the use of dummy fuel.
2. A package of design engineering documents and specifications is ready for improved prototype process equipment intended for reprocessing of spent nitride nuclear fuel with due consideration for modifications resulted from trial reprocessing of spent dense nuclear fuel in the hot cell laboratories.
3. Existing hot cell lines were retrofitted to install improved prototype process equipment intended for reprocessing of spent nitride nuclear fuel;
4. The improved prototype process equipment was installed and tested with the use of nuclear materials and dummy fuel based on spent nuclear fuel.
5. Partitioning of nuclear materials from fission products in the "chloride melt – molten bimetal system" was investigated.
6. Experiments with the focus on process medium purification from suspended solids of fission products, metal mixtures and fuel particles were conducted.
7. A technical specification, draft design, design engineering documents, and specifications for the prototype equipment were drawn up. The prototype salt washer was fabricated and tested to remove salts and fission products after reprocessing of spent nitride nuclear fuel.
8. The prototype process equipment was used to perform zinc distillation test after de-cladding spent nitride nuclear fuel. The experimental data will be used for development of commercial prototype.

9. A test prototype of continuously operated electrolyser was used to conduct a trial reprocessing of spent nitride fuel. New design and engineering ideas made it possible to increase operational performance of the apparatus. The experimental data will be also used for development of commercial prototype.
10. The trial purification of spent salt from alkaline and alkali-earth fission products was carried out. The obtained experimental data can demonstrate that the design performance of the apparatus was achieved to return salt into the cycle.

SETTING UP OF POLY-FUNCTIONAL RADIOCHEMICAL COMPLEX

Setting up of poly-functional radiochemical complex is done within the framework of government contract “Research and development work in support of engineering and design concepts poly-functional radiochemical complex. Work stages 2013–2015”. In 2013, RIAR accomplished development of safety-related, weight-lifting, material handling, and process equipment for poly-functional radiochemical complex. Moreover, processes and equipment of the radioactive waste management system were also developed to perform in-situ conditioning and immobilization of radioactive waste.

During the year under report JSC “SSC RIAR” set up the test site for equipment of poly-functional radiochemical complex. Its purpose is to practice connection of transport system to the mock-up of general-purpose process module, mount equipment, connect feeding and create media, provide electrical coupling (cables), install and distribute lighting and TV systems, as well as dummy apparatuses, to check feasibility of design concepts.

Technical concepts of modules are available to accommodate hydrometallurgical and pyrochemical equipment at the poly-functional radiochemical complex. Alongside with the development of design engineering documents and specifications, primary requirements to the design and performance capabilities of servicing robotics were defined for the general-purpose process module.

There is already a concept of instrumentation and control system for continuous work processes of the hydrometallurgical chain under the conditions of cyclic bench-scale tests. The specific feature of control over work processes at the poly-functional radiochemical complex is contingence of remote and sampling control. It was proposed to employ nuclear and physical methods under the remote control conditions which are recognized and undergo further development in the control radiochemical laboratories. As to the remote control, there are already control points including the process in the tanks and vessels. There is also a design engineering and layout concepts of the control and instrumentation to enable control and monitoring for the purposes of poly-functional radiochemical complex.

A package of technical documents is already available to provide analytical support of pyrochemical and hydrometallurgical processes at the poly-functional radiochemical complex. The novelty of the concept under consideration results from both specificity of the tasks due to small-seized process equipment and its accommodation in the general-purpose process module organized as separate process modules and from specificity of control over reprocessing of low-cooled spent nuclear fuel.

The design engineering documents are already available for production prototypes of process equipment for SFA decladding, concentration by evaporation of medium-level waste, and tritium management. There are engineering concepts of safety-related equipment for poly-functional radiochemical complex.

Engineering concepts are already available for weight-lifting equipment and transport system of the poly-functional radiochemical complex: casks for use in the hot cells and inside the module area, shipping casks for the high-level, medium-level and low-level waste, transfer trolley.

In the course of work in 2013, the highest priority was the engineering development of universal waste management system for both process and non-process waste generated at the poly-functional radiochemical complex.

IMPLEMENTATION OF PROJECTS UNDER THE DECREES OF THE RUSSIAN FEDERATION GOVERNMENT

Comprehensive technical upgrade and development of the reactor-based production of radionuclides at JSC "SSC RIAR" to promote development of nuclear medicine and radiation technologies

This project is targeted at modernizing the existing production processes at JSC "SSC RIAR" with the focus on the production of the following isotopes: cobalt-60, iodine-131, strontium-89, yttrium-90, californium-252 and other transplutonium elements. It is also necessary to set up the production of radionuclides of new nomenclature: lutetium-177, radium-223, 224 generators, thorium-228, actinium-225, 227.

The project implementation shall lead to setting and updating the production processes of the following radionuclides:

- strontium-89 radionuclide by fabrication of targets from isotopically-enriched strontium-88, their irradiation in the reactor and subsequent reprocessing of irradiated targets with the use of radiochemical methods;

- lutetium -177 radionuclide by fabrication of targets from isotopically-enriched lutetium-176, their irradiation in the reactor and subsequent reprocessing of irradiated targets with the use of radiochemical methods;
- yttrium-90 radionuclide by radiochemical separation of yttrium-90 from strontium-90 and its purification from radioactive impurities;
- thorium-228 and actinium-227 radionuclides by fabrication of targets from radium-226, their irradiation in the reactor and subsequent reprocessing of irradiated targets with the use of radiochemical methods to extract and purify thorium-228 and actinium-227;
- radionuclides radium-223 and radium-224 by step-by-step radiochemical separation of thorium-228 and actinium-227 from radiochemicals;
- cobalt-60-based high-level ionizing radiation sources;
- iodine-131 radiochemical;
- targets for accumulation of californium and transplutonium elements.

In order to set up the production, it will be necessary to set up and upgrade the following production lines:

- cobalt-60-based high-level ionizing radiation sources;
- iodine-131 radiochemical;
- preparation of targets for accumulation of californium and transplutonium elements.

The following products will be advanced end products, which are to be developed and produced within the framework of the project:

- cobalt-60-based gamma sources for nuclear medicine;
- iodine-131 radionuclide (sodium iodide) of medical application;
- californium-252 radionuclides as well as transplutonium elements – isotopes of americium-243, curium-244, 248.
- Radionuclides of lutetium-177, strontium-89, yttrium-90;
- Short-lived alpha-emitting radionuclides of radium-223, 224, thorium-228, actinium-225, 227, bismuth-212, 213 of medical application.

The purpose of end products produced within the framework of project:

- Radionuclides of medical application: for radiation oncology, production of radiochemicals and tracer compounds for examinations;
- Radioisotopes of general-purpose industrial grade including radiochemicals and sealed sources of alpha-, beta-, gamma- and neutron radiation;
- Isotopes for scientific work.

Products of JSC “SSC RIAR” has a high export capacity. So it will be possible to expand its market reach with the focus on the following isotopes: cobalt-60, iodine-131, strontium-89, yttrium-90, californium-252 and other transplutonium elements, lutetium-177. It will be also possible to establish new sectors at the market due to expansion of radionuclide nomenclature: radium-223, 224 generators, thorium-228, actinium-225, 227, bismuth-212, 213.

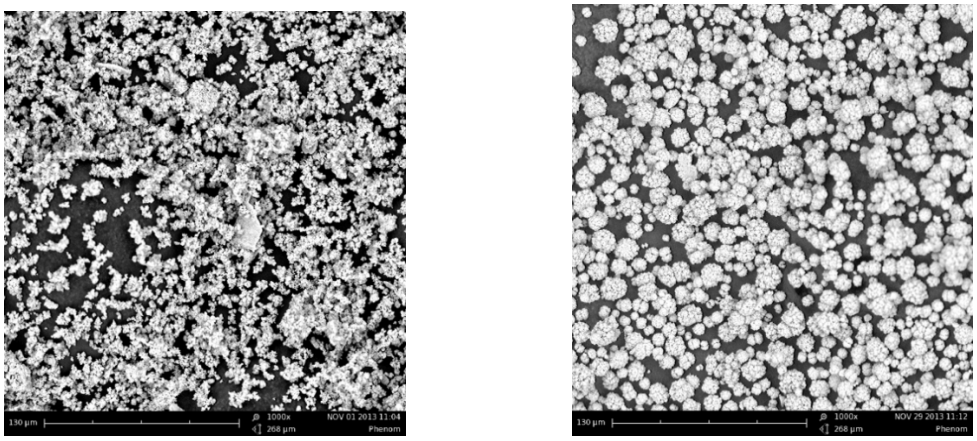
In 2013 the following major work was accomplished as a part of the Project:

1. Setting-up, dry-run tests and commissioning of the test facility intended for scientific and engineering work with the focus on radionuclide production.

2. The main input data were studied to setup the production of strontium-89, lutetium-177, yttrium-90, thorium-228 and actinium-227, as well as radium-223, 224. They include the requirements to radiochemicals of different application with reference to both radionuclides and methods employed by JSC "SSC RIAR" to produce these radionuclides. The best possible process flow options were proposed as to the each above-mentioned product. They are supposed to be tested and optimized.

Main view of the test facility intended for scientific experiments and engineering work

3. As a part of work related to process operations, experimental strontium carbonate pellets were fabricated. Their dissolution in nitric acid solutions of different concentrations was studied. There is also a method for measuring barium content in solutions. The process of chromatographic extraction of strontium in system "Sr-spec resin – HNO_3" was studied using different concentrations of nitric acid. RIAR could specify main parameters of preliminary purification for strontium carbonate with the employment of cyclic recrystallization method. The grain structure of initial and recrystallized powder was investigated by electron microscopy in order to examine the effect of starting material parameters on the pellet formation process.



a **b**

Particles of strontium carbonate in the initial condition (a) and after recrystallization (b)

4. The process of defects formation induced by ionizing radiation was investigated in the optical fiber materials including the rare-earth-doped materials i.e. erbium and ytterbium. Analyzed were also different impacts on radiosensitivity and radiation stability

of optical fibers. The optical performance change model is available for light fibers under gamma radiation. Discussed was also a possible development of scintillation optical fiber-based sensor where the optical radiation is excited by ionizing radiation.

5. Four technical specifications are available for technological equipment intended for the following:

- Reprocessing of irradiated tellurium oxide targets;
- Fabrication of targets for accumulation of transplutonium elements;
- Reprocessing of irradiated targets for cobalt-60 production.

6. Design engineering documents and specifications are available for the target intended for accumulation of transplutonium elements.

7. Design engineering documents, design specifications and estimates were completed for production site of iodine-131 targets.

8. To provide heat removal from the general-purpose irradiation rigs in the SM reflector channels, a special test facility was manufactured and mounted. A package of documents was prepared based on the results of acceptance testing.

9. Simulation experiments were conducted with the focus on gamma fields during the production of cobalt-60-based sources. High-precision simulation of gamma fields was done with regard to the available hot cells and hot cells under development at JSC “SSC RIAR” with due consideration for different loads of irradiated cobalt including assessment of ionizing radiation background in the rooms of personnel attendance. There is also a software enabling the geometrical model of the hot cell and its equipment for express estimation of exposure dose value and rate based on the simplified equations of radiation transfer.

Development of molybdenum -99 production technology with the use of low enriched uranium

The primary objective of this project is to develop the molybdenum –99 production method enabling production of this radionuclide by irradiation of special targets containing uranium-235 of 20% enrichment and less in the nuclear reactors and subsequent reprocessing of irradiated targets with the use of radiochemical methods to separate and purify molybdenum-99 radionuclide. It will be necessary to do the following in order to accomplish this task:

- Develop a new target for accumulation of molybdenum-99;
- Perform experimental and numerical estimation data analysis to demonstrate feasibility of molybdenum-99 accumulation under irradiation in the reactor;
- Optimize the available reprocessing methods of irradiated targets to make them feasible for the targets of new design and composition in order comply with the quality control requirements to the resultant product.

The following aspects should be taken into consideration in the course of this work:

- To minimize the performance losses of the process that provides for low enriched uranium and to try to achieve the same yield as in case of highly enriched uranium;
- To employ the available process equipment, to tend to minimize its replacement or avoid it at all.

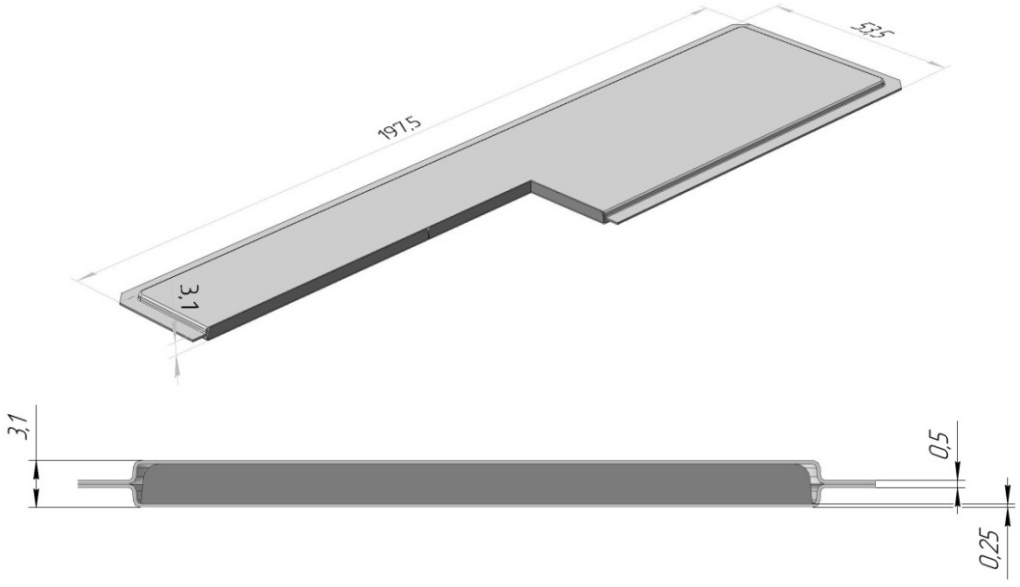
This project is targeted at developing molybdenum-99 production methods with the use of low enriched uranium provided that the production yield losses are to be minimized insofar as possible without any changes in the quality of produced radiochemical. Pursuing this objective is focused on fulfilment of the Russian Federation commitments in the field of nuclear non-proliferation.

In 2013 the following primary work was accomplished within the framework of the project:

1. Infringement search as to the project subject. Search (retrospective view 21 yrs.) was conducted in the library holdings of the Federal Service for Intellectual Property of Russia, Ulyanovsk Scientific and Technical Information Center, FSBEI HPO "Ulyanovsk State Technical University" and JSC "SSC RIAR", electronic data base of Federal State Budgetary Institution "Federal Institute for Industrial Design Rights". It was conducted over the countries of the Former Soviet Union, Russia, Germany, France, Great Britain, other countries of the European Union, USA, China, Japan etc.

2. Feasibility study of molybdenum-99 production with the use of low enriched uranium was done with reference to two production processes, which are a part of technology under development: accumulation of molybdenum-99 in the reactor and reprocessing of irradiated targets using radiochemical methods.

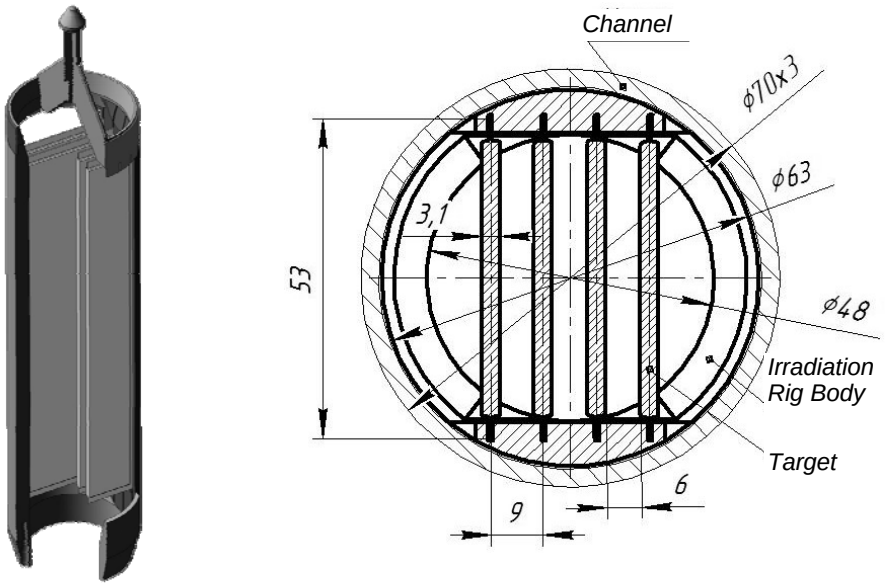
3. Feasibility study is based on the experimental and numerical estimation data analysis as well as feasibility demonstration of technology that provides for a flat target and two design options of irradiation capsules (channels).



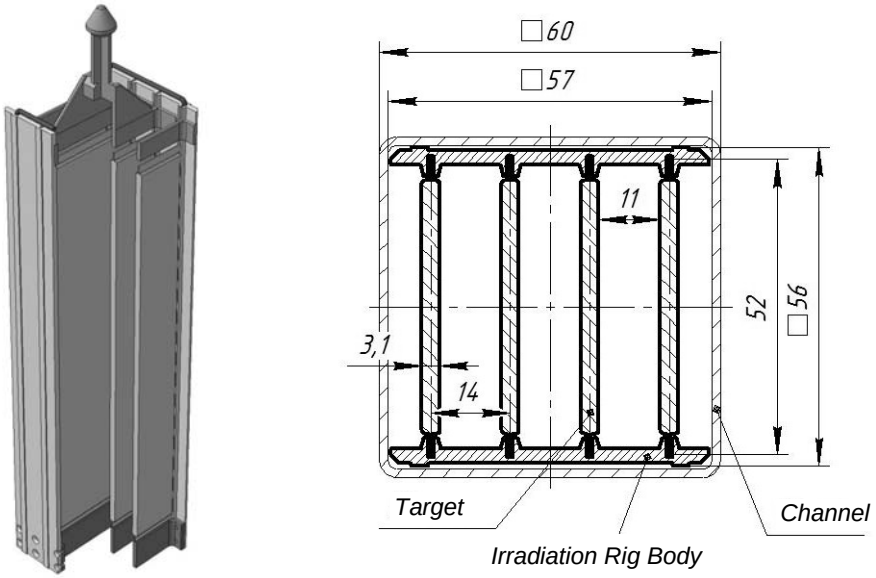
Flat target design

The target design options are distinguished with the fabrication method of cores and their amount in the target. All the design options under consideration provide for uranium-aluminum alloy that is intermetallic uranium UAl_4.

There are two design options of irradiation capsule: the channel with a circular cross-section and the channel with a square cross-section.



a

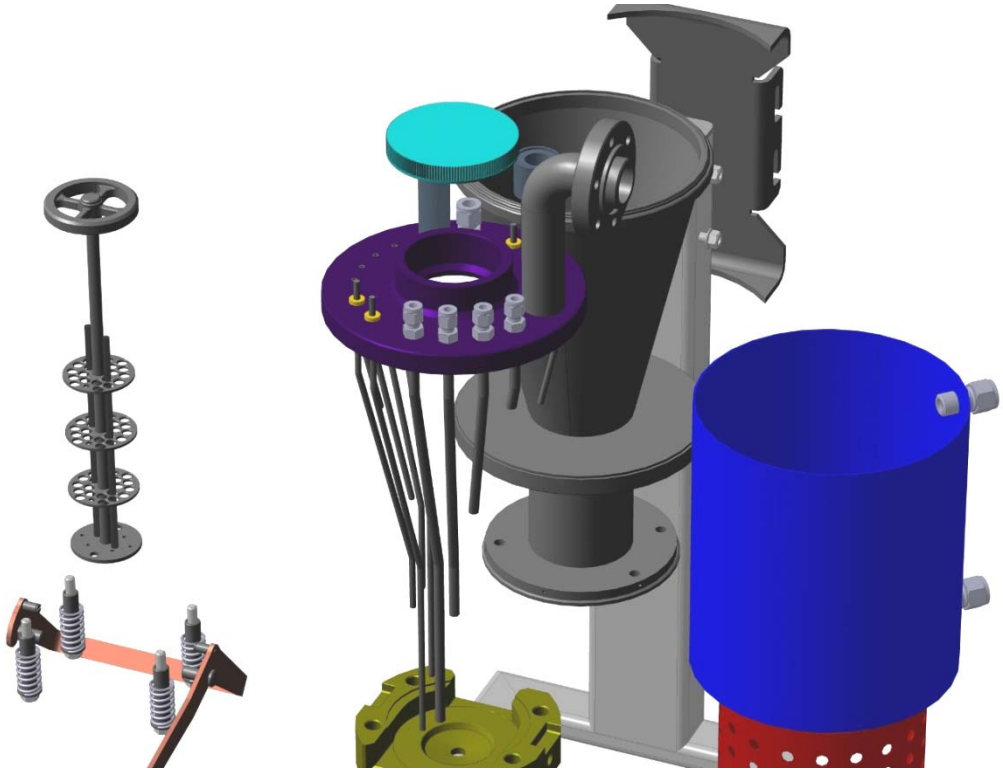


b

Design options of irradiation capsule of with a circular cross-section (a) and square cross-section (b)

4. The draft design engineering documents and design specifications are available for manufacturing of the following equipment:

- Preproduction prototype of process equipment for dissolving irradiated targets and primary separation of molybdenum-99 radionuclide from uranium;



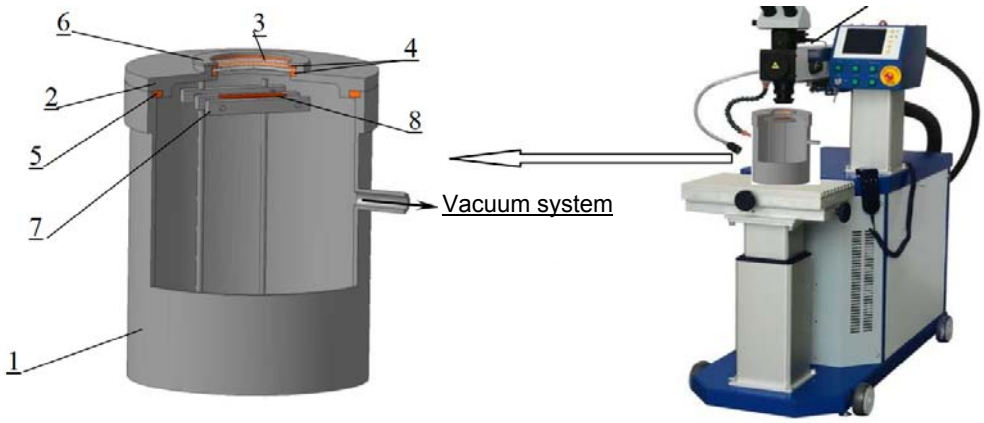
Configuration of the prototype dissolver apparatus

- Preproduction prototype of process equipment for sorptive extraction of molybdenum-99 radionuclide;
- Preproduction prototype of process equipment for concentration of molybdenum-99 radionuclide by evaporation;
- Dummy irradiated target intended for production of molybdenum-99 radionuclide from low enriched uranium. The draft design of the dummy target was developed to adopt the baseline targets and develop a dummy plate-type target incorporating uranium-235 of 20 % enrichment and less.

5. There is also a draft design and a package of design engineering documents as well as design specification for the dummy target to be fabricated for irradiation and intended for production of molybdenum-99 radionuclide from low enriched uranium by powder metallurgy.

6. A welding method was exercised on a perimetric edge weld of the aluminum claddings using a dummy plate target intended for accumulation of molybdenum -99 isotope.

7. A laboratory-scale (vacuum tank) was manufactured to develop and practice sealing methods on the target that is used for dummies fabrication.



Vacuum tank: 1 –cylinder body; 2 – lid; 3 – glass opening; 4, 5 – rubber gaskets; 6 – retaining ring; 7 – clamp fixture; 8 – test sample;
9 – laser station LRS-150F&

8. The first stage of dummy target testing was accomplished with the focus on the target intended for production of molybdenum-99 radionuclide from low enriched uranium. The dummy targets were subjected to testing and made sealed with the use of above-mentioned laser station. As to the dimensions of the welded joints, they were as specified by the drawing. The leak test did not reveal any defects. It was performed with the use of bubble and mass-spectrometry methods. Metallographic examination of welded joints did not reveal any defects either. According to the test data, the target could preserve its structural rigidity both in case of single-plate core and in case of a three-plate core.

SAFETY MANAGEMENT AND PERFORMANCE ENGINEERING OF EXPERIMENTAL FACILITIES

The scope of work under the program “Safety Management and Performance Engineering of Experimental Facilities” confines itself to annual arrangements, which are targeted at enhancing performance and safety of experimental and research facilities. These arrangements are annually approved by the investment committee of Innovation Management Bloc at ROSATOM State Nuclear Energy Corporation and included in the industry-specific program on development of experimental and research facilities.

This program was launched in 2011 in order to replace the worn-out and / or obsolete equipment and components. In 2013 RIAR undertook activities in this field within the framework of two independent projects aimed at safety management and performance engineering of the PIE facilities and reactors.

Safety management and performance engineering of PIE facilities at JSC “SSC RIAR”

The purpose of this project is to provide scientific framework and instrumentation engineering of research and development as well as engineering work performed at JSC “SSC RIAR” in support of post-irradiation examinations of irradiated fuel and structural materials with the focus on nuclear power engineering priorities and development of generation IV innovative nuclear reactors. In 2013 the following work related to PIE facility upgrade was accomplished:

1. Procurement contracts for fixed and portable radiation monitoring equipment and dose-rate meters: detectors BDGB-02I, personal radiation monitors DKS-AT3509A.

2. In order to enhance the performance of PIE facilities, the following equipment was procured and put into operation:

- ICP-MS mass spectrometer NexION 300D to examine isotope composition of irradiated materials in the laboratory environment;
- Equipment for testing tensile properties: vacuum chamber VS-1800 for the tensile test machine LFMZ 50 kN, high temperature pressure gauges 3641-003M-030M;
- Equipment for preparation test specimens for metallographic examination Hot Cell RotoSystem;

- Analytical scanning electron microscope VEGA 3 XMU of the TESCAN company production provided with a wide range of applications for electron probe microanalysis (the microscope was delivered, the hot cell and special room has been prepared for procured equipment mounting).

3. The equipment necessary for PIE data processing and logging was procured and put into operation. In doing so, it is possible to ensure safe transfer and storage of experimental data and enhance efficiency of data and analytical support of PIE work.

4. There are procurement contracts for the following research equipment:

- For profilometer measurements and eddy- current testing of irradiated rods to be 1.5 m long at the most in the hot cell;
- For preparation test specimens and crack testing, hardness measurement and impact testing.

5. The following work was done:

- Replacement of transformers;
- Retrofitting of vent stations and systems;
- Replacement of shutoff valves and water supply lines.

This project makes it possible to enhance capabilities of the materials test facilities at JSC "SSC RIAR" with the focus on PIE of irradiated fuel, materials and products under development, employment and operation, reliability forecasting and performance efficiency of core components, implementation of research programs as well as development of new fuel for different nuclear reactors and scientific support of their operation.

Safety and performance enhancement of research reactors at JSC "SSC RIAR"

As the research reactors of RIAR were mainly constructed in the sixties and seventies in the last century, the technical upgrading of the research reactor fleet at the Institute results from both the wear-out and obsolescence of the equipment as well as new federal safety rules and regulations for nuclear power facilities. The purpose of the project "Safety and performance enhancement of research reactor fleet at JSC "SSC RIAR"" is to provide scientific framework and instrumentation engineering of research and development as well as engineering work performed at JSC "SSC RIAR" in support of fuel and structural materials irradiation tests with the focus on nuclear power engineering priorities and development of generation IV innovative nuclear reactors.

In 2013 the following work was done in order to enhance performance and safety of research reactors:

1. Automatic fire alarm systems and evacuation management were upgraded at MIR, RBT-10/2, SM, RBT-6, and VK-50 buildings, as well as radioactive waste management facilities.

2. Automatic fire-extinguishing and warning system was put in operation at the SM and RBT-6 reactors.

3. Diesel-engine generators were installed at the MIR, VK-50 and BOR-60 reactors to provide emergency electric power supply in case of technological emergencies.

4. Radiation monitoring and emergency cooling systems were put into operation at the MIR loop PG-1 to provide emergency cooling in case of loss-of-coolant accident.

5. Safety-relevant measuring equipment responsible for thermal performance control of reactor circuits was upgraded at the MIR, SM, RBT-6, RBT-10/2, and VK-50 reactors and radioactive waste management facilities (approximately 420 measuring instruments were replaced in 2013 within the framework of the program).

6. New advanced subscribers exchange service station was commissioned that enabled enhancing engineering-telephone communication at the Institute and reliability of operations management.

7. New compressor station was commissioned as a part of technical upgrade program for compressed air system at the nuclear facilities. It led to safety enhancement of essential service functioning.

8. New electrical equipment was procured under the program for electrical reliability improvement at JSC “SSC RIAR” in order to improve reliability of electric power supply at the nuclear facilities.

9. Technical upgrading was undertaken for the industrial gas supply system at the reactors and nuclear facilities to enhance reliability of safety systems at the research reactors and test facilities. A transport tank with a submerged-type pump was replaced to provide emergency reserve of liquid nitrogen gas.

10. The industrial-type TV systems were procured to perform television monitoring over the reactor core components, fuel assemblies, and safety-related equipment.

11. Up-to-date equipment was procured to perform incoming inspection and radiographic examination of metal, welded joints of pipeline systems and equipment. Procured were also numerically controlled machines for metalworking and repair operations.

Implementation of the project in 2013 led to enhancement of nuclear, radiological and fire safety at the research reactors and improvement of the plant processes as well updating measuring equipment.

STAFF MANAGEMENT AND SOCIAL POLICY

4.2.

The core value for JSC “SSC RIAR” is a team of highly competent specialists. They have been contributing to the prominent success of the enterprise for many years.

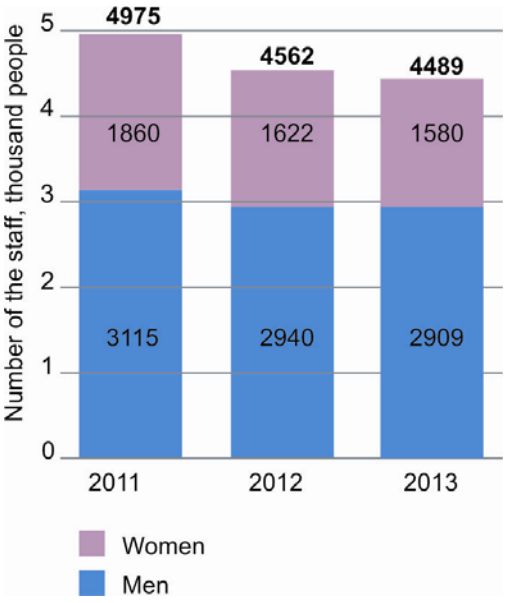
That is why the issues on maintaining the human resource quality, training and development of the staff, motivation, implementation of social programs and social responsiveness are among the most important parts of social policy at JSC “SSC RIAR” reflected in the Collective Labor Agreement which applies to all staff of the Institute.

JSC “SSC RIAR” STAFF GENERAL CHARACTERISTIC

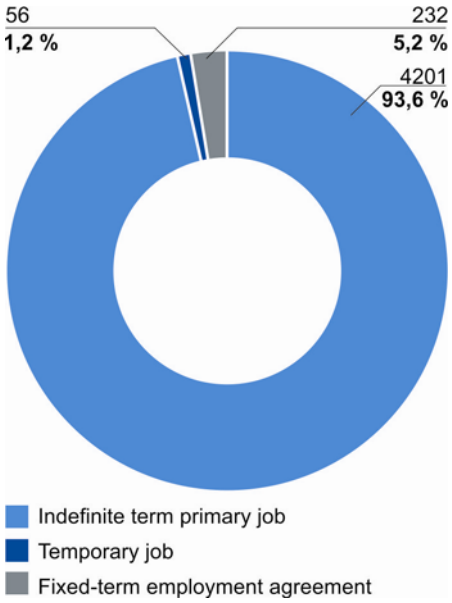
As of December 31, 2013 headcount at JSC “SSC RIAR” accounted for 4489 including 4482 full-time employees and 7 part-time employees. Compared to 2012 the number of the staff decreased by 1.6 %, which is explained by implementing an action plan on withdrawing non-core assets in 2013.

The average age of the staff is 46, a percentage of the staff under 35 is 26 %.

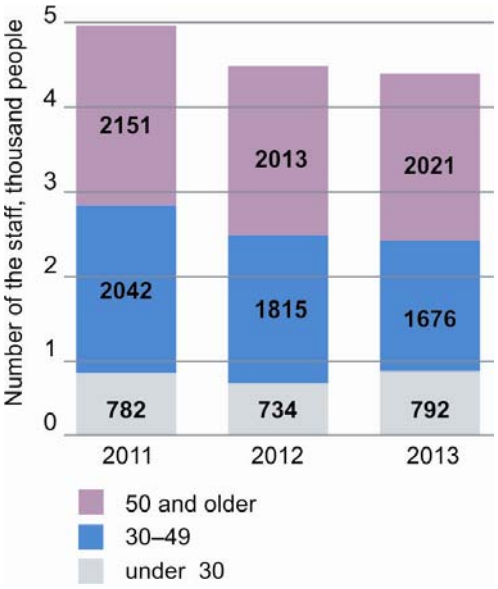
The number of the staff who have higher education is 1984 (44 %) of 4482 including 885 (44 %) who have industry-specific education.



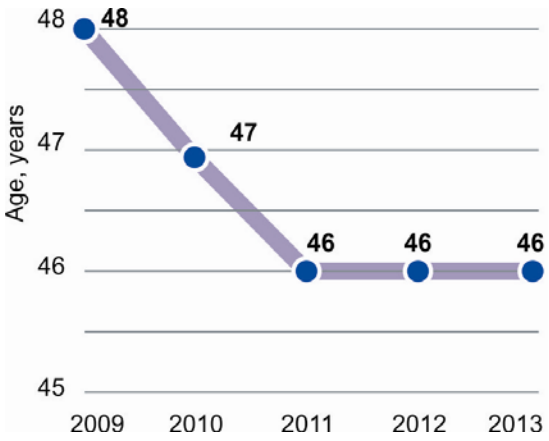
Dynamics of headcount with reference to gender



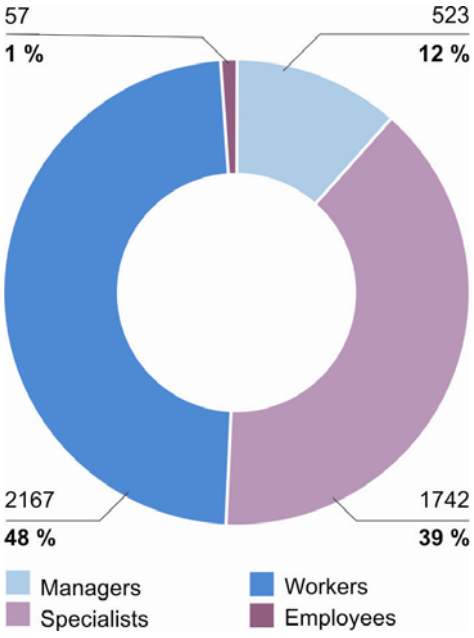
Total labor force with the breakdown by employment contracts



Dynamics of headcount with reference to age

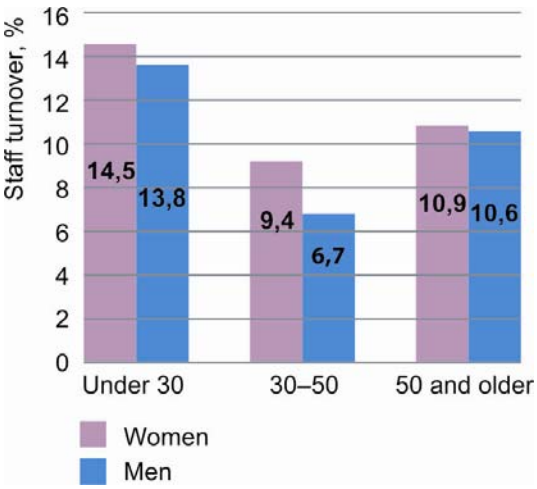


Changes in average age of the staff



Number of the staff divided by categories

Average age of the staff divided by categories



Staff turnover by age and gender

The staff turnover in 2013 made up 9.55 %.

In accordance with the labor law the minimal period of the staff notification on the changes in the enterprise activity is determined in the Collective Labor Agreement being no less than two months.

REMUNERATION

An efficient remuneration and compensation system is implemented at JSC "SSC RIAR" developed in accordance with *ROSATOM's Standard Uniform Remuneration System*. The remuneration system of JSC "SSC RIAR" ensures decent wages and encourages the staff to achieve the strategic goals of the Institute.

In accordance with the *Regulations on remuneration in JSC "SSC RIAR"* approved by Director of the Institute and agreed with the trade union, the salary (base rate) is similar for women and men for each staff category. It is set in accordance with the remuneration matrix. The integrated additional incentive is set for the staff in accordance with the level of professional status based on the results of assessment; it is assigned individually.

To improve the efficiency of implementation of the strategic goal of ROSATOM and its organizations, the staff professional activity efficiency management processes were initiated in 2009 at the enterprises of the industry, i.e. a system of the key performance indicators of the professional activity and annual assessment of the staff. The key performance indicators are set annually for Director of the Institute, his Deputies and other Heads of JSC "SSC RIAR"; their actual achievement levels reflect the key results of activity within the reporting period. Based on the key performance indicator achievement results by the Heads they are paid the annual award. The result of undergoing annual assessment procedure RECORD by the Heads is setting or changing the amount of the personal additional incentive determining the management potential. For those employees of JSC "SSC RIAR" who did not have the set key performance indicators

in the reporting period the amount of award on the work results per year is determined based on the personal performance factor and division performance.

In 2013 the staff expenses made up 2 172 888 thousand rubles.

Staff expense structure

Expense type	Amount, thou. RUR
Payroll fund	1 599 879
Including: basic payroll fund (salaries, integrated additional incentive 1, compensations, vacation)	1 193 024
bonuses and extra payments	85 375
awards for outstanding achievements	136 362
annual bonuses	160 883
other payments (redundancy payment, remuneration for an invention, incapacity allowance (3 days), fellowships, etc.)	24 235
Social expenses	78 941
Expenses on personnel selection and development	9 378
Taxes on the payroll fund	484 691

The average month payroll per one employee made up 30.1 thou. RUR. Compared to 2012 the growth is 25 %.

One of the key factors reflecting as economists and sociologists believe the level of social strain among the staff is a decimal factor describing the level of differentiation in remuneration of 10 % high-paid employees to 10 % low-paid employees. This factor value of 4 to 6 is recognized by the world practice as optimal for the existence and development of organization.

Decimal factor change

Year	Factor
2011	4.81
2012	4.95
2013	5.48

SOCIAL POLICY

All social benefits and guarantees for the Institute staff are established by the *Collective Labor Agreement of JSC "SSC RIAR"* and performed in accordance with the unified social policy of ROSATOM under the existing social regulations.

Management of social responsibility towards the staff is conducted in collaboration with the trade union. In JSC "SSC RIAR" there is the Trade Union of Nuclear Power and Industry Employees. The Institute Management meets the conditions to conduct the Trade Union activity, considers its opinion on all the issues envisaged by the law. Youth Board and Veteran Board are established and working vigorously at the enterprise.

The obligations of JSC "SSC RIAR" as an employer in social guarantees and benefits with the specification of the exact amount and payment mechanisms are fixed in the Collective Labor Agreement and its annexes. The Agreement applies to all employees of the Institute independently from their membership in the Trade Union. Thus, a percentage of the employees covered by the social programs, guarantees and benefits is 100 %.

In accordance with the *Collective Labor Agreement of JSC "SSC RIAR"* funds are allocated annually to fulfill social activities and responsibilities including material assistance for the employees and non-working retires, one-time payments for the anniversary dates and holidays, partial payment of the vouchers to children recreation camps for the employees' children, payments due to old-age or disability retirement, cultural and sport events and other payments. JSC "SSC RIAR" increases step-by-step the amount of funds designated for these purposes and aims at achieving the level envisaged by the industry agreement.

In 2013 social payments to the Institute staff made up 78.9 million RUR, social payments per one employee per year made up 17.8 thousand rubles taking into account the funds provided for healthy meals. The social expense volume is increasing annually, e.g., in 2014 an increase by 24 % is planned (per one employee).

Social expense structure

Expense type	Amount, thou. RUR
One-time payments (holidays, retirement)	8 947
Material assistance	5309
Including: employees	1797
retired	3512
Employees' children health improvement	1218
Cultural events	1401.0
Meals	53 357
Additional leave days	982
Housing improvement	675
Taxes on social expenses	4 477
Other social expenses (award for support of making an invention, trade union functioning, additional payments to women for child-care until a child is three years old)	2575
Total	78 941
Per one employee	17.8

A considerable amount of payments (3 512.2 thousand rubles) is material assistance for the employees on birth grant, funeral, treatment, family support including families with many children, non-working retired for holidays and anniversaries (2304 persons).

JSC "SSC RIAR" takes regular measures to provide the employees and their families with full health-care and recreation: 503 employees and 156 non-working pensioners underwent health improvement therapy in the health and recreation center of RIAR in the reporting period; 126 children of the employees had rest in children recreation camps "Fakel" and "Iskorka" in summer 2013. In addition, 251 employees were given vouchers for health resort treatment under Federal Medical and Biological Agency of Russia and 35 employees were given vouchers "Mother and Child".

The amount of expenses on the employees' health protection is growing annually. In 2013 a voluntary medical insurance agreement signing procedure was implemented, thus, 1000 employees working in extremely harmful and harmful conditions will have insurance. Annual preventive medical examination is conducted for JSC "SSC RIAR" employees and influenza vaccination of the employees is carried out.

The Collective Labor Agreement envisages social guarantees for non-working pensioners of the Institute and the mechanism of interaction with the Veteran Board is determined. The Veteran Board concludes with JSC "SSC RIAR" an annual cooperation agreement; in accordance with this agreement social payments are made to non-working pensioners. In 2013 similar payments made up 1 655.3 rubles per one pensioner. In cooperation with the Veteran Board the pensioners' leisure is organized. For instance, events on celebrating Victory Day and Day of Older Persons are conducted. The veterans are welcomed on corporate events.

Considerable scope of activities on sport and cultural events is implemented in collaboration with the Trade Union. Spartakiad is held at the Institute annually with over 1 000 persons who take an active part in various competitions. Among the most popular sports are football, chess, volleyball, cross-country skiing.

An honored torchbearer in Ulyanovsk leg of Olympic torch relay route for Sochi-2014 was Valentina Alekseeva, an employee of the Institute, multiple winner of town competitions, Master of Sports in track and field.

To form favorable social environment among the staff traditional corporate events are held dedicated to Nuclear Industry Specialist Day, Day of the Institute Establishment, Power Engineers' Day when an award ceremony of the best specialists of the Institute is held. At these events on-stage performance bands from Samara, Penza, Nizhnii Novgorod, Ulyanovsk are invited that have great success among the Institute specialists.

JSC "SSC RIAR" provides regular charity assistance: in 2013 the assistance was provided to orphan home "Planeta" and social disabled person organization "Preodoleniie". The Children Activity Center was given a telescope on the part of ROSATOM.

In order to attract young specialists the Institute is developing a program on improving the living conditions of young and high-qualified specialists. The Institute Management conducted activities on allocation of the territory and development of a new housing estate design. At present, a compensation for housing rent is envisaged for this staff category.

Moral encouragement

The Institute Management understands that the core of any enterprise is an encouraged person. Decent wage is of course very important in forming a good image of an employer. However, the Institute Management does not forget moral encouragement of the staff that is a powerful factor contributing to efficient performance of the duties and one of the key elements of the corporate culture.

The goal of moral encouragement is to increase the employees' interest in fulfilling their duties, which affects the labor efficiency increase and of course, the income increase.

In order to increase the involvement, awareness and merit recognition of the Institute staff involved in all spheres of science and research, to form a positive image of the Institute in the region, RIAR makes an efficient use of the Institute website, cooperates with the federal, regional and town mass media.

In Ulyanovsk region the winners of the annual contest of Mikhail Limasov's prize were decided. The contest has been held in the region on the initiative of Governor Sergey Morozov for four years already to enhance prestige of blue-collar jobs. Alexander Evseev, a mechanical engineer of experimental benches and facilities of JSC "SSC RIAR" gained the highest points in the age category of 36 and older.

On the eve of celebrating the 315th anniversary of Dimitrovgrad project "The Town is Proud with Them" was launched on those specialists who contributed to the town development in which the best employers of the town took part. The information on the best specialists of RIAR was placed on billboards. Due to conducting the Working Man Year in 2014 in Ulyanovsk region the Institute is working in this area.

Number of employees returned to work from maternity leave and a fraction of those who remained at the Institute after returning back to work from maternity leave with the breakdown by gender

Category	Number, persons	
	Men	Women
Those who have the right to parental leave	4	147
Those who took parental leave	4	147
Those who returned back to work from parental leave	1	43
Those who left the enterprise during the parental leave period	1	15
Those who returned back to work from parental leave and worked at the enterprise during 12 months after returning	1	34

All staff has the right to parental leave independently from age and gender.

PROVIDING QUALIFIED STAFF

The implementation of the main projects aimed at the Institute development requires highly-qualified staff; therefore the Institute Management pays great attention to sustainable staffing. The objective to provide the inflow of high-qualified young specialists in the Institute is integrated and requires long and systematic work of various divisions and services. The Institute developed and implemented the following:

- Programs on work with young people for 2013–2015;
- Program on coaching (training) development for the young specialists of JSC "SSC RIAR" for 2013–2015.

The first milestone of this work is to conduct activities on agitation and career guidance among pupils of Dimitrovgrad in order to inform them on the prospectives of education in specialities of higher and secondary vocational education that are in demand at the Institute. Such work will allow in future providing staffing of the Institute with local population. Therefore, the Institute Management, Staff Service and Communications Department take an active part in Open-Door Days in Dimitrovgrad and Ulyanovsk on the basis of Dimitrovgrad Engineering and Technological University – Branch of National Research Nuclear University MEPhI (DETI NRNU MEPhI), Ulyanovsk State University (UlSU), Ulyanovsk State Technical University (UlSTU). For the same purpose tours to JSC "SSC RIAR" is regularly conducted: annually 600–700 pupils and students from town and region as well as the neighbor regions such as Samara and Tatarstan visit the Institute.

To improve the efficiency of pupil agitation and career guidance activities the Center of Nuclear Innovation Cluster based on DETI NRNU MEPhI was established on November 28, 2013. Its main members are NRNU MEPhI and RIAR.

In addition, the Children Nuclear Academy has been operating successfully for many years. Its main goal is in-depth professionally oriented study of Physics, Chemistry, IT and Foreign Languages. The Children Nuclear Academy is aimed at developing personal motivation to learn and create providing additional opportunities for satisfying educational needs of children and teenagers in the area of non-school activity and leisure time. Classes at the Children Nuclear Academy going far beyond school curriculums allow broadening pupil's knowledge attracting pupils to do research, adapt practically the knowledge acquired at school to modern technologies and scientific and research work. The teachers of the Children Nuclear Academy are scientists of JSC "SSC RIAR", the representatives of higher educational institutions of Dimitrovgrad, Ulyanovsk, Moscow and leading Russian scientists.

The key factor describing the work of the Institute in this area is assigning the school graduates of Dimitrovgrad to target training in the leading universities of Russia for them to undergo training in specialties of higher education demanded at RIAR (Decree No. 421 of the Government of the Russian Federation as of 09.06.2010 "On the State Training Plan for Scientists, Specialists and Workers for the Military-Industrial Complex Organizations for 2011–2015"). For example, in 2013 such referrals were given to 46 school graduates of Dimitrovgrad, 38 of them entered universities for further

education including 17 persons to DETI NRNU MEPhI. An application to universities for 2014 was made for 82 graduates. For 2015 an application was issued for 110 pupils of the 10th grades.

The next stage in solving the target training task is integrated interaction with higher educational institutions in the staff training area. This interaction in addition to RIAR participation in the implementation of the main educational programs presupposes cooperative scientific and research activity. At present, 23 agreements and treaties have been concluded on cooperation with the following universities of Russia:

1. National Research Nuclear University MEPhI;
2. Dimitrovgrad Engineering and Technological University – Branch of National Research Nuclear University MEPhI;
3. Obninsk Institute for Nuclear Power Engineering – Branch of National Research Nuclear University MEPhI;
4. Seversk Technological Institute – Branch of National Research Nuclear University MEPhI;
5. Lomonosov Moscow State University;
6. Ural Federal University named after the first President of Russia B.N. Yeltsin;
7. Tomsk Polytechnic University;
8. Ulyanovsk State University;
9. Ulyanovsk State Technical University;
10. Kazan State Power Engineering University;
11. Kazan (Volga region) Federal University;
12. National Research University Moscow Power Engineering Institute;
13. Nizhny Novgorod State Technical University;
14. Russian State University of Tourism and Services Study;
15. Ivanov State Power Engineering University;
16. Technological Institute – Branch of Ulyanovsk State Academy of Agricultural Sciences named after P.A. Stolypin.

In April, 2013 the Memorandum of Cooperation was signed between JSC “SSC RIAR” and DETI NRNU MEPhI that aims at improving quality of specialist training, experience exchange and center of excellence, conducting joint projects as well as strengthening the interaction of the young specialists and students of the field-oriented higher institutes. In accordance with this Memo youth festival “New Horizons” was held on September 20–23, 2013. The festival was attended by fifty students of DETI NRNU MEPhI and fifty young specialists of JSC “SSC RIAR”. It is supposed that the festival will be held annually attended by region and industry youth.

In addition, long-term agreements were signed with Ulyanovsk State University, Ulyanovsk State Technical University and Togliatti State University on the target contractual training of qualified specialists for ROSATOM considerably respecting the interests of JSC “SSC RIAR”.

The cooperation with the higher educational institutions is conducted in the following main areas:

1. Organizing and conducting all training types on the basis of JSC "SSC RIAR": introductory training, on-the-job training, scientific and research training, pre-graduation practice.

In 2013 253 students of eighteen various higher educational institutions were sent to undergo on-the-job training at the Institute, 146 of them were from DETI NRNU MEPhI.

2. Attracting the leading specialists of the Institute as faculty members (lecturing, practical studies and laboratory research).

In 2013 36 RIAR specialists were among the faculty members of Dimitrovgrad Engineering and Technological University – Branch of National Research Nuclear University MEPhI and 7 specialists - of Ulyanovsk State University. In these universities basic departments have been established that are operating to improve the efficiency and conduct target training of the students. They are headed by RIAR specialists Sergey Pavlov (DETI NRNU MEPhI) and Vladimir Risovany (UlSU). The leading specialists are also involved into work in the State Examination Board and State Attestation Commission of these universities, which allows student training quality control.

3. Taking part in the university management (DETI NRNU MEPhI).

Five scientists working at the Institute are the members of Academic Council of DETI NRNU MEPhI:

- S.V. Pavlov, Director of JSC "SSC RIAR";
- V.V. Kalygin, Deputy Director for Science and Innovations;
- V.D. Risovany, Research Adviser of the Institute;
- R.A. Kuznetsov, Head (Director) of Radionuclide Sources and Radiochemicals Division;
- V.A. Krasnoselov, Chief Advisor.

4. Joint research and scientific activity.

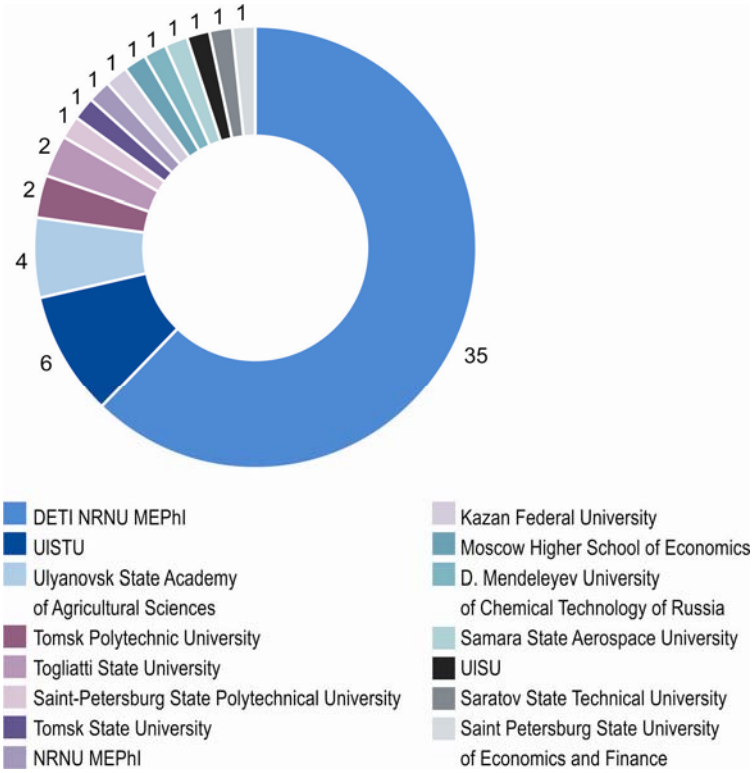
In conducting joint research and scientific projects there is a unique opportunity to attract the students of higher educational institutions to research on the Institute topics.

At the end of 2012 joint RIAR - UlSU project "Integrated Modernization and Development of Radionuclide Reactor Production at JSC "SSC RIAR" to Ensure the Development of Nuclear Medicine and Radiation Technologies" was supported at the contest held by the Ministry of Education and Science of the Russian Federation in accordance with Decree No. 1040 of the Government of the Russian Federation as of 12.10.2012 "On the Changes introduced into Decree of the Russian Federation No.218 as of 09.04.2010". This project will be implemented in 2013–2015 and will allow creating new production capacities at JSC "SSC RIAR" on radioisotope production: selenium-75, gadolinium-153, irridium-192, strontium-98. Six students, ten post-graduate students and ten young scientists who are UlSU specialists were involved in the implementation of this project in 2013. Following the results of 2013 fourteen joint articles were published in the leading editions, four applications on an invitation were made.

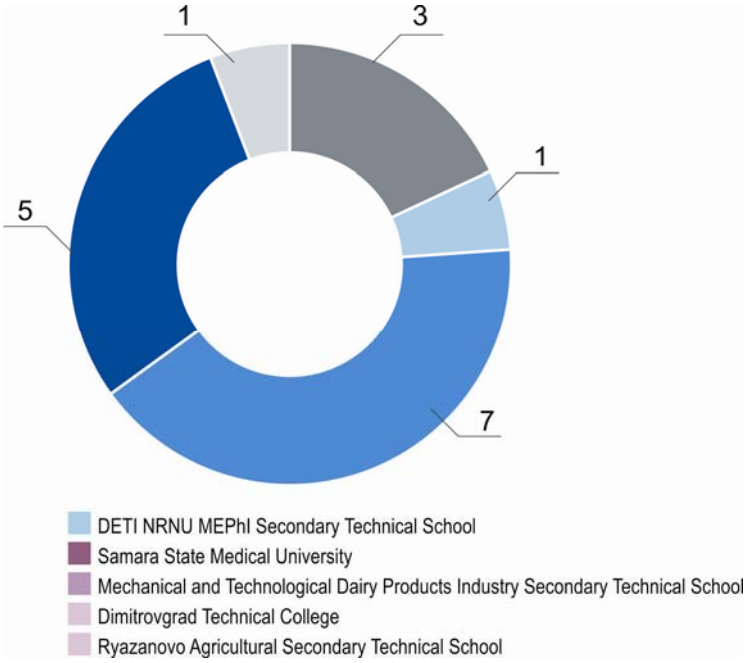
In 2013 JSC "SSC RIAR" initiated the implementation of another project under Decree No.218 of the Russian Federation as of 09.04.2010 "On State Support for the Development of Cooperation between the Russian Higher Educational Institutions, State Scientific Establishments and Organizations Implementing Integrated Projects on Creating High-Quality Production" during which a process for molybdenum-99 production using low enriched uranium is being implemented in cooperation with DETI NRNU MEPhI.

The project implementation will allow creation of a process of the molybdenum-99 production by irradiating special-purpose targets in a nuclear reactor containing uranium with enrichment of no more 20 % in uranium-235 followed by radiochemical reprocessing of the irradiated targets for extraction and purification of molybdenum-99. Seven students, one post-graduate student and two young scientists working for DETI NRNU MEPhI were involved in the implementation of this project. Based on the results two joint articles were published and one application for an invitation was made.

The implementation of these activities allows the Institute to have continuous inflow of the young specialists. In 2013 59 young specialists – graduates of fifteen higher educational institutions – were employed by JSC “SSC RIAR”.



Number of graduates of various higher educational institutions employed by JSC “SSC RIAR” in 2013



Number of graduates of various specialized secondary educational institutions employed by JSC "SSC RIAR" in 2013

In 2013 272 young specialists were employed by JSC "SSC RIAR" under 35 including 148 specialists; 123 workers; 1 head.

Another important objective is maintaining young specialists at the Institute. This goal can be solved by developing and implementing an integrated motivation system to attract young specialists to the Institute. Based on the results of the questionnaires among young people of Dimitrovgrad and region, the main encouraging factors are as follows:

- increase in wages in the scientific area (97 % of the pollees);
- modern material and technical basis (80.3 % of the pollees);
- professional growth (59.6 % of the pollees);
- conditions for full implementation of career ambitions (47.3 % of the pollees);
- assistance in solving housing issues (60.3 % of the pollees);
- possibility to avoid army recruitment (19.4 % of the pollees);
- occupational contacts and trips abroad (32.6 % of the pollees);
- increasing the science and scientific work prestige (43.7 % of the pollees);
- availability of information and communication possibilities (16.2 % of the pollees).

The results of the questionnaire and further monitoring showed that in choosing specialty and career in the future in addition to material assistance a modern material and technical basis, opportunities for professional growth, successful career and full implementation

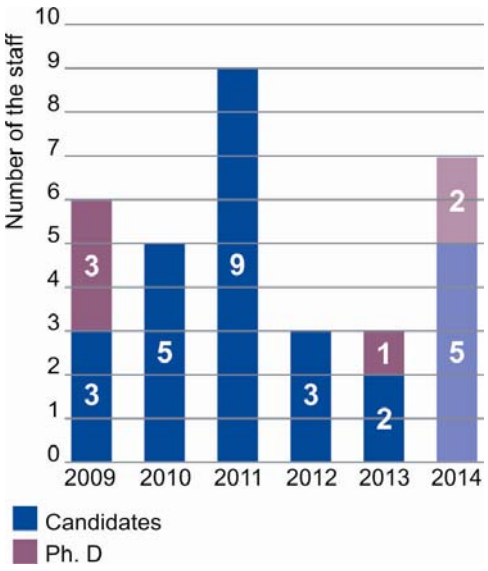
of career ambitions are important for young people. These are the very conditions that the industry enterprises, RIAR in particular can provide for a young specialist.

The key staff element of the Institute providing the required level of R&D on the main scientific and research areas is top-qualification specialists including Candidates (91 persons) and Ph.D. (10 persons). At present, the top-qualification specialists allow maintaining the Institute process basis and performing research at a sufficiently high level that is confirmed by the information on publications of the Institute specialists.

Information on publications in Russian and international journals

Information analytical system of science citation	Number of indexed publications
Web of Science	33
Russian list of journals indexed	64

Since 2006 RIAR is training top-qualification specialists in ten specialties on the basis of cooperation agreements in post-graduate and doctoral studies in the following higher educational institutions: DETI NRNU MEPhI, UlSTU, Obninsk Institute for Nuclear Power Engineering, UlSU, Ulyanovsk State Academy of Agricultural Sciences and Togliatti State University. This allows solving the issue of top-qualification staffing at the Institute. Over the last five years (2009–2013) 26 thesis works were defended including 4 PhD and 22 Candidates.



Dynamics of the number of the staff obtained PhD∗

At present, 24 specialists of the Institute are undergoing postgraduate training programs at the higher educational institutions specified above including 12 specialists in DETI NRNU MEPhI, 11 – in UlSU, 1 – in TSU.

∗ Data on 2014 are forward looking.

STAFF DEVELOPMENT SYSTEM

The compliance of the number and qualification of the staff to the scope and difficulty of the solving issues is one of the primary conditions of the efficient performance of the organization goals. A staff development system is operating efficiently at the Institute implementing various training types and forms including compulsory training in those activity types under control of various supervision types.

The average number of training hours per one employee per year divided by staff categories including compulsory training and level of expenses on training in rubles of an employee divided by the staff categories excluding compulsory training is presented in the table.

Average number of hours and level of expenses on training divided by staff categories

Factor	Category	For the staff trained	In relation to average staffing number	
			employees inside category	staff of the Institute
Average number of training hours per one employee, h	Heads	51.7	7.13	1.13
	Specialists	60.2	4.13	1.4
Level of expenses on training, rubles	Heads	30.9	4259.5	677.4
	Specialists	19.35	1329.4	449.9

Forming and developing the staff reserve of the organization and industry provides a wide range of possibilities for career development of the JSC “SSC RIAR” specialists, their professional competence growth, increases their motivation to labor and involvement in the job, contributes to maintaining unique, smart and promising specialists at the enterprise and in industry, reduces the dependence from the labor market.

The staff reserve is a first-priority source for assignments to vacant and newly established management positions of the organization. The external staffing to management positions is done when there is no right person currently among the staff reserve.

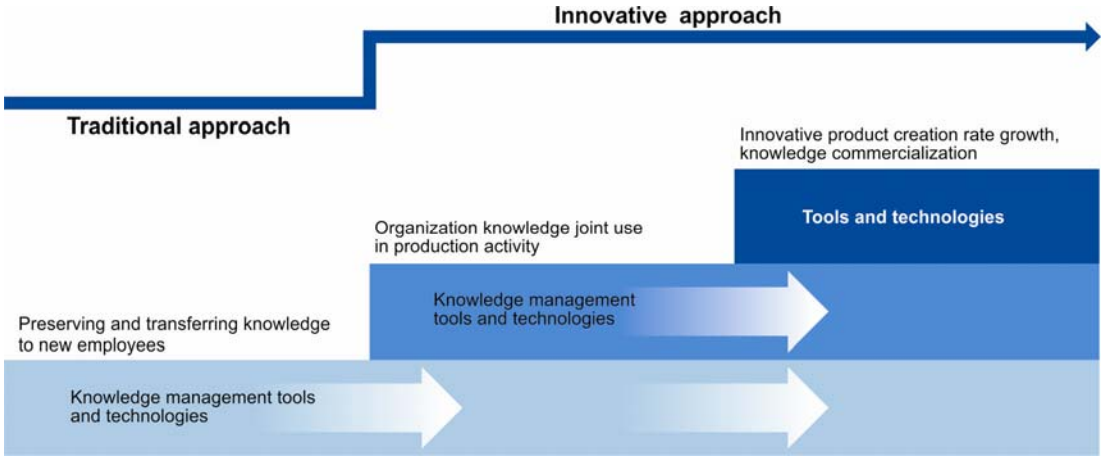
Staff reserve developing and forming

Index	Value
Percentage of employees for which periodic performance assessments are career development are done, %	100
Number of employees within the staff reserve, persons	29
Percentage of employees appointed to vacant positions from the staff reserve, %	100

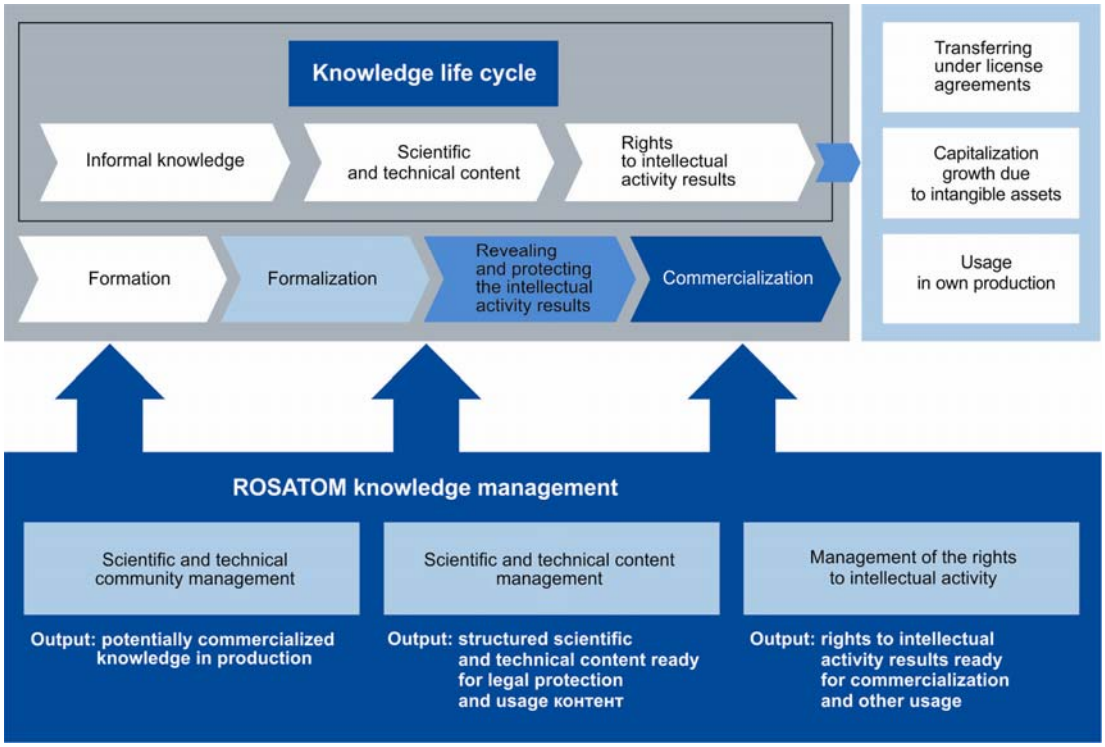
KNOWLEDGE MANAGEMENT SYSTEM ESTABLISHMENT

4.3.

A program for forming a corporate knowledge management system of ROSATOM and its organizations was established by ROSATOM Management in 2012.



Key goals of the knowledge management system



Knowledge management organization

Under industry project “Knowledge Management System” in the reporting year JSC “SSC RIAR” continued working in three trends: management of scientific and research communities, science and technical content and intellectual property. This project is one of the management tools for intellectual activity of the Institute.

Management of scientific and technical communities

The objective is to increase innovation activity of the employees of ROSATOM and its organizations due to:

- scientific and technical competence management;
- professional and scientific communities and infrastructure for their interaction;
- formalization of implicit knowledge;
- revealing and preserving critical knowledge at ROSATOM organizations.

In 2013 JSC "SSC RIAR" initiated a project on preserving critically important knowledge. Under the project a schedule was developed and approved and local regulations on implementing the critically important knowledge preservation system were issued:

- under Order No. 373 as of 19.04.2013 "On critically important knowledge preservation system" a special work team was established and vigorous activity in this area started;
- under Order No. 64/1217-P as of 11.12.2013 "Procedure of preserving critically important knowledge at JSC "SSC RIAR" and "Standard guidelines on preserving critically important knowledge" were approved and enacted.

Based on these local regulations JSC "SSC RIAR" issued the first edition of the knowledge map in 2013 including nine research areas. A list of critically important knowledge was issued on its basis and a program for the knowledge preservation was developed covering three topics:

1. Nuclear fuel cycle analysis methods.
2. X-ray diffraction analysis of the irradiated materials.
3. Nuclear and Neutron Physics.

The implementation of the program is scheduled 2014.

In order to preserve and spread the critically important knowledge at JSC "SSC RIAR" in 2013 for the students, post-graduates and young scientists the following activities were conducted:

- youth forum "Energy of Generations" (in cooperation with DETI NRNU MEPhI under Memo of Cooperation);
- annual contest of young specialists of the Institute under thirty-five.

Scientific and technical content management

The objective is to increase the research and development efficiency due to ensuring the availability and ease of use of the scientific and technical content by the staff of ROSATOM and its organizations due to:

- formalizing and recording the knowledge created in ROSATOM and its organizations;
- systematically collecting and storing the formalized (recorded) knowledge on ROSATOM's scientific and technical activity;
- systemizing the scientific and technical content on tangible media (knowledge mapping, development of the unified data catalogue, etc.);
- providing access to the employees of ROSATOM and its organizations to the inner science and technical content;
- providing access to the employees of ROSATOM to the external information sources.

In implementing this in 2013 work continued on forming collections of scientific and technical information placed on ROSATOM scientific and technical information portal. The content was updated with the current scientific and technical information and data of the digitalized scientific and technical documentation of the Institute.

Under the industry-wide project the scientists of the Institute had the access to international citation database “Scopus” and to the electronic database of one of the world’s largest publishing houses – “Elsevier” (over 2000 science journals covering about 250 thousand articles per year).

Management of the rights on the intellectual property results

The objective is to manage the results of intellectual activity at all stages of the life cycle (identification, accounting, use and disposal, keep the rights in force, protection of ROSATOM’s interests, monitoring) aimed at their commercialization by:

- establishing the center of competence on managing the rights on the intellectual activity results;
- regulation of the intellectual activity result right management (including the allocation of the responsibility areas and powers between the Innovation Management Center, Center of Competence being established and other participants);
- corporate accounting and monitoring of the intellectual activity results at all stages of the life cycle;
- control over the timely revealing of the intellectual activity results and their legal protection;
- collecting and providing the information on the intellectual activity results to the government authorities and authorized organizations in the intellectual property area in accordance with their scope of duties;
- managing the rights on the intellectual activity results, information support at all stages of the life cycle of creating the intellectual activity results;
- accounting mechanisms and remuneration to authors;
- disposal of the intellectual activity results in ROSATOM and its organizations;
- broadening the commercial use of the intellectual property results including grant of rights to use the intellectual activity results under license agreements.

Inventive activity at JSC "SSC RIAR"

Factor	Factor value by years		
	2011	2012	2013
Application for an invention and utility model	12	15 (including 4 – RF right holder)	13 (including 4 – RF right holder)
Granted patents for an invention and utility model	16	8+1 database	13 (including 2 – RF right holder, 1 – jointly with JSC "SverdNIIKhimmash")
Issuing the legal protection for the know-how	10	–	26
Supported inventions and utility models; know-how	115	118 (including 80 – inventions; 35 – utility models; 1 – database; 2 – know-how)	153 (including 83 – inventions; 41 – utility models; 1 – database; 28 – know-how)
Used inventions and utility models*	44	52	54

INTELLECTUAL PROPERTY COST

Type of intellectual property	Cost, thousand rubles	
	initial	residual
Invention	351	263
Utility model	105	68
Know-how	99 871	89 897
Trademark	22	10
Total	100 349	90 238

* Based on accounting 4-HT form.

4.4. JSC "SSC RIAR" AND PRESENCE REGION: UNITY OF SUSTAINABLE DEVELOPMENT PURPOSES

JSC "SSC RIAR" is one of the principal employers of Dimitrovgrad. It is impossible to solve the crucial strategic goals set to the Institute by ROSATOM without improving the competitive advantage of the region on the Russian market, which takes efforts and attention not only of the Institute Management but also of Dimitrovgrad authorities. Such issues are typical for other ROSATOM enterprises located in various regions of Russia. Therefore, during several years already ROSATOM has been conducting consistent work in supporting and developing the presence area of its enterprises as it allows solving a range of strategic goals and improve competitive advantages of ROSATOM on the Russian and foreign markets. The interaction with the territories is done based on the common strategy of the corporation including vigorous work with authorities and public, generation and financial support of social and humanitarian projects aimed at achieving the specific goals on the specific territories.

At the end of 2012 a set of cooperation agreements was signed between ROSATOM and Russian regions on the territory of which there are nuclear facilities. Due to these agreements towns have new large-scale possibilities for the target additional funding of socially important projects due to using the potential of the tax payments of ROSATOM enterprises to the Russian Federation constitute entity funds that have been increasing since 2013. It should be noted that these agreements were concluded only with those regions where there are nuclear power plants and closed administrative territories of the nuclear industry. Only Ulyanovsk region is an exception. This reflects the fact that ROSATOM management pays great attention to the development of the presence territory of JSC "SSC RIAR" as the challenging tasks set to the Institute on its development requires considerable improvement of Dimitrovgrad infrastructure in achieving the world standards.

In Ulyanovsk region under Addendum No. 255-DP as of 30.11.2012 between ROSATOM and government of Ulyanovsk region *Program of Activities on Developing Infrastructure of Municipal Entity "Town Dimitrovgrad"* was developed and its implementation was initiated due to additional inter-budget transfers from Ulyanovsk region funds (Decree of the Government of Ulyanovsk region No. 488-P as of 23.10.2013).

The implementation of this program was scheduled targeted 2013–2016 envisaging activities in the following areas:

- **Healthy lifestyle:** activities under this trend are aimed at developing sport infrastructure to increase the number of population doing sports.
- **Education and science:** in implementing this trend it is planned to establish a system of network interaction of educational institutions of all types to ensure the development of the staffing, creation of modern library center to improve public informing and provide its sustained intellectual development, development of cultural institutions.
- **Construction, road repair on the adjacent territories.**

- **Housing and utilities and town site improvement:** the planned activities are aimed at providing a full scope of the counted need in water for the population of the western part of the town, developing the engineering infrastructure of the town, support of privileged citizens, population safety assurance, upgrading of the existing basis and increasing its production capacity for collection, removal and disposal of solid household waste and bulk waste from the town territory.

Funding of the program due to additional inter-budget transfers Ulyanovsk region funds will make up 680.5 million rubles: in 2013 it made up 121.88 million rubles, in 2014 it will amount to 142.95 million rubles, in 2015 – 243.26 million rubles, in 2016 – 172.5 million rubles.

NUCLEAR INNOVATION CLUSTER

The Nuclear Innovation Cluster of Dimitrovgrad is localized in Ulyanovsk region. The key areas of the Cluster are related to various applications of nuclear technologies: nuclear power, nuclear medicine, production of various purpose isotopes, etc.

At present, the Cluster includes major enterprises, educational institutions and scientific and research organizations of the region providing the formation and development of the basic Cluster areas as well as small and middle business companies:

1. Government of Ulyanovsk region;
2. Ministry of Economic Development of Ulyanovsk region;
3. Dimitrovgrad Authorities;
4. ROSATOM State Nuclear Energy Corporation;
5. Federal Medical and Biological Agency under the Ministry of Health and Social Development of the Russian Federation;
6. Independent nonprofit organization “Centre for Development of Nuclear Innovation Cluster of Dimitrovgrad”;
7. Municipal public institution “Investment and Innovation Project Board”;
8. Joint Stock Company “State Scientific Center – Research Institute of Atomic Reactors”;
9. Joint Stock Company “AKME-engineering”;
10. National Research Nuclear University MEPhI;
11. Dimitrovgrad Engineering and Technological University – Branch of National Research Nuclear University MEPhI;
12. Ulyanovsk State University;
13. Ulyanovsk State Technical University;
14. “Pantex”, LLC;

15. “PromServis”, CJSC;
16. “Zenit-Khimmash”, LLC;
17. Sosny R&D Company, Branch in Dimitrovgrad;
18. FSUE “Federal Center for Nuclear Medicine Facility Design and Development” of the Federal Medical and Biological Agency under the Ministry of Health and Social Development of the Russian Federation;
19. “Ulyanovsk Center for Technology Transfer ”, LLC;
20. Research Technological Institute named after S.P. Kapitsa under UlSU;
21. “Ulyanovskoblvodokanal”, LLC;
22. “Ekoprom”, LLC;
23. Science Park “UlSU – High Tech”;
24. “TestGen”, LLC;
25. “InP”, LLC;
26. Innovative Company “Modern Technologies”, LLC.

The Nuclear Innovation Cluster was established in 2010 through extensive collaboration with the interested parties: ROSATOM, Government of Ulyanovsk region, Dimitrovgrad local authorities, Federal Medical and Biological Agency under the Ministry of Health and Social Development of the Russian Federation. At the preparatory stage of the Cluster development in 2010–2011 the strategic goals of its development were set, the participants and major projects were determined. During several joint meetings and discussions a list of the key Cluster companies was determined including small and middle innovative companies wishing to join the Cluster.

Another stage of the Cluster development (2011–2013) was finalizing the institutionalization and joint strategy development. With fruitful engagement of the main interested parties a joint program for the development of the Nuclear Innovation Cluster of Dimitrovgrad was developed and approved. In August, 2012 the Nuclear Innovation Cluster of Dimitrovgrad entered the federal list of pilot innovative territory clusters (approved 28.08.2012 by Order NDM-P8-5060 of Prime Minister of the Russian Federation) under which the projects can apply for co-funding from the federal funds.

Federal policy of the innovative territory cluster support influenced considerably the development and implementation of various activities in the area of the cluster development in the reporting year: the Ministry of Economic Development of the Russian Federation (Order N 188 of the Government of the RF as of 06.03.2013 (rev. dated 15.07.2013) “On Approval of the Regulations for Allocation and Provision of the Grants from Federal Funds to the Russian Federation Entity Funds on Implementing Activities Envisaged by the Pilot Innovative Territory Cluster Development Programs”).

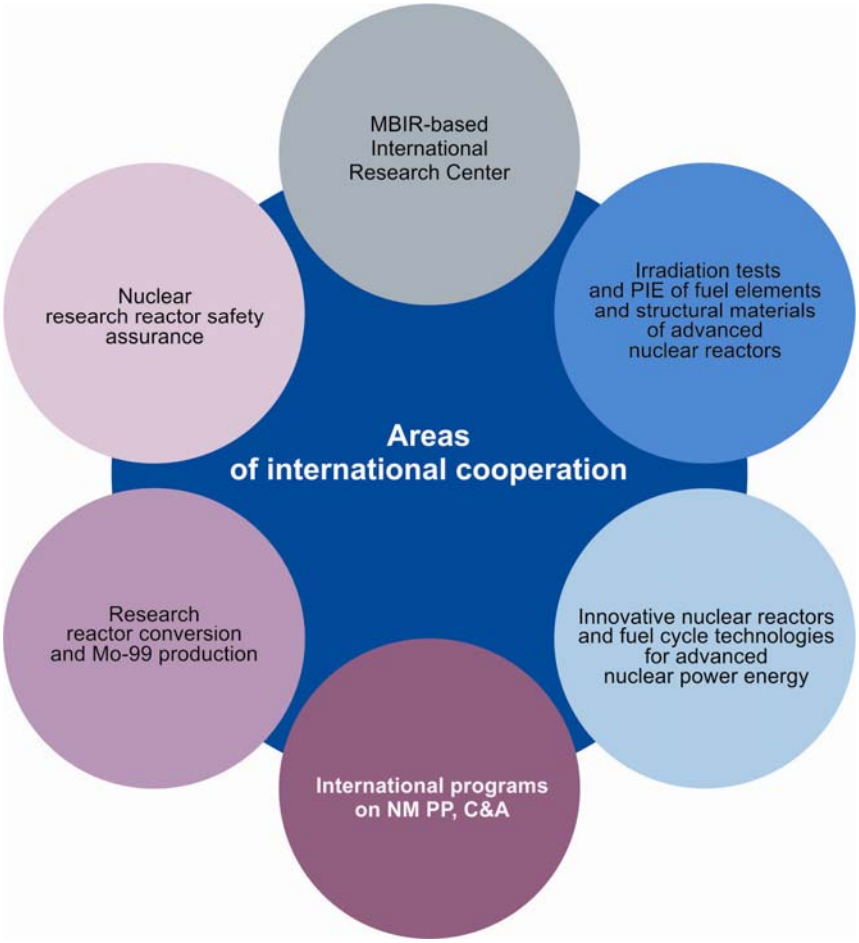
The 2013 results show that every task set was completed in full and the Nuclear Innovation Cluster of Dimitrovgrad entered the new development stage related to innovative infrastructure expanding and commercialization of scientific-technological potential of the Cluster members including outward investments into the Cluster projects.

INTERNATIONAL COOPERATION

4.5.

The international cooperation of JSC “SSC RIAR” is aimed at implementing the strategy of ROSATOM up to 2030 that envisages building scientific capacity on the foreign markets and increasing export of high-tech products.

In 2013 the cooperation was very fruitful. Over one hundred and fifty-five international events took place abroad and in Russia attended by one hundred and twenty-five RIAR specialists. Forty international events of ninety were held in Dimitrovgrad with attendance of RIAR specialists. Our Institute was visited by one hundred and fifty-six international specialists from twenty-four countries. Scientists and engineers of the Institute joined twenty-five international forums and conferences, forty working group meetings and information workshops including the IAEA events. Forty-seven meetings and negotiations were conducted under the current contracts including twelve on international technical assistance programs in the area of Nuclear Material Physical Protection, Control and Accounting, five in the International Scientific and Technical Center and over ten were aimed at signing new contracts. The Institute specialists took part in the acceptance tests of special equipment ten times developed for the Institute labs in order to implement federal target programs. In 2013 eight new contracts were signed on research in the primary areas of the Institute activity. The preparatory work was conducted in other seven projects. Over thirty licenses of the Federal Service for Technical and Export Control were obtained, twenty scientific reports were sent.



Areas of RIAR international cooperation

IRRADIATION AND POST-IRRADIATION EXPERIMENTS OF FUEL ELEMENTS AND STRUCTURAL MATERIALS OF ADVANCED NUCLEAR REACTORS

This is one of the most demanded areas of commercial partnership of JSC “SSC RIAR” and foreign companies. The cooperation is conducted through a set of contracts on feasibility study, irradiation in BOR-60 and a range of PIE of the fuel elements and structural materials of advanced nuclear reactors. In 2013 R&D was performed under seven agreements signed earlier. In the reporting year three contracts were signed and four contracts are undergoing the agreement and signing procedures. During multiple meetings in the current year the technical issues related to experiments and interpretation of the results as well as conditions and ways of shipping of the material samples for irradiation have been discussed.

Our partners are as follows:

- AREVA (France);
- CEA, France;
- TerraPower (USA);
- DOE, USA;
- KAERI (South Korea).

RESEARCH REACTOR CONVERSION AND MO-99 PRODUCTION

Under the executive agreement between ROSATOM and DOE on collaboration in performing research on possibility of Russian research reactor conversion to LEU fuel the feasibility study and safety analysis of the MIR reactor are being performed in order to determine the technical possibility for its conversion.

The current status of the contracts is an issue to discuss during the annual Russian-US working group meetings on coordinating the cooperation with engaged RIAR specialists. A set of tasks includes the identification of the LEU fuel and FA suitable for conversion. In doing so, an agreement was approved in ROSATOM and signed between JSC “SSC RIAR”, Argonne National Laboratory and JSC “TVEL” on fabrication and test in the MIR reactor of experimental FAs IRT-3M containing uranium-molybdenum fuel 19.7 % enriched in U-235.

The Institute specialists were part of the IAEA workgroup on research of Mo-99 production process conversion to LEU.

DESIGN ON MULTIPURPOSE FAST RESEARCH REACTOR

ROSATOM, DOE and CEA singed a Memo of Understanding at International Industry Forum "ATOMEXPO-2013" in Saint-Petersburg on the issues of International Research Center based on MBIR establishment, construction of multipurpose fast research reactor in Dimitrovgrad, which will become the most powerful reactor in the world after its commissioning (150 MW).

In accordance with the adopted document in the following year after the Memo signing a working group of the experts from three countries will be operating: legal specialists will choose the most appropriate organization chart, economists will determine the percentage of financial participation, scientists will develop a joint research program for 2020–2030.

The first international scientific and technical workshop on the MBIR-based International Research Center design was held in November, 2013 in Dimitrovgrad.

At the same time investigation was conducted on the reactor construction design. "EGP Invest" from Czech Republic (Uherský Brod, Czech Republic) completed designing a turbine unit for MBIR. The documents on the reactor equipment room were submitted to the state expert review in Russia. At present, the work on its 3D-model is being completed.

INNOVATIVE NUCLEAR REACTORS AND FUEL CYCLE TECHNOLOGIES FOR ADVANCED NUCLEAR POWER

In July, 2013 JSC “SSC RIAR” welcomed XVI Meeting on Molten Salt Reactors under International Forum “Generation-IV” attended by the leading Russian scientific organizations: Kurchatov Institute, Russian Academy of Sciences, NIKIET, SSC RF – IPPE, VNIINM, OKBM Afrikantov and the representatives of France, the Netherlands, Germany, USA, China, Japan and South Korea.

At present, RIAR is the only world’s scientific platform that has a possibility to conduct research in chemistry and thermal dynamics of molten salt fuel with the real minor actinides – americium and curium. The long-term result of the meeting was full-scale engagement of the Russian Federation that had earlier an observer status into taking part in the system management of International Forum “Generation -IV” on molten salt reactors.

Two simultaneous projects on pyrochemical actinide fractioning in the chloride and fluoride molten salt funded by the European and Russian agencies were selected as a result of coordinated competition at the seventh baseline program of the international nuclear society. The interaction under Russian Project “Study of Pyrochemical Processes for Minor Actinide Recycling in the Chloride and Fluoride Molten Salts” abbreviated PYROSMANI and European Project “Actinide Separation Safety” (SACSESS) are regulated by the agreement on action coordination between JSC “SSC RIAR” and CEA. The agreement will come into force in 2014.

NUCLEAR RESEARCH FACILITY SAFETY ASSURANCE

At the CIS Heads of Government Council Meeting in Minsk a decision was taken to assign JSC “SSC RIAR” a status of the basic organization on information exchange in the area of the CIS Member State nuclear facility safety assurance. The priority activity area of the basic organization is inter-governmental information exchange and implementation of the nuclear power peaceful use programs under CIS Member-State nuclear facility safe operation assurance.

The annual CIS Member State Research Reactor Coalition Meeting was held on June 4–7 at JSC “SSC RIAR” attended by the representatives of Russia, Belarus, Kazakhstan, Ukraine, Uzbekistan, Tajikistan, Kyrgyzstan and IAEA. The CIS Research Reactor Coalition was established under IAEA Project RER/1/007 “Enhancing Use and Safety of Research Reactors through Networking, Coalitions and Shared Best Practices” as a new model for experience exchange in the area of research reactor safety assurance and assistance to their wider and more efficient use for scientific, social and economic development of the CIS Member States as well as to facilitate the access of the Member States that does not have such facilities. As a result of the working meeting a Coalition action plan was established for the next year and a Memorandum was signed.

NUCLEAR MATERIAL PHYSICAL PROTECTION, CONTROL AND ACCOUNTING ENHANCEMENT PROGRAM

One of the important constituents of the Russian-US cooperation is the program on the nuclear material physical protection, control and accounting enhancement at the Russian nuclear facilities. However, there were no new contracts in 2013 signed, and the interaction format was limited to showing the work performed earlier and taking part in the coordinator meetings, which is related to the statement of the Russian part on its refusal to continue cooperation under this program on conditions stated in the Agreement between the Russian Federation and USA Concerning the Safe and Reliable Transportation, Storage and Destruction of Weapons and the Prevention of Weapons Proliferation dated June 17, 1992.

The Government of the Russian Federation and Government of the United States of America signed a protocol to the Basic Order Agreement as of May 21, 2003 on multipartite nuclear environmental program in the Russian Federation and cooperation under the agreement on multipartite nuclear environmental program.

A new technical cooperation program was recorded in the Commission on Humanitarian Aid and Technical Assistance Commission under the Government of the Russian Federation on December 26, 2013 as a program in the area of handling spent nuclear fuel and radioactive waste. Thus, signing new projects and contracts is renewed in the established order in accordance with the revised regulations.

5 INTERACTION WITH INTERESTED PARTIES

ESTABLISHMENT OF PUBLIC REPORTING SYSTEM

5.1.

In 2013 considerable attention at JSC “SSC RIAR” was paid on establishing a public reporting system. There was a Committee on Public Reporting established; its main objectives are the management of the established public reporting system in JSC “SSC RIAR”, its improvement and maintenance.

In the reporting year a set of corporate documents was developed and approved in the area of public reporting including as follows:

- Order on the Committee on Public Reporting of JSC “SSC RIAR”;
- Order on the Commission of Interested Parties of JSC “SSC RIAR” in the area of public reporting;
- Statement of Work on issuing the Annual Report 2013;
- Schedule on preparing the Annual Report 2013;
- Action Items on establishing and improving the public annual reporting system of JSC “SSC RIAR” in 2013.

A draft of Enterprise Standard “Quality Management System of JSC “SSC RIAR”. Annual Report Preparation Procedure” was developed at the Institute that is currently undergoing the approval procedure.

In addition, in preparing the 2013 Report a list of the revealed indices and GRI factors was extended in order to achieve application level B.

Work on improving the public reporting system of JSC “SSC RIAR” was scheduled on 2014.

The responsibility for arrangement of the public reporting was placed on the Research Center.

5.2. JSC "SSC RIAR" PUBLIC POSITION AND ITS IMPLEMENTATION REGARDING SUSTAINABLE DEVELOPMENT AND INTERACTION WITH INTERESTED PARTIES

In 2013 JSC "SSC RIAR" continued taking part in the implementation of the project on public position of the Institute on the issues of corporate social responsibility the aim of which is to form the channels for transmitting trust via interaction with interested parties meeting the AA 1000 SES International Standard requirements.

In collaboration with interested parties JSC "SSC RIAR" understands its liabilities with regard to the formation of mutually beneficial partnership and public relations based on a regular constructive dialogue aiming its activity at such partnership and mutually beneficial relations with interested parties following these basic principles:

- respect and accommodation of interests, opinions and preferences including respect to history, culture, traditions, way of life and legacy of the local population;
- openness and transparency;
- trust and honesty;
- full compliance with laws;
- compliance with the standards of the Russian Federation and international standards;
- timely information of interested parties;
- interaction on a regular basis;
- responsible fulfillment of the assumed liabilities.

JSC "SSC RIAR" pursues the transparency policy aimed at providing credible and complete information to all interested parties on the key areas of its activity. Accommodation of interests of the Institute and interested parties in the specific issues is done within the framework of direct dialogues with the representatives of interested parties. Work in close cooperation with interested parties enables to promptly learn their expectations and timely response to their requests.

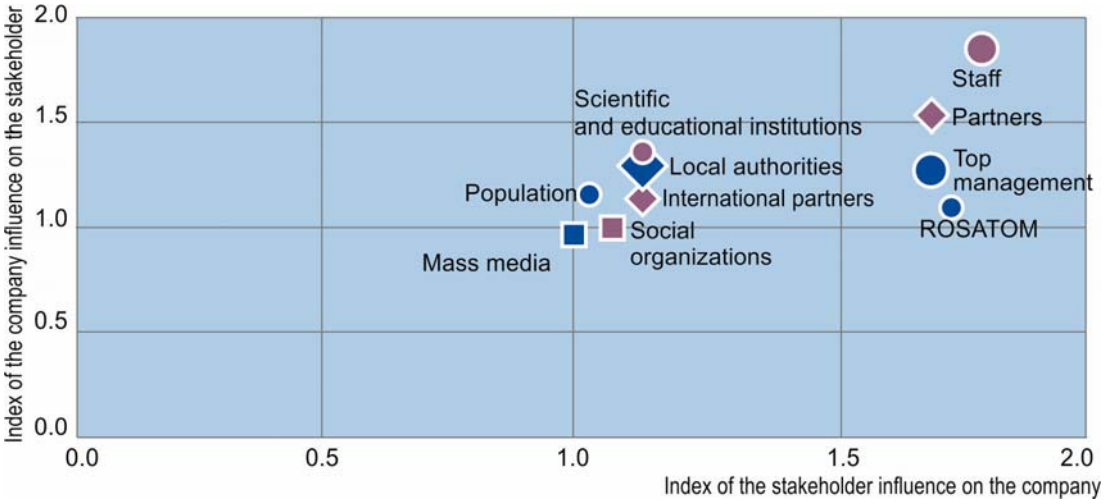
In order to study the opinions of interested parties and have feedback JSC "SSC RIAR" carries out regular questionnaires of the interested party representatives and analyzes the received written requests.

Based on the evaluation of the importance of the interested party influence on current JSC "SSC RIAR" activity and how the Institute influences them, the main groups of interested parties were determined to create the effective system of interaction with interested parties.

GROUPS OF INTERESTED PARTIES

5.3.

Interested Parties	Interests of the Parties
ROSATOM State Nuclear Energy Corporation	Compliance with the industry development strategy; corporate governance; project management quality; term and budget discipline; sustainable development; innovations; investments
Partners (customers, suppliers, subcontractors)	Fulfillment of contractual obligations; term and budget discipline; development prospectives; construction objects; high product quality; efficient cooperation; new orders based on the enterprise development prospectives
International partners	Innovative development; sustained cooperation; joint project implementation
Top management	Institute development strategy; human resources and social policy; sustained development
Staff (employees)	Results and achievements; human resources and social policy; training and staff development prospectives; fair wage
Local authorities – Ulyanovsk region and Dimitrovgrad	Environmental and radiation safety; infrastructure development; tax liabilities; employment; social and charitable programs; combination of the Institute development interests and region development interests
Research and education institutions	High-quality staff assurance; educational and research cooperation
Local population	Employment, development prospectives; nuclear and industry safety, environmental protection issues
Mass media	Open and available information on the Institute activities; key events
Social organizations	Nuclear and industrial safety; environmental impact; activity on environmental protection; social responsibility



Stakeholder ranking chart created on the basis of a questionnaire of their main representatives and JSC "SSC RIAR" high and mid-level managers

DIALOGUES WITH INTERESTED PARTIES

5.4.

Interested parties were involved in all milestones of 2013 Public Annual Report issuing from shaping its concept to discussing its final draft; they were able to state their requests, comments and questions.

In preparing the Report four dialogues were conducted with interested parties that were attended by the representatives of all interested party groups:

- discussion of the Report concept (19 attendees);
- dialogue on “JSC “SSC RIAR” contribution to the innovative development of the nuclear industry” (560 attendees);
- dialogue on “JSC “SSC RIAR” and presence region: unity of sustainable development purposes” (560 attendees);
- public consultations on the draft of 2013 RIAR Public Annual Report (in absentia).

DIALOGUE 1 “DISCUSSION OF THE ANNUAL REPORT CONCEPT WITH INTERESTED PARTIES”

The dialogue with the main interested party representatives was held on December 13, 2013 at the Meeting of the Research and Development Board of Dimitrovgrad. They were suggested to express their point of view on the Report concept including the following issues:

- priority topic of the Report and topics for discussions with interested parties;
- Report structure;
- key events and achievements of JSC “SSC RIAR”;
- Report parameters including the stated level of compliance with the international standards;
- determining and ranging interested parties;
- list of the verifying parties.

Based on the dialogue results the Report concept was adjusted, the requests of interested parties on disclosure of the information on the Institute activities over 2013 were revealed at the primary stage of the Report issuing.

DIALOGUES 2 AND 3: "JSC "SSC RIAR" CONTRIBUTION TO THE INNOVATIVE DEVELOPMENT OF THE NUCLEAR INDUSTRY", "JSC "SSC RIAR" AND PRESENCE REGION: UNITY OF SUSTAINABLE DEVELOPMENT PURPOSES"

Public hearings on environmental impact of the MBIR reactor construction were held on April 9, 2013 at the Conference Center including public reports on "JSC "SSC RIAR" contribution to the innovative development of the nuclear industry" and "JSC "SSC RIAR" and presence region: unity of sustainable development purposes".

During the discussions of these reports RIAR top-management presented the information not only about the reporting year results and promising plans but also about retrospective of JSC "SSC RIAR" development.

The dialogues were attended by the representatives of Dimitrovgrad and Ulyanovsk administration, RIAR staff and labor union, research and education institutions, population, environmental and social organizations as well as mass media.

Public representatives greatly appreciated the quality of the materials presented, event organization level and gave their recommendations for the final Report editing.

PUBLIC CONSULTATIONS

The draft Report was sent to interested parties on May 15, 2014 for them to introduce suggestions. There were no comments and suggestions on the Report content.

PLANS AND LIABILITIES TO INTERESTED PARTIES

5.5.

The final dialogue was held in summer 2014 with the representatives of six groups of interested parties: administration of Ulyanovsk region and Dimitrovgrad, social organizations, higher and secondary vocational education institutions, mass media. The representatives of interested parties became assured that all the requests and suggestions of the previous dialogue attendees on the information disclosure in RIAR Public annual Report 2013 were incorporated.

Requests and wishes on information disclosure by interested parties during dialogues

Request / suggestion	Implementation
More detailed disclosure of the information about a business-model and development strategy of the Institute	The information is given in Section 2 "Products and Rendered Services" and "Management System"
Participation of JSC "SSC RIAR" in the international projects	The information is given in full in Section 4 "International Cooperation" and in fragments following the text of the Report
The information about the Institute development as the main industry experimental platform on creating and justifying of a new process platform of the nuclear power in Russia	The information is given in Section 4 "JSC "SSC RIAR" Position in Industry" and "Innovative Development"
Staffing in a long-term prospective	The information is given in Section 4 "Staff Management and Social Policy"
Interaction with interested parties	The information is described in Section 5 "Interaction with Interested Parties"
Safety issues	The information is given in Section 3 "Health and Industrial Safety" and "Environmental Safety and Protection"
Cooperation with higher educational institutions and implementation of the joint projects	JSC "SSC RIAR" cooperation with higher educational institutions in the filed of the staff target training and joint scientific and research activities is presented in Section "Personnel Management and Social Policy". Peculiar attention is paid to the results of joint project implementation under Decree No.218 as of 09.04.2010 of the Russian Federation Government "On Measures of State Support for Development of Cooperation between Russian Higher Educational Institutions and Organizations Implementing Integrated Projects on Creating High-Quality Production" (Section 4 "Sustainable Results Development")

5.6. DECISION ON PUBLIC VERIFICATION OF THE PUBLIC ANNUAL REPORT OF JSC "SSC RIAR"

INTRODUCTION

The management of Joint Stock Company "State Scientific Center – Research Institute of Atomic Reactors" (hereinafter referred to as "SSC RIAR") suggested us to verify its 2013 Public Annual Report (hereinafter referred to as "Report") in terms of completeness and significance of the revealed information regarding the most significant issues for interested parties. For this purpose we were given an opportunity to join the dialogues and public consultations on the draft Report (hereinafter referred to as "Consultations") that took place in December 2013 – April 2014 and freely express our opinion on the discussed issues.

DRAFT PUBLIC ANNUAL REPORT EVALUATION PROCEDURE

Our conclusion is based on the comparative analysis of two Report 2013 versions: draft Report for consultations and final Report, and the analysis of information obtained during dialogues and consultations: presentations, record of dialogues, table with the incorporated comments of interested parties as well as comments received from the management and staff of JSC "SSC RIAR".

During the Report public verification we were not aimed at checking the data acquisition and processing system, we did not conduct a special study of the data and management processes. The credibility of the actual data given in the Report is not as well the subject of public verification. All the attendees of the public hearings had a full opportunity to freely express their opinions and did not obtain any award from JSC "SSC RIAR" for their participation in the public verification procedure.

EVALUATIONS, COMMENTS AND RECOMMENDATIONS

We all agree on the positive evaluation of the 2013 Report. JSC "SSC RIAR" prepared an informative and well-structured document that is consistent with our expectations. It is particularly important that the Report is issued on a voluntary basis and it is a good example of the transparency and openness principle implementation on the part of JSC "SSC RIAR". JSC "SSC RIAR" has shown both a high professional level of information disclosure and the readiness to conduct an open dialogue with interested parties on a variety of issues related to the areas of its activity including safe operation of the research reactor facilities and other facilities. We can see that the management of JSC "SSC RIAR" aims at constructive interaction with interested parties. We are not aware of any fact that questions the credibility of the information given in the Report.

We believe that during the public consultations and other public verification events related to the public annual report with the participation of interested parties JSC "SSC RIAR" gave the detailed information on the strategic aims, development key points, results of activity over the reporting period and contribution to the town development presenting in detail all areas of the Institute activity.

The absolute advantage of the Report is using the international standards during its generation (Sustained Development Reporting Guideline (Global Reporting Initiative, version G3.1)), as well as the integrated nature of the Report that allowed information disclosure in an integrated manner on the key areas of JSC "SSC RIAR" activity in 2013 considering its sustained development assurance. The decision of JSC "SSC RIAR" management to generate the Report both in the Russian and English language was noted positively. It was particularly noted that in contrast to other public reports by ROSATOM sites, the JSC "SSC RIAR" public annual report is the official publication: it was assigned an ISBN number, the UDC identifier and underwent the editorial and publishing preparation ensuring the high quality of the published material and compliance with all the editorial and publishing standards.

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Based on the performed analysis we conclude as follows.

INFORMATION SIGNIFICANCE

We believe that the Report reflects all the topics significant to interested parties both on primary activities and on social and ecological aspects of sustainable development. The most important information for understanding the prospectives of JSC "SSC RIAR" development is given in the Report Sections on strategic development of the Institute, its unique competitive advantages and growth prospects, the aspects of the financial management effectiveness increase, influence on the economy, social sphere and environment as well as safety issues during the project implementation. We are not aware of any other issues significant for interested parties that were to be included in the Report by JSC "SSC RIAR".

COMPLETENESS OF PRESENTED INFORMATION

We believe that the information in the Report is presented in a full scope needed for the deep insight of interested parties into the current state and development prospects of JSC "SSC RIAR".

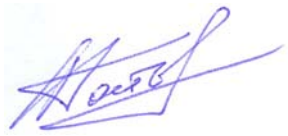
RESPONSE TO THE COMMENTS AND WISHES OF INTERESTED PARTIES

The recommendations of interested parties were included in the record of the dialogues and consultations placed on the website; a detailed analysis was performed in order to incorporate them during issuing the final Report. Several Report Sections were revised based on the recommendations. The interaction with interested parties has already started at the stage of the Report concept shaping: interested parties were given an opportunity to express their wishes and recommendations on the information revealing in the Report.

JSC “SSC RIAR” has shown its commitment to the implementation of the ROSATOM State Corporation policy requirements in public reporting, constructive relation to the wishes and suggestions of interested parties.

The attention of JSC “SSC RIAR” to the comments, suggestions and recommendations of interested parties is proved by the fact that the final revision of the Report included the changes introduced during the dialogues: additional information was included; the scope of information on the international cooperation was extended. We believe that the modifications introduced into the Report after the attendees of the dialogues had made their comments allowed improving the Report quality.

Traditionally noting the high quality of JSC “SSC RIAR” interaction with interested parties we hope that the Institute will be consistent in implementing the liabilities, plans and intentions stated in the 2013 Report.

Director General of CJSC “Science and Innovations”, managing company of JSC “SSC RIAR”		A.V. Dub
Director of CJSC “Science and Innovations”, Managing Head of JSC “SSC RIAR”		S.V. Pavlov
Chief Engineer of JSC “SSC RIAR”		A.L. Petelin
Director Deputy of “SSC RIAR” for Science and Innovations		V.V. Kalygin
Director of autonomous noncommercial organization “Centre for Development of Nuclear Innovation Cluster of Dimitrovgrad, Ulyanovsk region”		A.N. Gataullin
Chairman of JSC “SSC RIAR” Trade Union		I.A. Kungurtsev
Minister of Strategic Development and Innovations of Ulyanovsk region		A.A. Smekalin
Head of Dimitrovgrad town administration		N.A. Gorshenin
Deputy Head of Ulyanovsk State University Scientific Research Office		B.M. Plottsev
Head of DETI NRNU MEPhI		I.A. Sagan
Head of “Dimitrovgrad” Newspaper Economics Department		S.E. Knyaginina
Chairman of Town Public Organization “Veterans of War and Labor”		A.D. Voronin

FEEDBACK QUESTIONNAIRE

You opinion about the Public Annual Report of JSC “SSC RIAR” is very important for us. Please, fill in the questionnaire below.

1. What group of interested parties do you refer to?

- ☐ ROSATOM, JSC “Atomenergoprom”
- ☐ Partners (customers, suppliers, subcontractors)
- ☐ Personnel of JSC “SSC RIAR”
- ☐ Federal, regional and local authorities
- ☐ Regulatory bodies
- ☐ Educational Institutions
- ☐ Resident population
- ☐ Mass media

2. Did you find out anything new about JSC “SSC RIAR”?

- ☐ Yes
- ☐ No

Your comments _____

3. Could you get information you were interested in?

- ☐ Yes
- ☐ No

Your comments _____

4. What section was the most interesting for you?

Your comments _____

5. How satisfied or dissatisfied are you with the objectiveness and reliability of data presented in the Report?

- ☐ Very satisfied
- ☐ Satisfied
- ☐ Dissatisfied
- ☐ No opinion

6. How satisfied or dissatisfied are you with the Report exposition?

- ☐ Very satisfied
- ☐ Satisfied
- ☐ Dissatisfied
- ☐ No opinion

7. How satisfied or dissatisfied are you with the Report design?

- ☐ Very satisfied
- ☐ Satisfied
- ☐ Dissatisfied
- ☐ No opinion

8. How satisfied or dissatisfied are you with the Report significancy?

- ☐ Very satisfied
- ☐ Satisfied
- ☐ Dissatisfied
- ☐ No opinion

9. What do you find the most prominent advantage of the Report?

Your comments _____

10. What is the most prominent disadvantage of the Report ?

Your comments _____

11. What information should the Report be added with?

Your comments _____

Please, send the filled questionnaire to:

- by post: 433510, Russian Federation,
  Ulyanovsk region, Dimitrovgrad-10;
- by fax: +7 (84-235) 3-58-59;
- by e-mail: niiar@niiar.ru

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Information Edition

JSC “SSC RIAR” Annual Report 2013

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