



УРАЛЬСКИЙ  
ЭЛЕКТРОХИМИЧЕСКИЙ  
КОМБИНАТ

ПРЕДПРИЯТИЕ ГОСКОРПОРАЦИИ «РОСАТОМ»

# ENVIRONMENTAL SAFETY REPORT

2014





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ПРЕДПРИЯТИЕ ГОСКОРПОРАЦИИ «РОСАТОМ»

STOCK  
COMPANY URAL  
ELECTROCHEMICAL  
INTEGRATED PLANT  
ENVIRONMENTAL  
SAFETY REPORT  
2014



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# 1. SC UEIP General Presentation & Core Business

In 1945 the Soviet of People's Commissars of the USSR took the decision to start the construction of Gas Diffusion Plant in Sverdlovsk-44 of Sverdlovsk region. The Plant was designed for production of highly enriched uranium (HEU) under the Soviet nuclear weapons program.

In 1949 Ural Electrochemical Plant was put in operation. It was the first USSR Plant engaged in commercial uranium isotope separation using gas diffusion technology. In 1954 the production of low enriched uranium (LEU) was launched, which was to meet the needs of nuclear power industry (reactors, marine power facilities, research reactors and nuclear power plant reactors).

In 1962 the first in the world centrifuge uranium enrichment plant was commissioned, which was an important step towards increasing efficiency of UEIP separation production. UEIP experts and qualified specialists contributed greatly to this process and always kept the separation

production at the highest possible level.

In 1966 the plant reconstruction program started and by 1988 the gas diffusion equipment has been consequentially replaced by the centrifuges. It made possible to reduce the power consumption of separation production by a factor of 10 at twofold or threefold increase in enrichment capacity.

In the early seventies UEIP entered the international market and since then, it has exported low enriched uranium to a number of companies of France, Germany, Belgium, England, the USA, South Korea, Sweden, Spain, Finland, Switzerland, Italy, Argentina. In 1989 UEIP discontinued fabrication of weapon-grade uranium. Pursuant to later intergovernmental agreements on reduction of nuclear weapons in 1995 UEIP initiated reprocessing HEU into fuel for nuclear power plants. For this purpose the special HEU-LEU technology was developed and introduced.

On August 15, 2008 Federal State-owned Unitary Enterprise Ural Electrochemical Integrated Plant was reorganized into Joint-Stock Company Ural Electrochemical Integrated Plant.

An important milestone was UEIP incorporation into ROSATOM TVEL Fuel Company in 2010. TVEL Fuel Company integrates separation-sublimation combine, gas centrifuge production, fabrication of nuclear fuel and research & development cluster. It enabled further effective development of the Company, its production facilities, infrastructure and human capital.

According to the Russian Federation legislation since the beginning of 2015 the full commercial name of the Company is Stock Company Ural Electrochemical Integrated Plant (SC UEIP).

SC UEIP is located in the industrial area of Novouralsk city in Sverdlovsk region 80 km to the north-west of Yekaterinburg. Two localities directly border on the Company: that is

Novouralsk city (the population is about 88 000 people) and Verkh-Neivinsky settlement (the population is about 6 500 people).

SC UEIP is one of the major links in a chain of Russian nuclear fuel cycle, holding intermediate process position between uranium production and fuel fabrication for nuclear reactors.

Nowadays SC UEIP is the largest uranium enrichment enterprise not only in Russia, but also all over the world. The Company enrichment production uses highly effective and reliable gas centrifuge technology. The following companies represent enrichment production of Russia and apply the same technology:

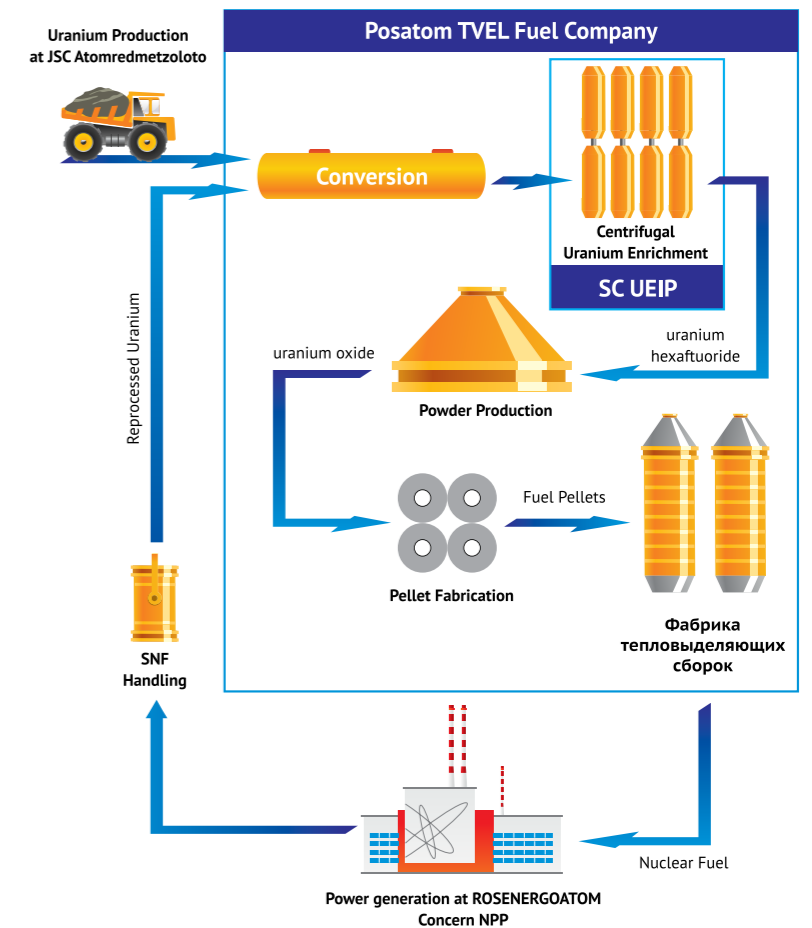
- Joint-Stock Company Electrochemical Plant (ECP), Zelenogorsk, Krasnoyarsk region;
- Joint-Stock Company Siberian Chemical Enterprise (SChE), Seversk, Tomsk region;
- Joint-Stock Company Angarsk Electrolysis Chemical Combine (AECC) Angarsk, Irkutsk region.

Natural uranium consists of three radioactive isotopes:

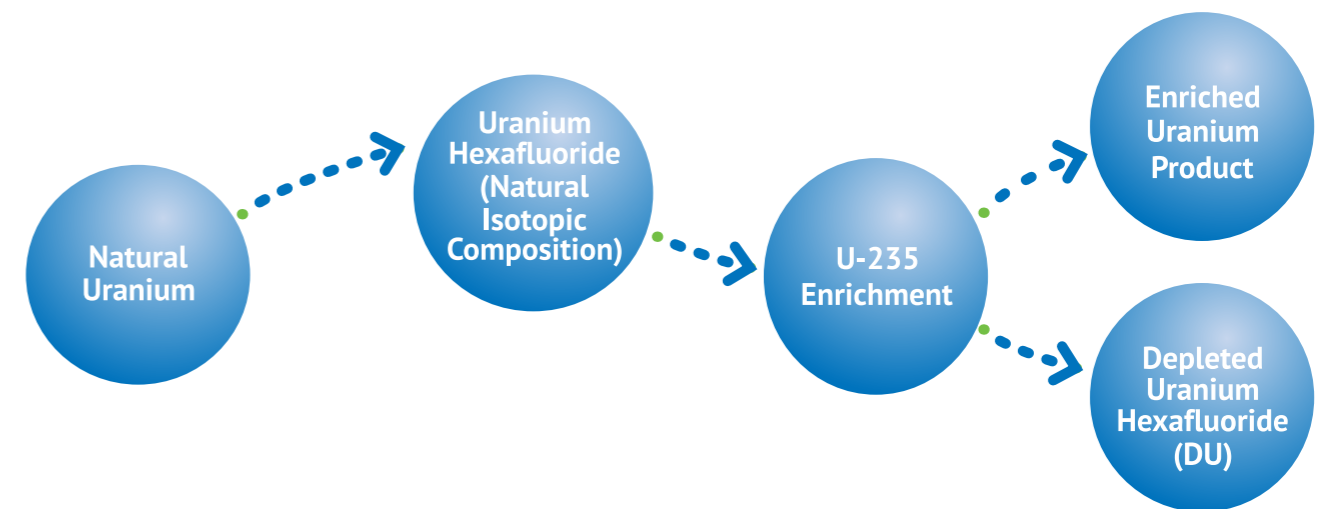
- U-238 (circa 99.28%),
- U-235 (circa 0.71%),
- U-234 (circa 0.01%)

Many nuclear power reactors run on uranium fuel enriched in U-235. The influence of the Russian enriched uranium export on the world power balance is comparable to that of the Russian gas and oil export.

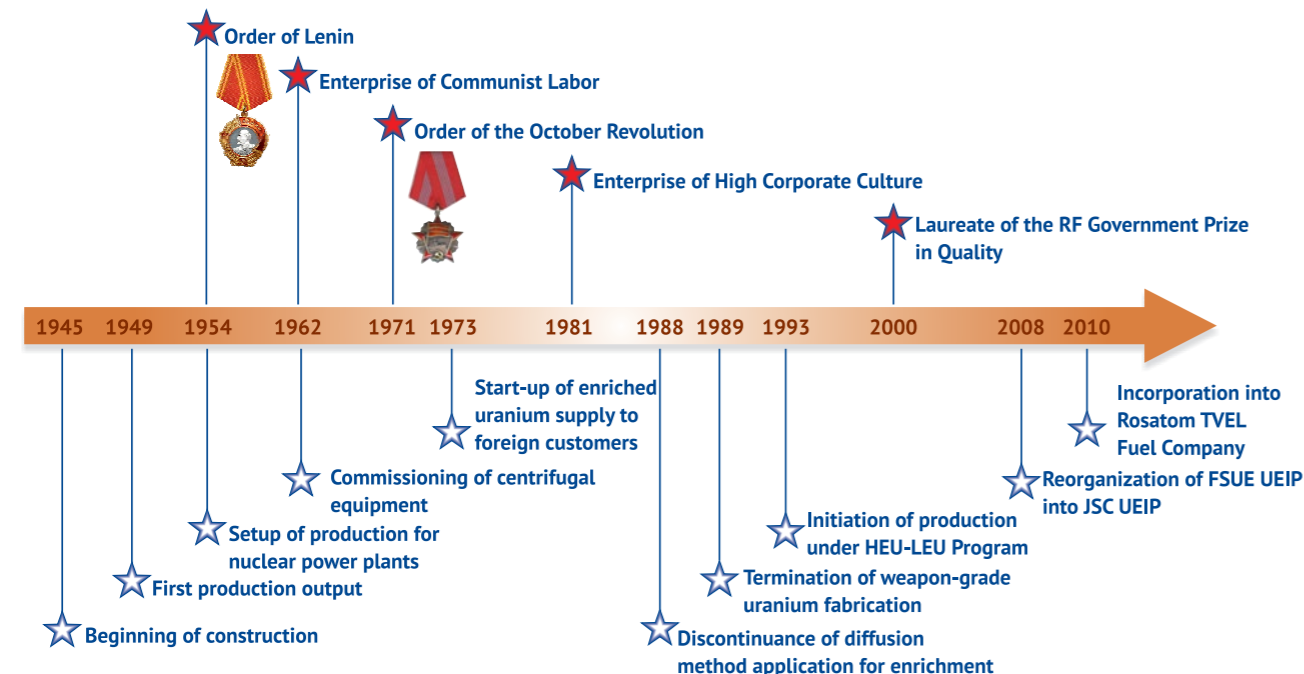
SC UEIP Position in Rosatom Nuclear Fuel Cycle



Uranium Isotope Separation Flow Chart



- In order to ensure enrichment process, natural uranium is converted to uranium hexafluoride.
- The enrichment process generates enriched uranium product (EUP) and depleted uranium hexafluoride (DU)
- EUP is delivered to the customer, and DU is transferred for storage and subsequent reprocessing





## 2. Integrated Management System



Environmental management - a part of the overall corporate governance system which involves well-defined organizational structure and aims at achievement of environmental policy objectives by means of environmental protection program implementation.

Its concept is based upon sustainable development model. In 1992 in Rio de Janeiro the summit of state heads was held which was devoted to sustainable development of human society and the nature, and where the Agenda 21 was adopted, which included general provisions of the new concept offered to all countries of the world. The summit took the decision that environmental management should be referred to as a key dominant of sustainable development and as a high priority of industrial activity and business.

In 1993 in the course of the Uruguay Round negotiations which led to creation of World Trade Organization, the new international standards on environmental management were set forth. The International Organization on Standardization (ISO) issued ISO 14000 standards which define the principles environmental management system functioning.

One of the key parameters of Company sustainable development is the effectiveness of Quality Management System (QMS) that covers the whole life cycle of the product: from development to realization and ensures

faultless operation of all process chains. SC UEIP QMS has been continuously improved: from zero-defect production, comprehensive quality control system to implementation, certification and utilization of QMS in accordance to ISO 9001 since 2004.

The technology for enriched uranium transfer into the transport cylinders of international customers was developed in 1973. Since then, the company product is supplied to the customers in France, Spain, Great Britain, Germany, Sweden, Finland, Netherlands, USA, Republic of South Africa, South Korea, Japan and China.

No claims on the supplied product quality were received within the whole period of export activities.

SC UEIP implemented and successfully operates Environmental Management System (EMS). A comprehensive certification audit was conducted at UEIP in 2010, which was to confirm SC UEIP compliance to the requirements of ISO 9001 and ISO 14001 international standards. The result of audit at UEIP subdivisions was the issuance of Certificate of conformity which proved SC UEIP process organization compliance with the requirements of QMS and EMS international standards. In 2011-2012 the Company was audited for conformity to the requirements of ISO 9001 and ISO 14001 international standards. The audit results

confirmed the JS UEIP QMS operation conformity to the issued TUV CERT certificate. In July 2012 SC UEIP Environmental Management System was successfully audited by "Vattenfall Nuclear Fuel AB", Sweden.

A comprehensive certification audit was conducted at SC UEIP in July 2013, which was to confirm the compliance of QMS operation to the issued Certificate of conformity. In October 2013 SC UEIP was audited as per JSC TVEL Integrated Management System under the requirements of three international standards: ISO 9001 (Quality Management System), ISO 14001 (Environmental Management System) and OHSAS 18001 (Health Protection & Labor Safety

Management System). In 2013 SC UEIP Environmental Management System was also successfully audited by the Swedish company «Vattenfall Nuclear Fuel AB». The audit results made the Swedish customers sure that SC UEIP is a reliable and safe business-partner.

In 2014 the traditional audit of JSC TVEL Integrated Management System was successfully conducted. Besides, in 2014 SC UEIP was given a Certificate of QMS conformity to ISO 50001 standard requirements (Energy management System). Thus, SC UEIP Integrated Management System currently comprises:

Environmental Management System focused on improvement of procedures

providing environmental safety.

Quality Management System focused on improvement of procedures providing high quality of yielded product.

Health Protection & Labor Safety Management System focused on the Company employees.

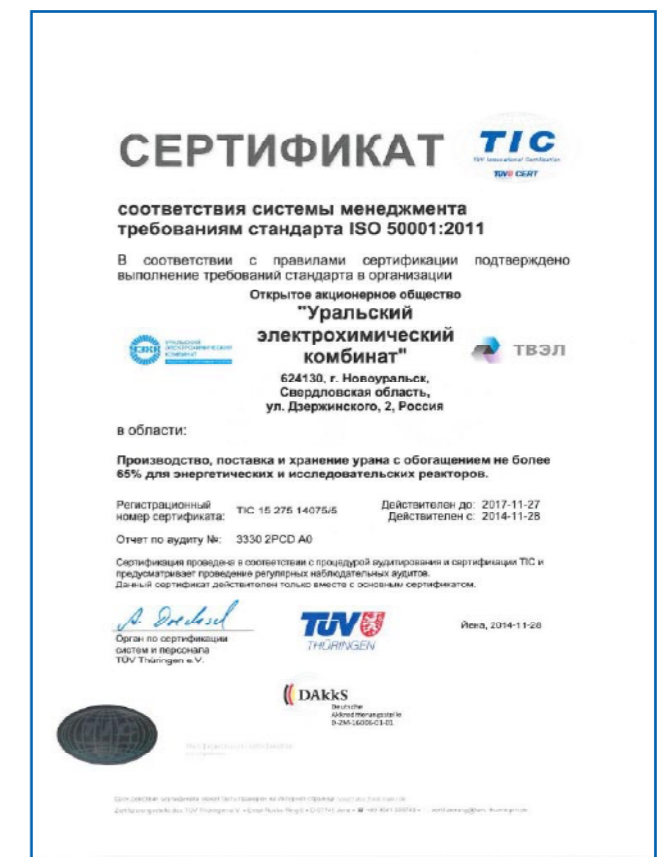
Energy Management System focused on improvement of procedures providing energy and natural resources saving.

Integrated Management System was implemented and operates in all SC UEIP subdivisions providing quality and operational safety at all stages of production.

Unified Certificate of Conformity to ISO 9001, ISO 14001 and OHSAS 18001



Certificate of Conformity to ISO 50001





### 3. SC UEIP Environmental Policy



Systematic reduction of environmental and population impact is the highest priority of SC UEIP environmental policy. When planning its activities, the Company takes into consideration the relationship between environment and process facilities. SC UEIP employees understand their responsibility for ecological implications of production process and constantly strive for decrease of anthropogenic impact on the environment.

In pursuing ROSATOM State Corporation environmental policy UEIP management is guided by the following principles:

Meet regulations, standards and guidelines in the area of radiation and nuclear safety, environment protection, sanitary and epidemiological well-being of the population, protection of the population in case of environmental emergency of natural or man-caused origin.

Decrease and prevent the environmental and population impact of the enrichment process by prioritizing environmental aspects and their management.

Maintain high level of environmental safety based on applying advanced technologies, equipment, methods and systems of environmental protection.

Ensure the management and personnel readiness to prevent and mitigate emergency situations and other incidents.

Assure publicity and availability of information of SC UEIP

operating activities regarding environmental protection and ecological safety.

To meet the objectives and implement the main principles of environmental policy SC UEIP undertakes the following obligations:

- Carry out effective environmental monitoring and industrial ecological control in order to meet legal and other requirements in the sphere of ecological safety and environment protection.
- Ensure constant readiness to accident, incident, emergency prevention and effective management.
- Improve the personnel skills and knowledge in the sphere of environmental protection and ecological safety.
- Dialog to all concerned parties on the issues of plant operation.

The first SC UEIP Environmental Policy was put in force on April 22, 2008 by SC UEIP General Director order. In length of time the Company Environmental Policy was annually revised and updated.

The current revision of SC UEIP Environmental Policy was put in force on January 1, 2014 by SC UEIP General Director order and was approved by ROSATOM State Corporation and SC TVEL. The Company Environmental Policy was published in mass media and is available at SC UEIP official web-site.

### 4. Basic Regulatory Documents Specifying SC UEIP Environmental Activity

Federal Law No 7-FZ of 10.01.2002 on Environmental Protection

Federal Law No 174-FZ of 23.11.1995 on Ecological Assessment

Federal Law No 96-FZ of 4.05.1999 on Ambient Air Protection

Water Code of the Russian Federation No 74-FZ of 3.06.2006

Federal Law No 89-FZ of 24.06.1998 on Production and Consumption Waste

Federal Law No 52-FZ of 30.03.1999 on Sanitary and Epidemiological Well-being of Population

Federal Law No 3-FZ of 09.01.1996 on Radiation Safety of Population

Federal Law No 170-FZ of 21.11.1995 on Nuclear Energy Use

Federal Law No. 2395-1 of 21.02.1992 on Underground Resources

Sanitary Rules SP 2.6.1.2523-09 of 07.07.2009 on Radiation Safety Standards NRB-99/2009.

Sanitary Rules SP 2.6.1.2612-10 of 26.04.2010 on Basic Sanitary Rules for Radiation Safety (OSPORB-99/2010)

Federal Law No 190-Z of 11.07.2011 on Radioactive Waste Management and Amendments to Certain

Legislative Acts of the Russian Federation

Concept of Depleted UF<sub>6</sub> Safe Handling, ROSATOM, 27.12.2006.

Furthermore, the regulation of activities in the field of radiation, nuclear and environmental safety is subject to regulations of the Russian Federation government, state standards, sanitary rules, norms, guidelines and other regulatory documents, issued by the government of the Russian Federation, ministries, departments, state regulatory authorities within their competence.

#### The list of the Company basic licensing documents relating to environmental protection

SC UEIP has got all the necessary permits in accordance with the effective environmental legislation of the Russian Federation, including:

Permits for emissions and discharges of polluting chemical substances and radionuclides;

License for production and consumption waste management;

Limit for production and consumption waste disposal;

Certificates for hazardous production and consumption waste;

Water use agreements;

Decisions on granting of water bodies for use;

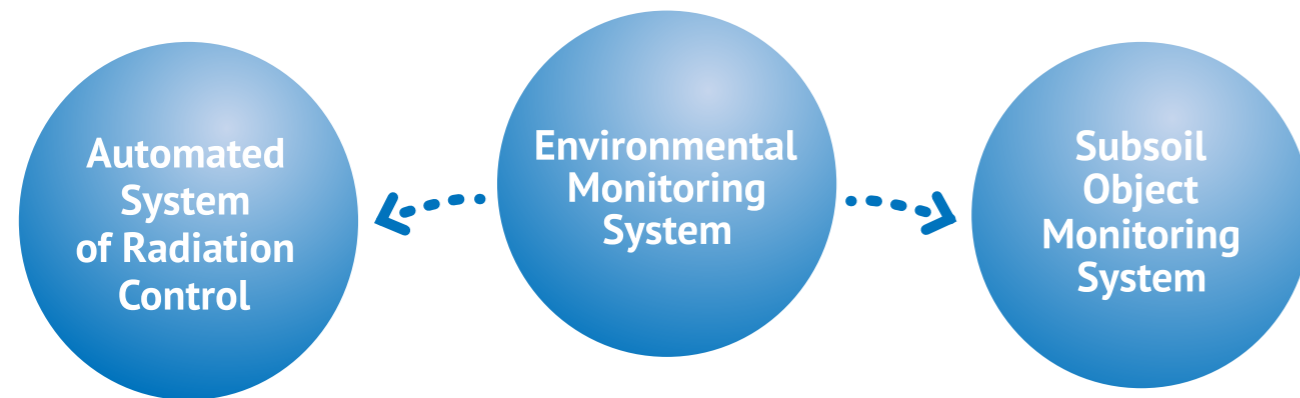
Licenses for use of nuclear energy;

Other documents.

Contractors providing services and carrying out works at the Company site are also have a complete set of necessary permits and licenses.



## 5. Industrial Environmental Control & Ambient Monitoring



The following objects within SC UEIP influenced area are constantly monitored:

- Water bodies of an open hydrographic network, including bottom silt adjournment and the higher aquatic vegetation;
- Ambient air;
- Soil and vegetation;
- Atmospheric precipitation (snow);
- Radiation situation;
- Meteorological parameters.

SC UEIP performs monitoring of radiation, ecological situation and environmental objects using three systems:

### 5.1 ACKPO. Monitoring of Radiation Situation and Meteorological Observations

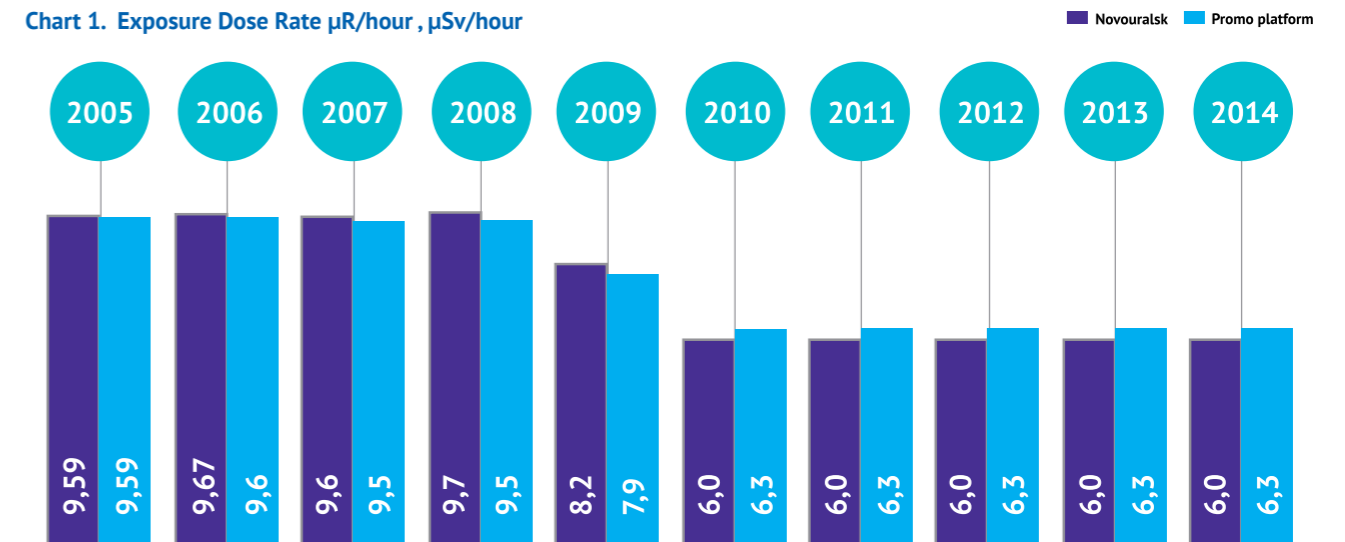
For the purpose of radiation environment control Environmental Protection Department (EPD) applies the

Information & Measuring Automated System of Radiation Control (ACKPO), which is an integral part of ROSATOM Unified State Automated System of Radiation Control. The system is designed for constant automatic control of radiation and meteorological conditions in monitoring points connected with control panel. For today ACKPO system at SC UEIP is equipped with the advanced equipment.

Seven control stations cover all industrial sites of the Company. The data of measurements of equivalent gamma-radiation dose rate received by SC UEIP Automated System of Radiation Control are daily transmitted to FSUE «ROSATOM Situation-crisis center». After that the data shall be available for open access at web-site [www.russianatom.ru](http://www.russianatom.ru).

The exposure dose rate at UEIP industrial sites and in Novouralsk does not exceed 0.15  $\mu\text{Sv}/\text{hour}$ , which is considerably lower than the standard values and background exposure dose rates specified for Ural region.

Chart 1. Exposure Dose Rate  $\mu\text{R}/\text{hour}$ ,  $\mu\text{Sv}/\text{hour}$



### 5.2 Monitoring of Environmental Objects

Industrial environmental and ambient monitoring is carried out by SC UEIP Environmental Protection Department. In accordance with approved monitoring schedule the monitoring activities are being performed by ANK-Service Ltd. At the premises of SC UEIP Analytical Center which has got Accreditation Certificate issued by Technical Regulation & Metrology Federal Agency.

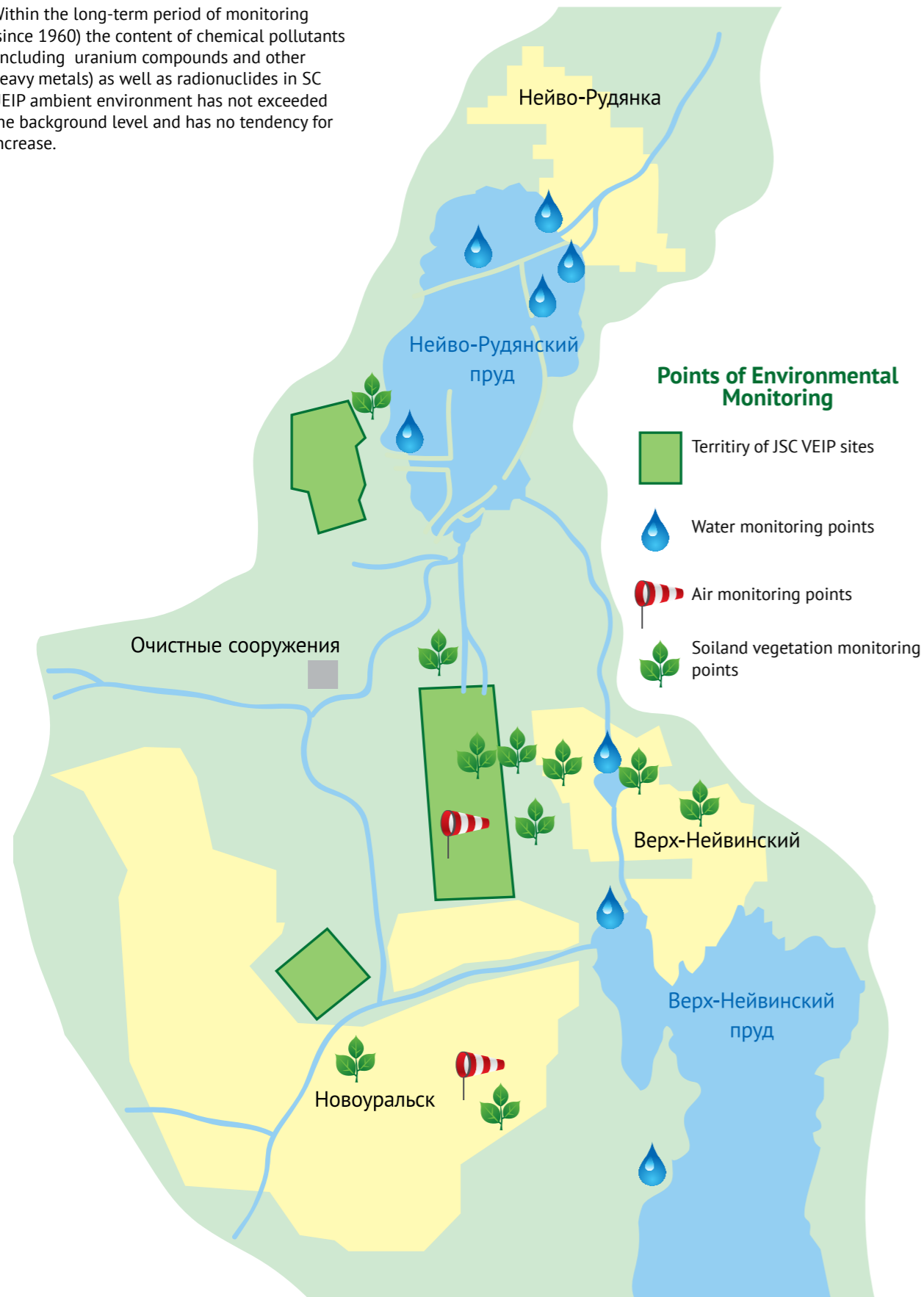
#### Results of long-term measurements show the following:

- The content of radionuclides in ambient waters is approximately 150 times below the sanitary standards.
- The content of radionuclides in ambient air in Novouralsk and within SC UEIP site does not exceed the background level and is approximately 270 times below permissible limits.
- The radionuclide content in soil does not exceed the background level.





Within the long-term period of monitoring (since 1960) the content of chemical pollutants (including uranium compounds and other heavy metals) as well as radionuclides in SC UEIP ambient environment has not exceeded the background level and has no tendency for increase.



### 5.3 SC UEIP Subsoil Monitoring

In order to ensure regulation of SC UEIP ambient waters quality and control of process water supply to the site it was necessary to determine the laws of dynamics, structure, chemical composition of underground waters. For this purpose the Company has established a secure network of supply wells and monitoring stations to control the aquifer hydrodynamic status and water quality. Methods, techniques and means of observation of well ties, sample procedures, laboratory analyses of water samples and other procedures have been tested.

Introduction of qualitatively new system of subsoil object monitoring makes it possible to obtain the accurate data on substructure of radioactive waste storage facilities located at the site, as well the data on the underground hydrosphere status. At the same time the system also has resource for establishing a base of the

future integral information-analytical system of radiation environmental monitoring (IAS REM) at ROSATOM State corporation enterprises.

The work on installation of subsoil monitoring system included geological, geodesic researches of SC UEIP radioactive waste storage facilities' locations, cameral treatment of researches performed during the previous years. The research of change in geocological environment indicators was conducted, the analysis of the site geological and hydro-geological structure as performed, geological and hydro-geological cross sections were made. Following the results of this work the observation well network beyond the SC UEIP underground waters was approved and established, geoinformation system was introduced.

The purpose of researches being conducted is to confirm that SC UEIP nuclear hazardous facilities do not

affect adversely on the underground waters and also that the influence of the underground waters on these facilities will not result in radiation and toxic exposure of the population and the personnel, will not result in contamination of environmental objects by radioactive and chemical substances.

The results of work were published for scientific practical conferences «Geo-ecological issues of water objects protection at enterprises of nuclear industry» which were held in 2013 and 2014.

#### The Population is Free from Radiation Exposure

In 2014 the Company experts developed the science-based reference levels. Correspondence to these levels absolutely confirms the zero level of the Company environmental pollution damage ('zero' level of environmental impact).

Table1. Main Monitoring Objects Within The Area of SC UEIP Influence

Environmental Object	Zero Level	Actual Content
Ambient waters, µkg/l	2,2	0,02 – 0,03
Ambient air, µBq/m <sup>3</sup>	0,33	< 0,13
Snow, µkg/l	2,2	0,03-0,7
Vegetables – potatoes, µkg/kg	2,4	0,2-0,9
Vegetables – other than potatoes, µkg/kg	1,7	0,3-0,6
Grassland, µkg/kg	135	0,015 – 0,021



## 6. Environmental Impact

### 6.1 Water Abstraction from Water Sources

In the production process SC UEIP takes the water from Verkh-Neivinsky, Neivo-Rudyansky and Ayatsky water basins and the water supply system of Municipal Unitary Company MUP Vodokanal. Water sources are used for feeding of enrichment production external outline cooling systems, for feeding of thermal power plant (TPP) hot water supply system and as drinking and service water.

Recycling water supply is organized as follows:

After equipment cooling, the water is discharged through the training channels into the basins separated by dams from the main water bodies of Verkh-Neivinsky and Neivo-Rudyansky basins. The water is cooled in the basins and after that is supplied again to the process facilities using pumping stations.

#### Characteristics of water supply sources

Verkh-Neivinsky water basin is used for public water supply of NGO population and process water supply of the Company. The water intake significantly impacts the water basin (more than 5 % of average annual volume of water body). The total storage capacity of Verkh-Neivinsky water basin is 47.9 million m<sup>3</sup>. The water body is not qualified as nationally or internationally protected area. As far as

biodiversity is concerned the water basin is not valuable. It is used as the main drinking water source and as the recreation area for the population of Novouralsk and Verkh-Neivinsk settlement.

Neivo-Rudyansky water basin is used as a source of water abstraction for the Company process water supply. The total storage capacity of water basin amounts to 11.3 million m<sup>3</sup>. The water intake significantly impacts the water basin (more than 5 % of average annual volume of water body). The water body is not qualified as nationally or internationally protected area. As far as biodiversity is concerned the water basin is not valuable. Generally it is used as sink for NGO industrial and public utilities' waste waters (including SC UEIP).

Ayatsky water basin is used as a reserve source for adding water to Verkh-Neivinsky water basin in dry years. It is also used for process water supply of collective gardens. The total storage capacity of water basin amounts to 61.9 million m<sup>3</sup>. The water intake does not significantly impact the water basin (less than 5 % of average annual volume of water body). The water body is not qualified as nationally or internationally protected area. As far as biodiversity is concerned the water basin is not valuable.

Table 2. Water Abstraction from Natural Water Sources

Source Description	Water Intake, thousand m <sup>3</sup> /a									
	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Verkh-Neivinsky water basin	5 469	5 093	4 868	4 970	5 081	5 004	4 578	3 978	3 651	3 052
Neivo-Rudyansky water basin	1 182	1 870	1 575	1 733	1 364	1 459	1 243	1 178	1 171	638
Ayatsky water basin	28	28	21	34	26	48	5 483	32	26	17
Utility and drinking water supply for Tavatuy holiday camp	102	100	75	77	78	57	55	50	60	0
Artesian wells	706	610	519	506	459	658	616	655	0	0
<b>Total</b>	<b>7 487</b>	<b>7 701</b>	<b>7 058</b>	<b>7 320</b>	<b>6 978</b>	<b>7 226</b>	<b>11 975</b>	<b>5 893</b>	<b>4 908</b>	<b>3 707</b>

Table 3. Economy of fresh water due to recycling and reuse of water supply

Consumption in recirculated water systems, thousand m <sup>3</sup> /a							
2007	2008	2009	2010	2011	2012	2013	2014
199 088	194 551	186 824	187 779	181 942	182 807	175 298	160 598

### 6.2 Discharge of Chemical Pollutants

In 2014 SC UEIP discharged waste waters through 3 discharge outlets. "Permissible discharge limits" (PDL) were specified for every discharge outlet. "Permits for discharge of pollutants with waste waters" were obtained. Ministry of natural resources of Sverdlovsk region issued "Decisions on granting of water bodies for waste water discharge". In accordance with new «Decisions ...» approved in 2014 SC UEIP was permitted to discharge up to 8.3 million m<sup>3</sup> of

waste waters into surface-water bodies. According to the process inspection data the actual volume of discharge in 2014 amounted to 4.4 million m<sup>3</sup>. The waste water category is partially clean water. The main sink for waste water discharge is Neivo-Rudjansky water basin. Off-schedule discharges are not performed. There is no dependence of pollutant content on average dryness of the year at SC UEIP. Discharges of polluting substances during the year have the similar concentration.

Table 4. Composition of discharge by basic pollutants, 2014

№	Description of basic pollutants	Class of hazard	PDL, t/a	Actual value of discharge in 2014	
				t/a	% of limit
1	2	3	4	5	6
1	Petroleum products	4	1,24	0,2	18
2	Suspended substances	4	87,1	27,4	31
3	Solid residue	N/A	2112	769,2	36
4	Ammonia nitrogen	4	5,6	0,79	14
5	Nitrites	2	2,07	0,33	16
6	Phosphorus	3	0,69	0,25	36
Total, only by basic pollutants			2208,7	798,17	36

### 6.3 Radionuclide Discharge

Within the recent years SC UEIP has systematically carried out activities focused on termination of discharge of waste waters, containing radionuclides. This work resulted in termination of radionuclide discharge into surface-water bodies since 2006.

Chart 2. Volume of Waste Waters, million m<sup>3</sup> per year

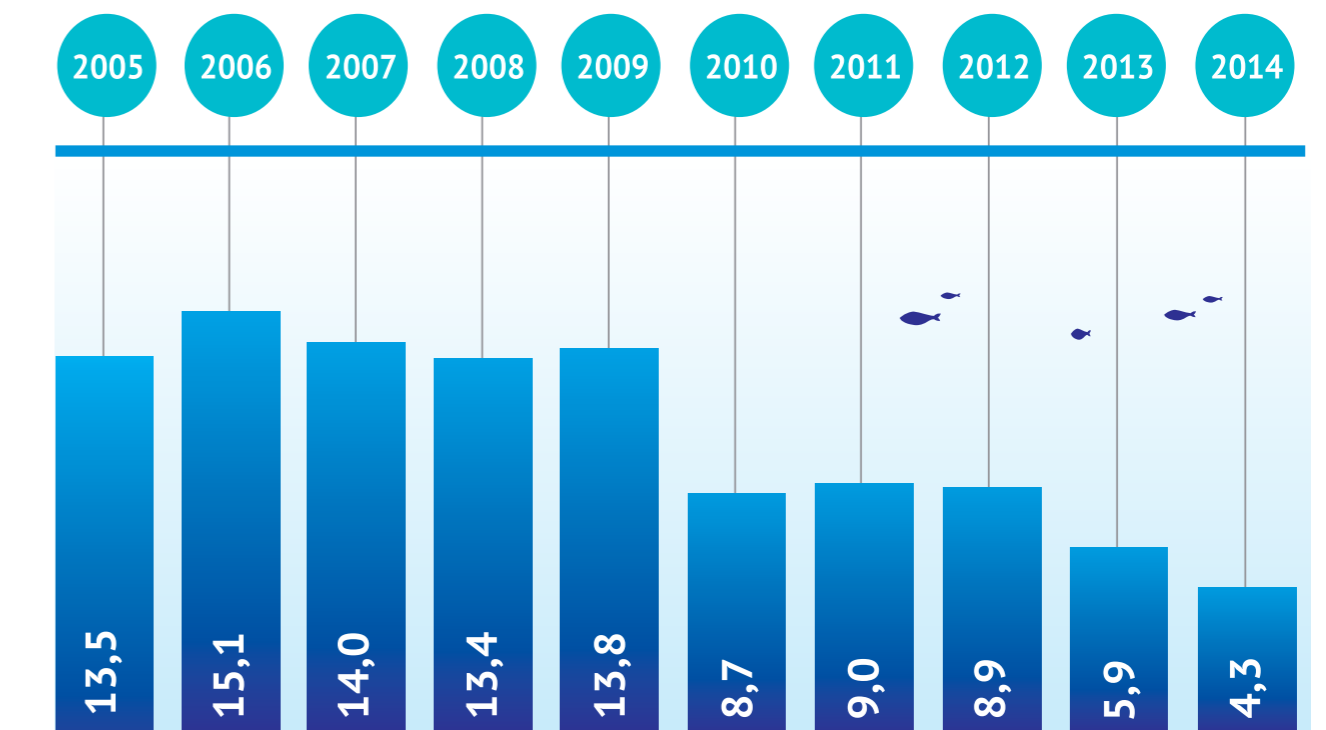
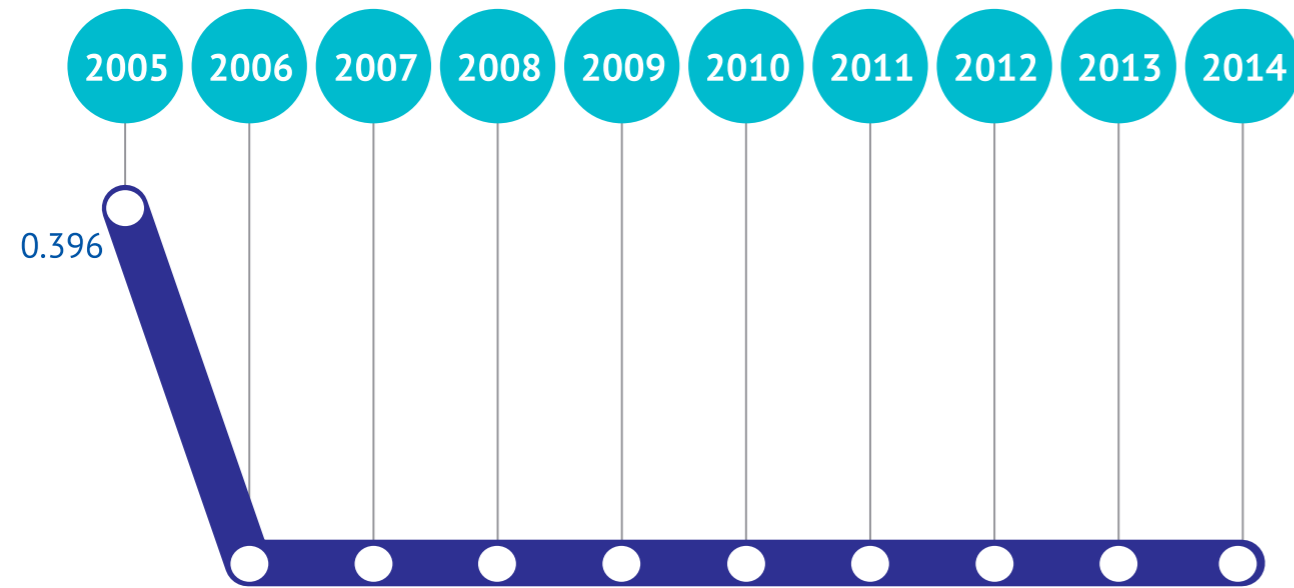




Chart 3. Results of Radionuclide Discharge Monitoring, GBq/year



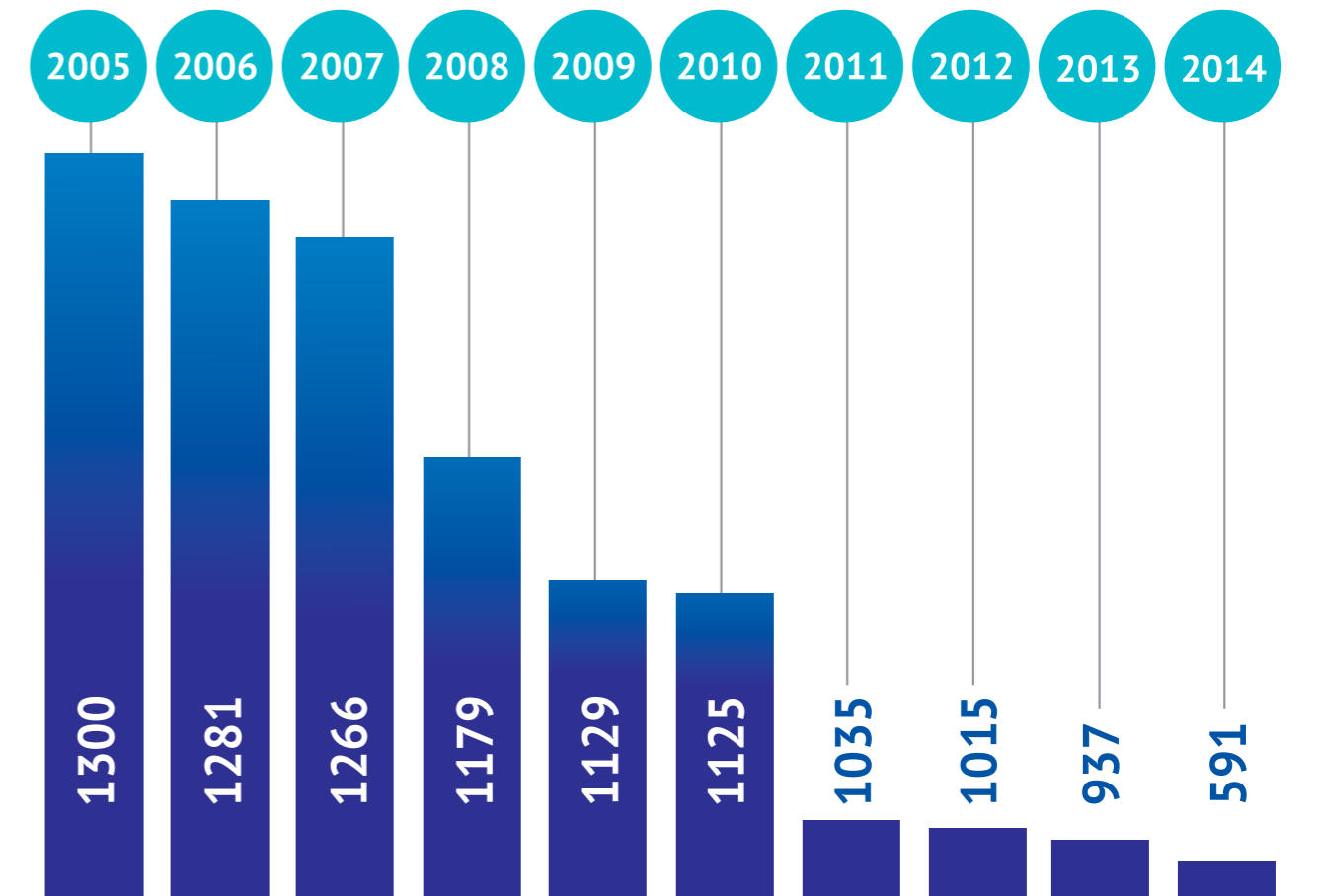
#### 6.4 Emissions of Chemical Pollutants

The Company is permitted to emit 1647 tons of chemical pollutants a year. In 2014 the actual emission volume did not exceed 591 tons, i.e. amounted to ~ 57 % of maximum permissible level. It should be noted that the bulk of emissions is provided by SC UEIP heat-and-power plant which supplies heat and hot water not only to the process facilities but also to the houses and social facilities of Novouralsk city.

The Company emission control is provided in accordance with annual "Schedule for emission control", approved by SC UEIP Technical Director. TPP emissions (more than 80 % of SC UEIP total emissions) and also hydrogen fluoride emissions from all emission points of enrichment production are controlled by means of instrument procedures. The limits for other emissions are determined using duly approved procedures based on emission calculations as per specific values.



Chart 4. Atmospheric Emission, t/year





**Table 5. Data on SC UEIP emissions of basic chemical pollutants over the last decade**

№	Basic pollutants	Permissible emission for 2014, t.	Actual emission, ton										% of permissible limit in 2014
			2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	
1	sulfur dioxide, 3d class of hazard	57	3	2,8	2,7	3	5,8	6	4	3,8	3,5	5	9
2	carbonic oxide, 4th class of hazard	227	30	23	22	22	50	42	45	40	50	61	27
3	nitrogen oxide in equivalent of NO2, 3d class of hazard	1123	964	940	928	854	803	785	740	875	834	475	42
Other	solid, gaseous and liquid	-	315	315	313	300	270	292	246	97	50	50	-
Total		1647	1255	1312	1281	1266	1179	1129	1125	1034	1015	591	36

**6.5 Initiative to Reduce Greenhouse Gas Emissions and Obtained Reduction**

The Company implements the Program on "Energy saving and increase of energy effectiveness at SC UEIP in 2011-2020". The Program effectiveness is confirmed by the yearly changes in direct greenhouse gas emissions in the course of organic fuel combustion and indirect emissions in the course of energy consumption.

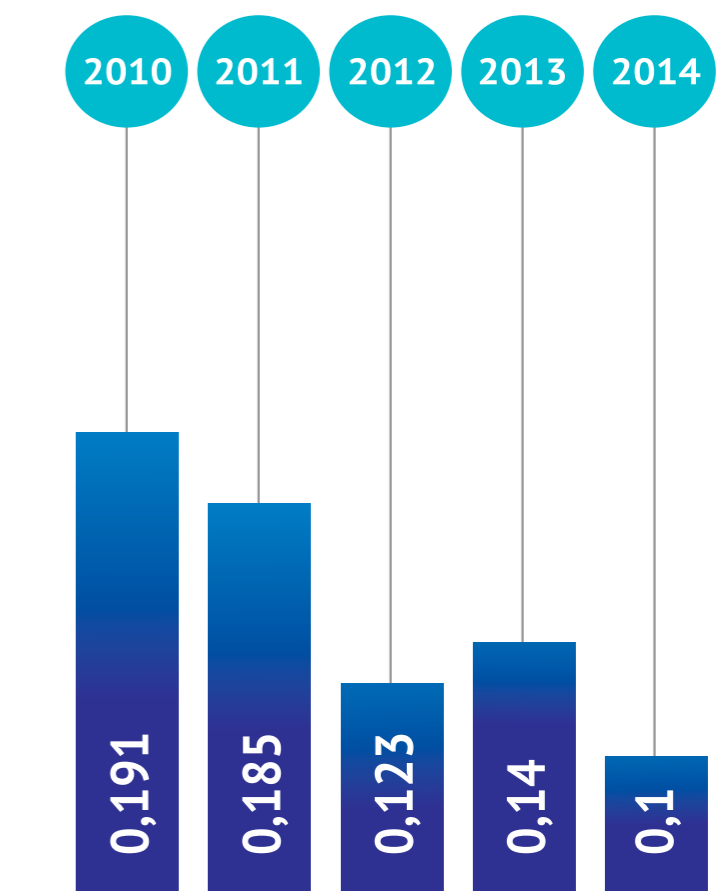
**Table 6. Direct & Indirect Greenhouse Gas Emissions**

Material (substance)	Measuring unit	Greenhouse Gas Emission				
		2010	2011	2012	2013	2014
<b>Прямые выбросы парниковых газов</b>						
All types of emissions in CO2 equivalent	ton	510 367	476 669	452 650	422 560	419 762
<b>Косвенные выбросы парниковых газов</b>						
Total in CO2 equivalent	ton	832 034	798 310	778 478	736 839	729 469

**6.6 Radionuclide Emissions**

Chart 5 shows the results of radionuclide emission control. According to the Chart the radionuclide emissions at SC UEIP are within the specified limits. Thus, the population dose rate from radionuclide inhalation does not exceed 0,005 mZv/year, which makes 0,5% of population dose limit. For the purpose of radionuclide emission reduction, sorption and absorption processes are widely used at the enrichment facilities. The use of granular sodium fluoride and chemical black-ash occludent specially developed for enrichment production made it possible to increase effectiveness of decontamination up to 99,9%, return the uranium hexafluoride into the process cycle and reduce the radionuclide emission. Allowable emission for 2014 makes 0.92 Gbq/year.

**Chart 5. Dynamics of Radionuclide Atmospheric Emission Dynamics, GBq**



**Table 7. Dynamics of production and consumption waste generation in 2009 – 2014, t/year**

Year	2009	2010	2011	2012	2013	2014
Total generation	27057	21041	8249	5401	4445	4067
Incl. 1st class	6202	9	9	7	5	29
2d class	66	28	23	0	1	0
3d class	66	377	299	150	320	114
4th class	6125	6577	3197	1428	1510	1241
5th class	14598	14050	4721	3816	2609	2683
Quantity of used и disposed wastes	17848	23901	8501	9537	119	46
Waste generation limit		42580		25930		4500



### 6.7 Production and Consumption Waste Management

The Company has got all waste management permits for production and consumption waste management. The established waste generation limits were not exceeded. The most part of waste volume is transferred for further processing to the companies with corresponding licences. Annually SC UEIP performs organizational and technical activities focused on reduction of waste volume generation.

Chart 6. Generation of production and consumption waste, t/year

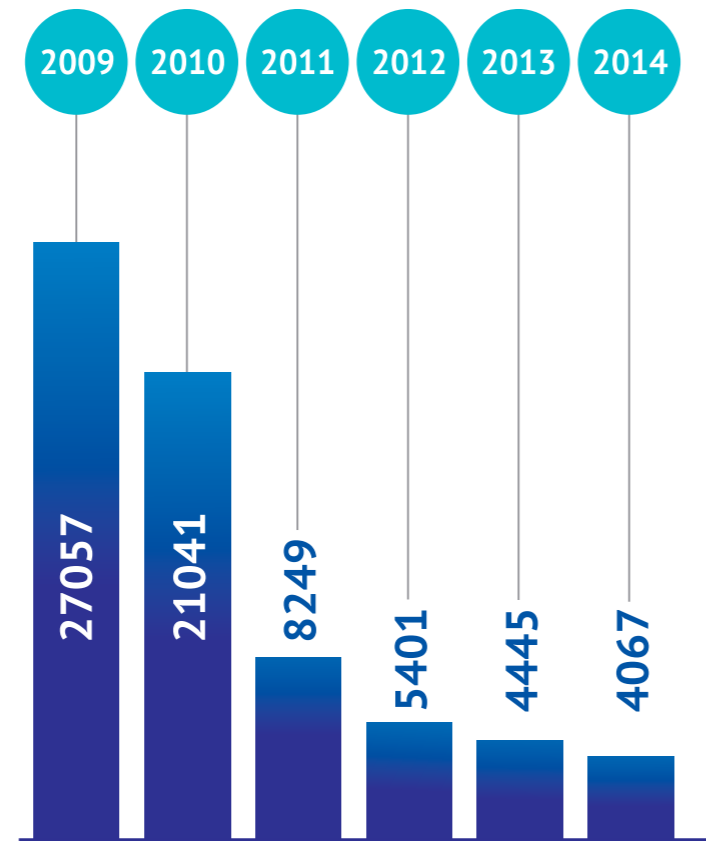
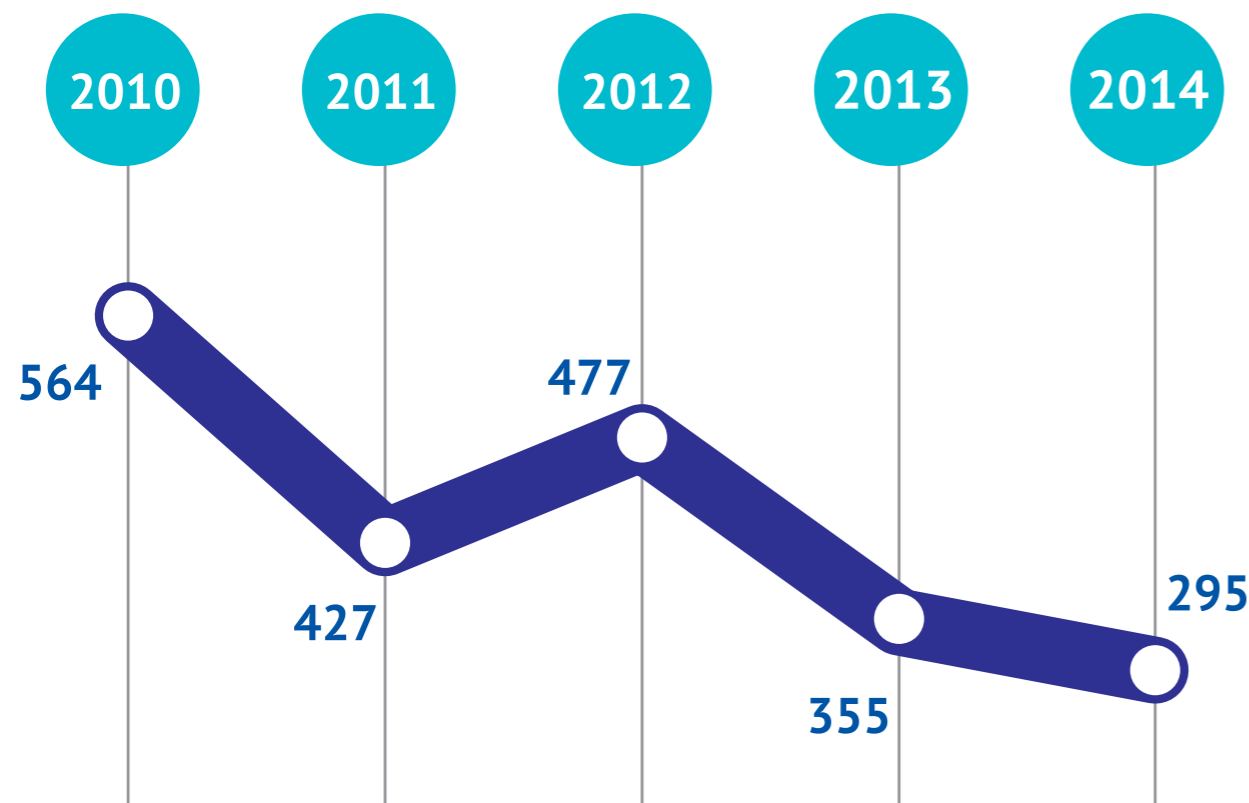


Chart 7. Solid Radioactive Waste Generation, m<sup>3</sup>



### 6.8 Radioactive Waste Management

SC UEIP process facility operation results in generation of Solid Radioactive Waste (SRW) at different stages of production process. In accordance with monitoring data generated at UEIP facilities, SRW are considered as low-active and medium-active waste in compliance with OSPORB-99 regulations. The most of SRW volume collected at the plant facilities, undergoes reprocessing and compacting. After reprocessing SRW packages are put into safe SC UEIP SRW storage pits isolated from the environment.

Decontaminating solutions containing uranium are processed using special technology. Improvement of uranium-bearing solution reprocessing technology in 2005 made it possible to reduce the content and activity of radioactive substances in such solutions to the levels allowing to treat them as nonradioactive discharged water.

The main principles and criteria of SRW management at SC UEIP are the assurance of radiation safety of personnel, population and environment following the radiation safety regulations and radiation protection requirements.

### 6.9 Energy Use

SC UEIP pays great attention to introduction of energy-saving technologies and cost saving. The Program on "Energy saving and increase of energy effectiveness at SC UEIP in 2011-2020" was developed, approved and launched in accordance with the inspection carried out in 2010. The Program covers the effective use of energy resources and reduction of energy loss due to change in personnel behavior and production process upgrade.

### Effective use of energy resources & reduction of energy losses

The energy saving plan for 2013 was successfully fulfilled in all the Company subdivisions. Energy saving plans for 2013-2016 were developed and approved. The target values for cost saving are included into the Complex Optimization Plan developed in the Company subdivisions. The Plan performance is reviewed during making up the results of production competition among the Company subdivisions. The Company plans and conducts the following organizational and technical activities:

- optimize (reduce) the power equipment in operation as per the requirements of enrichment and non-core production;
- ensure transfer of process shops ventilation systems to thermal energy use generated from process operations;
- optimize the vent modes;
- adjust the lighting of industrial site and production facilities to the personnel work schedule.

SC UEIP initiatives and activities in the field of energy saving are effected with regard to Rosatom State Corporation provisions for long-term period. It should be noted that the reduction of power consumption is fulfilled under the stable capacity utilization due to regular comprehensive optimization.

**Table 8. Energy consumption**

	2010 r.	2011 r.	2012 r.	2013 r.	2014r.
SC UEIP power consumption, thousand kW/ h.	1 225 585	1 190 212	1 156 060	1 095 121	1 068 888
SC UEIP thermal energy consumption, Gcal	999 678	790 081	712 260	695 726	667 107
Total energy consumption, GJ	8 600 757	7 595 203	7 146 185	6 857 528	6 643 175

**6.10 Specific gravity of SC UEIP emissions, discharges and wastes totally within the site**

SC UEIP share in total volume of chemical pollutant (ChP) and radionuclide emissions and discharges both in Sverdlovsk region and at Rosatom State Corporation enterprises makes less than 1 percent.

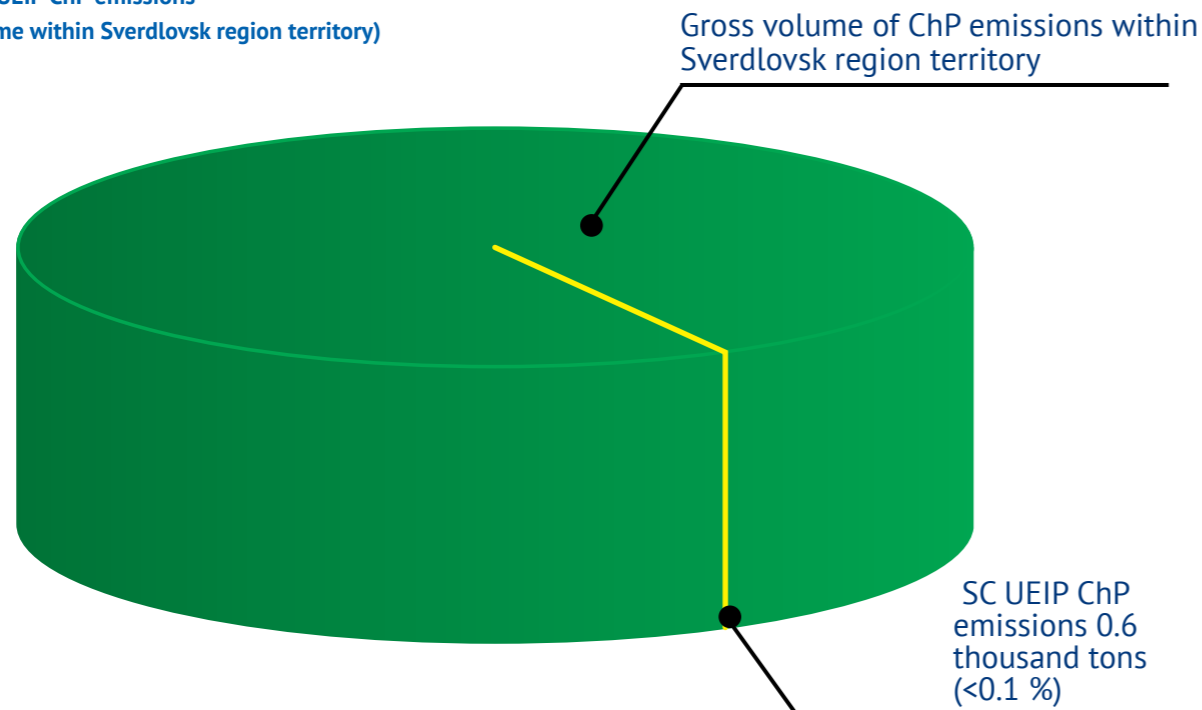
**Table 9. Comparison of gross volume values within the territory**

Value	Territory Gross Volume	SC UEIP Gross Volume	SC UEIP Specific gravity
ChP emissions, thousand tons	1 097*	0,6	< 0,1 %
Discharges (volume of discharged waters), million m <sup>3</sup>	950*	4,3	< 1 %
Production and Consumption Wastes, million tons	194*	0,004	< 0,01 %
Emissions of α - emitting nuclides, GBq	7,54*10 <sup>9</sup> **	0,1*10 <sup>9</sup> **	< 2 %
Discharge of waters containing radionuclides, million m <sup>3</sup>	5,15*10 <sup>9</sup> **	0	0

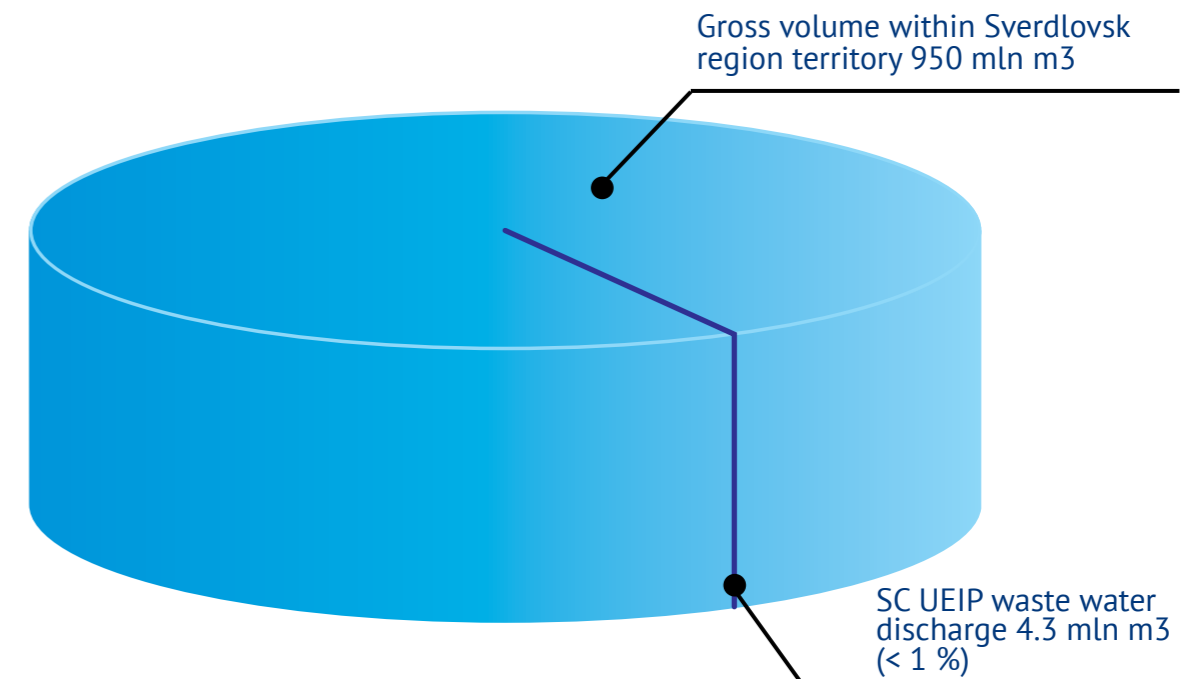
\* Gross volume within Sverdlovsk region in 2013.

\*\* Gross volume at JSC TVEL enterprises in 2012. The given values of emissions and discharges of radionuclides do not exceed the RF permissible limits.

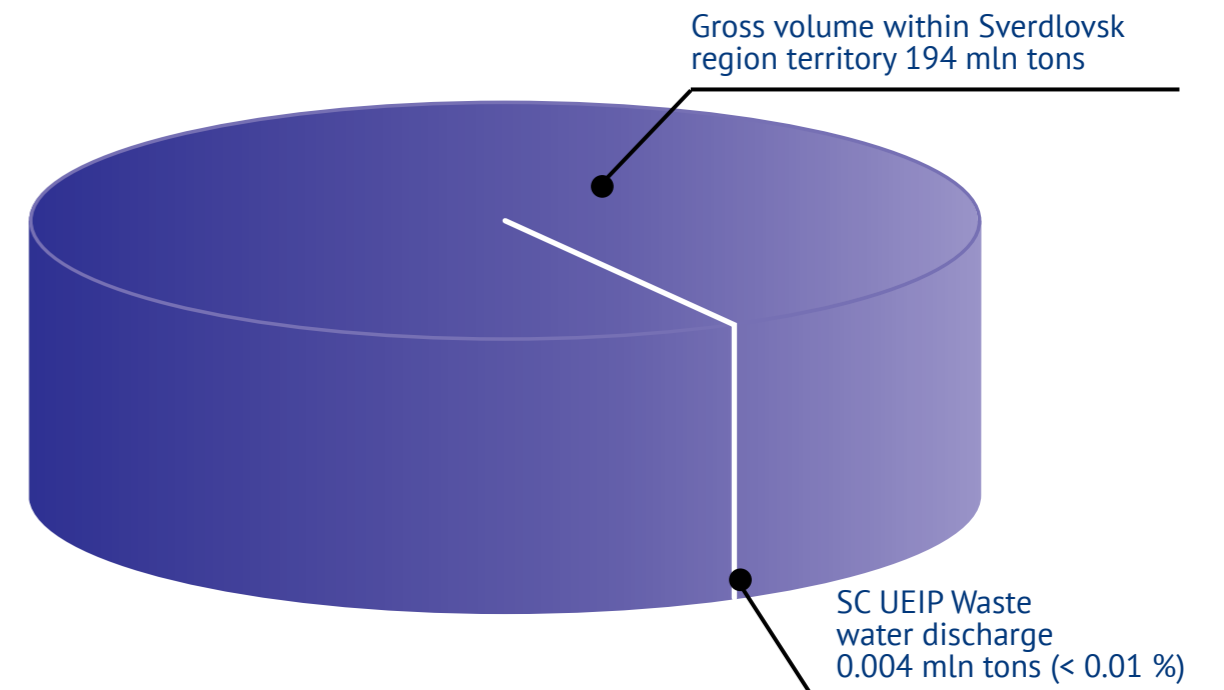
**Chart 8. SC UEIP ChP emissions (Gross volume within Sverdlovsk region territory)**



**Chart 9. SC UEIP Waste Water Discharge (Gross volume within Sverdlovsk region territory)**



**Chart 10. Generation of SC UEIP Production & Consumption Waste (Gross volume within Sverdlovsk region territory)**





Expert-Ural» magazine published the rating of 400 largest enterprises of Urals and Western Siberia. Ural Electrochemical Integrated Plant occupies the 98th position, thus, having entered into the first hundred of the largest enterprises in the region. «Expert-Ural-400» rating was prepared by «Expert-Ural» analytical centre on the basis of a procedure developed by «Expert PA» rating agency. The rating was based on the analysis of data on Sverdlovsk, Chelyabinsk, Kurgan, Orenburg, Tyumen regions, Perm region, Khanty-Mansi and Yamal-Nenets Autonomous Areas, Republic of Bashkortostan and Udmurtia. The rating has no branch restrictions and therefore it includes the companies dealing practically with all major sectors of economy: oil, metallurgical, chemical, machine-building, etc. The rating position of the companies was determined by their ranking by sales revenue (works, services). In comparison with last year result SC UEIP with sales revenue of over 19 billion roubles (2013 indicator) is holding its position in TOP-100 in the general rating. It proves the Company effective operation, sustainable results and development prospects.

#### 6.11 Status of SC UEIP Site

There are no territories polluted by radionuclides within UEIP sites and within the health protection zone. Gamma-radiation intensity does not exceed the natural background and amounts to 0.06 – 0.12  $\mu\text{Sv}/\text{hour}$  (average value – 0.09  $\mu\text{Sv}/\text{hour}$ ). Over the long period of SC UEIP

operation there was no emergencies, spills, etc., resulted in environmental contamination. SC UEIP radiation hazard category is established by the Document “Classification of SC UEIP as radiological facility on the basis of potential hazard in accordance with requirements of General Sanitary Rules of Radiation Safety (OSPORB-99/2010)” approved by FSBHCl No31, RF FMA territorial body. In compliance with this Document SC UEIP is referred to the III category of potential radiological hazard. Thus health protection zone for SC UEIP as a radiological facility is not determined.

Sanitary protection area of SC UEIP as nuclear hazardous facility is regulated by the “Project for SC UEIP and Limited Liability Company Novouralsk Research and Design Center (NRDC) joint sanitary protection area”, approved by the Head of NGO and SC UEIP and NRDC General directors. The expert’s report № 02-05/38 of 20.10.2010 and the sanitary-and-epidemiologic decision № 66. ФУ.01.000. Т.000005.02.11 of 10.02.2011 have been obtained for the Project. According to OSPORB-99/2010 requirements SC UEIP sanitary protection area is limited to the perimeter of the occupied territory (land allocation borders).

The Company facilities occupy the area (incl. lease land) of 11 060.39 hectares (including buildings, roads, agricultural land). The total site area makes 563.3 hectares. The Company does not possess the land within the natural area of protection and territories with high value of biodiversity.



## 7. Implementation of Environmental Policy in 2013

Environmental safety is of primary importance for nuclear industry and is the mandatory requirement for nuclear energy technology development and nuclear facilities operation. Moreover, despite of nuclear industry sustainable development, technology and security upgrade, the strength of nuclear industry position is intimately connected with its ecological and social allowability greatly depending upon conditions that ensure reduction of radioactive waste volume, development of technology on their safe disposal, development of decommissioning technology and decision of «nuclear heritage» problem.

Therefore in terms of «AtomEko-2013» the General Director of Rosatom State Corporation stated the serious objective, i.e. to implement the Zero Damage Strategy which requires effective work of enterprises and organizations engaged in this sphere (AtomEco 2013 Forum, VII International Forum, October 30-31, Forum Hall, Moscow).

SC UEIP range of activity is of great strategic importance for Novouralsk Urban District development as it considerably contributes to its progressive innovative advance. In this connection SC UEIP management realizes the necessity to balance strategic objectives for corporate business development and environmental safety constituting the basis of life and health of present and future generations. One of the Company major tasks remaining constant for many years is to ensure the parity of economic and environmental values. Practically it is implemented by means of technical upgrade, retrofit and energy saving corporate programs, as well as detailed assessment and minimization of potential environmental risks in the course of new build projects. Increase of environmental and power efficiency of production is the major constituent of the Company strategy, a key element of environmental management system and environmental policy. SC UEIP advanced multilevel environmental management system incorporates qualified scientists and engineers and meets the modern management efficiency criteria in this sphere. The comprehensive approach to a problem solution in the field of conservancy and environmental protection enables SC UEIP to achieve all intended environmental purposes, minimize environmental risks and increase social responsibility of business.

In 2014 the Company developed and put in force several

basic documents comprising all scheduled activities on industrial and environmental safety:

1 “Long-Term Plan for SC UEIP Environmental Policy Implementation up to and including 2015”.

2 Annual “SC UEIP Environmental Program”.

3 Schedule of activities focused on ecological and safety culture development in Rosatom State Corporation and its enterprises as part of the Project “Year of Culture” in the Russian Federation in 2014.

3 Annual Charts for environmental objects manufacturing control, emissions and discharges of pollutants.

All activities of «Plan...», «Program...» и «Chart...» scheduled for 2014 were fully implemented in due time.

#### 7.1 Initiatives on Mitigating Product & Service Environmental Impact, Scope of Mitigation Procedures

Operational safety of SC UEIP nuclear facility (NF) and its systems and components is ensured by the successive implementation of defense in depth. Application of physical barrier project system on the way of ionization radiation, nuclear material and radioactive material penetration into the environment, from primary package wall (vessel, pipeline) to building structure and roof, is the main method of the accident prevention. SC UEIP NF operation safety comprises protection of physical barriers, assurance of their operability within a given lifetime and measures on personnel and environment protection. For this purpose SC UEIP performs a complex of special activities to prevent emergencies that can cause the equipment seal failure (abnormality of process conditions, violation of equipment operation conditions and limits, self-sustained chain reaction, fire, load fall, mechanical or corrosion damage, etc.). Measures on limitation of radiation accident consequence are also specified.

The level of NF safety achieved by SC UEIP and other activities in the sphere of nuclear energy use is ensured primarily by technical control and decisions taken under the design of equipment, systems, NF components and also under development of procedures on nuclear material, radioactive substance and radioactive waste treatment.

Implementation of measures on mitigation of adverse environmental impact is one of the mainstreams of the Company Environmental Policy.



Table 10. Current environmental costs in 2014, thousand rbl.

Type of environmental activity	Total current (operating) costs, 2014	Of these, from own funds
<b>A total of</b>	775 839,2	775 839,2
<b>Including:</b>		
Atmospheric air protection	140 381,2	140 381,2
Collection and purification of waste water	22 958,3	22 958,3
Waste management	1 153,0	1 153,0
Environmental radiological safety	604 018,3	604 018,3
Other types of environmental activities	7 328,4	7 328,4

Chart 11. Current environmental costs, mln. rub.

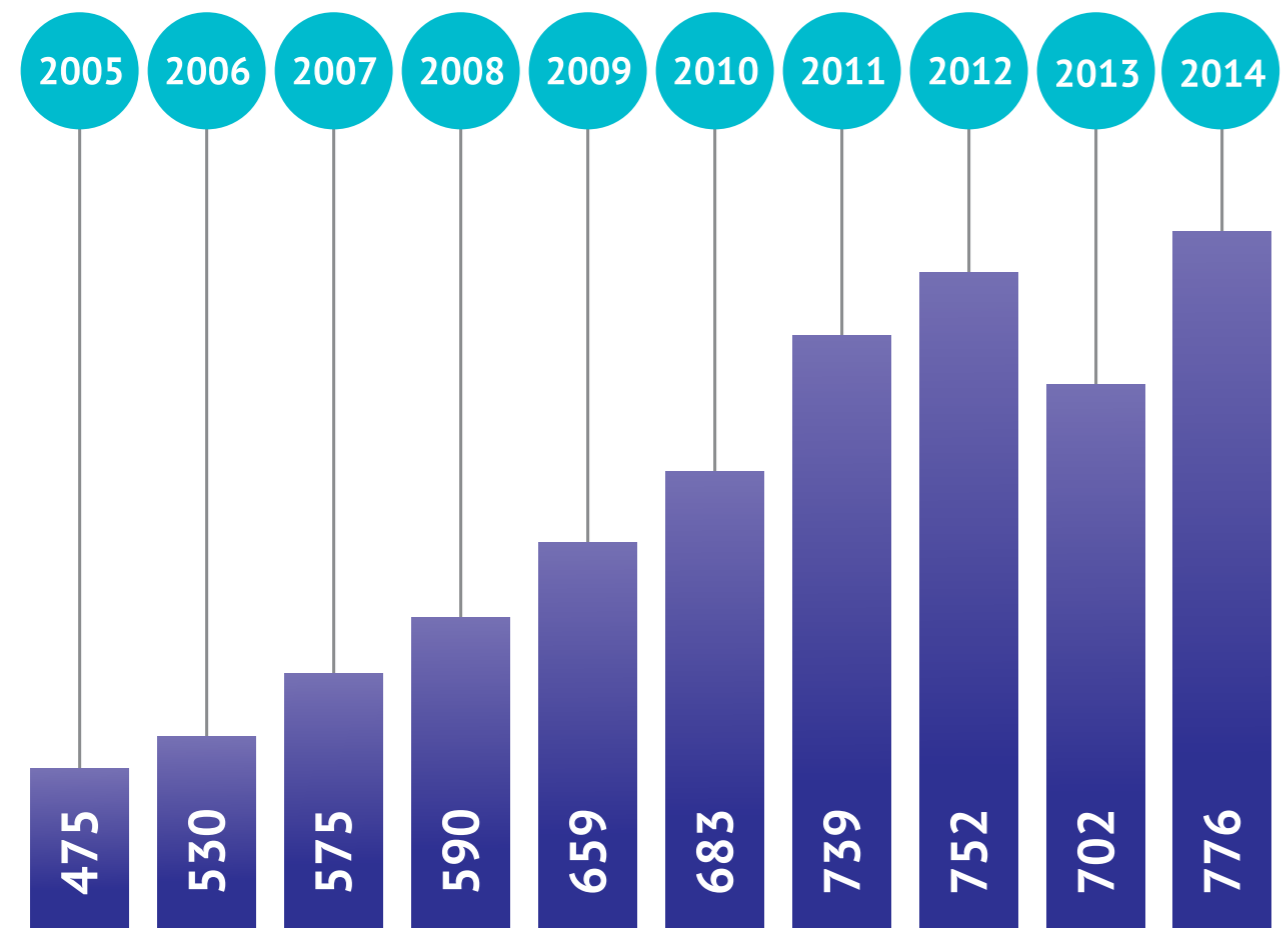
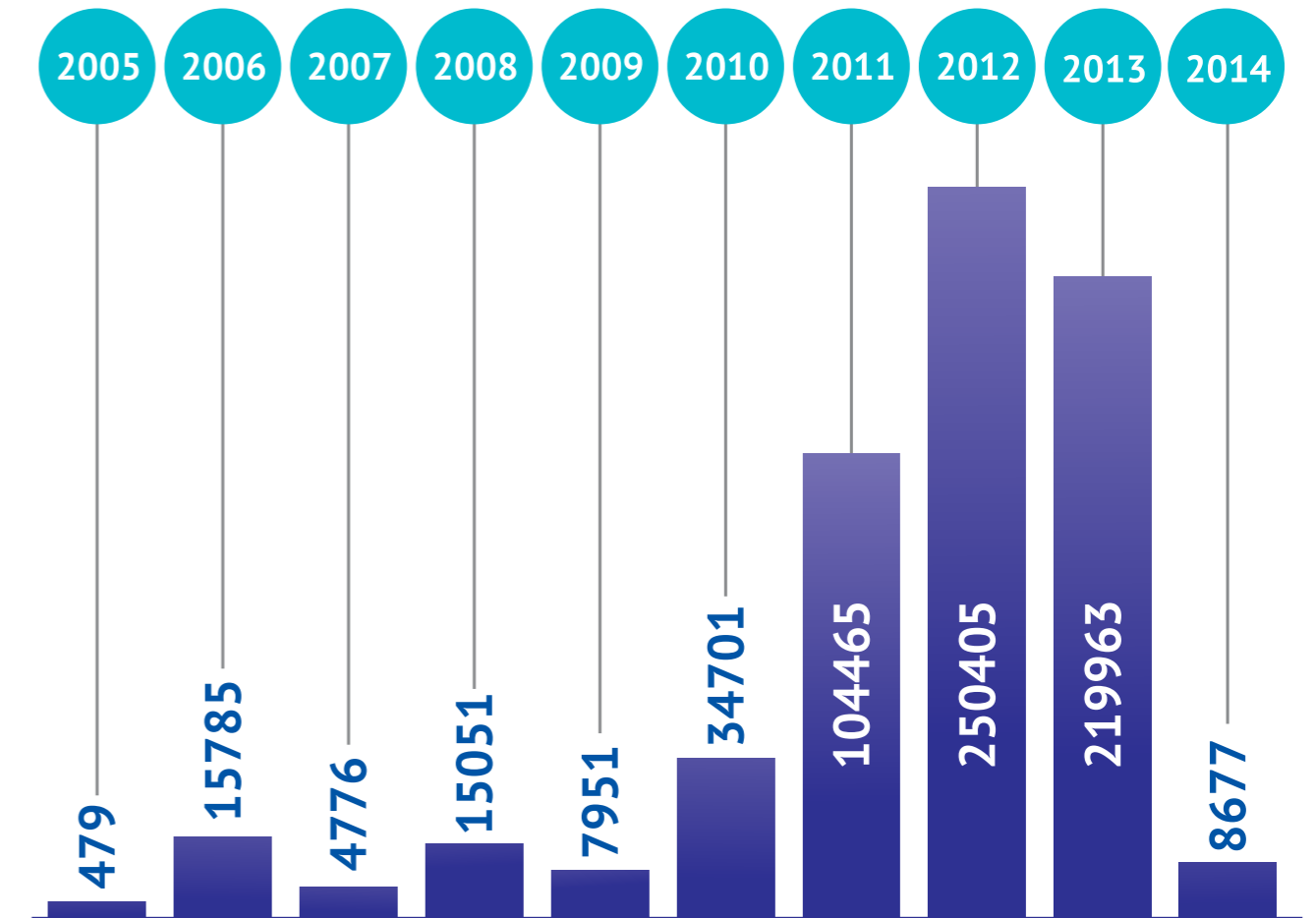


Chart 12. Data on conservation capital investment, thousand rub.



Assessment of efficiency of implemented initiatives on mitigating environmental impact in 2014:

- SC UEIP subdivisions kept to the specified standards for chemical pollutant (ChP) and radionuclide emissions and discharges
- Environmental safety regulations were observed
- Volume of discharge waters into surface-water bodies was decreased by 25%
- Emission of chemical pollutants was decreased by 37%
- Volume of production and consumption waste was decreased by 9%
- Total energy consumption was decreased by 214 353 GJ.

Table 11. Structure of Pollution Charges, thousand rubles.

Year	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Pollution charges	15225	310	276	327	337	387	339	315	292	192
Incl. water bodies	608	98	56	75	131	96	103	105	84	64
Ambient air	1369	155	138	130	148	285	233	210	208	128
Waste disposal	13248	57	82	122	58	6	3	0*	0*	0*

\* Applied is the graduated payment rate – the product of chargeable rate by coefficient (taking into account environmental factors, in this context – reductive). Thus chargeable rate for production and consumption waste disposal within the specified limits are applied using coefficient 0 in case of waste disposal in compliance with statutory requirements (RF Governmental Regulation No 344, Federal Law No 309-FZ).



## 8. Environmental Education



SC UEIP is committed to environmental education. One of the Company environmental policy mainstreams is to ensure transparency and public availability of information regarding UEIP environmental protection and safety activities. In 2014 more than 80 news materials in corporative, local, regional and branch mass media were published. The information covered the issues on the Company environmental activities and environmental conditions within the territory of presence. According to the "transparency" policy that SC UEIP strives to pursue, 8 ecological press-tours to the site were conducted. The tour participants received a unique opportunity to visit the Company process sites, measure radiation background in any point of their route and make sure that the plant was of no hazard to the environment. Annually since 2008, the Company publishes Environmental Safety Reports presenting full and objective information about the current environment status and environmental impact resulting from

SC UEIP operation. Environmental Safety Reports 2012, 2013 and 2014 were presented to concerned regional public communities. The Report was distributed among organizations dealing with SC UEIP on the issues of environmental protection and industrial safety, mass media and public organizations located in Novouralsk city district, and is available at SC UEIP official web-site.

### 8.1 Cooperation with Public Authorities

«Expert-Ural» analytical centre held a conference "Review of industrial ecology legislation: new model of assessment and control, tools, implication". Ecologists from Sverdlovsk region industrial enterprises (including Stock Company UEIP), representatives of scientific research institutes: Institute for industrial ecology, Ural Branch of the Russian Academy of Sciences, Scientific research institute for complex use and protection of water resources, Institute for environmental management, Center of urban planning ecology, etc., took part in the proceedings. Advantages

and disadvantages of the best available technologies, issues and problems of Sverdlovsk region enterprises were discussed. At the meeting the Head of SC UEIP Environmental Protection Department A.V. Nalivaiko made a report, which covered the issues of introduction of the best available technologies within Rosatom State Corporation enterprises.

The adequate level of nuclear, radiation, industrial, ecological and labor safety at SC UEIP was confirmed in the course of repeated inspections conducted by the following public authorities:

- Rostekhnadzor Ural Administration – with regard to industrial safety at UEIP hazardous process facilities;
- Rostekhnadzor Ural Interterritorial Administration for Nuclear Radiological Safety - with regard to compliance with standards and regulations in nuclear energy use while operating nuclear facility ;
- RF FMBA Regional office No 31 – in the field of health legislation requirements compliance at SC UEIP.

### 8.2 Safety Culture Year at Nuclear Facilities

Pursuant to the RF President order the year 2014 was announced the Year of culture in Russian Federation. Rosatom State Corporation enterprises also supported this initiative. By decision of VIII International Forum "Safety culture at nuclear facilities" the year 2014 was announced the Year of culture and safety culture within Rosatom State Corporation. The Company experts developed the Plan for development of environmental culture and safety culture at SC UEIP as part of the General Branch Plan of measures.

The Plan comprises the following main activities:

- Meetings, conferences, training of experts and managers in the field of RF statutory requirements and international standards on ecological safety and environmental protection
- Public presentation of SC UEIP Annual Environmental Safety Report
- Preparation of environmental press-releases
- Participation in scientific and practical workshops on ecological safety
- Arrangement and participation in environmental activities

The most challenging activities held in 2014 relating to implementation of SC UEIP Plan for the Year of culture and safety culture, are stated below:

On January 17 SC UEIP organized the briefing related to the results of Environmental Safety Year and the plans for 2014, which was announced the Year of culture and safety culture across Rosatom State Corporation enterprises. Ye.M. Lobov, SC UEIP Acting Technical Director and A.V. Nalivaiko, the Head of SC UEIP Environmental Protection Department

answered the questions of corporative and local mass media representatives.

On January 27, in the SC UEIP recreation centre took place the regular session of SC UEIP Scientists' Club. The issue on the agenda was "Environmental conditions in the territory of Novouralsk city district. SC UEIP activity in the field of environment protection and environmental safety of production". The Head and the experts of SC UEIP Environmental Protection Department participated in the meeting, made a report concerning the issue on the agenda and answered the questions of participants.

The experts of SC UEIP Environmental Protection Department took part in IX International Public Forum-dialogue "Nuclear energy, society, safety 2014", arranged by Rosatom State Corporation Public Council.

The art-project "I live in Atomgrad" was launched. SC UEIP arranged the Ecological festival "Piggy box for ideas" where the works of Novouralsk schoolchildren were exhibited.

The experts of SC UEIP Environmental Protection Department took part in the workshop No.3 of scientific and technical council (STC) of FGUGP "Hydrospecegeology" on the issue "Methodological support for object monitoring of subsurface resources conditions within Rosatom State Corporation enterprises". The achieved high performance of SC UEIP monitoring system operation was mentioned during the official ceremony which was held after the SCC. SC UEIP staff was gifted by the chronological collection of memoirs with a presentation inscription from FGUGP "Hydrospecegeology" geologists and hydrogeologists, who



SC UEIP arranged the Ecological festival "Piggy box for ideas" where the works of Novouralsk schoolchildren were exhibited.





carried out investigations at special -purpose facilities of the Soviet Union.

The book was taken for storage to SC UEIP Museum. SC UEIP employees (including the employees of SC UEIP subsidiaries) took part in All-Russian environmental volunteer clean-up "Green Spring".

The Company employees took part in the IX International Forum "Emergency Preparedness & Response at Nuclear Facilities". "Feathery Compartment" Festival confined to the International Bird Day, was held. The 'Best birdhouse' contest was conducted.

SC UEIP employees and Novouralsk students took part in 'The Nuclear Bicycle Race'. The radiation situation map of Novouralsk was prepared.

The Company specialists took part in ATOMEXPO-2014 International Forum, International Public Forum-Dialogue.

Under the Rosatom State Corporation communication project "Teachers' Day at nuclear industry facilities" and in accordance with the Company environmental policy, on October, 28 and 30, and also on November 7, 17 and 20 SC UEIP hosted the ecological tours that were arranged for the teachers of Urals and Sverdlovsk region.

On October 30 Novouralsk National Research Nuclear University "MEPhI" held the Regional scientific-educational seminar "Nuclear, radiation safety and non-proliferation" where the Company experts made reports.

On November 20 SC UEIP conducted the extended session of Public Chamber Committee of the Russian Federation. Participants of the meeting discussed aspects of ecological, radiation and operational safety of modern industries.

On November 29 the Out-of-school Activity Center of Novouralsk Urban District conducted the final game of

Rosatom Fuel company TVEL education project called "First step into the nuclear project". In the final game traditionally arranged in the format of a TV game «Brain-ring», the students from "Atom-Class" of Vocational School No.58, Vocational School No.56, Gymnasium No.41, Secondary School No.40, No.54, No. 49, as well as representatives of School No.1 Atom-class from Zarechny city (due to expanded geography of the project) tested their intellectual abilities.

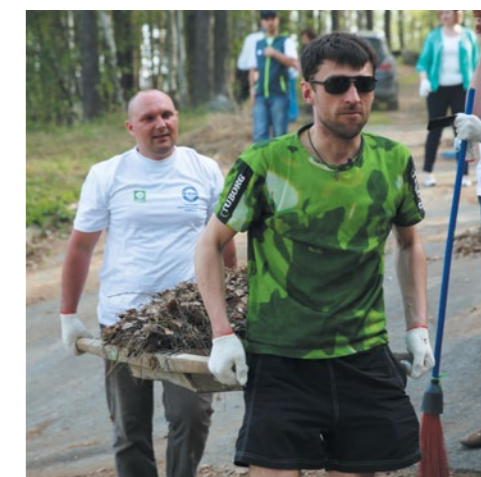
### 8.3 Winners of Branch and Regional Competition

At the ATOMEXPO-2014 International Forum which was held on June 9-11, 2014 in Moscow, SC UEIP was awarded the diploma "For active participation in the All-Russian environmental volunteer clean-up "Green Spring", for initiative and support to environmental activities, that became an important part of ecology improvement in the Russian Federation". The award was presented by V.A.Grachev, the Chairman of the All-Russian environmental volunteer clean-up organizing committee, the President of Non-governmental fund in the name of V.I.Vernadsky, the associate of the Russian Academy of Sciences, the Adviser of Rosatom State Corporation General Director .

Following the results of Rosatom State Corporation activity on development of ecological culture and safety culture the Non-governmental ecological Fund in the name of V.I.Vernadsky awarded SC UEIP "For contribution to development of ecological culture and safety culture within the nuclear industry". On December 22, 2014 the diploma and a cup were presented to A.V.Nalivaiko, the Head of Environmental Protection Department at the Conference on the ecological culture which was held in the State geological museum in the name of V.I.Vernadsky of the Russian Academy of Sciences.

SC UEIP became the winner among production facilities in "Green owl" municipal ecological contest.

The book was taken for storage to SC UEIP Museum. SC UEIP employees (including the employees of SC UEIP subsidiaries) took part in All-Russian environmental volunteer clean-up "Green Spring".



"Feathery Compartment" Festival confined to the International Bird Day, was held. The 'Best birdhouse' contest was conducted.



Experts organizations are participating in public events



SC UEIP became the winner among production facilities in "Green owl" municipal ecological contest.



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