



# ENVIRONMENTAL SAFETY REPORT

of JSC «PA ECP»  
for **2018**



## GENERAL DIRECTOR'S LETTER TO READERS

*Here you will find the Environmental Safety Report of Joint Stock Company «Production Association «Electrochemical Plant» for 2018.*

*Environmental responsibility is a key element of Rosatom's business strategy. The foundations of environmental safety in JSC «PA ECP» are strict compliance with principles of the corporate Environmental Policy and effective environmental protection management system. Environmental safety and responsible use of natural resources are essential components of our daily operations. High environmental safety standards are guaranteed by qualified labour, modern equipment and necessary funding.*

*The developed multi-level environmental management system of JSC «PA ECP» embraces the entire personnel of the enterprise and complies with today's criteria of management in this area.*

*Thanks to the combined approach to solve problems in rational use of natural resources and environment protection, JSC «PA ECP» can reach its environmental goals and minimize environmental risks.*

*We will continue implementing the principles of sustainable development, and put maximum effort to issues of safety and care about the environment.*

**S. V. Filimonov**  
**General Director**  
**Joint Stock Company «Production Association «Electrochemical Plant»**

# TABLE OF CONTENTS

GENERAL DIRECTOR'S LETTER TO READERS .....	2
1. GENERAL INFORMATION ABOUT JSC «PA ECP» .....	4
2. ENVIRONMENTAL POLICY OF JSC «PA ECP» .....	10
3. ENVIRONMENTAL, QUALITY AND OCCUPATIONAL HEALTH AND SAFETY MANAGEMENT SYSTEMS .....	12
4. MAIN DOCUMENTS REGULATING ENVIRONMENTAL PROTECTION FOR JSC «PA ECP»	14
5. INDUSTRIAL, ENVIRONMENTAL, AND RADIATION MONITORING OF THE ENVIRONMENT .....	18
6. ENVIRONMENTAL IMPACT .....	26
6.1. WATER INTAKE FROM WATER BODIES .....	26
6.2. DISCHARGES TO THE OPEN WATER SYSTEMS .....	27
6.2.1. HAZARDOUS CHEMICALS DISCHARGE .....	28
6.2.2. RADIONUCLIDE DISCHARGE .....	30
6.3. EMISSIONS .....	30
6.3.1. EMISSIONS OF HAZARDOUS CHEMICALS .....	30
6.3.2. RADIONUCLIDE EMISSIONS .....	33
6.4. WASTE .....	33
6.4.1. HANDLING OF INDUSTRIAL WASTE AND CONSUMPTION WASTE .....	33
6.4.2. HANDLING OF RADIOACTIVE WASTE .....	36
6.5. MEDICAL AND BIOLOGICAL CHARACTERISTIC OF THE LOCATION .....	36
6.6. THE SHARE OF JSC «PA ECP» IN EMISSIONS, DISCHARGES AND WASTE PRODUCED IN THE LOCALITY .....	39
6.7. CONDITION OF THE LOCATION OF JSC «PA ECP» .....	40
7. IMPLEMENTATION OF ENVIRONMENTAL POLICY .....	42
8. ENVIRONMENTAL ACTIVITY AND RAISING PUBLIC AWARENESS .....	44
8.1. INTERACTION WITH STATE AND LOCAL AUTHORITIES .....	44
8.2. INTERACTION WITH ENVIRONMENTAL ORGANIZATIONS, SCIENTIFIC AND SOCIAL INSTITUTES AND PUBLIC .....	46
8.3. PUBLIC AWARENESS .....	48
ADDRESS AND CONTACT INFORMATION .....	50

# 1

## GENERAL INFORMATION ABOUT JSC «PA ECP»

Joint Stock Company «Production Association «Electrochemical Plant» is situated within the Zelenogorsk Closed Area, approximately 150 km to the east of Krasnoyarsk. The company is located to the north-west of the Zelenogorsk town on the bank of Kan river 2.5 kilometers away from the residential area. The administration of Zelenogorsk Closed Area has duly assigned the plot for all industrial facilities of JSC «PA ECP».

Joint Stock Company «Production Association «Electrochemical Plant» is a uranium enrichment business incorporated into TVEL, a Rosatom's fuel company.

The production of highly enriched uranium began in **1962**.

The company has produced stable isotopes since **1972**.

Since **1988** the main ECP's product has been low enriched uranium ( $^{235}\text{U}$ ) used to fuel nuclear power plants (NPPs).

Gas centrifuges are used to enrich uranium. Gas centrifuge technology is recognized as the most effective industrial uranium enrichment method. The same technology makes it possible to produce stable and radioactive isotopes of various chemical elements on an industrial scale.



Uranium enrichment facilities include:

- gas centrifuge cascades in the Uranium Enrichment Division;
- feed and withdrawal stations in the Chemical Division
- production of recovered uranium hexafluoride by recycling corrosion deposits, process turnovers, left over solutions with uranium in the Recovery Division;
- repairs of the primary process equipment with the site for incineration of spent gas centrifuges in the Recovery Division;
- inspection and repairs of separation-related devices and instruments in the Recovery Division;
- control of all uranium production and processing cycle in the Central Plant Laboratory;
- Energy Division with liquid nitrogen and cooling water preparation facility;
- Division for Grids and Substations.

The plant has been present in the international uranium enrichment market since **1990**, there have been no claims for the product.

The company constantly upgrades its equipment and introduces new generations of high-tech centrifuges. The main production layout is highly dynamic and flexible, easily reacts to the requirements of the enriched uranium market and may be rebuilt without loss of performance indicators. The high quality of products is ensured by the most advanced process control systems and the most advanced microprocessor-based systems monitoring the operation of the main and auxiliary equipment, as well as the high qualification and technological discipline of personnel. The products meet the requirements of Technical Specifications (TU), ASTM specifications and contracts with customers.

In **2009**, JSC «PA ECP» was the first in Russia (and second in the world) to develop industrial reprocessing of depleted uranium hexafluoride (DUF<sub>6</sub>).



# 1

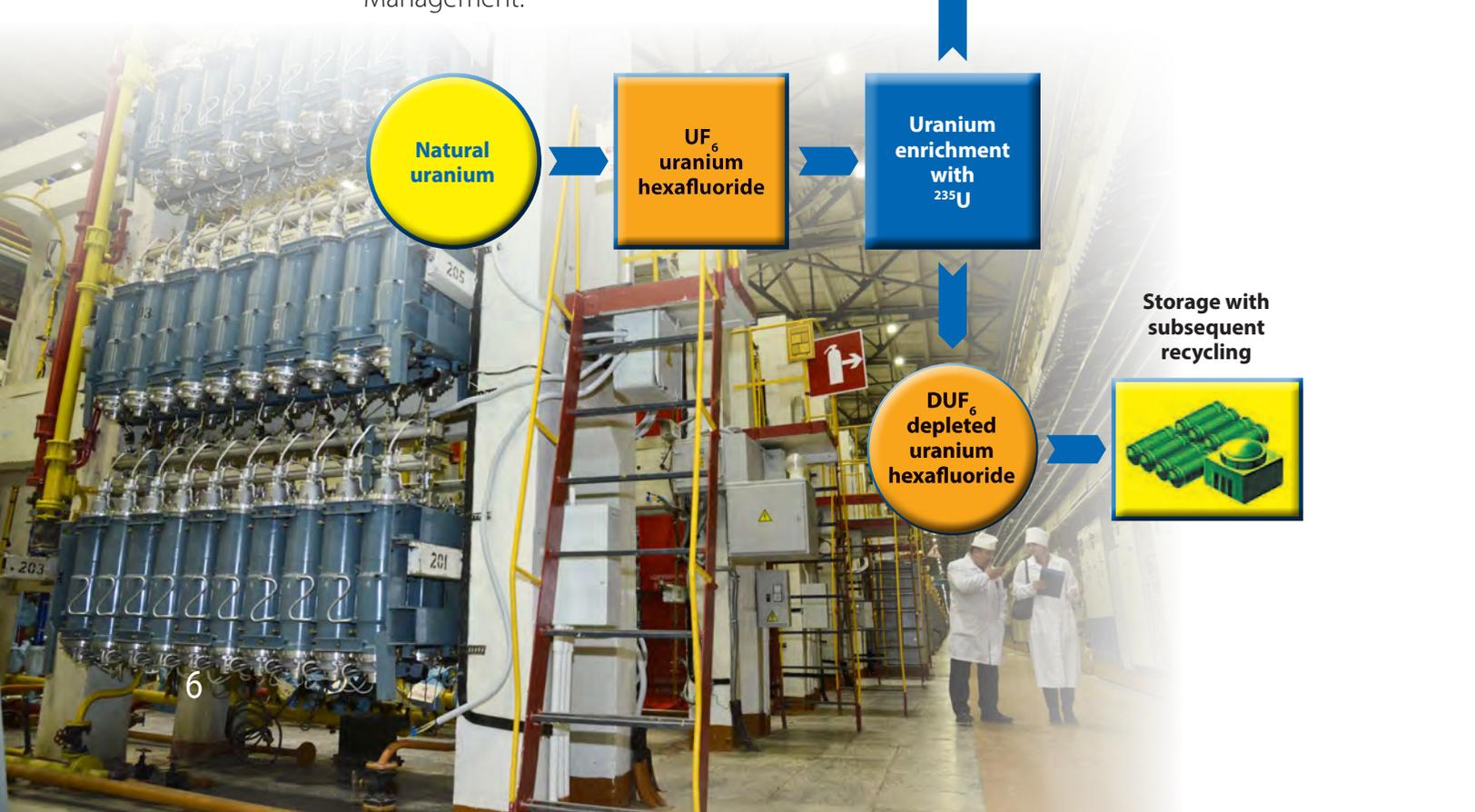
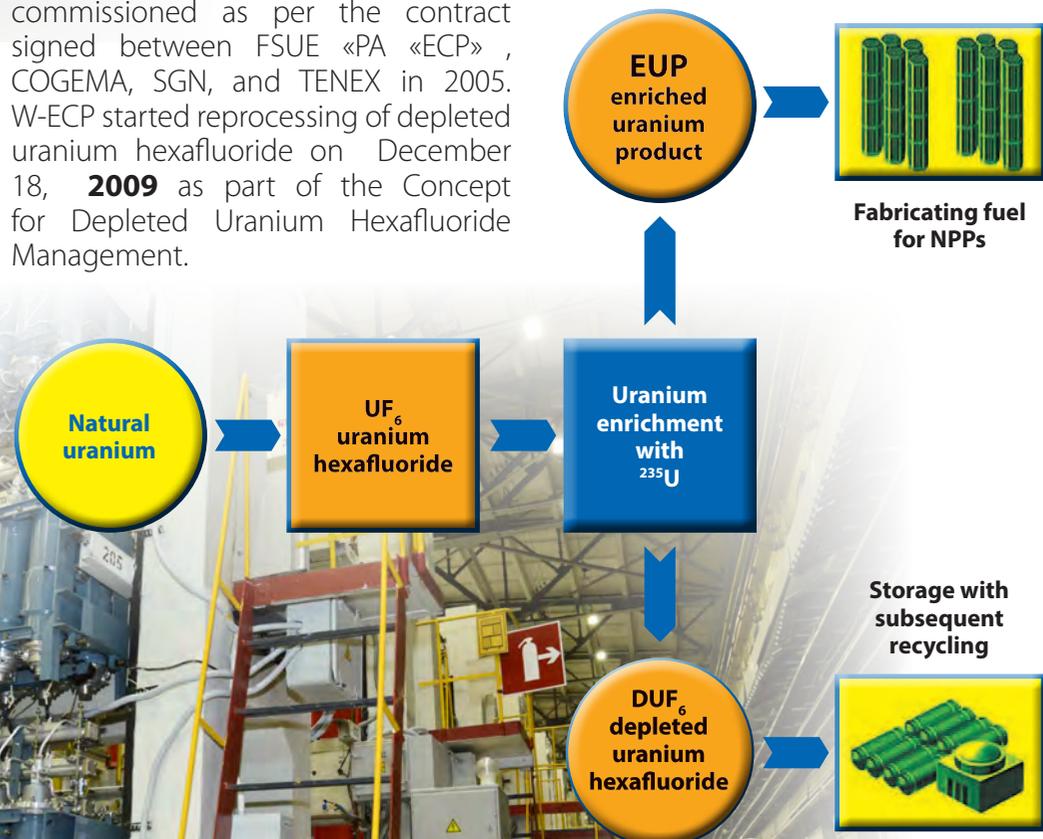
# GENERAL INFORMATION ABOUT JSC «PA ECP»

JSC «PA ECP» is the only company in Russian nuclear sector that has a functioning defluorination line for depleted uranium hexafluoride (DUF<sub>6</sub>), W-ECP plant with designed output of **10,000** tons of DUF<sub>6</sub> annually.

This W-ECP plant, which is unique for Russian nuclear sector, is designed to convert potentially hazardous uranium hexafluoride into a stable chemical form, uranium oxide (this substance is similar to natural state of uranium ores and suitable for safe long term storage), yielding commercial products: hydrofluoric acid and anhydrous hydrogen fluoride. The W-ECP plant makes it possible to reduce industrial areas occupied with containers holding an aggressive uranium compound.

W-ECP plant was built and commissioned as per the contract signed between FSUE «PA «ECP» , COGEMA, SGN, and TENEX in 2005. W-ECP started reprocessing of depleted uranium hexafluoride on December 18, **2009** as part of the Concept for Depleted Uranium Hexafluoride Management.

## PRODUCTION LAYOUT JSC «PA ECP»





In December **2010**, the first unit for rectification of 70% hydrofluoric acid began producing commercial products, anhydrous hydrogen fluoride and 40% hydrofluoric acid.

In **2011**, the W-ECP plant reached design capacity and has since been operated at design capacity. The production has been effective and without failures from the start.

Produced hydrofluoric acid and anhydrous hydrogen fluoride may be applied in various industries including nuclear industry. The production shop has a railroad tank filling unit used to ship the products to customers.

According to specialists, uranium hexafluoride defluorination makes it possible to recycle a significant amount of fluorine and form a closed fluoride cycle within the nuclear industry. This also reduces dependency of Rosatom's companies on external supplies of hydrofluoric acid.

In **2018**, the defluorination plant reprocessed **9,945** tons of  $\text{DUF}_6$ .



# 1

## GENERAL INFORMATION ABOUT JSC «PA ECP»

Beginning from **2011**, hydrofluoric acid has been delivered to the companies of TVEL and to companies of chemical, metallurgic, mining, oil and gas industries, and used in production of fluoroplastics and refrigerants.

We deliver to Perm, Sterlitamak, Verkhnyaa Salda, Pervouralsk, Chelyabinsk, Ufa, Volzhsky, Volgograd, Urengoy.

At the moment, JSC «PA ECP» is the largest manufacturer of stable isotopes by gas centrifuges and is in the top five of the world isotope manufacturers. The range of products encompasses **107** isotopes of **21** chemical elements. The annual output of isotopes reaches hundreds of kilograms.

JSC «PA ECP» now shares over **40 %** of the worldwide stable isotope market.

Our specialists have earned extensive experience and taken part in developing unique methods for production of stable isotopes by gas centrifuges, which were initially used to enrich uranium.





The applied method of isotope separation allows obtaining maximally enriched products of high chemical purity, gives a competitive price advantage, while the available production capacity allows meeting the demand.

Centrifugal cascades are flexible production systems capable of changing the range of products with minimum intervals between production runs of limited batches that satisfy specific requirements of individual customers. A modern reconfigurable cascade may take a few days to be switched to production of another isotope with its process gas having different physical and chemical properties. The concentration of the desired isotope may be increased both in the light and in the heavy fraction of the separated element's isotopic range.

The isotope products of JSC «PA ECP» are widely used in various fields, including nuclear power, medicine and electronics, general chemistry, physics, biotechnology, meteorology, agrochemistry and other fields of science.

The Siberian enterprise supplies its isotopes to a wide range of countries: Russia, USA, Canada, Brazil, Mexico, Germany, France, Spain, Netherlands, Belgium, Denmark, Italy, Norway, Sweden, Poland, Hungary, Finland, Korea, Taiwan, China, Japan, India, Jordan, Saudi Arabia, Australia, Uzbekistan and other countries.

The main types of environmental impact of the enterprise are emissions of radionuclides and harmful chemicals into the air, formation and storage of radioactive waste, generation of production and consumption waste, water intake from surface water bodies.



# 2

## ENVIRONMENTAL POLICY OF JSC «PA ECP»

**The environmental policy of JSC «PA ECP» follows the basic principles of Rosatom's environmental policy.**

The environmental policy of JSC «PA ECP» was last revised in 2018 and effected by the order No. № 13/1521-P dated 08.10.2018. The environmental policy of JSC «PA ECP» is harmonized with the environmental policy of JSC «TVEL».

The basic strategic goals of JSC «PA ECP» regarding environment are ensuring environmental safety needed for sustainable development of the enterprise and reducing the negative environmental impact of production process and products to the minimum acceptable level.

The environmental policy of JSC «PA ECP» serves as the basis to set goals and objectives in environmental safety and is implemented through the environmental management system.

Short-term environmental goals are set to realize the intentions and principles of the policy. The objectives take into account legal, regulatory and other requirements, significant environmental aspects, as well as financial, operational and stakeholder requirements.

The environmental policy is published on the official website of JSC «PA ECP», is available to all stakeholders, and is communicated to all personnel of the enterprise, as well as contractors



# ПОЛИТИКА В ОБЛАСТИ ЭКОЛОГИИ

## АО «ПО «Электрохимический завод»

Акционерное общество «Производственное объединение «Электрохимический завод» (далее – АО «ПО ЭХЗ») – предприятие Госкорпорации «Росатом» и дочернее общество АО «ТВЭЛ» - является одним из крупнейших производителей обогащенного урана, изотопной продукции, фтористоводородной кислоты и безводного фтористого водорода.

Руководство АО «ПО ЭХЗ» осознает, что осуществляемая деятельность предприятия, связанная с эксплуатацией объектов использования атомной энергии, обращением с ядерными материалами, радиоактивными веществами и радиоактивными отходами, не должна приводить к негативным изменениям в окружающей среде и отрицательно влиять на здоровье человека.

Главными стратегическими целями АО «ПО ЭХЗ» в области экологии являются обеспечение экологической безопасности, необходимой для устойчивого развития АО «ПО ЭХЗ», и сокращение негативного воздействия производства и поставляемой продукции на окружающую среду до минимально приемлемого уровня.

Деятельность АО «ПО ЭХЗ» основывается на принципах:

- признания экологической опасности планируемой и осуществляемой деятельности;
- обеспечения соответствия деятельности российскому природоохранному законодательству, нормативным и другим требованиям, принятым АО «ПО ЭХЗ»;
- применения на действующих и вводимых производствах технологических процессов, методов контроля и мониторинга состояния окружающей среды, обеспечивающих достижение и поддержание экологической безопасности на уровне, отвечающем современным требованиям;
- приоритета действий, направленных на предупреждение опасного воздействия на человека и окружающую среду; системного и комплексного подхода, основанного на современных концепциях анализа рисков и возможностей, к обеспечению экологической безопасности действующих производств, к проведению оценки влияния намечаемой деятельности на окружающую среду и здоровье человека при принятии решения о ее осуществлении;
- постоянной готовности к предотвращению и ликвидации последствий возможных техногенных аварий;
- ответственности руководства и персонала за нанесение ущерба окружающей среде и здоровью человека;
- открытости и доступности экологической информации, конструктивного взаимодействия с заинтересованными сторонами.

Основные направления политики АО «ПО ЭХЗ» в области экологии:

- обеспечение результативного функционирования и постоянного улучшения системы экологического менеджмента в соответствии с требованиями ISO 14001;
- внедрение технологий, оборудования, применение материалов, направленных на рациональное природопользование, снижение негативного воздействия на окружающую среду, сохранение здоровья персонала и населения;
- повышение энергоэффективности производства;
- развитие информационно-аналитических систем контроля состояния окружающей среды и управления экологической безопасностью;
- применение современных методов комплексного анализа рисков и возможностей для прогнозирования и управления экологической безопасностью действующих производств и для принятия решений об осуществлении планируемой деятельности;
- обеспечение постоянной готовности к предотвращению и ликвидации последствий возможных техногенных аварий, при использовании атомной энергии и иных чрезвычайных ситуаций;
- выделение ресурсов, включая кадры, финансы, технологии, оборудование и рабочее время, необходимые для обеспечения экологической безопасности и охраны окружающей среды;
- обеспечение постоянного совершенствования профессиональных навыков специалистов АО «ПО ЭХЗ» в сфере экологической безопасности и охраны окружающей среды;
- обеспечение безопасного обращения с радиоактивными отходами и отходами производства и потребления.

Руководители, специалисты и персонал АО «ПО ЭХЗ» принимают на себя обязательство обеспечить реализацию этой политики и поддерживать её в актуальном состоянии.

Генеральный директор  
АО «ПО «Электрохимический завод»

С.В. Филимонов

Ввод в действие: с 12 ноября 2018 г.



# 3

## ENVIRONMENTAL, QUALITY AND OCCUPATIONAL HEALTH AND SAFETY MANAGEMENT SYSTEMS

JSC «PA ECP» has developed, documented, implemented, maintained and continuously improved an integrated management system (IMS), including quality management system (QMS), environmental management system (EMS), occupational health and safety management system (OHSMS) and energy management system (EMS).

JSC «PA ECP» implemented TVEL's Integrated Management System (IMS) in 2012. In July 2018, JSC «PA ECP» successfully passed the certification audit of corporate integrated management system (IMS) of JSC «TVEL» for compliance with the new version of standard ISO 14001:2015.

Intercertifica-TUV LLC, a Russian representative of TUV Thuringen e.V. (Germany), issued in 2018 a new certificate of conformity (TIC 15 100 52672/5, TIC 15 104 10699/5, TIC 15 116 11266/5, TIC 15 275 14075/5) to ECP. This certificate is only valid with the primary certificate of JSC «TVEL» (TIC 15 100 52672, TIC 15 104 10699, TIC 15 116 11266, TIC 15 275 14075).

The Certificate of Conformity to ISO 9001:2015, ISO 14001:2015, BS OHSAS 18001:2007 и ISO 50001:2011 describes the scope of application. The scope of application was changed in 2018.



Internal and external audits, as well as top management review, are used to evaluate the performance of management systems.

During the reporting period, 21 internal audits of IMS were conducted. The audits confirmed that the company's operations comply with the requirements of international standards, Russian legislation and the requirements that JSC «PA ECP» has committed to the field of environmental safety.

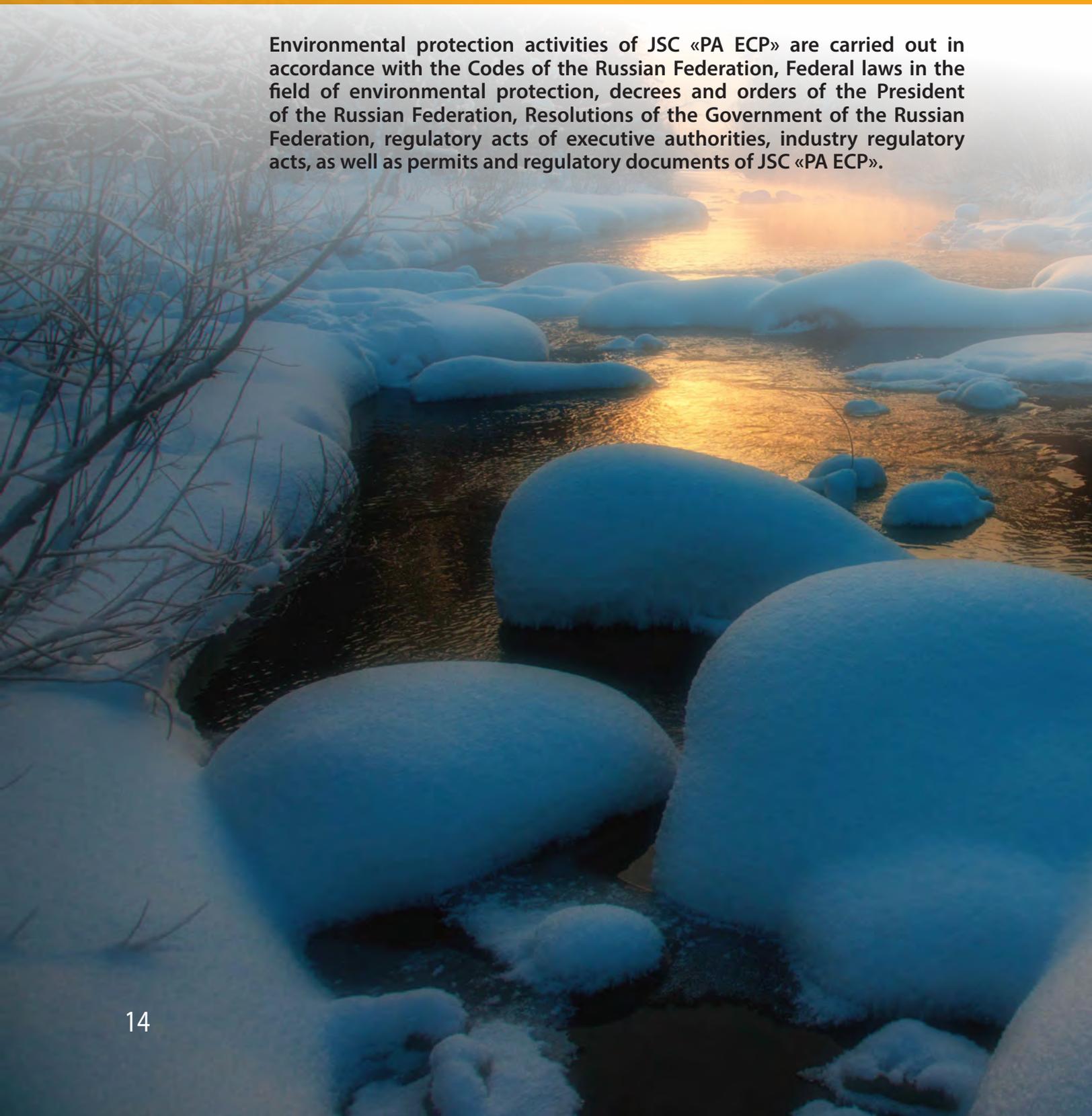
Based on the annual top management report for 2018, the quality management system, the environmental management system, the occupational health and safety management system and the energy management system of JSC «PA ECP» were found suitable, adequate and effective.



# 4

## MAIN DOCUMENTS REGULATING ENVIRONMENTAL PROTECTION FOR JSC «PA ECP»

Environmental protection activities of JSC «PA ECP» are carried out in accordance with the Codes of the Russian Federation, Federal laws in the field of environmental protection, decrees and orders of the President of the Russian Federation, Resolutions of the Government of the Russian Federation, regulatory acts of executive authorities, industry regulatory acts, as well as permits and regulatory documents of JSC «PA ECP».



**Table 1.**  
**List of documents regulating environmental protection for JSC «PA ECP»**

No.	Name
1	Federal Law of 21.11.1995 No. 170-FZ "On the Use of Atomic Energy"
2	Federal Law of 23.11.1995 № 174-FZ "On Environmental Expertise"
3	Federal Law No. 3-FZ of 09.01.1996 "On radiation safety of the population"
4	Federal Law No. 89-FZ of 24.06.1998 "On Production and Consumption Wastes"
5	Federal Law No. 52-FZ of 30 March 1999 on Sanitary and Epidemiological Welfare of the Population
6	Federal Law of 04.05.1999 № 96-FZ "On Protection of Atmospheric Air"
7	Federal Law No. 7-FZ dated 10.01.2002 "On Environmental Protection"
8	Federal Law of 11.07.2011 No. 190-FZ "On radioactive waste management and on amendments to certain legislative acts of the Russian Federation"
9	Law of the Russian Federation of 21.02.2002 № 2395-1 "On Subsoil"
10	"Urban Development Code of the Russian Federation" of 29.12.2004 № 190-FZ
11	"Land Code of the Russian Federation of 25.10.2001 № 136-FZ"
12	"Water Code of the Russian Federation of 03.06.2006 № 74-FZ"
13	Joint Venture 2.6.1.2216-07 "Sanitary protection zones and observation zones of radiation objects. Operating conditions and justification of borders".
14	JV 2.6.1.2523-09 "Radiation safety standards. (NRB-99/2009)"
15	Joint Venture 2.6.1.2612-10 "Basic Sanitary Rules for Radiation Safety (OSPOORB-99/10)"

## 4

# MAIN DOCUMENTS REGULATING ENVIRONMENTAL PROTECTION FOR JSC «PA ECP»

No.	Name
16	SanPiN 2.2.1/2.1.1200-03 "Sanitary Protection Zones and Sanitary Classification of Enterprises, Structures and Other Objects (new edition)
17	Certificate of state registration as an object having a negative impact on the environment dated 26.12.2016 No. JSC1ERA06
18	Draft Maximum Permissible Emissions (MPE) of Pollutants into the Air, approved by the order of the Krasnoyarsk Territory Administration of the Federal Service for Supervision of Natural Resources Management (Rosprirodnadzor) No. 1067 dated 12.10.2017. Validity period up to 12.10.2024
19	Permit for emission of harmful (polluting) substances into the air from 12.10.2017 № 05-1/32-151, issued by the Department of Rosprirodnadzor for Krasnoyarsk Territory. Validity period up to 12.10.2024
20	Norms of permissible discharge of pollutants into the Kan River, approved by the Yenisei River Basin Water Administration on 10.06.2014. Valid until 01.07.2019
21	Permit for discharge of pollutants into the environment No. 035 dated 29.07.2014 issued by the Krasnoyarsk Territory Department of Rosprirodnadzor. Valid until 01.07.2019
22	Draft waste generation and disposal limits (PNOOLR) approved by the order of the Krasnoyarsk Territory Federal Service for Supervision of Natural Resources Management dated 31.10.2018 No. 1317. Valid until 31.10.2023.
23	Document on approval of waste generation standards and waste disposal limits dated 31.10.2016 No. 05-1/26-101 issued by the Krasnoyarsk Territory Federal Service for Supervision of Natural Resources Management No. 1317 dated 31.10.2018. Valid until 31.10.2023
24	Permit for release of radioactive substances into the atmosphere No. 21/2015 dd. 22.07.2015 issued by the Interregional Territorial Administration for Nuclear and Radiation Safety Supervision of Siberia and the Far East. Valid until 28.07.2020
25	License GN-03-115-3304 of 23.12.2016 for the right to operate a nuclear facility issued by the Federal Service for Environmental, Technological and Nuclear Supervision. Valid until 23.12.2021.

No.	Name
26	License GN-05-401-2948 of 13.11.2014 for the right to handle nuclear materials during transportation, issued by the Federal Service for Environmental, Technological and Nuclear Supervision. Valid until 13.11.2019.
27	License GN-08-115-3370 of 23.06.2017 for the right to use nuclear materials in research and development, issued by the Federal Service for Environmental, Technological and Nuclear Supervision. Valid until 23.06.2027
28	License GN-10-115-3357 of 15.05.2017 for the right to design and construct nuclear installations, radiation sources, nuclear materials and radioactive substances storage facilities, radioactive waste storage facilities, issued by the Federal Service for Environmental, Technological and Nuclear Supervision. Validity period up to 15.05.2027
29	License SO-11-115-1974 of 10.07.2013 for the right to carry out activities on the design of equipment for nuclear installations, radiation sources, nuclear materials and radioactive substances storage facilities, radioactive waste storage facilities, issued by the Federal Service for Environmental, Technological and Nuclear Supervision. Validity up to 10.07.2023
30	License SO-11-101-2051 of 24.01.2014 for the right to carry out design activities for nuclear installations, nuclear material and radioactive substance storage facilities issued by the Federal Service for Environmental, Technological and Nuclear Supervision. Validity period up to 24.01.2024
31	License SO-06-501-2050 of 21.01.2014 for the right to handle radioactive substances in the course of their processing, issued by the Federal Service for Environmental, Technological and Nuclear Supervision. Validity up to 21.01.2019
32	Water use agreement No. 24-17.01.03.004-R-DZVO-S-2018-04219/00 of 29.12.2018, signed with the Ministry of Natural Resources and Environment of Krasnoyarsk Territory. Valid until 21.03.2024
33	Decision on the provision of a water body for use dated 15.07.2014 No. 24-17.01.03.004-R-RSVH-S-2014-01981/00. Valid until 01.07.2019

## 5

# INDUSTRIAL, ENVIRONMENTAL, AND RADIATION MONITORING OF THE ENVIRONMENT

In terms of potential radiation hazard for the population, JSC «PA ECP» belongs to Category III object, the radiation impact of which in case of an accident is limited to the territory of the object, and the observation zone is not established for it. The category of the object is approved by Regional Office No. 42 of the Federal Medical and Biological Agency of Russia.

In accordance with the requirements of the Federal Law No. 7-FZ «On Environmental Protection», the company obtained the Certificate of State Registration as an object having a negative impact on the environment, No. AO1ERA06 of 26.12.2016. JSC «PA ECP» was assigned the second category by the degree of negative environmental impact.

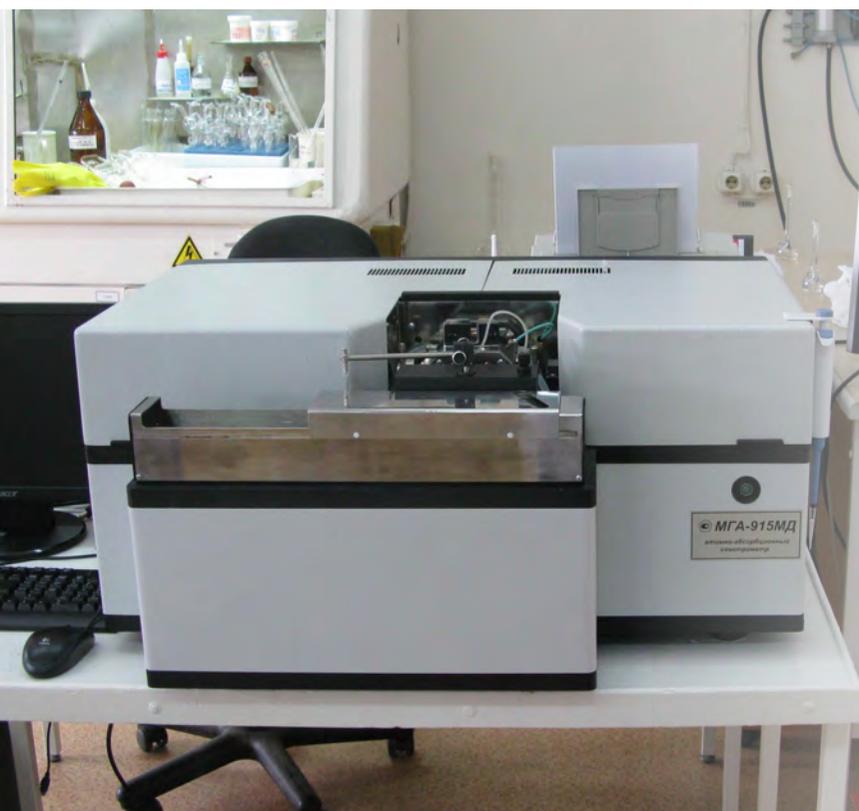
The Sanitary Protection Zone (hereinafter referred to as SPZ) of JSC «PA ECP» was determined by during a corresponding project, which received a positive sanitary and epidemiological conclusion and was approved by the Head of the Zelenogorsk CATO Administration in 2013. The SPZ coincides with the border of the main industrial site.

The area of the main industrial site land plot is 244.5 ha.

The industrial site of the enterprise has a fence around the perimeter, is guarded, has access railways and a network of paved roads, numerous communications of different purposes.

The territory of the enterprise is planned, landscaped and has green plants.

In accordance with Article 67 of the Federal Law dated 10.01.2002 No. 7-FZ «On Environmental Protection» the enterprise carries out industrial environmental control.





Industrial environmental control is carried out in accordance with the Industrial Environmental Control Programme.

The unit that provides this function in the enterprise is Department for Production and Environmental Control (DPEC). DPEC is accredited in the national accreditation system as a testing laboratory for compliance with the requirements of GOST ISO/IEC 17025. Accreditation certificate No. RA.RU.512213.

Radiation control is carried out by the radiation control laboratory in accordance with the «Regulation on radiation control of emissions, discharges, environmental objects and radioactive waste», approved by the Chief State Doctor of Office No. 42 of the Federal Medical and Biological Agency.

# 5

# INDUSTRIAL, ENVIRONMENTAL, AND RADIATION MONITORING OF THE ENVIRONMENT

## Types of industrial environmental and radiation control:

- Control of hazardous substances (hereinafter - HS) and radionuclides in atmospheric emissions;
- Control of HS content in atmospheric air at the border of the sanitary protection zone (SPZ);
- Monitoring of the volume activity of radionuclides in the ground layer of the atmosphere at the industrial site and in settlements;
- Control of contamination of snow, vegetation and soil with radionuclides within the industrial site and settlements;
- Control of HS and radionuclide content in the waste water of the plant, groundwater and surface water bodies;
- Control of radionuclide content in bottom sediments;
- Control of specific and volumetric activity, isotopic composition of radioactive waste.

The following methods for control of emissions and discharges of harmful chemicals are applied: potentiometric, photocolorimetric, atomic-absorption, X-ray fluorescent, capillary electrophoresis.

Department of industrial environmental control of the enterprise is equipped with modern measuring equipment: Kapel capillary electrophoresis system for quick and effective analysis of organic and inorganic ions in solutions, Spetroskan MAKS-GV X-ray machine for spectral analysis, MGA-1000 atomic absorption spectrometer with autosampler for the determination of metals in air and water.



Radiation monitoring uses alpha-spectrometric method with radiochemical separation and radiometric method. SEA-13P semiconductor alpha energy spectrometers and RIA-02M and iSolo alpha radiometers are used as measuring instruments.

All instruments (spectrometers, radiometers, spectrophotometers, etc.) are included in the state register of instruments and undergo annual verification in accredited laboratories.

All radioactive waste generated at the enterprise is certified. Radiation control laboratory monitors the isotopic composition and specific activity of waste. The activity of radionuclides is determined by direct measurement with ISOCS gamma-spectrometric system.

In accordance with the order of the General Director of ROSATOM and the Regulation on the procedure for on-site monitoring of the state of subsurface resources at the enterprises and organizations of ROSATOM, JSC «PA ECP» has developed and is implementing the Program for on-site monitoring of the state of subsurface resources within the industrial site (sanitary protection zone) of JSC «PA ECP». The purpose of the on-site monitoring of the state of subsurface resources (OMSR) is to obtain reliable information on the impact of nuclear and radiation hazardous facilities of the enterprise on the state of the subsoil, which is necessary to assess the environmental safety in the operation and decommissioning of these facilities, to inform the management on the implementation of environmental protection measures.

The main task of the OMSR is to obtain regular and reliable information on the state of the subsurface resources and to determine the spatial and temporal distribution of the various types of impacts on the subsurface resources in the area of monitoring objects.



# 5

## INDUSTRIAL, ENVIRONMENTAL, AND RADIATION MONITORING OF THE ENVIRONMENT

OMSR is a part of environmental and radiation monitoring and includes control over the radiochemical, hydrochemical, hydrodynamic and temperature state of groundwater, monitoring of soils, snow cover, surface water and bottom sediments in the area of nuclear and radiation hazardous facilities of the enterprise.

The OMSR data are used to form annual forecasts and assessments of the safety at the nuclear and radiation hazardous facilities.

As part of the development of information-analytical systems for environmental monitoring at the Electrochemical Plant, an on-site automated measuring system for industrial environmental monitoring (AMSPM) was created. Its task is to provide continuous radiation and chemical monitoring of work areas and the entire area of the industrial site, as well as the closed area of Zelenogorsk. As of today, the system encompasses 61 control posts.





## AISPEM POSTS MAPPING WITHIN THE INDUSTRIAL SITE



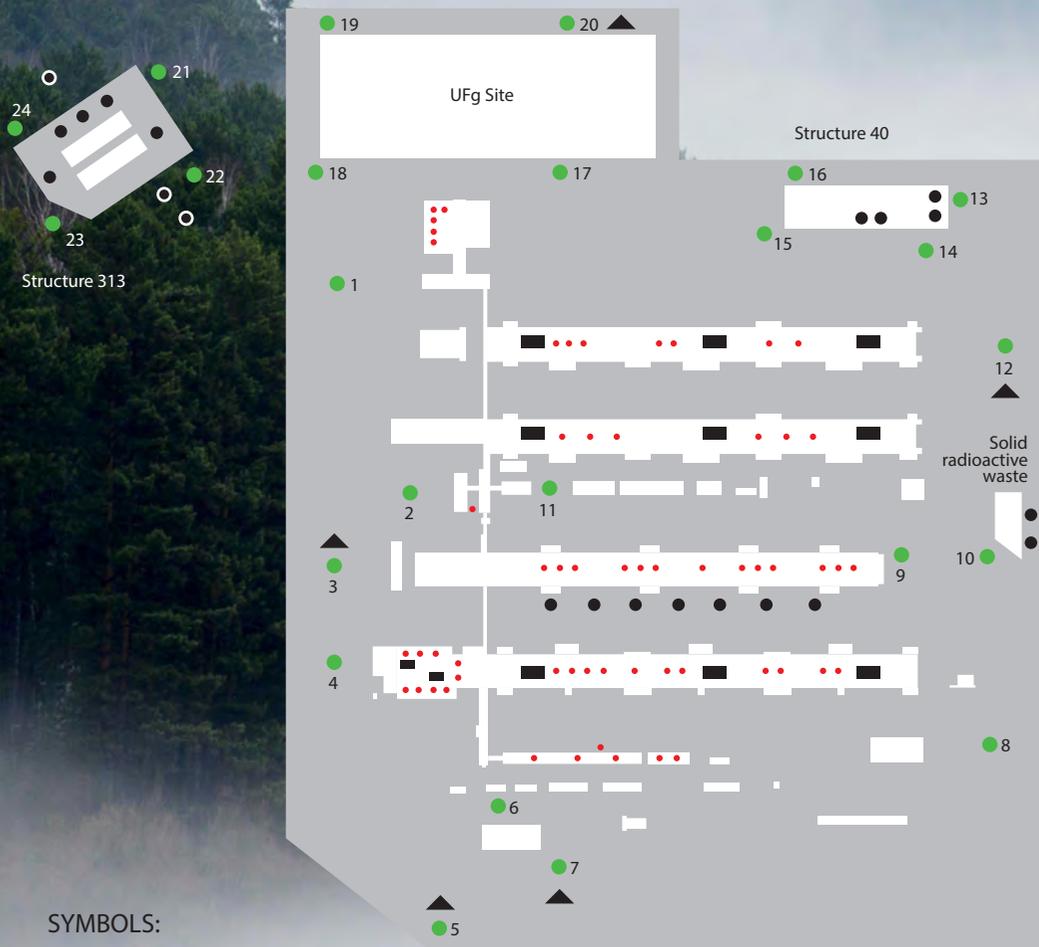
- X – chemical monitoring
- M – weather monitoring
- P – radiation monitoring

*Radiation and chemical sensors ensure continuous monitoring of radiation background and hazardous chemicals in workplace air, within the industrial site, on the border of the sanitary protection zone and in the residential areas of Zelenogorsk.*

# 5

# INDUSTRIAL, ENVIRONMENTAL, AND RADIATION MONITORING OF THE ENVIRONMENT

SCHMATIC MAP  
ECP MONITORS EMISSION SOURCES, ENVIRONMENTAL OBJECTS,  
DISCHARGE AND GROUND WATER WITHIN ITS AREA



**SYMBOLS:**

- – Sanitary protection zone
- (red) – Monitoring of radio active and chemically hazardous emissions
- (green) – Sampling of SOIL vegetation, snow and near-surface air
- (black) – Sampling of ground water
- (black) – Sampling of discharge water
- ▲ (black) – Sampling of hazardous substances in air

AMSPEM controls all types of hazardous environmental impacts, which may be caused by the company's production, i.e. radiation (gamma radiation) and chemicals (hydrogen fluoride, ammonia, sulphur dioxide, nitrogen dioxide), as well as data on weather conditions (determines wind speed and direction, measures atmospheric pressure, temperature and relative humidity, and precipitation). Meteorological data allow forecasting the development of a possible emergency situation and making balanced decisions to protect the population and eliminate the negative consequences of possible emergencies.

AISPEM includes a mobile automated emergency response system with an environmental monitoring system (ASEMCAR). ASEMCAR is designed to quickly deploy a local mobile dispatch center (LMDC) or an emergency response headquarters (ERH) in the emergency response zone. It also can deploy a network of automatic and automated control stations for radiation, chemical and meteorological conditions that warns about exceeded permissible levels and transmits monitoring reports to the AISPEM database.

In 2015, AISPEM of JSC «PA ECP» passed the metrological certification and was entered into the Register of Measuring Instruments of the Russian Federation.

Radiation situation at the location of the plant has corresponded to the safe values of gamma background, typical for the East-Siberian part of Russia,  $\sim 0.15 \mu\text{Sv/h}$ , for the whole period of operation.



## 6

## ENVIRONMENTAL IMPACT

## 6.1. WATER INTAKE FROM WATER BODIES

Water for cooling of main and auxiliary equipment is taken from Kan river via owned water intake facility. Water intake is located within the industrial site on the left bank of Kan river 97.4 km from its estuary. The water intake is protected to prevent young fish from entering.

The water is used as per the contract for water use between ECP and the Ministry of Natural Resources and Ecology of Krasnoyarsk Territory. The type of water use is water use with intake (extraction) of water resources from water bodies and return of water into water bodies.

Permissible water intake volume is 112,500,000 m<sup>3</sup>/ year.

Water taken from Kan river in 2018 was 76,214,230 m<sup>3</sup>.

After cooling the equipment, a part of discharge water is pumped to the trout farm ponds of Iskra LLC. In 2018, 3,171,400 m<sup>3</sup> of discharge water were given to the trout farm sharing 4,2% of the industrial cooling water

Table 2.  
Water intake volume according to the report of 2-tp (water department)

Source	Source type	Water intake volume, m <sup>3</sup>
Industrial water, Kan river	Surface water body	76,214,230
Artesian wells	Underground	339,960
Municipal water lines	Communal water supply lines	923,040
Grids of TVK LLC, TEK-45 LLC		5,750
<b>TOTAL:</b>		<b>77,482,980</b>



In the reporting year, industrial water consumption decreased by 8.8% compared to 2017 due to the implementation of measures under the energy saving and energy efficiency improvement program. As part of the program, a frequency control device was installed at the industrial pumping station of JSC «PA ECP», which made it possible to optimize the operation of heat-exchange equipment, resulting in reduced water consumption.

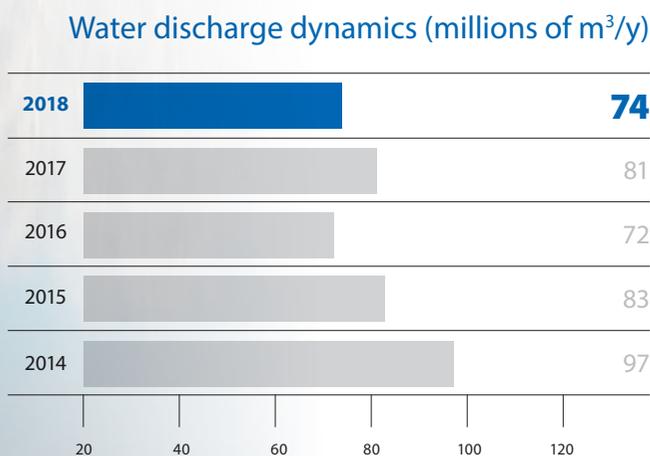
## 6.2. DISCHARGES TO THE OPEN WATER SYSTEMS

The water discharged after cooling of main and auxiliary equipment and rainwater drainage from the industrial site flow to the Kan river via a riverside outlet.

Water discharge is authorized under the Water Body Use Grant issued by the Ministry of Natural Resources and Ecology of Krasnoyarsk Territory and Pollutant Discharge Permit issued by the Regional Directorate for Natural Resource Supervision.

Permitted water discharge is 120,411,540 m<sup>3</sup>.

In 2018, 73,740,980 m<sup>3</sup> were discharged, decreasing by 8.8 % as compared to 2017 due to decreased intake from the Kan river for equipment cooling.



## 6

## ENVIRONMENTAL IMPACT

## 6.2.1. HAZARDOUS CHEMICALS DISCHARGE

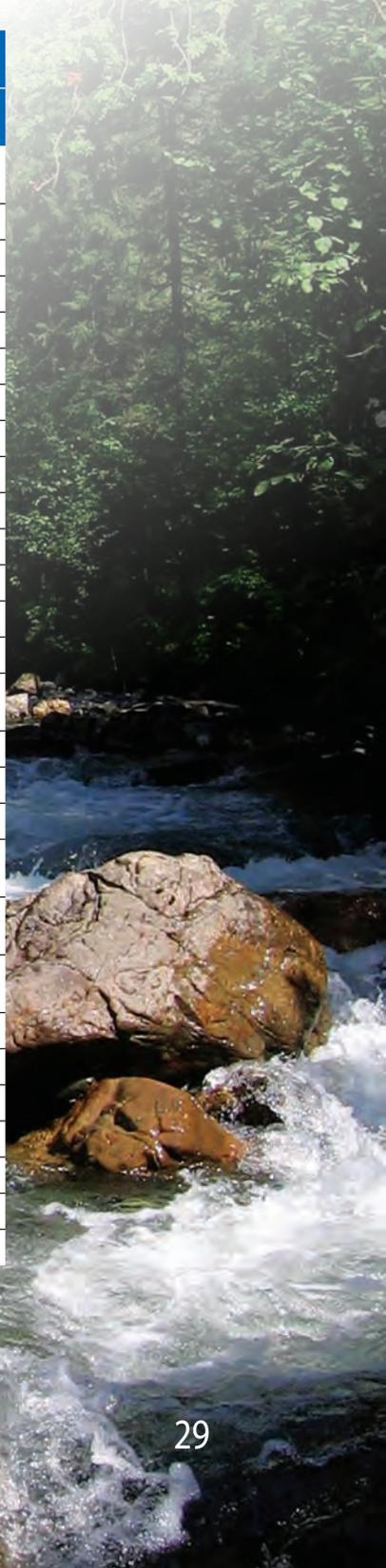
The quality of discharged water corresponds to the quality of the natural water withdrawn from the Kan River, hazardous chemicals do not exceed background concentrations in wastewater.

**Table 3. Results of observations of quality indicators of wastewater and surface water in 2018**

Sampling point	Measured parameters	Measurements, mg/dm <sup>3</sup>			
		1 quarter	2 quarter	3 quarter	4 quarter
Kan river, 400 m above water discharge, at water intake point	Synthetic surfactants	0.029	0.025	0.025	0.032
	BOD <sub>p</sub>	2.8	3.2	2.3	2.3
	BOD <sub>s</sub>	2.0	1.7	1.2	1.0
	Weighted substances	7.0	14.8	3.4	7.5
	Iron dissolved	0.046	0.287	0.09	0.114
	Ammonium ion	0.135	0.27	0.36	0.22
	Petroleum products	0.02	0.017	0.024	0.017
	COD	12.0	23.0	13.6	10.9
	Dry residue	190	134.3	124.3	167
	pH	7.7	8.1	8.0	8.1
	Dissolved oxygen	8.8	9.0	9.0	10.2
	Temperature, °C	3.0	10.6	18.1	2.9
	Toxicity	no acute toxicity			
	TCB, CFU/100 ml	351			
	TTCB, CFU /100 ml	351			
	Coliphage, PFU/100 ml	0			
	Intestinal infections agents	not detected			
Cysts of pathogenic intestinal protozoa	not detected				



Sampling point	Measured parameters	Measurements, mg/dm <sup>3</sup>			
		1 quarter	2 quarter	3 quarter	4 quarter
	Vital helminthe eggs	not detected			
	Coliform index	3510			
Water discharge	Synthetic surfactants	0.025	0.025	0.025	0.027
	BOD <sub>p</sub>	2.3	2.5	1.8	1.5
	BOD <sub>s</sub>	1.6	1.5	1.0	0.8
	Weighted substances	3.4	8.3	3.0	6.0
	Iron dissolved	0.04	0.26	0.08	0.09
	Ammonium ion	0.124	0.24	0.25	0.2
	Petroleum products	0.018	0.01	0.009	0.013
	COD	7.3	22.0	9.0	7.2
	Dry residue	182.3	128	120.3	160.3
	pH	7.8	8.1	8.1	8.1
	Dissolved oxygen	9.6	9.1	8.8	10.1
	Temperature, °C	5.0	10.6	18.1	5.0
	Toxicity	no acute toxicity			
	TCB, CFU/100 ml	188			
	TTCB, CFU /100 ml	188			
	Coliphage, PFU/100 ml	0			
	Intestinal infections agents	not detected			
	Cysts of pathogenic intestinal protozoa	not detected			
	Vital helminthe eggs	not detected			
	Coliform index	1880			
Kan river, 500 m below water discharge	Synthetic surfactants	No measurements were made due to the inability to take samples in winter	No measurements were made due to the inability to take samples in spring	0.025	0.025
	BOD <sub>p</sub>			2.2	2.5
	BOD <sub>s</sub>			1.2	1.2
	Weighted substances			3.2	7.8
	Iron dissolved			0.1	0.094
	Ammonium ion			0.2	0.2



## 6

## ENVIRONMENTAL IMPACT

Sampling point	Measured parameters	Measurements, mg/dm <sup>3</sup>			
		1 quarter	2 quarter	3 quarter	4 quarter
	Petroleum products			0	0.012
	COD			10.4	12.7
	Dry residue			126.7	131.0
	pH			8.0	8.3
	Dissolved oxygen			9.0	not detected
	Temperature, °C			18.4	4.9
	Toxicity	no acute toxicity			
	TCB, CFU/100 ml	315			
	TTCB, CFU /100 ml	315			
	Coliphage, PFU/100 ml	0			
	Intestinal infections agents	not detected			
	Cysts of pathogenic intestinal protozoa	not detected			
	Vital helminthe eggs	not detected			
	Coliform index	3150			

## 6.2.2. RADIONUCLIDE DISCHARGE

The facility does not discharge radioactive substances into water bodies. Uranium-238, uranium-235 and uranium-234 in discharged water are on background level not exceeding the sanitary-hygienic limit of 0.2 Bq/kg.



## 6.3. EMISSIONS TO ATMOSPHERIC AIR

### 6.3.1. EMISSIONS OF HAZARDOUS CHEMICALS

Emitting process equipment is fitted with gas treatment devices:

- Chemical absorption units and ion ventilation filters for hydrogen fluoride capture;
- Water scrubbers for soot and radionuclide purification;
- Aerosol filters for suspended substances and radionuclides.

Gas treatment efficiency is 70-99.9%.

In 2018, stationary contaminant sources emitted 24.928 tonnes of contaminants representing 62.3 % of the permitted amount.

Contaminant emission decreased by 10.9% as compared to the previous year. This decrease is due to the new standards of maximum allowable emissions of pollutants by the Krasnoyarsk Territory Federal Service for Supervision of Natural Resource Use (Rosprirodnadzor) in accordance with the Order of the Government of the Russian Federation of 08.07.2015 No. 1316-r.

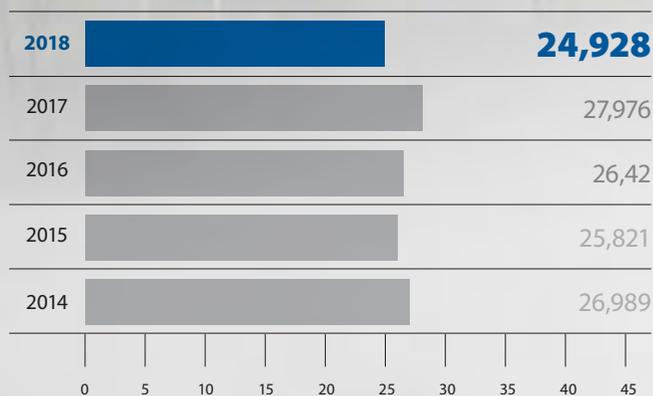
## 6

## ENVIRONMENTAL IMPACT

Table 4. Emission breakdown (basic substances)

No.	Contaminant	Hazard class	Purificat on rate, %	Actual emission in 2018, t	Maximum permission limit, t	% of the limit
1	Ammonia	4	–	2,54	8,889	28,6
2	Carbon (soot)	3	70,0	2,044	7,776	26,3
3	Hydrogen fluoride	2	93,0	0,149	0,441	33,8
4	Kerosene	–	–	8,055	8,055	100,0
5	Hexan	4	–	1,804	1,804	100,0
6	Acetone	4	–	0,88	1,84	47,8
7	Gasoline	4	–	0,399	0,479	83,3
8	Iron oxide	3	99,0	0,28	0,28	100,0
9	Freon-22	4	–	2,8	3,3	84,8
10	Freon-134a	–	–	3,2	3,2	100,0
11	Freon-141b	–	–	2,27	3,4	66,8
12	Other			0,507	0,551	
	<b>Total:</b>			<b>24,928</b>	<b>40,015</b>	

Contaminant gross emission dynamics (t/year)

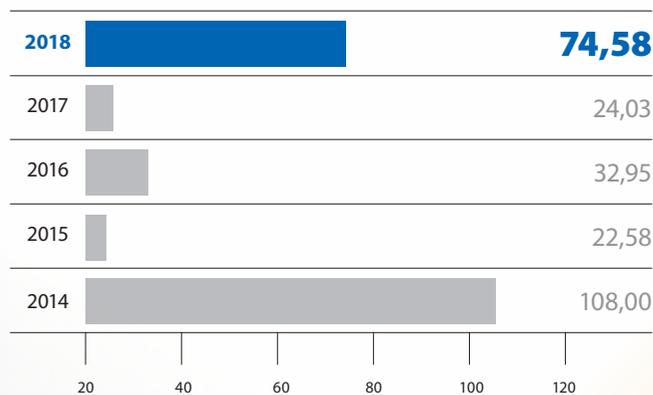


### 6.3.2. RADIONUCLIDE EMISSIONS

In 2018, the facility released  $74.58 \times 10^6$  Bq constituting 0.16% of permissible limit determined by the Permit for Radionuclide Atmospheric Emission issued by the Federal Environmental, Industrial and Nuclear Supervision Service of Russia.

The increase in radionuclide emissions compared to 2018 was due to changes in the operation mode of the Regeneration Division.

Radionuclide emission dynamics



### 6.4. WASTE

#### 6.4.1. HANDLING OF INDUSTRIAL WASTE AND CONSUMPTION WASTE

The facility has developed standard limits for waste generation and storage approved by the Federal Environmental, Industrial and Nuclear Supervision Service of Russia. All types of industrial waste and consumption waste are certified.

ECP does not have its own waste burial and decontamination facilities.

## 6

## ENVIRONMENTAL IMPACT

The Handling procedure for industrial and consumption waste is the internal document that regulates waste handling in the facility. The adverse environmental impact from waste is reduced by observing waste generation and storage limits, conditions of temporary waste accumulation on the production site, and decreasing the amount of generated waste.

The facility has a procedure for accurate registration of generated, reused, decontaminated, and stored industrial and consumption waste. In 2018, ECP generated 7,368.06 tonnes (4,147.534 tonnes in 2017) of industrial and consumption waste:

0.05 % — hazard class I waste;

50.2 % — hazard class IV waste;

49.75 % — hazard class V waste (almost non-hazardous).

In the reporting year, all generated waste was given to the external specialized organizations for disposal, decontamination, burial.

Hazard class I waste is represented only by spent fluorescent lamps.

The waste generation and storage limits were not exceeded in the reporting year.

The amount of industrial and consumption waste generated and transferred for decontamination and disposal in 2018 is at the last-year values, the number of allocated waste increased by 46.5%.

The amount of allocated waste increased in 2018 due to large-scale upgrades of heat communications. This resulted in generation and transfer for allocation in a specialized site of 1,030 tons more of construction waste.

#### 6.4.2. HANDLING OF RADIOACTIVE WASTE

The source of radioactive waste at JSC «PA ECP» is the ongoing operation of the nuclear facility: recycling of process solutions, elimination or repair of equipment, replacement of outdated and worn equipment, incineration of spent gas centrifuges, appliances and materials used by personnel in their work, repair of industrial rooms.

Table 5. Waste generation dynamics (t/year)

Hazard class	2014	2015	2016	2017	2018
I	3.292	3.113	3.32	2.659	3.731
II	0	0	0	0	0
III	423.732	75.485	13.072	73.885	0
IV	3614.500	1639.390	1583.712	2499.522	3698.26
V	4505.900	640.809	2652.033	4571.468	3666.069

Table 6. Information about generation, neutralization and allocation of industrial and consumption waste for the last 5 years

Year	Generated waste, tons	Annual limit for generated waste, tons	Given to external organizations for disposal, tons	Given to external organizations for neutralization, tons	Given to external organizations for burial, tons	Annual limit for waste allocation, tons
2014	8 547,481	10 407,679	4 762,659	3,292	3 781,53	5 659,564
2015	2 358,797	10 407,679	582,424	3,113	1 773,260	5 659,564
2016	4 252,137	10 407,679	2 553,233	3,320	1 695,584	5 659,564
2017	7 147,534	8 577,633	4 497,300	2,659	2 647,575	4 147,833
2018	7 368,060	17 726,707	3 486,019	3,731	3 878,310	13 514,917

# 6

## ENVIRONMENTAL IMPACT

The facility generates the following types of solid very low-activity radioactive waste:

- slag and ash from incineration of gas centrifuges;
- ceramics (fittings, insulators), fiberglass;
- plastic compounds, rubber, teflon;
- work clothes, personal protection equipment, cloth rags;
- construction and other waste;
- sediment after pulp separation plant.

All solid radioactive waste is given for storage to specialized near-surface storage facilities. In 2018, radioactive waste was handled in compliance with License No. GN-03-115-3304.

### 6.5. MEDICAL AND BIOLOGICAL CHARACTERISTIC OF THE LOCATION

Interregional Office No. 42 of the Federal Medical and Biological Agency of Russia, within its capacity to control and supervise sanitary and epidemiological wellbeing of people employed at the facility and living within the closed area of Zelenogorsk, regularly checks the compliance of JSC «PA ECP» with radiation safety requirements.

It has been confirmed that conditions and arrangement of actions for radiation safety in handling of ionizing radiation sources are assured.





Sanitary and hygienic situation at JSC «PA ECP» has been stable and virtually unchanging for several last years as confirmed by radiation control:

- average annual concentrations of radionuclides in the workspace air below are below permissible levels for personnel;
- radionuclide activity in workspace air has been at the level of averaged data for the last 5 years;
- work surface contamination is below permissible levels;
- hazardous chemical emissions into open water system does not exceed the normative limits;
- radionuclide and hazardous chemical emissions into atmosphere are significantly lower than normative limits;
- radionuclide content in the environment is at the background level.

No incidents or radiation emergencies have been recorded. No cases of occupational diseases or suspected occupational diseases were detected.

Interregional Office No. 42 of the Federal Medical and Biological Agency annually analyzes and evaluates radiation in the environment in Zelenogorsk using the results of radiation control performed by the Center for Hygiene and Epidemiology No. 42 of the Federal Medical and Biological Agency.

Radiological conditions in Zelenogorsk (according to the results of multi-year studies) are characterized as favorable. Measured results of the gamma-radiation effective dose have remained stable for several years (~ 0.15  $\mu\text{Sv/h}$ ) and conform to the natural values of the Eastern-Siberian Region confirming that JSC «PA ECP» does not industrially impact human environment.

The principal share into public radiation exposure in Zelenogorsk is brought by natural ionizing current sources.

The annual effective dose that the population in Zelenogorsk receives from natural sources of ionizing radiation is significantly lower than the accepted irradiation level.

## 6

## ENVIRONMENTAL IMPACT

Social and hygienic monitoring shows contamination-free environment in Zelenogorsk, that is: no industrial contamination of atmosphere, soil, and water bodies. Tap water is safe in sanitary and epidemiologic terms.

Socio-economic conditions are amongst the determining factors in public health of Zelenogorsk. The population of Zelenogorsk tends to decrease in all age groups except from people over 60 years. This is caused by natural and migrational population decline.

In 2018 natural population dynamics in Zelenogorsk did not change significantly: the population is declining with a coefficient of 5.71, which is higher than long-time average annual values in Krasnoyarsk Region and Russia.

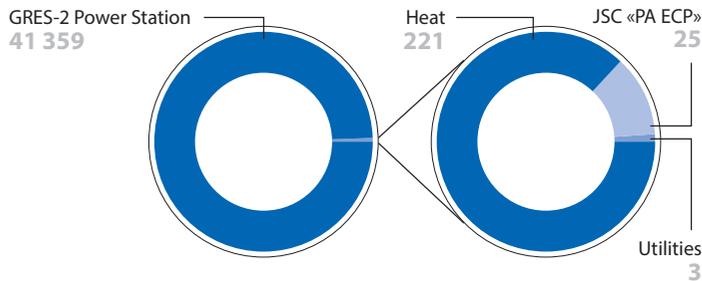
According to Interregional Office No. 42 of the Federal Medical and Biological Agency, general mortality rates in Krasnoyarsk Region and in Zelenogorsk have remained within the same range for 3 years (from 2016 to 2018). General mortality rate in Zelenogorsk is on the level of Krasnoyarsk Region: 12.3 for 1000, ‰.

The principal mortality cause in Zelenogorsk as well as in Krasnoyarsk Region has been diseases of cardiovascular system with 57.37%, the second cause is tumors with 21.51%, the third is diseases of digestive system with 21.51%, the fourth is external causes (accidents, injuries, intoxication, murders, suicides) with 5.35%. The fifth is respiratory diseases with 2.48%.

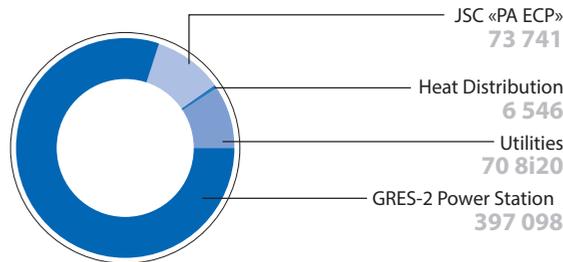


## 6.6. THE SHARE OF JSC «PA ECP» IN EMISSIONS, DISCHARGES AND WASTE PRODUCED IN THE LOCALITY

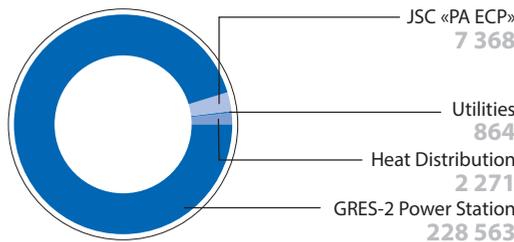
The share of air pollution among the industrial polluters (according to the data provided by businesses of Zelenogorsk closed area in 2018), tons/year



The share of water discharge among the principal industrial polluters (according to the data provided by businesses of Zelenogorsk closed area in 2018), thousands of m<sup>3</sup>



The share of waste generated by the principal industrial polluters (according to the data provided by businesses of Zelenogorsk closed area in 2018), tons



# 6

## ENVIRONMENTAL IMPACT

### 6.7. Condition of the location of JSC «PA ECP»

There are no areas contaminated with hazardous chemicals and radionuclides within the location of JSC «PA ECP», the sanitary protection zone of the industrial site, and outside of it.

The impact of emissions, discharges, waste of the enterprise to the environment is limited within the area of the industrial site and complies with the requirements to emissions, discharges, waste.

Department for Production and Environmental Control measures radionuclides and hazardous chemicals in environment within and outside the sanitary protection zone (SPZ). Control points are placed according to the dominant wind pattern, background points are placed downwind.

Hydrogen fluoride (HF), being the most hazardous of the discharged substances, is controlled in five points within the sanitary protection zone and in one point near the town of Zelenogorsk. The concentrations of other contaminants discharged by the facility are less than 0.1 of the threshold on the SPZ line, therefore their concentrations are not controlled beyond SPZ.

The values for uranium isotopes and hydrogen fluorides near the town are comparable with background values confirming that the facility does not negatively impact environment and public health.

Water discharged from the facility is classified as "clean to requirements", the content of hazardous chemicals and uranium isotopes in it is at the background level.

Table 7.  
Results of production and environmental control for 2014 – 2018

Year	Location	Specific activity of uranium isotopes (total of uranium-234, uranium-238, uranium-235), Bq/kg			Near-surface layer of air	
		Soil	Vegetation	Snow	Volumetric activity of alpha-emitting nuclides, Bq/m <sup>3</sup>	HF concentrations, mg/m <sup>3</sup>
2014	On border of SPZ	71,38	5,34	0,161	0,000 3	< 0,001
	Town	46,0	0,6	0,02	0,000 3	< 0,001
	Background	43,0	0,9	0,02	0,000 3	< 0,001
2015	On border of SPZ	84,84	2,14	0,277	0,000 3	< 0,001
	Town	41,9	0,88	0,03	0,000 4	< 0,001
	Background	32,0	0,75	0,02	0,000 4	< 0,001
2016	On border of SPZ	72,16	2,54	0,052	0,000 6	< 0,001
	Town	40,4	1,24	0,03	0,000 2	< 0,001
	Background	29,4	1,05	0,03	0,000 1	< 0,001
2017	On border of SPZ	73,38	4,46	0,119	0,000 7	< 0,001
	Town	45,2	0,97	0,03	0,000 3	< 0,001
	Background	45,8	0,90	0,03	0,000 1	< 0,001
2018	On border of SPZ	76,05	4,18	0,151	0,000 7	< 0,001
	Town	39,9	0,90	0,03	0,000 3	< 0,001
	Background	35,8	0,90	0,03	0,000 1	< 0,001

# 7

## IMPLEMENTATION OF ENVIRONMENTAL POLICY

For implementation of its environmental policy, JSC «PA ECP» annually determines environmental goals and plans actions to achieve them.

The industrial pump station was optimized reducing the industrial water consumption by 1.3 million m<sup>3</sup> in 2018 as compared to 2017.

HTM-2-1-4000 refrigerator was sent for modernization in order to reduce the inventory of refrigerators filled with Freon-12.

The cooling system of separation centrifuges and conditioning system of the Uranium Enrichment Division are being upgraded. In 2018, the detailed design for installation of refrigerators and cooling towers was developed for that purpose.

Two 110 kV oil circuit breakers VS-15 and VS-16 from Substation 22 were deinstalled; eight 6 kV oil circuit breakers from Substation 30 were disconnected. This reduced the usage of transformer oil by 16.7 tons.

Rosprirodnadzor approved the project of limits for waste generation and placement.

In order to ensure compliance with environmental regulations, the management and employees of ECP underwent training for Assurance of environmental safety by managers and employees of general industrial management systems. 28 people completed the training.

The following principal technical actions are planned for 2019 in relation to the environmental policy:

- upgrading the HTM-2-1-4000 refrigerator;
- upgrading 12 sections of gas centrifuge equipment;
- continued upgrades of general and gas filtering ventilations in Chemical Division;
- upgrading the environmental monitoring equipment;
- receiving state environmental inspection for nuclear facility licensing in relation to the project Main production building. Reconstruction. Extension of separation facilities in JSC «PA ECP».

In 2018, ECP paid 2,175,298 rubles for the negative impact to the environment.

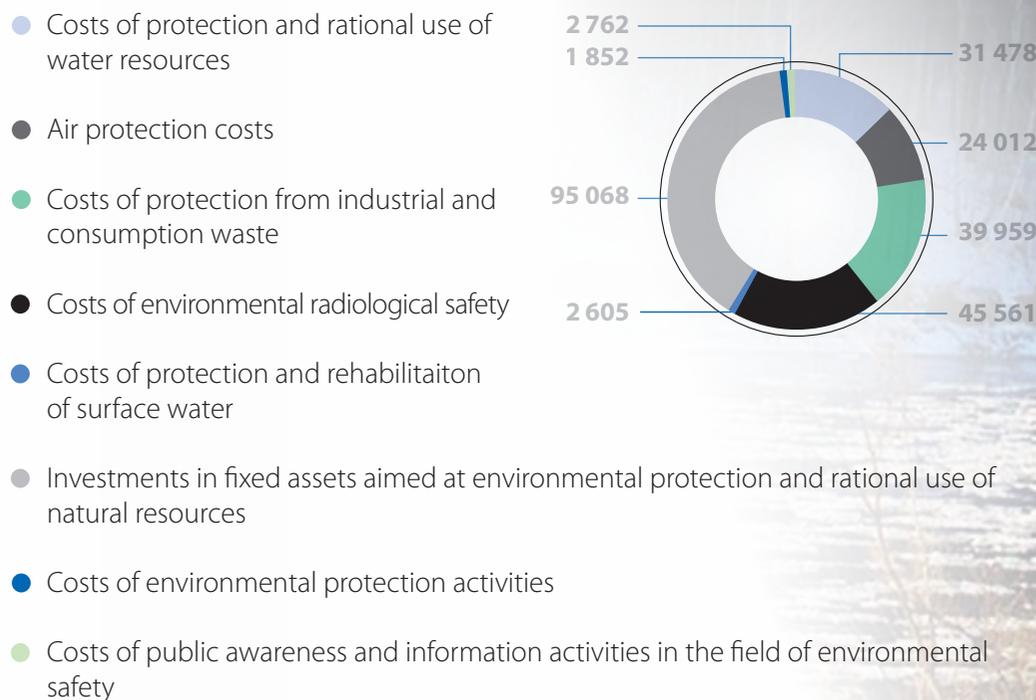
This includes:

- for emission of contaminants – 720 rubles;
- for waste allocation – 2,174,578 rubles.

Table 8.

Total costs for environmental protection in 2018, thousands of rubles

No.	Description	Actual annual cost, thousands of rubles
1	Costs of protection and rational use of water resources	31,478.0
2	Air protection costs	24,012.0
3	Costs of protection from industrial and consumption waste	39,959.0
4	Costs of environmental radiological safety	45,561.0
5	Costs of protection and rehabilitation of surface water	2,762.0
6	Costs of public awareness activities in the field of environmental safety	1,852.0
7	Investments in fixed assets aimed at environmental protection and rational use of natural resources	2,605.21
8	Costs of environmental protection activities	95,607.81
	<b>Total environmental protection costs:</b>	<b>207,666.26</b>



# 8

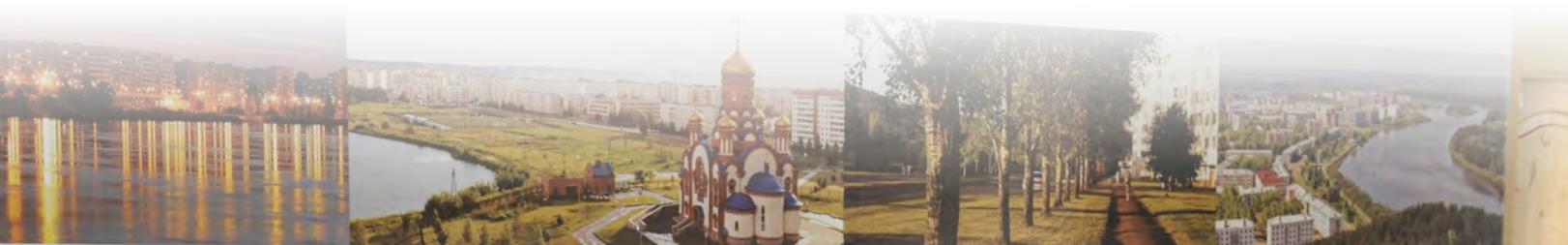
# ENVIRONMENTAL ACTIVITY AND RAISING PUBLIC AWARENESS

## 8.1. INTERACTION WITH STATE AND LOCAL AUTHORITIES

In the reporting period, state and local environmental supervisory authorities did not carry out inspections, issue fines or prescriptions for breach of legal or regulatory environmental requirements.

ECP externally communicates with the state environmental and legal supervisory authorities by submitting timely, complete and true environmental information (statistical reports, environmental protection plans, financial documents, statements about environmental control of production, etc.).

In April 2018, Zelenogorsk held public hearings regarding construction of new facilities at ECP.





Public hearings touched upon construction of new fabrication facilities integrated into existing separation facilities of ECP and a solid radioactive waste storage within the industrial site.

These projects were presented with supporting documents for the license on nuclear activities. The public hearings were held because these documents should be reviewed by state expert commissions as per Art. 11 of Federal Law No. 174 On environmental expert review dated 23.11.1995.

Those who participated unanimously approved allocation, construction and operation of the facilities.

After the state environmental review of the supporting documents for the license on nuclear activities, Rosprirodnadzor made a positive decision in October 2018.

The supporting documents for the license on nuclear activities submitted for the state environmental review are confirmed to fulfill legislative environmental requirements of Russian Federation. The environmental impact of the planned activity is considered acceptable.



## 8

# ENVIRONMENTAL ACTIVITY AND RAISING PUBLIC AWARENESS

## 8.2. INTERACTION WITH ENVIRONMENTAL ORGANIZATIONS, SCIENTIFIC AND SOCIAL INSTITUTES AND PUBLIC

JSC «PA ECP» always responds to statements and reports of organizations and the public concerning environmental protection issues.

During 2018, no complaints and claims related to the environmental impact of the company were registered from public organizations or residents of Zelenogorsk.

The Company builds and maintains stable, constructive and transparent relations with stakeholders, prepares and disseminates information on the environmental impact of its activities.

In 2018, the following major environmental safety awareness events were held:

- Public hearings on the construction of new fabrication facilities integrated into existing separation facilities of ECP, a storage facility for solid radioactive waste at the industrial site, as well as on the expansion of the defluorination plant for depleted uranium hexafluoride («W2-ECP»). Residents of Zelenogorsk, representatives of executive authorities and local self-government bodies, representatives of public organizations and mass media, managers and employees of ECP took part in the public discussions. Stakeholders' representatives supported all three projects;
- meeting of the leading specialists of the enterprise with the heads of budgetary and public organizations of Zelenogorsk within the framework of preparation of the public annual report;
- Participation of the company's specialists in the reception of the Public Council of Rosatom State Corporation;
- Participation of the company's specialists in the X International Forum AtomExpo-2018;
- Participation of the enterprise's specialists in the preparation of the program «Horizons of Atom» of the Russia 24 TV company;
- Introduction of the ECP's principal activities to schoolchildren of Zelenogorsk;
- Professional business game for senior schoolchildren «Fair of vacancies».



ECP employees regularly volunteer and initiate cleaning and gardening of Zelenogorsk and surrounding areas.

In 2018, ECP won two environmental competitions:

- "Top 100 of Russian enterprises. Environment and environmental management" that took place as part of XII National Conference "Ecology and industry. Future of developing economic mechanisms for environmental protection." in Saint Petersburg. ECP was awarded the gold medal of the contest, and the general director of the company, S.V. Filimonov, was awarded the «Ecologist of the Year 2018» badge;
- ECP had already been the winner of the prestigious XIV National Competition «Leader of Environmental Protection in Russia» in 2016 and 2017, and in 2018 it received another prize.



## 8

# ENVIRONMENTAL ACTIVITY AND RAISING PUBLIC AWARENESS

## 8.3. PUBLIC AWARENESS

ECP informs the population and external parties about the implementation of the Environmental Policy and the enterprise's activities in the field of environmental protection through the mass media (Impulse-ECP corporate newspaper, Panorama town newspaper, TViN TV programs).

The Impulse-ECP newspaper, an informational outlet of ECP, published 17 articles on environmental issues in the period from January to December 2018.

The company's environmental protection activities are periodically covered by mass media, such as TViN TV studio, Zeleny Gorod radio, Strana Rosatom, Element Buduschego, Segodnyashnyaya Gazeta and Panorama newspapers.

The Company's website annually publishes the annual environmental safety report and the integrated public annual report of ECP prepared in accordance with the Public Reporting Policy of the State Atomic Energy Corporation Rosatom and the Standard of Public Annual Reporting of the State Atomic Energy Corporation Rosatom, which take into account Russian and international corporate reporting requirements.





# 9

## ADDRESS AND CONTACT INFORMATION

RF, 663690, Krasnoyarsk Region,  
Zelenogorsk, Pervaya Promyshlennaya  
Street, building 1  
Joint Stock Company «Production  
Association «Electrochemical Plant»  
E-mail: [taifun@ecp.ru](mailto:taifun@ecp.ru)

General Director  
**Sergey Filimonov**

Deputy General Director for Technical  
Support and Quality - Chief Engineer  
**Alexey Blagoveschensky**

Deputy Chief Engineer for Nuclear,  
Radiation, Environmental and  
Occupational Safety  
**Sergey Merkulov**  
Tel./fax: (39169) 9-41-01

Head of Department for Production  
and Environmental Control  
**Andrey Andrianov**  
Tel: (39169) 9-41-84  
Fax: (39169) 9-22-70  
E-mail: [ecos@ecp.ru](mailto:ecos@ecp.ru)





JOINT STOCK COMPANY  
«PRODUCTION ASSOCIATION  
«ELECTROCHEMICAL PLANT»

Printed in the printing company «NONPAREL».  
663690, Krasnoyarsk region, Zelenogorsk, St. First Industrial, d. 1A.  
Phone: 8 (39169) 9-37-00, 9-43-58.