

# DRAFT

SC UEIP ENVIRONMENTAL  
SAFETY REPORT



**2016**

# Contents

|  |    |
|--|----|
| <b>1. SC UEIP General Presentation &amp; Core Business</b> .....   | 4  |
| <b>2. Integrated Management System</b> .....   | 8  |
| <b>3. SC UEIP Environmental Policy</b> .....   | 10 |
| <b>4. Basic Regulatory Documents Specifying SC UEIP Environmental Activity</b> .....   | 14 |
| <b>5. Industrial Environmental Control and Ambient Monitoring</b> .....  | 15 |
| 5.1 State of SC UEIP site .....  | 15 |
| 5.2 Information & Measuring Automated System of Radiation Control.<br>Control of Radiation and Meteorological Observations ..... | 16 |
| 5.3 Monitoring of Natural Environment .....  | 17 |
| 5.4. SC UEIP Subsurface Monitoring System .....  | 18 |
| <b>6. Environmental Impact</b> .....   | 20 |
| 6.1 Water Withdrawal From Water Sources .....  | 20 |
| 6.2 Discharge into Open Drainage System .....  | 22 |
| 6.3 Radionuclide Discharge .....   | 23 |
| 6.4 Emissions of Chemical Polutants.....   | 26 |
| 6.5 Greenhouse Gas Reduction Initiatives and Achieved Reduction.....   | 27 |
| 6.6 Radionuclide Emissions .....   | 28 |
| 6.7 Production & Consumption Waste Management .....  | 29 |
| 6.8 Radioactive Waste Management.....  | 32 |
| 6.9 Energy Use .....   | 32 |
| 6.10 Share Of SC UEIP Emissions, Discharges & Waste in Sverdlovsk Region.....  | 33 |
| 6.11 Share of sold product and packing materials returned to producer for reprocessing .....                                     | 36 |
| 6.12 Financial aspects and other risks and possibilities for the Company activity<br>with reference to climate change .....      | 36 |
| <b>7. Implementation of Environmental Policy</b> .....   | 37 |
| 7.1 Initiatives On Mitigating Product & Service Environmental Impact,<br>Scope Of Mitigation Procedures .....                    | 38 |
| <b>8. Environmental, Publicity &amp; Education Activities</b> .....  | 41 |
| 8.1 Cooperation With Public Authorities .....  | 41 |
| 8.2 Information of the Public .....  | 41 |
| 8.3 Cooperation with Public Environmental Organizations, Scientific and Social Institutions .....                                | 42 |
| 8.4 Winners of Branch and Regional Competitions .....  | 43 |
| <b>9. Contact Details</b> .....  | 44 |

# Foreword



Environmental public safety report 2016 of Stock Company Ural Electrochemical Integrated Plant is the ninth environmental report made by our enterprise on a voluntary basis and addressed to the wide range of the concerned parties. The report comprises data on SC UEIP environmental protection, production environmental safety and SC UEIP environmental impact.

One of the Company key tasks remaining consistent for many years is to ensure the parity of economic and environmental values. Practically it is ensured by implementation of technical upgrade, retrofit and energy saving corporate programs, and by detailed assessment and minimization of possible environmental risks as part of greenfield projects. SC UEIP operation is of great strategic importance for the development of Novouralsk Urban District, as it greatly contributes to its innovation progress.

Therefore, SC UEIP management understands the necessity to provide a balance between strategic objectives of corporate business development and environmental safety, regarded as the basis for life and health of present and future generations.

This report was first made in compliance with the Sustainability Reporting Guidelines i.e. GLOBAL REPORTING INITIATIVE (GRI, version G4, main variant of compliance).

Due to the fact that the Report is being issued in 2017 that was declared the Year of Ecology in Russian Federation, this version additionally contains data on some Novouralsk Urban District natural objects. Detailed information on Novouralsk and Sverdlovsk Region natural objects can be found in the book entitled «Novouralsk Urban District Guide. Nature» issued by the Ural local publishing house (the city of Verkhniy Tagil).

# 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, offshore power plants, 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 completely replaced by the centrifuges. It made possible to reduce the

power consumption of separation production by a factor of 10 providing 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.

An important milestone became UEIP incorporation into ROSATOM TVEL Fuel Company in 2010. TVEL Fuel Company comprises 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

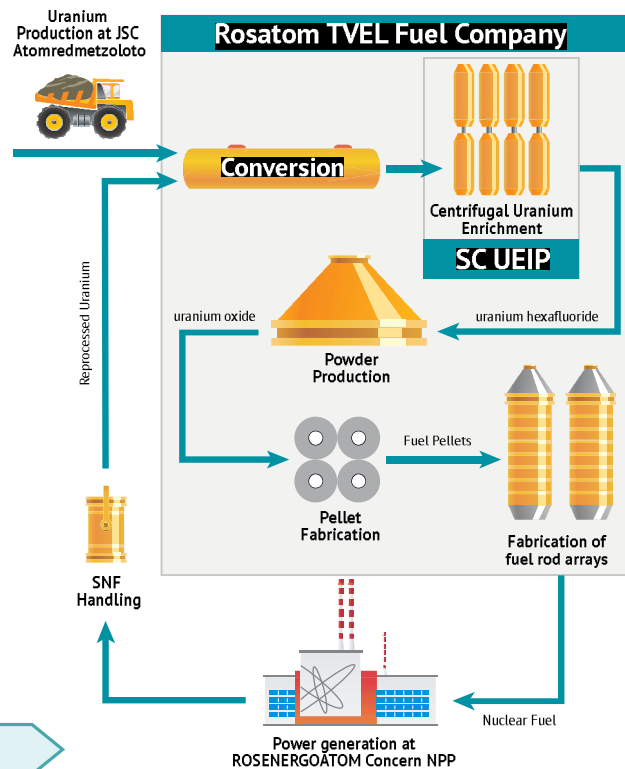
**On August 15, 2008** Federal State-owned Unitary Enterprise Ural Electrochemical Integrated Plant was reorganized into Joint-Stock Company Ural Electrochemical Integrated Plant.

from 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 the 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.*



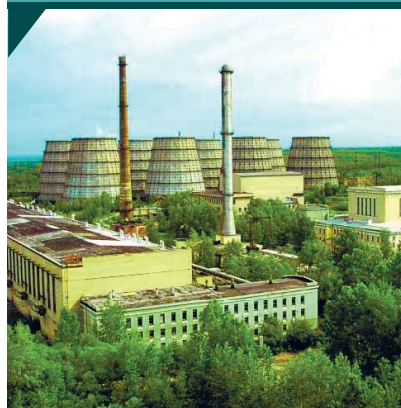
SC UEIP Position in Rosatom Nuclear Fuel Cycle

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.

The main component of SC UEIP structure is a group of enrichment production shops No. 53, 54, 87 and UEIP Analytical Center (department 16), Chemical metallurgical shop (shop 70), Machine inspection shop (shop 19) and Department for special product storage, transportation and control (department 7). There are gas centrifuge cascades in shops No.53, 54, 87. "Chelnok" facility located in shop 54 is used for transfer of uranium hexafluoride enriched up to 21% in  $U_{235}$ .

Enrichment production waste reprocessing (extraction, precipitation, vessel washing, uranyl-uranate fluorination, solid radioactive waste

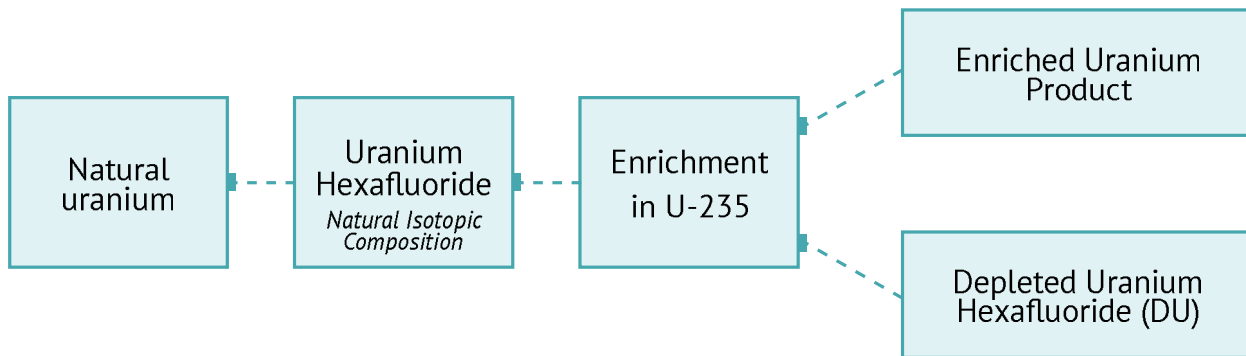
conditioning, metal waste preparation), operation of process pulp filtration unit, preparation for solid radioactive waste transfer for disposal to State Unitary Enterprise "National Operator for Radioactive Waste management" (SUE NO RWM) are performed in Chemical metallurgical shop. Equipment decontamination and process equipment repair are performed in Machine inspection shop.

UEIP Analytical Center performs analytical procedures and produces uranium isotopic certified reference materials.

Department for special product storage, transportation and control ensures nuclear material storage and transportation as well as performs some functions of UEIP nuclear material control and accounting department.



## Uranium Isotope Separation Flow Chart



In order to ensure enrichment process the natural uranium is converted into 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.



## Integrated Management System



### ***Environmental management***

*is a part of the overall corporate governance system that involves well-defined organizational structure and aims at the 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. It was devoted to sustainable development of human society and the nature, and adopted Agenda 21, that included general provisions of the new concept being suggested to all countries of the world. The summit concluded that environmental management shall be regarded as key dominant of sustainable development and as high priority for industrial operations and business.

In 1993 in the course of the Uruguay Round negotiations devoted to establishment of the World Trade Organization, it was decided to introduce the new environmental international standards. **The International Organization on Standardization (ISO)** issued ISO 14000 standards stipulating the principles of environmental management systems.

One of the key parameters of the Company sustainable development is the effectiveness of Quality Management System (QMS) that covers the whole life cycle of the product from the development to implementation, and ensures the faultless operation of all process chains. SC UEIP QMS is being constantly improved: from zero-defect production, comprehensive quality control system to implementation, certification and utilization of QMS in accordance with 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 management system is certified in compliance with the standards*

ISO 9001:2008

ISO 14001:2004

ISO 50000:2011

BS OHSAS 18001:2007

### *as a part of Rosatom TVEL Fuel Company integrated management system*

SC UEIP implemented and successfully introduced Environmental Management System (EMS). A comprehensive certification audit was conducted at UEIP in 2010. It confirmed SC UEIP compliance with the requirements of ISO 9001 and ISO 14001. The audit conducted in UEIP subdivisions resulted in the issuance of Certificate of conformity which proved the compliance of SC UEIP production organization 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. The audit results confirmed compliance of SC UEIP QMS by the issuance of 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 in SC UEIP in July 2013. The audit

confirmed the compliance of QMS operation to the issued Certificate of conformity. In October 2013 SC UEIP was audited as part of 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

### *Therefore, at present SC UEIP Integrated Management System comprises:*

#### **Environmental Management System**

focused on improvement of procedures providing environmental safety.

#### **Quality Management System**

focused on improvement of procedures providing high quality of generated product.

#### **Energy Management System**

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

#### **Health Protection & Labor Safety Management System**

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

#### **STRATEGIC GOAL**

**Ensuring safe and sustainable development, mitigation of environmental impact.**



## SC UEIP Environmental Policy



**G4-14** 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.

***Pursuant to ROSATOM State Corporation environmental policy SC UEIP management is committed to 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 Company environmental and population impact by prioritizing environmental aspects and their further management.
- Maintain high level of environmental safety based on applying environmental protection advanced technologies, equipment and methods.
- Ensure the management and personnel readiness to prevent and mitigate emergency situations and other incidents.
- Assure publicity and availability of information of SC UEIP operations 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.

◆◆◆ Dialogue to all concerned parties on the issues of SC UEIP operation.

The first SC UEIP Environmental Policy was introduced on April 22, 2008 by SC UEIP General Director order. The Company Environmental Policy was annually revised and updated.

The current revision of SC UEIP Environmental Policy was introduced on July 7, 2016 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.



# Novouralsk Urban District Guide. Nature

## Seven Brothers Rocks

Seven Brothers Rocks are situated 7 kilometers eastward from Verkh-Neyvinsky Pond - at the top of Semibratskaya Mountain. They consist of granite layers.

The rocks present one of the most picturesque natural monuments in the Middle Ural. The full name of the complex is 'Seven Brothers and One Sister'. 'Sister' is located west of the 'brothers'.

It is known that there are more than seven rocks. The number 'seven' came from ancient times. Local residents could count only to six and number 'seven' meant 'many', so there are many rocks but not seven.

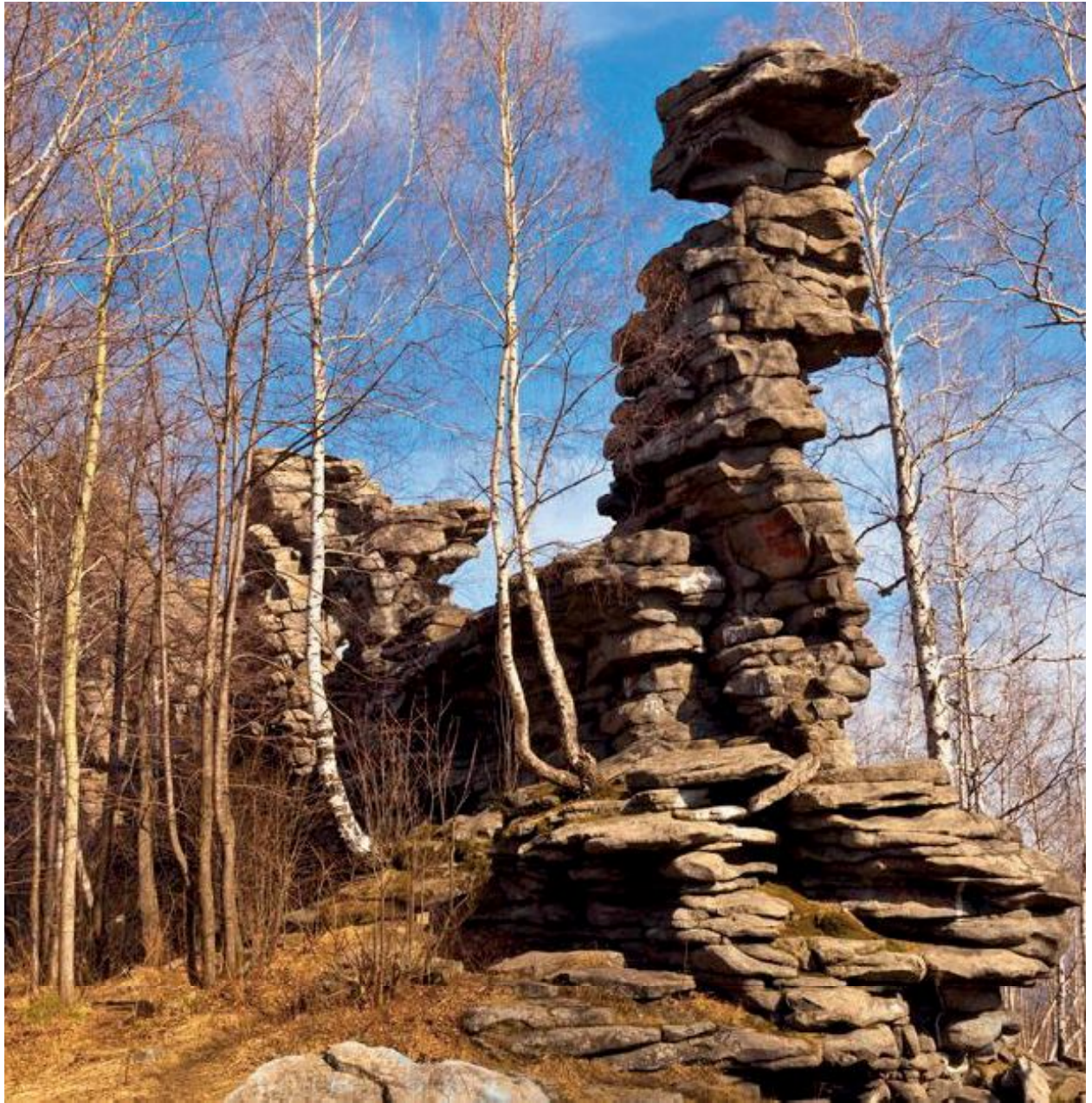
Each pillar consists of flat granite plates placed one upon another (so-called spheroidal structure). The rock relative height is 25 meters, the forth 'brother' ('the elder brother') is the highest pillar; its height is 45 meters.

All visitors pay attention to the inscription: «Social revolution forever!». In 1912 the rocks served

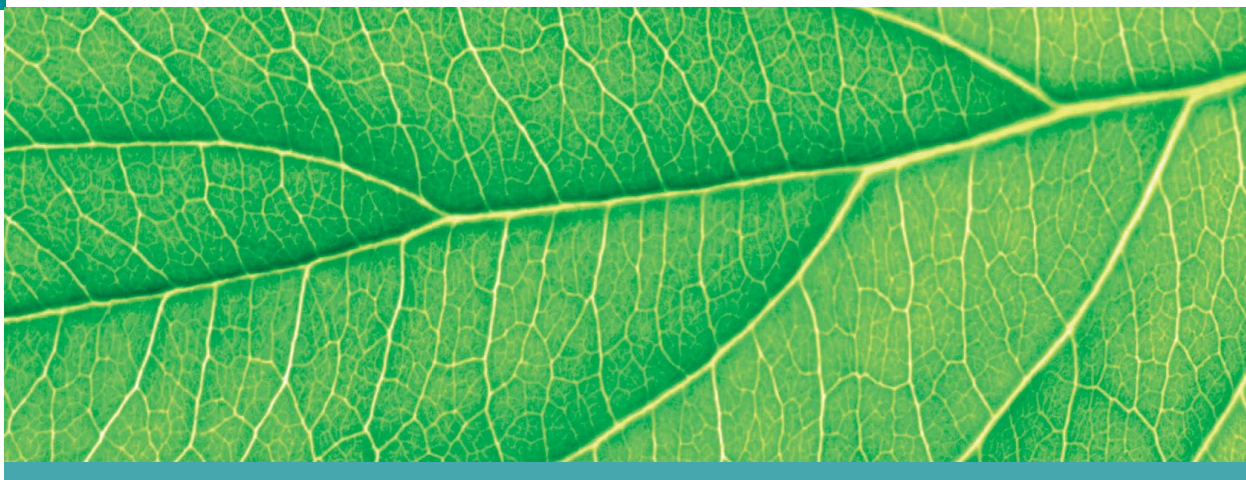
as a place for meeting of revolutionaries from the nearest Verkh-Neivinsky settlement. In summer it was reported that the Governor General from the city of Perm was going to arrive and the local officers wanted to show him the Middle Ural area of unique interest - Seven Brothers Rocks. The bolsheviks decided to upset the distinguished guest. Three workers (P. Firsov, F. Vorobyov and F. Verevkin) wrote these words on the rocks by order of the party leaders.

According to the old legends the rocks were the natural native idols that were worshipped by the local people. These places were considered holy places. Many legends were composed about Seven Brothers Rocks: about the children of cruel Mong, about a cave where a beautiful woman was sleeping, about Ermak, gold diggers and so on.





## Basic Documents Regulating SC UEIP Environmental Activity



- Constitution of the Russian Federation
- 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 190-Z of 11.07.2011 on Radioactive Waste Management and Amendments to Certain
- Legislative Acts of the Russian Federation
- 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)

Furthermore, the Company activities in the field of radiation, nuclear and environmental safety are regulated by the Russian Federation governmental rules, 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 obtained all 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 water bodies for use;
- Licenses for use of nuclear energy;
- Other documents.

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

# Industrial Environmental Control & Ambient Monitoring

5.



## 5.1. State of SC UEIP site

G4-EN24

There are no territories polluted by radionuclides within UEIP site and health protection zone. Gamma-radiation equivalent dose rate does not exceed the natural background and amounts to 0.06 – 0.12  $\mu\text{Sv}/\text{hour}$  (the average value is 0.09  $\mu\text{Sv}/\text{hour}$ ). Within the long period of SC UEIP operation there was no emergencies, spills, etc., resulted in environmental contamination. SC UEIP radiation hazard category is specified by the “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 the RF FMBA territorial body. In compliance

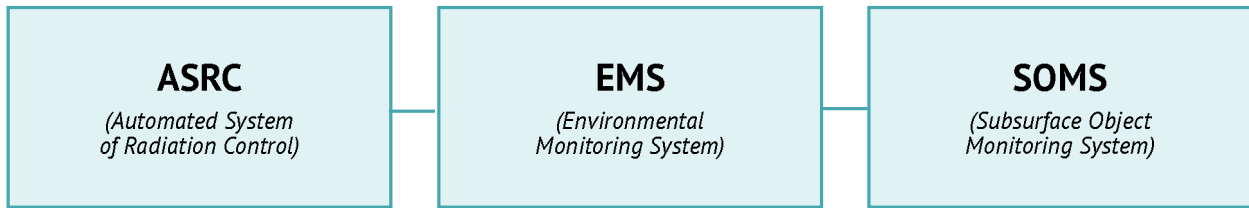
G4-EN11

with this classification SC UEIP is referred to the III category of potential radiological hazard. Thus SC UEIP control zone is not specified. Sanitary protection area for SC UEIP regarded as the nuclear hazardous facility is regulated by SC UEIP Sanitary Protection Zone Project, approved by the Head of NGO and SC UEIP General Director. The Company facilities occupy the area (incl. lease land) of 11 053.14 hectares (including buildings, roads, agricultural land). The total site area makes 512.3 hectares. The Company land assets do not include the conservation areas and valuable biodiversity territories.

***The following monitoring objects within SC UEIP zone of influence 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 environment;
- ◇ Meteorological parameters.

**SC UEIP performs monitoring of radiation, ecological situation and natural environment using three systems:**



**5.2. Automated System of Radiation Control. Radiation Monitoring and Meteorological Observations**

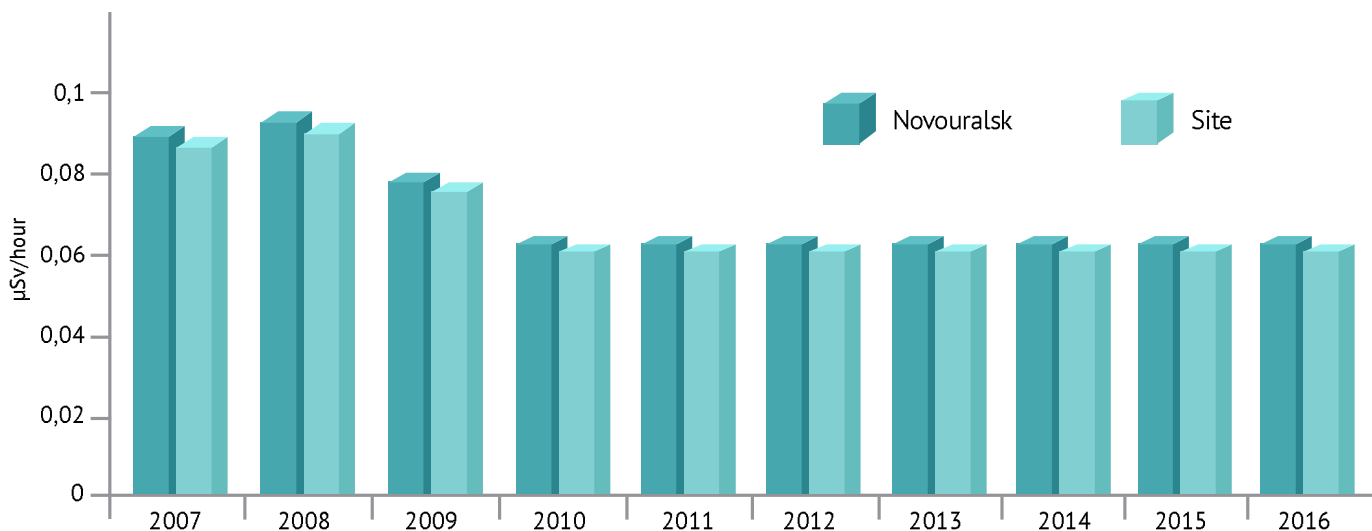
For the purpose of radiation environment control, Environmental Protection Department (EPD) applies the Information & Measuring Automated System of Radiation Control (ASRC), which is an integral part of ROSATOM Unified State Automated System of Radiation Control. The system is designed for constant automatic control of radiation and meteorological conditions in monitoring points connected to the control panel. At present SC UEIP ASRC is equipped with the advanced equipment.

Seven control stations cover all industrial sites of the Company. The measuring data for equivalent gamma-

radiation dose rate received by SC UEIP Automated System of Radiation Control are daily transmitted to FSUE «ROSATOM Situation-crisis center». Thereafter these data shall be available 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 μSv/hour, which is considerably lower than the standard values and background exposure dose rates specified for Ural region.

**Exposure Dose Rate μR/hour**



***In 2016 SC UEIP automatic weather station was put into operation and ASRC system was updated in order to use environmental and monitoring control methods that ensure achievement and maintenance of environmental safety meeting modern requirements.***





## 5.3. Monitoring of Natural Environment

Industrial environmental and ambient monitoring is carried out by SC UEIP Environmental Protection Department. The monitoring activity shall be performed by SC UEIP Analytical Center personnel and the personnel of the agencies accredited by Technical Regulation & Metrology Federal Agency. SC UEIP annually makes work contracts with these agencies.





SC UEIP Analytical Center is equipped with up-to-date instruments, equipment and measuring devices for sampling and analysis of environmental object samples. For example, determination of uranium isotope content in environmental objects is performed by mass-spectrometric method using modern mass-spectrometers of the world leading producers of analytical equipment.



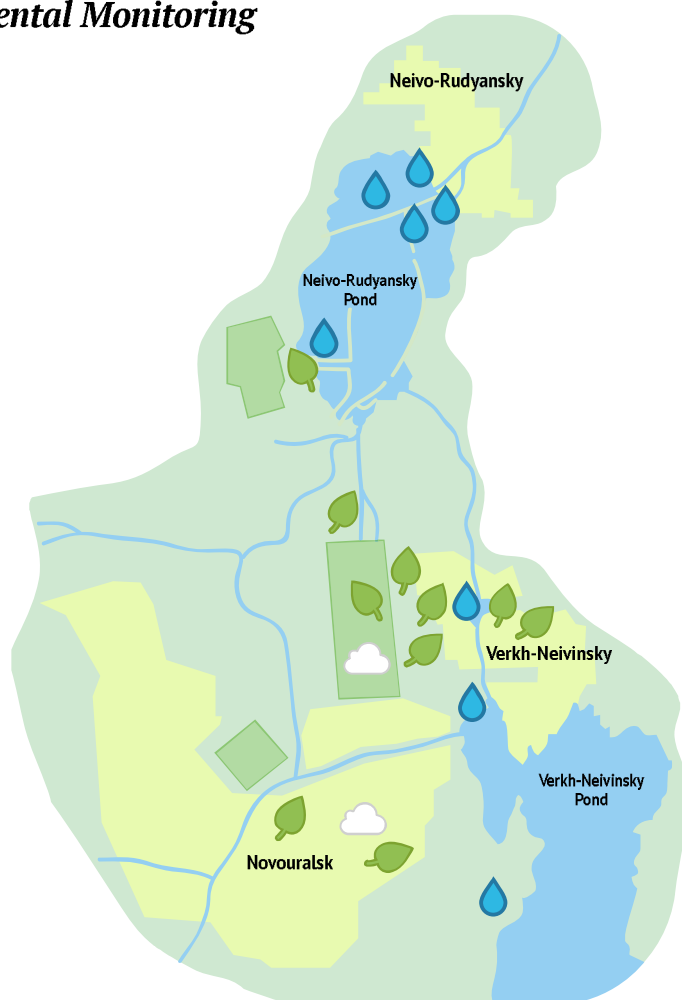
### Results of Long-term Measurements Are As Follows:

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

### Points of Environmental Monitoring

-  — territory of SC UEIP sites
-  — water monitoring points
-  — soil and vegetation monitoring points
-  — air monitoring points

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.



## 5.4. SC UEIP Subsurface State 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 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 were tested.

Introduction of qualitatively new system of subsurface state monitoring makes it possible to obtain the accurate data for substructure of radioactive waste storage facilities located at the site, as well the data on the underground hydrosphere state. At the same time the system serves as a resource for establishing the basis of the future integral information-analytical system of radiation ecological monitoring (IAS REM) at ROSATOM State corporation enterprises.

The work on installation of subsurface state monitoring system included geological, geodesic research of SC UEIP radioactive waste storage

facilities' locations, camera treatment of research performed during the previous years. The research of change in geoecological environment indicators was conducted, the analysis of the site geological and hydro-geological structure was 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. The geoinformation system was introduced.

The purpose of research is to confirm that SC UEIP nuclear hazardous facilities do not affect negatively on the underground waters, and that the influence of the underground waters on these facilities will not result in population and personnel radiation and toxic exposure, and natural environment contamination by radioactive and chemical substances.

Results of monitoring outside the UEIP site confirm that the uranium isotopes intervention levels are not exceeded and respectively radioactive waste storage facilities do not affect the ground waters.



***In 2014 the Company experts developed the science-based reference levels. Correspondence to these levels absolutely confirms the zero level of the Company environmental effect ('zero' environmental impact). As for the environment components, these reference levels were not exceeded.***



### ***Main Monitoring Objects within SC UEIP Zone of Influence***

| Natural Environment                  | 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         |
| Vegetables – potatoes, µkg/kg        | 2,4        | 0,2-0,9        |
| Vegetables – except potatoes, µkg/kg | 1,7        | 0,3-0,6        |
| Grassland, µkg/kg                    | 135        | 0,015-0,021    |



The Population Is Free From Radiation Exposure





G4-EN9

## 6.1. Water Withdrawal from Water Sources

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

Recycling water supply is performed as follows: After cooling of equipment the process water is discharged through the guide channels into the basins separated by dams from the main water bodies of Verkh-Neivinsky and Neivo-Rudyansky basins. The water in the basins is cooled and after that is supplied again to the process facilities by means of pumping stations.



## Water Supply Sources' Characteristics

### Verkh-Neivinsky water basin

is used for drinking water supply to NGO population and process water supply to 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 for biodiversity the water basin is not valuable. It serves as centralized drinking water supply and as recreation area for Novouralsk and Verkh-Neivinsk settlement population. Water consumption quote specified for SC UEIP makes 8 329 thousand cubic meters/year.



### Neivo-Rudyansky water basin

is used 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 classified as nationally or internationally protected area. With relation to biodiversity the water basin is not valuable. Generally it is used as waste water receiver for NGO industrial and public utilities (including SC UEIP). Water consumption quote specified for SC UEIP makes 1,296 thousand cubic meters/year.



### Ayatsky water basin

is used as a reserve source for adding water to Verkh-Neivinsky water basin in low water years. It also serves for water supply to 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 treated as nationally or internationally protected area. As for biodiversity the water basin is not valuable.



## *Water Withdrawal from Natural Water Sources*

G4-EN8

| Source Description   | Water Intake, thousand m <sup>3</sup> /a |              |              |              |               |              |              |              |              |              |
|--|--|--------------|--------------|--------------|---------------|--------------|--------------|--------------|--------------|--------------|
|  | 2007                                     | 2008         | 2009         | 2010         | 2011          | 2012         | 2013         | 2014         | 2015         | 2016         |
| Verkh-Neivinsky water basin                                | 4 868                                    | 4 970        | 5 081        | 5 004        | 4 578         | 3 978        | 3 651        | 3 052        | 2 798        | 2 706        |
| Neivo-Rudyansky water basin                                | 1 575                                    | 1 733        | 1 364        | 1 459        | 1 243         | 1 178        | 1 171        | 638          | 540          | 585          |
| Ayatsky water basin  | 21                                       | 34           | 26           | 48           | 5 483         | 32           | 26           | 17           | 7            | 31           |
| Utility and drinking water supply for Tavatuy holiday camp | 75                                       | 77           | 78           | 57           | 55            | 50           | 60           | 0            | 0            | 0            |
| Artesian wells   | 519                                      | 506          | 459          | 658          | 616           | 655          | 0            | 0            | 0            | 0            |
| <b>Total</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> | <b>3 345</b> | <b>3 322</b> |

### *Economy of fresh water due to recycling and reuse of water supply*

| Consumption in circulation water supply systems, thousand m <sup>3</sup> /a |        |        |        |        |        |        |        |        |        |
|---|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 2007  | 2008   | 2009   | 2010   | 2011   | 2012   | 2013   | 2014   | 2015   | 2016   |
| 199088  | 194551 | 186824 | 187779 | 181942 | 182807 | 175298 | 160598 | 160723 | 155925 |

G4-EN22

## **6.2. Discharge into Open Drainage System**

In 2016 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 the surface-water

bodies. According to the process inspection data the actual volume of discharge in 2016 amounted to 5.3 million m<sup>3</sup>. The waste water category is partially clean water. The main waste water receiver is Neivo-Rudyansky water basin. Off-schedule discharges are not performed. Pollutant content shall not depend on average dryness of the year. Discharges of polluting substances of similar concentration are performed during the year.



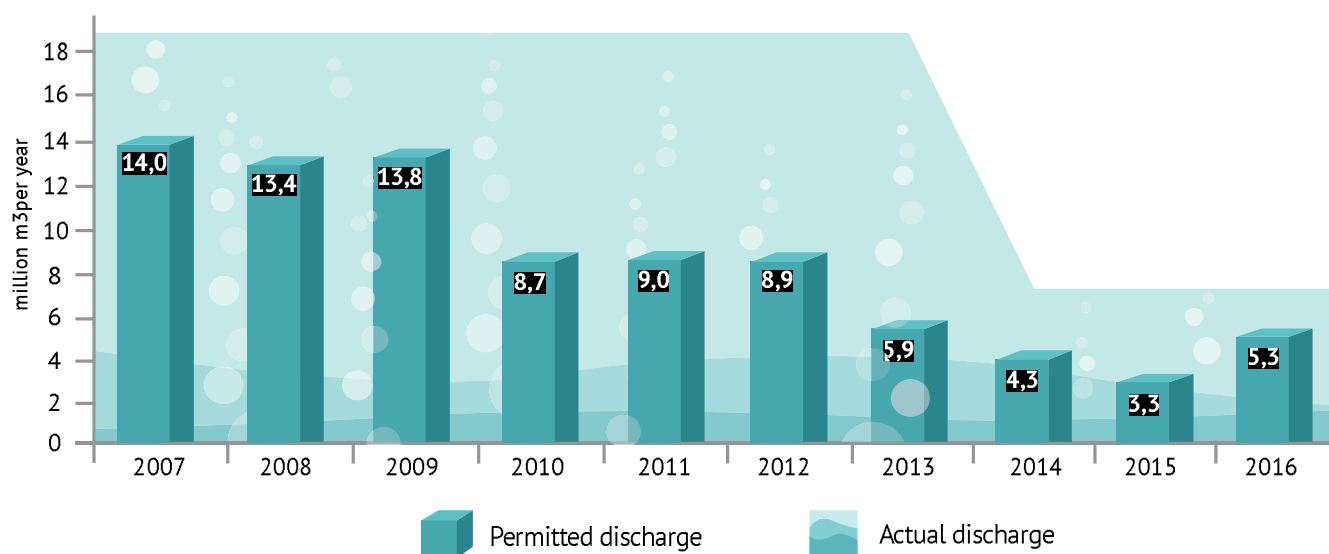
**! Increase in waste water discharge in 2016 relates to increase in malt water ingress in high-water season.**

## Composition of discharge by basic pollutants, 2016

| Nº                                     | Description of basic pollutants | Class of hazard | PDL*, t/a   | Actual value of discharge in 2015 t/a |            |
|--|---------------------------------|-----------------|-------------|---------------------------------------|------------|
|  |                                 |                 |             | t/a                                   | % of limit |
| 1                                      | 2                               | 3               | 4           | 5                                     | 6          |
| 1                                      | Petroleum products              | 3               | 1,24        | 0,4                                   | 32         |
| 2                                      | Suspended substances            | 4               | 87,2        | 34,4                                  | 39         |
| 3                                      | Ammonia nitrogen                | 4               | 5,6         | 0,83                                  | 15         |
| 4                                      | Nitrites                        | 4               | 2,07        | 0,55                                  | 27         |
| 5                                      | Phosphorus                      | 4               | 0,69        | 0,4                                   | 58         |
| <b>Total, only by basic pollutants</b> |                                 |                 | <b>96,8</b> | <b>36,58</b>                          | <b>38</b>  |

\*PDL – Permissible discharge limit

## Waste Water Volume



## 6.3. Radionuclide Discharge

For the past several years SC UEIP 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 in 2006.



# Novouralsk Urban District Guide. Nature

## Verkh-Neivinsky Pond

The aquatorium of Verkh-Neivinsky pond is a part of Novouralsk Urban District territory.

Verkh-Neivinsk Railway station is located on the pond northwest cost. It was built in 1878 with the construction of Gornozavodskaya railway line that connected Ekateruburg and Perm with many Ural factories including Verkh-Neivinsky.

The pond was named after the river Neyva where it was created due to the construction of plant dam. Verkh-Neivinsky plant was built by Prokofy Demidov, the grandson of the dynast Nikita Demidov.

In 1759 Demidov's steward Grigory Makhotin suggested building a dam and a plant on the upper reaches of the river Neyva, between Trubnaya, Sukhaya and Minikhina mountains. By the order of His Imperial Majesty Peter the 3d "the nobleman Prokofy Demidov was permitted to built an iron making plant in Siberian county on Neyva river near Pristalycap". The date of ordersigning-April 3, 1762-is the date of Verkh-Neivinsky plant foundation.

The Dam construction was finished in 1764. It took 12 years to fill an intermountain basin with Neyva waters before the pond took its modern shape.

The length of the pond from the north to the south is about 10 kilometers, the width is up to 2 kilometers, the water surface area makes about 17 square kilometers. Coast line height is 263.5 meters above the sea level. In the south Verkh-Neivinsky pond is connected with Tavatuy lake by channels.

The cost of the pond is rather rugged and swawpy in places. The east cost is hilly. There are spurs of Semibratskaya, Khazovaya, Beyozovaya mountains. The west coast is softer and also swamped in places. The most significant mountains of west coast are Trubnaya and Murzinskaya.

Overgrown gulfs are specific to the shoreline. One of the gulfs has an interesting name - Veryovkin Ugol (that can be translated as 'the rope corner'). There is a recreation center under the same name. There is the Green Cape to the south. One can see beaches and leisure areas extending for more than 2 kilometers. There are preventorium 'Vesna', sanatorium 'Green Cape', health camp for children 'Green Cape', recreation facility for fishermen and hunters.

There are some islands. The most famous among them: Pristaloy (Shapka), Yelnichny, Kamenny.







In 50-60s of the 20th century there was missile launcher on one of the islands.

There are some floating islands in the pond – they were separated from the bog surface in gulfs.

Many brooks and rivers pour in the pond including Bunarka river.

Many wild ducks winter on nonfreezing area of the pond. There are perches, ruffs, rudds, pikes in the pond. One can see many fishermen in summer and in winter.

Meadows of the pond west shore are under considerable recreational load that impairs their ecological state.

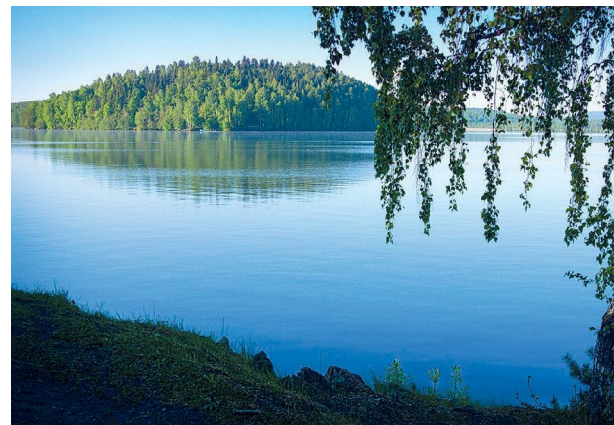
Verkh-Neivinsky pond is the city main water supply source.

Islands of Verkh-Neivinsky pond: Pristaloy (Shapka), Yelnichny (the biggest), Kozy, Kamenny, Kudryavaya Berezka, Berezka, Kalinovy Kust, Zmeinye, Pashenka, Rybachye.

Capes of Verkh-Neivinsky pond: on the west: Black Cape, Green Cape, Cow Cape; on the east: Slyudyanaya, Pashenka.

Gulfs of Verkh-Neivinsky pond: on the west – Zimnik, Veryovkin Ugol, Neyvitsa; on the east – Alekseevskaya Poyma, Bolshoe Dikoe, maloe Dikoe.

The rivers flowing into Verkh-Neivinsky Pond: Neyva, Chyornaya, Murzinka, Alekseevskaya, Pervaya, Vtoraya, Tretya, Cheryomukhovaya, Beryozovka.



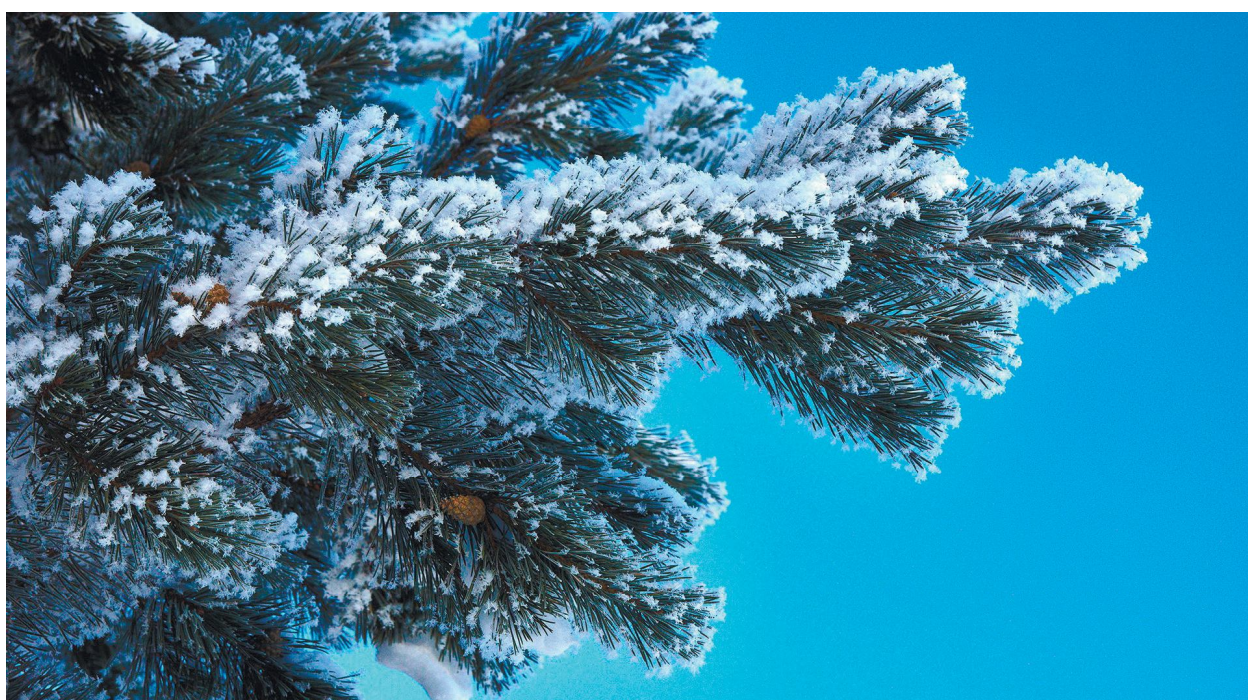
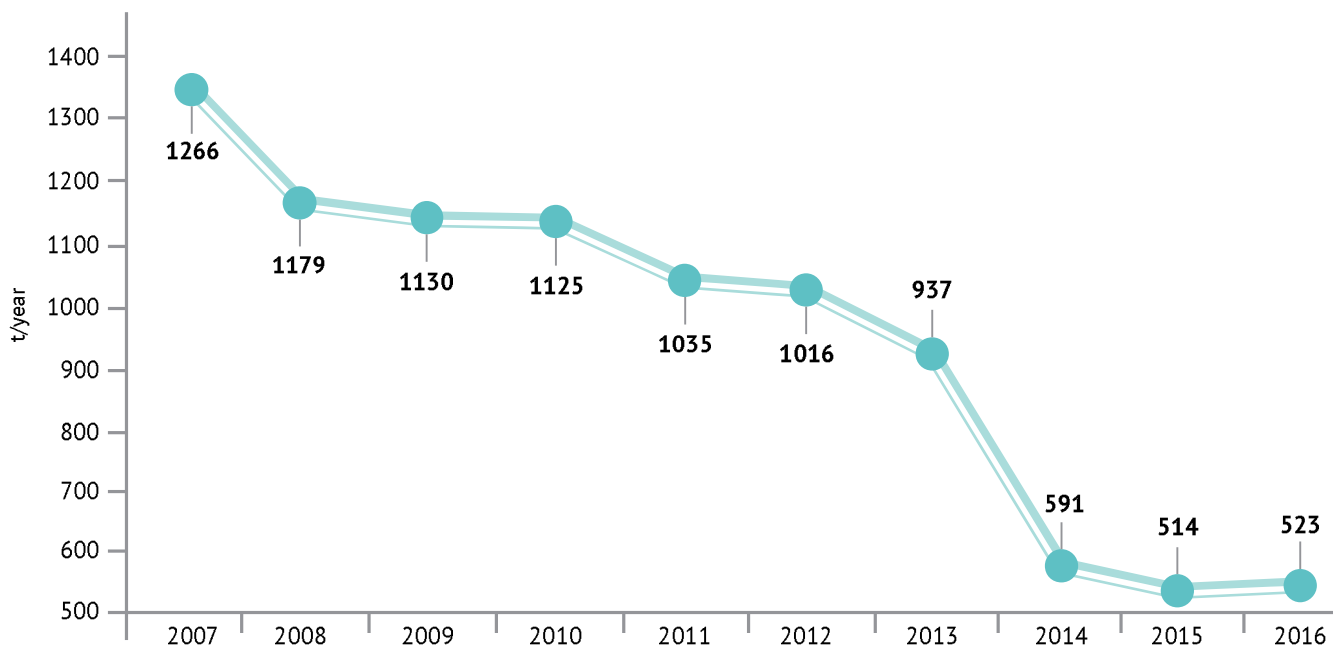
## G4-EN21 6.4. Emissions of Chemical Pollutants

The authorized emissions of chemical pollutants amount to 1745 tons a year. In 2016 the actual emission volume made 523 tons, i.e. amounted to ~ 30 % of maximum permissible level. It should be noted that the greater part 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 Novouralsk houses and social facilities.

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 sources 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.

*Air Emissions*



## *SC UEIP basic chemical pollutant emissions over the last decade*

| Pollutant  | Unit | Year     |          |          |         |         |         |         |
|--|------|----------|----------|----------|---------|---------|---------|---------|
|  |      | 2010     | 2011     | 2012     | 2013    | 2014    | 2015    | 2016    |
| Total  | ton  | 1125.226 | 1034.926 | 1015.793 | 937.187 | 591.035 | 513.624 | 523.008 |
| Including stationary sources of emissions        | ton  | 1049.874 | 1000.330 | 975,694  | 879.550 | 525.671 | 478.820 | 491.091 |
| Including non-stationary sources of emissions:   | ton  | 75.352   | 34.596   | 40.099   | 57.637  | 65.364  | 34.804  | 11.917  |
| Solid  | ton  | 16.628   | 15.262   | 2.297    | 1.124   | 1.074   | 0.857   | 0.898   |
| Gas and liquid pollutants, among them:           | ton  | 1108.598 | 1019.664 | 1013.496 | 936.063 | 589.961 | 512.767 | 522.110 |
| Sulfur dioxide                                   | ton  | 6.073    | 3.939    | 3.850    | 3.474   | 4.960   | 3.706   | 3.808   |
| Carbonic oxide                                   | ton  | 42.006   | 45.203   | 39.842   | 49.945  | 61.142  | 29.189  | 37.078  |
| Nitrogen oxides (in-equivalent NO <sub>2</sub> ) | ton  | 785.381  | 739.588  | 875.197  | 834.010 | 475.171 | 431.377 | 432.700 |
| Hydrocarbons ∅ (without VOC)                     | ton  | 24.507   | 1.021    | 0.720    | 0.420   | 0.420   | 0.420   | 0.420   |
| Volatile organic compounds (VOC)                 | ton  | 82.209   | 79.100   | 65.856   | 40.243  | 40.243  | 40.208  | 40.205  |
| Other gas and liquid pollutants                  | ton  | 168.422  | 150.813  | 28.031   | 7.971   | 8.025   | 7.867   | 7.899   |
| Persistent organic pollutants                    | ton  | 0        | 0        | 0        | 0       | 0       | 0       | 0       |

## 6.5. Greenhouse Gas Reduction Initiatives and Achieved Reduction

G4-EN15

The Company implements the Program for “SC UEIP Energy saving and energy efficiency enhancement 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.

G4-EN16

### *Direct & Indirect Greenhouse Gas Emissions*

| Material (substance)                                     | Measuring unit | Greenhouse Gas Emission |        |        |        |        |         |
|--|----------------|-------------------------|--------|--------|--------|--------|---------|
|  |                | 2011                    | 2012   | 2013   | 2014   | 2015   | 2016    |
| <i>Direct Greenhouse Gas Emissions</i>                   |                |                         |        |        |        |        |         |
| For all types of emissions in CO <sub>2</sub> equivalent | ton            | 440140                  | 417467 | 388065 | 385342 | 356986 | 356916  |
| <i>Indirect Greenhouse Gas Emissions</i>                 |                |                         |        |        |        |        |         |
| For all types of emissions in CO <sub>2</sub> equivalent | ton            | 868184                  | 847856 | 803195 | 792706 | 734215 | 723 213 |

## *Rate of Greenhouse Gas Emissions*

| Material (substance)  | Measuring unit     | Greenhouse Gas Emission |         |         |         |         |         |
|---|--------------------|-------------------------|---------|---------|---------|---------|---------|
|   |                    | 2011                    | 2012    | 2013    | 2014    | 2015    | 2016    |
| Total direct and indirect greenhouse gas emissions                    | tons               | 1308324                 | 1265323 | 1191260 | 1178047 | 1091201 | 1080129 |
| Volume of annual revenues from products (services) sales              | mln. rubles        | 19 550                  | 19 840  | 19 400  | 20 543  | 20 523  | 22 908  |
| Rate of greenhouse gas emissions / annual revenues from product sales | tons / mln. rubles | 67                      | 64      | 61      | 57      | 53      | 47      |

## 6.6. Radionuclide Emissions

Table 8 shows the results of radionuclide emission control. According to the Chart, SC UEIP radionuclide emissions 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.



***Allowable emission for 2016 makes 0.3 Gbq/year***

### *Results of Radionuclide Emission Monitoring*

| Nuclide   | Atmospheric emission |       |       |       |       |       |
|---|----------------------|-------|-------|-------|-------|-------|
|   | 2011                 | 2012  | 2013  | 2014  | 2015  | 2016  |
| Total atmospheric emission of long-lived alpha-active radionuclides, Gbq/year | 0,184                | 0,123 | 0,140 | 0,103 | 0,098 | 0,093 |
| Allowable emission, Gbq/year  | 7,4                  | 7,4   | 2,0   | 0,92  | 0,55  | 0,3   |

## 6.7. Production and Consumption Waste Management

G4-EN23

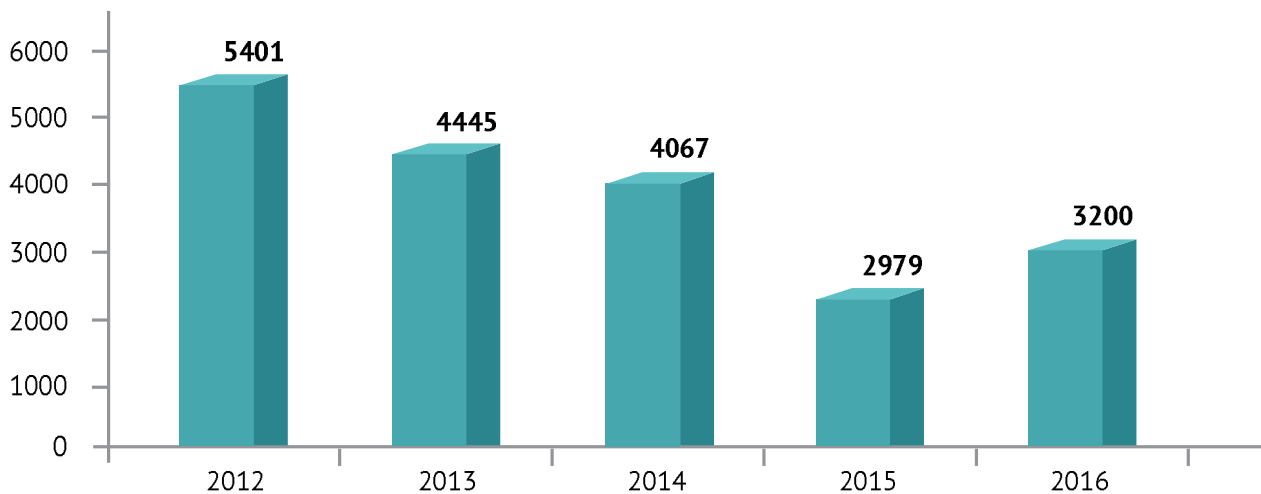
The Company obtained all waste management permits for production and consumption waste management. The established waste generation limits were not exceeded. The most part of waste volume is transferred for further reprocessing to the authorized companies. Annually SC UEIP performs

organizational and technical activities focused on reduction of waste volume generation. For the last 2 years the quantity of waste was reduced for more than one thousand tons due to the conclusion of a contract for waste accumulation place maintenance with a contracting organisation.

### *Dynamics of production and consumption waste generation, t/year*

| Year                                     | 2012         | 2013        | 2014        | 2015        | 2016        |
|--|--------------|-------------|-------------|-------------|-------------|
| <b>Total waste generation</b>            | <b>5401</b>  | <b>4445</b> | <b>4067</b> | <b>2979</b> | <b>3200</b> |
| 1 <sup>st</sup> class                    | 7            | 5           | 29          | 8           | 30          |
| 2d class                                 | 0            | 1           | 0           | 0           | 0           |
| 3d class                                 | 150          | 320         | 114         | 19          | 73          |
| 4 <sup>th</sup> class                    | 1428         | 1510        | 1241        | 578         | 453         |
| 5 <sup>th</sup> class                    | 3816         | 2609        | 2683        | 2374        | 2644        |
| <i>Quantity of used u disposed waste</i> | <i>9537</i>  | <i>119</i>  | <i>46</i>   | <i>0</i>    | <i>0</i>    |
| <i>Waste generation limit</i>            | <i>25930</i> |             | <i>4500</i> |             |             |

### *Production and Consumption Waste Generation, t/year*



*Increase in production and consumption waste generation relates to the equipment replacement need.*

# Novouralsk Urban District Guide. Nature

## Bunarka River

Bunarka River flows across the city. Along the river banks there are Parkway of War Glory with Eternal Flame Monument (1975), Parkway of Labor Glory (1974), Parkway of the Youth (1978) with the monument to the soldiers who were killed during Afghanistan and Chechnya wars (2004), Parkway devoted to liquidators of Chernobyl nuclear disaster (2006), honorary monuments devoted to the 40th (1985) and 60th (2005) anniversary of the Victory in the II World war.

The river starts from the Main Dividing Ridge. This is the name of the Ural Mountains peak chain that divides rivers of Asian and European flows. The length of the river is approximately 10 kilometers. The first 5 kilometers it flows across a deep valley north-easterly. Then it turns eastward at the crossing with Avtozavodskaya street and flows along Yubileynaya street about 1 km and then joins the main inflow - small Olkhovka river.

In 1992 during the flood there was a great jam around the bridge at the Obyezdnaya highway and the water rushed through courtyards of Oktyabrskaya and Sovetskaya streets, flowed to Avtozavodskaya and Komsomolskaya streets and then to the Stele «Founders of the City».

In a place of Olkhovka River influx Bunarka River turns left at right angle that usually does not occur in the nature. In this connection it is possible to assume that the river flows along Yubileynaya street on an artificial channel. The given assumption is conformed by the documents. The place of Bunarka and Olkhovka Rivers' confluence is at 1 verst (about 1.5 km) from the crossing with the railway at the map of Verkh-Neyvinskaya sessional summer residences (1918) and other maps of that period. That namely corresponds to the place where the Stele «Founders of the City» is located. But already on maps of 1928 the river was shown in the channel where it flows now. It means that the channel

was made in 1920th. And it was necessary right here. Gold ore had been mined at the Olkhovka River for the hundred years by that time. Gold was found, but it was difficult to mine it and, first of all, because of insufficiency of water. Numerous dams up the Olkhovka River could not solve this problem. Thus, the Bunarka River brought through the new channel increased a quantity of water at least twice in Olkhovsky gold mine.

There are no obvious inflows except Olkhovka at the territory of the city; they were hidden in storm drainage pipes or just disappeared because of water bearing layer destruction as a result of city construction. There is a channel only near Oktyabrskaya street, 5. It is an artificial inflow. A small river flows across a valley that approaches the city west. It becomes full-flowing only in the spring and after rains, therefore it was earlier called Vesnjanka ('Spring River'). The natural slope of relief made the river flow to the Old Trade Centre. In the late forties of the 20th century a construction was started here and water was offtaken to Bunarka by means of a channel in order to prevent from flood. The channel was hidden under the ground in the course of Sovetskaya and Oktyabrskaya streets construction. The channel comes out from the forest neat Sovetskaya street, 18 and then goes under the ground. It runs into Verkh-Neyvinsky Pond outside the city.

Feeding of the river is mixed, mostly by snow. Flood flow is observed in May, the river is iced in December and melted in April. The riverbed is rocky. The river bank along Pervomayskaya street «is dressed» in concrete and stone and decorated with cast iron fence. The bottom is laid by concrete plates, artificial ledges are created.

Wild ducks spend winter at the confluence of Bunarka and Olkhovka rivers.

Bunarka inflows as well as the headwaters are dried up almost completely in hot time.



There is a hydrological facility on Bunarka river a sluice of drainage-way near the Stele «Founders of the City». It was constructed in the course of aircraft manufacturing plant building (1941-1944) and was intended for floodwater withdrawal from the factory sites located below. Water of Bunarka can be offtaken to the Rudyansky pond by the channel. Parts of Mironovka and Talaya riverbeds were used

in the course of channel construction.

The name of Bunarka river definitely relates to the name of Bunar mountain - the highest mountain (612 meters above the sea level) here. Professor A.K. Matveev associates the name with the Mansi word «nar» that means «mountain». The meaning of the first part of the word is still uncertain.



*Before the beginning of the 20th century the Bunar mountain, two rivers flowing nearby and falling into Tagil river and Rudyansky pond, Bunarka and some mines were named Bynar, Bynarki or Bynarskiye mines on the maps and in documents. Probably a mistake was made (letter 'y' was replaced by 'u') when the 'official' maps were constructed by topographers at the beginning of the 20th century and then people got used to new name.*



## 6.8. Radioactive Waste Management

In the course of SC UEIP nuclear facility operation leads to generation of Solid Radioactive Waste (SRW) at different stages of production process. In accordance with the results of monitoring, SRW are classified as low-active and medium-active waste in compliance with OSPORB-99/2010 regulations. The most part of SRW collected at the Company facilities is subject to reprocessing and compacting. After reprocessing SRW packages shall be transferred to SC UEIP SRW storage facility, which is safe and isolated from the environment.

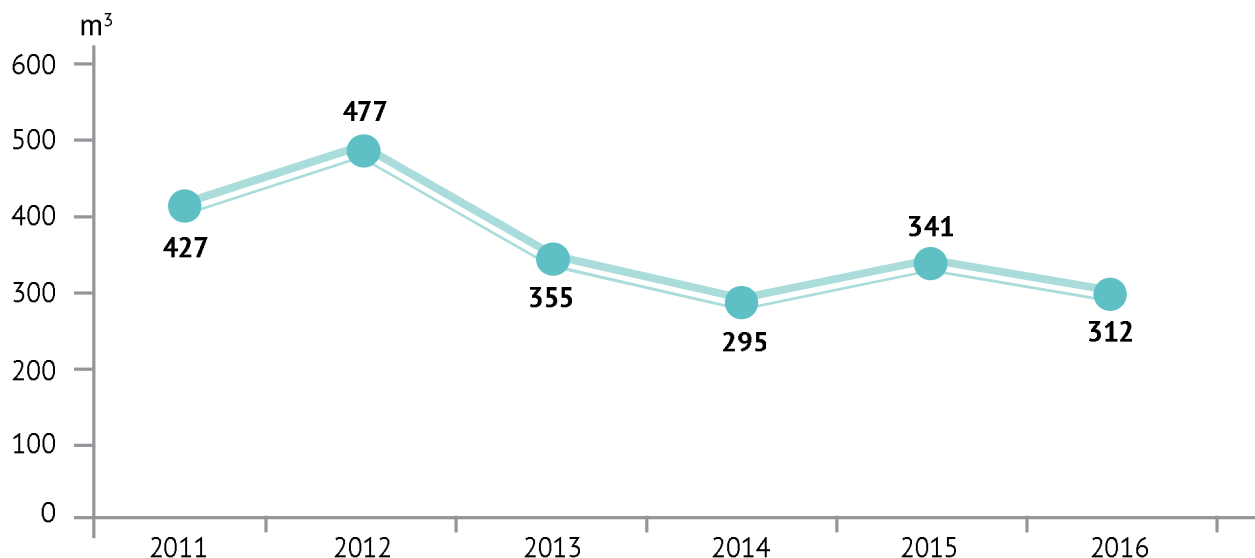
Decontaminating uranium-bearing solutions shall be reprocessed by means of special technology. Improvement of uranium-bearing solution

reprocessing technology in 2005 made it possible to reduce the content and activity of radioactive substances in such solutions to the levels which allow to classify them as nonradioactive discharged water.

The main SC UEIP principles and criteria for SRW management shall cover the personnel, population and environment radiation safety meeting the radiation safety regulations and radiation protection requirements.

In 2016 for the first time in Russia SC UEIP transferred a batch of low-active waste for disposal to Federal State Unitary Enterprise "National Operator for Radioactive Waste Management". In 2016 SC UEIP terminated generation of the 3d class radioactive waste.

### *Solid Radioactive Waste Generation*



G4-EN3

## 6.9. Energy Use

SC UEIP is committed to introduction of energy-saving technologies and cost saving. The Program on "SC UEIP Energy saving and increase of energy effectiveness in 2011-2020" was developed, approved and launched as per investigation 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 & Energy Loss Reduction*

The energy saving plans were successfully fulfilled in all SC UEIP subdivisions. Energy saving plans for 2016 were developed and approved. The cost saving target values are included into the integrated optimization plan developed by the

Company subdivisions. The plan performance is reviewed during summing 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 changeover of process shop ventilation systems to the thermal energy generated from process operations;
- ▶ optimize the vent modes;
- ▶ bring the site and process facility lighting system in balance with the personnel work schedule.



***SC UEIP initiatives and activities in the field of energy saving shall be conducted in accordance with Rosatom State Corporation long-term provisions. It should be noted that the reduction of power consumption is fulfilled under the stable use of production capacities due to systematic integrated optimization.***



### ***Energy Consumption***

|  | <b>2010</b>    | <b>2011</b>    | <b>2012</b>    | <b>2013</b>    | <b>2014</b>    | <b>2015</b>    | <b>2016</b>    |
|--|----------------|----------------|----------------|----------------|----------------|----------------|----------------|
| SC UEIP power consumption, thousand kW/h | 1225585        | 1190212        | 1156060        | 1095121        | 1068888        | 1006733        | 976161         |
| SC UEIP thermal energy consumption, Gcal | 999678         | 790081         | 712260         | 695726         | 667107         | 591284         | 604521         |
| <b>Total energy consumption, GJ</b>      | <b>8600757</b> | <b>7595203</b> | <b>7146185</b> | <b>6857528</b> | <b>6643175</b> | <b>6101719</b> | <b>6045161</b> |

## **6.10. Share of SC UEIP Emissions, Discharges & Waste in Sverdlovsk Region**

SC UEIP share in total volume of chemical pollutants (ChP), radionuclide emissions and discharges both in Sverdlovsk region and across

Rosatom State Corporation enterprises makes less than 1 percent.

### ***Comparison of total volume indicators across the territory***

| <b>Indicator</b>   | <b>Territory Total Volume</b> | <b>SC UEIP Total Volume</b> | <b>SC UEIP Share</b> |
|--|-------------------------------|-----------------------------|----------------------|
| ChP emissions, thousand tons                                       | 984*                          | 0,5                         | < 0,1 %              |
| Discharges (volume of discharged waters), million m <sup>3</sup>   | 894*                          | 5,3                         | < 1 %                |
| Production and Consumption Waste, million tons                     | 179*                          | 0,003                       | < 0,01 %             |
| α - emitting nuclide emissions, GBq                                | 476 000 **                    | 0,093 **                    | < 0,0001 %           |
| Discharge of radionuclide containing water, million m <sup>3</sup> | 2,3*10 <sup>10</sup> **       | 0                           | 0                    |

\* - Total volume in Sverdlovsk region in 2015.

\*\* - Total volume across JSC TVEL companies in 2015. The given values of radionuclide emissions and discharges do not exceed the RF permissible limits.

# Novouralsk Urban District Guide. Nature

## Hangin Stone Mountain

The mountain is situated within the territory of Novouralsk city. The height is 545 meters above the sea level, area – 537 ha.

A mountain peak or a single mountain noted for its height is usually named stone in the Ural. There are Denezhkin Stone and Konzhakovsky Stone in the Middle Ural, Starik Stone – in the North Ural. In times past Russian people called the Ural Mountains Stone Belt or Stone. Riverside cliffs and tower rocks are also often called Stone.

There is derelict Alexandrovsky mine where chrome ore was mined south-westerly of Hanging Stone Mountain.

Hanging Stone Mountain – geomorphological and botanical monument of regional importance. This is the highest mountain peak in Novouralsk Urban District. The city is clearly seen from its top. There is a mountain ski-track at the east mountain slope. The mountain is a place for tourism and rest.



## Border between Europe and Asia

In the second half of the 16th century the Russians marked the boundary between Europe and Asia along the 'Stone' – the name of the Ural Mountains at that time.

The earliest written source that mentioned the border between Europe and Asia is the so-called Yesipovskaya Chronicle of 1636. A clerk from the city of Tobolsk Savva Yesipov wrote:

"There is the high Mountain between the Russian State and the Siberian lands ... Different trees grow there ... many animals and birds live on this mountain ... many rivers flow from the mountain, some of them flow down to the Russian Kingdom, others to the Siberian lands ..."

Since the beginning of the 18th century the border between Europe and Asia was well defined along the Ural Mountains and is kept up till now. It was initiated by conspicuous statesman, famous chronographer and the first Urals explorer Vasily Tatishchev. He was the first among Russian people who began to use the name 'Ural Mountains' or just 'the Urals'.

On the basis of personal observations and some written sources V. Tatishchev came to the conclusion that the Ural Mountains hold a boundary position. This thought is expressed in details in the paper

"General geographical description of the whole Siberia" published for the first time only in 1950.

However in the light of modern representations the Ural border of two parts of the world along the divide line can be considered as only conditional boundary, since a geological structure and a relief of the Ural mountains are rather rugged. The divide line of the Ural mountains is very indistinct and passes now to the west foothills, then to the east foothills.

Nevertheless the border stated by V. Tatishchev, at all convention, keeps historical importance, and it is known all over the world till now.

Numerous signposts with an inscription "Europe - Asia" that were installed in the Urals in the 20<sup>th</sup> century invariably attract tourists and visitors of Ural Mountains with the romanticism.

The divide line is rather complicated in our places. It goes from longitudinal range of mountains to Bunarsky range of mountains at the latitude of Novouralsk Urban District and then it goes to the east foothills at the latitude of the city of Pervouralsk.

Four signposts that mark Europe-Asia border were erected near Novouralsk at different times.



**G4-EN28 6.11. Share of sold product and packing materials returned to producer for reprocessing**

**G4-EN32** SC UEIP product manufacturing process provides for 100% return of packaging equipment (cylinders) to product manufacturer. Safety of purchased products and services is ensured in UEIP by:

- product incoming inspection and acceptance;
- specifying requirements to the suppliers.

When evaluating and choosing suppliers the following factors are taken into account:

- requirements to the supplied product and availability of regulatory documents specifying these requirements
- availability of documents that confirm compliance of products to environmental and environmental safety requirements (certification

**G4-EN34**

of product conformity and origin, safety and health certificates)

- availability of documentation proving the product quality.

Liabilities of contractors in the sphere of operations management (activity types) when rendering services, supplying products are specified in the contracts.

In order to update the integrated management system the Company implements "Environmental and environmental safety requirements related to operations, rendering service and product supply by contractors".

As for environmental impact there are no claims received from the contractors.

**G4-EC2 6.12. Financial Aspects and Other Risks and Possibilities for the Company Activity with Reference to Climate Change**

Meteorological observations (since 1960s) prove that temperature and wind regimes, amount of precipitations are practically constant at the territory of UEIP activity and stay at the level of average annual rate. Climatic and weather conditions are steady.

The Company develops plans of activities on emergency situation prevention (flood protection, fire protection) to mitigate the risks of possible climatic accident damage every year. Taking into

account the Company geographic location, available statistical observations and developed activities on possible climatic accident compensation, these risks are extremely low.

Due to the slowness of climatic changes, the Company management has not performed special quantitative assessment of financial consequences in connection with climatic changes in medium and long-term perspective.



# Implementation of Environmental Policy

7.



Environmental safety is the nuclear industry priority and the mandatory requirement for nuclear technology development and nuclear facilities operation. Moreover, despite of nuclear industry sustainable development, technology and security upgrade, the strength of nuclear industry position is closely connected to its ecological and social acceptability. It greatly depends on conditions for radioactive waste volume reduction, development of safe waste disposal technology, development of decommissioning technology and the proper solution of “nuclear heritage” problem.

SC UEIP scope of activity is of great strategic importance for Novouralsk Urban District development since it greatly contributes to its innovation progress. In this connection SC UEIP management understands the need for providing balance between strategic objectives for corporate business development and environmental safety, which is the basis for life and health of present and future generations. One of the Company key

tasks remaining vital 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 in environmental and production power efficiency is the mainstream of the Company strategy, a key element of environmental management system and environmental policy. SC UEIP advanced multilevel environmental management system involves 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 2016 the Company developed and introduced several basic documents comprising all planned activities related to industrial and environmental safety:***

1. Long-Term Plan for SC UEIP Environmental Policy Implementation up to and including 2018.
2. Annual SC UEIP Environmental Program.
3. Annual schedule for monitoring of environmental objects, emissions and pollutant discharges.

***All activities of «Plan...», «Program...» u «Schedule...» planned for 2016 were fully implemented in due time.***

## **G4-EN27 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 protection 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 personnel and environment protection procedures. For this purpose SC UEIP performs a complex of special activities to prevent

emergencies that can cause the process 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.). Radiation accident management and control are also provided.

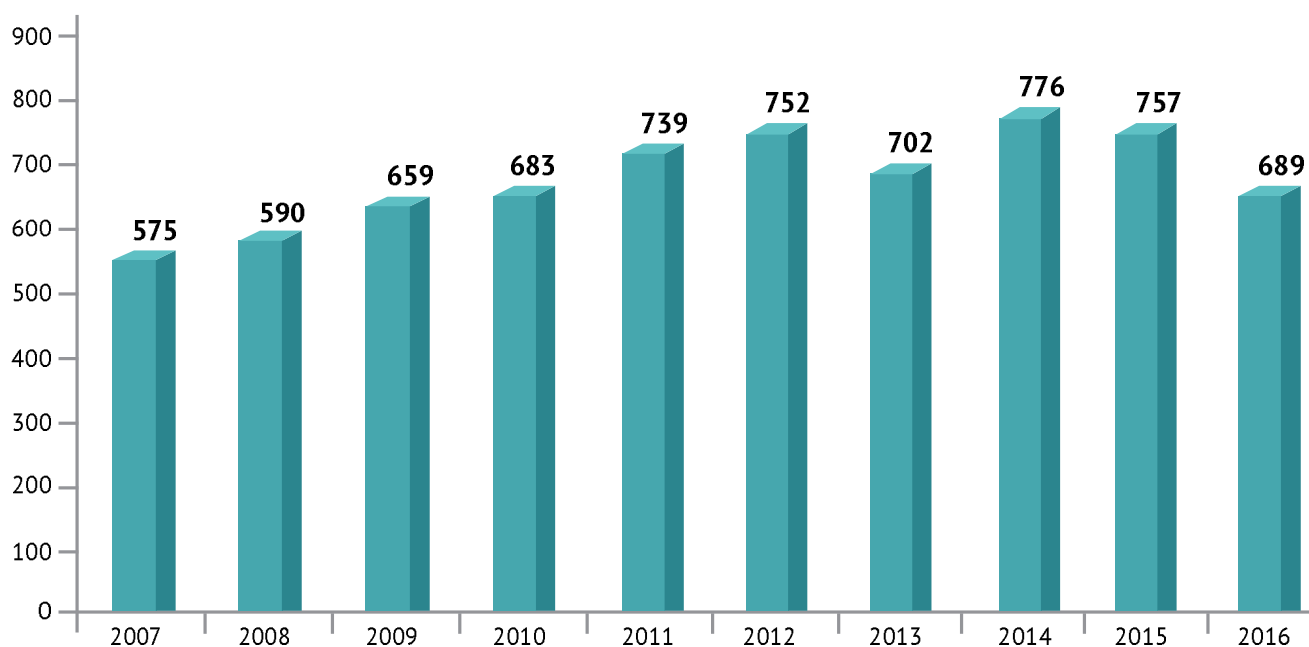
NF safety achieved by SC UEIP and other activities in the sphere of nuclear energy use is ensured primarily by technical measures and decisions taken during design of equipment, systems, NF components, and also by development of procedures on nuclear material, radioactive substance and radioactive waste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

**G4-EN31 *Implementation of measures on mitigation of adverse environmental impact is one of the mainstreams of the Company Environmental Policy.***

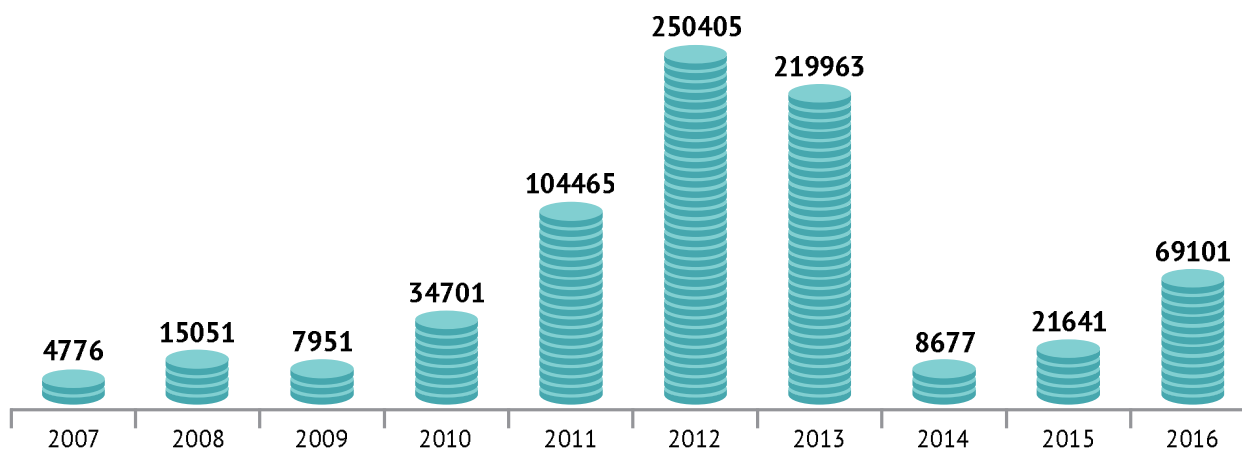
### ***Current environmental costs in 2016, thousand rubles***

| Type of environmental activity             | Annual current (operating) costs | Of which at the Company's expense |
|--|----------------------------------|-----------------------------------|
| <b>Total</b>                               | <b>689 454,1</b>                 | <b>689 454,1</b>                  |
| Including:                                 |                                  |                                   |
| Atmospheric air protection                 | 123 045,6                        | 123 045,6                         |
| Collection and purification of waste water | 303 965,8                        | 303 965,8                         |
| Waste management                           | 8 614,4                          | 8 614,4                           |
| Environmental radiological safety          | 251 913,3                        | 251 913,3                         |
| Other types of environmental activities    | 1 915,0                          | 1 915,0                           |

### *Current Environmental Costs, mln. rubles*



### *Environmental Permanent Investment Data, thousand rubles*



### *Environmental permanent investment in 2016:*

- Shop 19, building 302. Department for defect cylinder repair – **14 822,29 thousand rubles.**
- Shop 19, building 302. Re-equipment of department for nonferrous metal refining – **43 563,47 thousand rubles.**
- Re-equipment of chlorination plant – **80,92 thousand rubles.**
- Upgrading of atmospheric air control stations – **4 648,36 thousand rubles.**
- Upgrading of ASRC system – **5 986,33 thousand rubles.**

**! In 2016 no monetary fines and nonmonetary sanctions related to violation of environmental laws, were imposed on the Company.**

G4-EN29

### **Structure of Pollution Charges, thousand rubles**

| Year               | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 |
|--------------------|------|------|------|------|------|------|------|------|------|------|
| Pollution charges  | 276  | 327  | 337  | 387  | 339  | 315  | 292  | 192  | 182  | 96   |
| Incl. water bodies | 56   | 75   | 131  | 96   | 103  | 105  | 84   | 64   | 60   | 43   |
| Ambient air        | 138  | 130  | 148  | 285  | 233  | 210  | 208  | 128  | 122  | 53   |
| Waste disposal     | 82   | 122  | 58   | 6    | 3    | 0*   | 0*   | 0*   | 0*   | 0*   |

*\* 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 zero coefficient in case of waste disposal in compliance with statutory requirements (RF Governmental Regulation No 344, Federal Law No 309-FZ).*



#### **Key events and achievements in 2016:**

- The specified standards for emission and discharges of pollutants and radioactive substances were met by the Company departments
- There were no violations of regulations in the field of environmental safety
- SC UEIP was the first company in Rosatom State Corporation that registered at the national level all operated facilities that have environmental impact in compliance with the provisions of the Federal Law No 7-FZ on Environmental Protection
  - SC UEIP was first in Russia to transfer a batch of low-active waste for disposal to Federal State Unitary Enterprise “National Operator for Radioactive Waste Management”
- SC UEIP terminated generation of the 3d class radioactive waste
- SC UEIP automatic weather station was put into operation in the framework of the project “Reduction in expenditure for providing enrichment production with meteorological information”
- Upgrading of Automated System of Radiation Control (ASRC) was performed.



# Environmental Education

8.



## 8.1. Cooperation with Public Authorities

The proper level of nuclear, radiation, industrial, ecological and labor safety at SC UEIP was confirmed in the course of repeated inspections conducted by the following executive 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.

SC UEIP management works closely with Novouralsk Urban District administration. SC UEIP employees together with the public organization constantly organize activities on settlement gardening, garbage collection, as well as different charitable activities.

## 8.2. Information of the Public

SC UEIP is committed to environmental education. One of the Company environmental policy mainstems is to ensure transparency and public availability of information regarding UEIP environmental protection and safety activities. More than 90 news materials were published in corporative, local, regional and branch mass media in 2015. The information covered the issues on the Company environmental activities and environmental conditions within the territory of presence. According to the “transparency” policy pursued by SC UEIP, 11 ecological press-tours to the site were conducted. The tour participants received a unique opportunity to visit the Company process facilities, 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 - 2016 were presented to concerned regional public communities. The Report shall be submitted to 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 shall be available at SC UEIP official web-site.

### 8.3. Cooperation with Public Environmental Organizations, Scientific and Social Institutions

On **January 29**, 2016 the Agreement on cooperation between SC UEIP, URALPRIBOR LLC, UGCP LLC and Lyceum No. 58 was signed. This document launched the project “Designer School” – Rosatom Fuel Company TVEL educational project oriented to popularization of designer profession in the sphere of development and production of nuclear fuel and high-technology products on the basis of nuclear competences and capacities. Ural Electrochemical Integrated Plant is the first customer of “Designer School”. It gave the task to the lyceum to develop the robot controller able to perform the radiation survey.

On **February 26**, 2016 a traditional briefing related to the issues of environmental protection and the Company environmental safety was held in SC UEIP museum. SC UEIP Technical Director Ye.M. Lobov and the Head of Environmental Protection Department A.V. Nalivaiko told about 2015 results and the Company plans in the sphere of environmental protection to the journalists of corporate and city mass-media.

On **March, 3** the awarding ceremony of participants of the “Beauty of Urals” photo contest initiated by Environmental Protection Department UE IP Public Relation Department was held.

On **April 14** the Day of Trekhgorny City and Federal State Unitary Enterprise Instrument Making Plant in Novouralsk was held on the basis of scientific-educational center “Atomic Cities of Russia”. One of the key events became the talk show “The Earth, the atom, the future” that aimed to educate children and to form the system of knowledge on nuclear power industry, nuclear safety and environmental protection. The Head of Environmental Protection Department A.V. Nalivaiko took part in the talk show as guest expert.

On **April 14** the survey among the pupils of general education establishments was conducted in order to obtain information on Novouralsk people opinion concerning SC UEIP activity in the sphere of environmental protection and safety on the basis of scientific-educational center “Atomic Cities of Russia”.

***In the framework of All-Russian Act “Green Spring-2016” UEIP employees took part in:***

On **April 22** volunteer clean-up on the playground in Privokzalny district,

On **April 28** volunteer clean-up near UEIP stela.



The expert of Department 23 Ye.Ye. Yelina presented the report “SC UEIP and Lyceum No.58 joint innivation project “Robot Controller”” at Atomexpo-206 International Forum in Moscow. This project also won the 1st place among teen-age project development of physicsmathematics lyceum technological parks and atomclasses from TVEL Fuel Company presence cities.

On the eve of Ecologist Day, on **June, 3** the expert of Department 23 M.V. Noskov took part in Novouralsk Broadcasting Company teleshow “School of Success” devoted to the victory of Lyceum No.58 pupils in contest of teen-age project development of physics-mathematics lyceum technological parks and atomclasses from TVEL Fual Company presence cities. SC UEIP and Lyceum No.58 joint innovation project “Robot controller” was also discussed in the course of the show.

On the eve of Ecologist Day the experts of Environmental Protection Department and their children visited petting zoo where became acquainted with different animals and birds.

On **June, 06-08** the Head of Environmental Protection Department A.V. Nalivaiko took part in sectorial scientific workshop “Nuclear safety and environmental protection in nuclear industry” in Sevastopol city. The following report were presented:

- Development of “Radioactive Substances Allowable Emissions” Project by the Company efforts, by the example of SC UEIP
- Problems relating to legal requirements in the field of registration of the objects that impact environment adversely, by the example of SC UEIP.

On **June, 20-24** the 7th All-Ruassian workshop “Radioactive substances and waste accounting and control system and radioactive waste management” was held in Saint Petersburg. Head of Environmental Protection Department A.V. Nalivaiko and the Head of Nuclear Safety Department A.D. Taratorkin took part in the workshop and presenteed the report “Analysis of radioactive waste management in SC UEIP».

Environmental Safety Report 2015 was issued. English version of the Report was presented by SC UEIP in the course of IAEA representatives’ technical tour. The Russian version of the Report was presented in the international exhibition center “Yekaterinburg Expo” in the framework of Innoprom-2016 International Exhibition.

“SC UEIP and Lyceum No.58 joint innovation project “Robot Controller” was presented at Innoprom-2016.

In 2016 the survey among Novouralsk Urban District people and SC UEIP employees was conducted in order to obtain information SC UEIP activity in the sphere of environmental protection and safety.

SC UEIP experts were jurymen of the final game of the TVEL Fuel Company educational program for schoolshildren “The First Step in Atomic Project”.

## 8.4. Winners of Branch and International Competition

SC UEIP won the 3d place in the branch contest “Environmentally exemplary company of nuclear industry”.

SC UEIP project “Beauty of Urals” photo contest carrying-out” took part in the international project “Environmental Culture. Peace and Harmony” and become a winner in the category “Environmental Culrure of Social Initiatives” by the decision of international jury.





**URAL  
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INTEGRATED PLANT**

ASC «ROSATOM» COMPANY

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