

# 4. Capital Management Results

## 4.1. Production Capital

### PERFORMANCE FOR 10 YEARS:

- **In 2007**, domestic uranium mining enterprises were consolidated and JSC RUSBURMASH was integrated into ARMZ Uranium Holding Company;
- **In 2008**, trial production operations were completed at Khiagda deposit of JSC Khiagda;
- **In 2009**, PJSC PIMCU's new sulfur acid plant was inaugurated with the capacity of 180 ktpa;
- **In 2012**, the first stage of PJSC PIMCU's mine eight was commissioned.
- **In 2013**, JSC Khiagda completed geological exploration and confirmed reserves at its Dybrynskoye, Koretkondinskoye, Namaruskoye, Kolichikanskoye and Vershinnoye Deposits. JSC Dalur obtained the license for exploration and development of its Khokhlovskoye deposit;
- **In 2015**, one of the largest industrial innovation projects was completed. It was construction, under permafrost conditions, of JSC Khiagda's advanced uranium mining enterprise, commissioning of all primary construction facilities of the central production site and the sulfur acid production plant. JSC Dalur commissioned, for commercial operation, the drying system for uranium compound suspension (yellow cake);
- **In 2016**, JSC Khiagda performed the Physical launch of the mining and processing complex at its Vershinnoye Deposit;
- **In 2017**, JSC Dalur obtained the subsoil use license for its Dobrovolnoye Deposit. JSC Dalur completed construction and installation work in its associated scandium extraction workshop. Physical launch of the mining and processing complex ensured at JSC Khiagda's Vershinnoye Deposit.

### 4.1.1. Mineral Raw Materials Base Development

JSC Atomredmetzoloto's uranium resources (MRB) as of 1/1/2018 stand at 523.9 kt. By the volume of its MRB, the Holding Company ranks second among global uranium mining majors.

**Table 9. Reserves and Resources of ARMZ Uranium Holding Co.'s Russian Enterprises as of 12/31/2017, kt**

Plant	Reserves	Resources P1*	Total MRB
PJSC PIMCU	100.8	-	100.8
JSC Khiagda	37.1	1.4	38.5
JSC Dalur	14.8	8.1	22.9
Elkon MMP, JSC	357.1	-	357.1
JSC «UMC Gornoe»	4.6	-	4.6
<b>In total:</b>	<b>514.5</b>	<b>9.4</b>	<b>523.9</b>

In 2017, the Holding Company increased its mineral resource base by:

- obtaining the subsoil license for the Dobrovolnoye Deposit (reserves C1+C2 – 7.1 kt, resources P1 – 5.1 kt);
- completing geological exploration at the Khokhlovskoye deposit and approval of reserves with the gain of 0.7 kt.

### GEOLOGICAL EXPLORATION IN RUSSIA

**Table 10. Works Exploration Drilling and Financing in 2017**

Types of Activities	Drilling volume, thousand line meters	Financing, Million RUB
Exploratory scoping FS and reserve calculation report for the Khokhlovskoye deposit (JSC Dalur)	-	17.0
Design of exploration operations at the Dobrovolnoye deposit (JSC Dalur)	-	5.9
Operation scoping FS for 2017 to 2020 for development of Streltsovskoye, Antey and Malo-Tulukuyevskoye molybdenum and uranium ore deposits of Streltsovskoye ore field in the Trans-Baikal Territory (PJSC PIMCU)	-	28.8
<b>Total:</b>	<b>-</b>	<b>51.7</b>

In 2017, geological exploration was performed at Khokhlovskoye deposit in the Kurgan Region and deposits of Streltsovskoye ore field (PJSC PIMCU, Trans-Baikal Territory). Total investments into geological exploration amounted to RUB 51.7 MM.

#### KEY ACTIVITIES AND RESULTS IN 2017:

- completion of exploration and pilot operation work for uranium mining using in-situ leaching at Khokhlovskoye deposit, receipt of the positive state expert conclusion on the exploratory scoping FS from Rosnedra GKZ (minutes No. 442-к dd. 9/6/2017) and reserve calculation report (minutes No. 5255 dd. 12/15/2017);
- receipt of the subsoil use license for Dobrovolnoye Deposit;
- development and submission of the exploratory operation project for Dobrovolnoye deposit to FBU Rosgeologeksperitiza;
- receipt of the positive state expert conclusion from Rosnedra GKZ for Operation scoping FS for 2017 to 2020 for development of Streltsovskoye, Antey and Malo-Tulukuyevskoye molybdenum and uranium ore deposits of Streltsovskoye ore field in the Trans-Baikal Territory (minutes No. 439-к of 6/9/2017).

#### PLANS FOR 2018:

- receipt of the positive conclusion from FBU Rosgeologeksperitiza for the exploration project for Dobrovolnoye Deposit;
- commencement of pilot production uranium mining operations using in-situ leaching at Dobrovolnoye deposit.

Commencement of Mine No. 6 project implementation within the framework of further site deconservation	The program for implementation of Mine No. 6 project was completed in full in 2017
Commencing construction of the Sredneye tailings' pond second stage at the expense of the Federal Target Program funds	Project implementation started. Dam increase work completed in 2017 Tailings' pond reconstruction operations will continue in 2018
Commencing design of the pilot operation unit for pyrite cinder processing	The unit is planned to be designed within the framework of the integrated project for pyrite cinder processing to produce gold and iron containing products

In 2017, motorcar transportation functions of Allianttransatom, JSC were returned to PJSC PIMCU's business unit, United Assets and RU Urtuyskoye.

Hitachi EH1700 dump truck was purchased for performance of stripping operations at Urtuysky Strip Mine.

New models of the domestic load-haul-dump machine produced by PJSC PIMCU presented at the Import Substitution exhibition at Crocus Expo. Diversification of production will allow PJSC PIMCU to enter new markets and increase its profits in the future. New machinery is planned for use during implementation of PJSC PIMCU's Mine No. 6 construction strategic project critical for the entire Krasnokamensk.

For details of participation in the exhibition, see 4.1.3. Business Diversification.

## 4.1.2. Production Capital Management

### PJSC PIMCU

#### PERFORMANCE FOR 10 YEARS:

- In 2012, the first stage of new uranium mine eight was commissioned;
- In 2014, the personnel and machinery positioning, and mining underground communication system was commissioned;
- In 2015, the new stowing complex was commissioned and implementation of the equipment fleet upgrade program started at Urtuysky strip mine;
- In 2016, break-even operation was achieved;
- In 2017, Mine No. 8 reached its rated capacity of 705 tpa of uranium and preparatory work to commence construction of Mine No. 6 was completed.

Figure 22. Uranium Production and Reserves in 2015-2017



#### 2017 RESULTS:

Plans declared in Report 2016	Results
Production of 1,631 tonnes of uranium (-242 tonnes versus 2016)	Uranium production program 2017 was implemented in full (1,631 tonnes)
Production of 3,500 kt of coal	3,306 kt of coal produced (+9% versus 2016)
Taking actions to migrate certain HMP workshops to the five-day working work from the seven-day working week	Certain HMP business units migrated to the five-day working work from the seven-day working week. It will allow cutting electric power and transportation costs materially as well as avoiding accumulation of ore excesses at the Central Ore Yard
Continued upgrading of mine and shaft equipment at underground uranium mine one and underground Mine No. 8, replacement of worn-out imported mining equipment for high-quality domestic peers	Upgrades of mining and shaft equipment performed

#### PLANS FOR 2018:

- celebration of PJSC PIMCU's 50th anniversary;
- commissioning of the plant for production proprietary granulated explosives;
- commissioning of the second stage of the Sredneye tailings' pond;
- commissioning the of water drainage duct at the Urtuysky strip mine.

#### MID-TERM PLANS:

- Mine No. 6 construction;
- life extension of existing mines until commissioning of Mine No. 6;
- development of new businesses including sized coal, pyrite cinders, lithium and mining machinery.

ASH DUMP AT KRASNOKAMENSK CHP NOW PUT INTO OPERATION

### JSC Dalur

#### PERFORMANCE FOR 10 YEARS:

##### 2007-2008

- commissioning of the primary process facility for processing of product solution with the capacity up to 700 tpa of uranium;
- commissioning of the Western local sorption unit;
- commissioning of the trial site facilities at Khokhlovskoye deposit including product and return solution tanks, oxidizing process hub and electric panel room.

##### 2009-2010

- implementation of the ISL intensification method using industrial volumes of oxidizer;
- completed construction of the road and bridge across the Barneva river;
- commissioning of the Ust-Uksyanskaya local sorption unit.

##### 2011-2012

- completed construction and commissioning of the road and bridge from the central production site (CPS) to Ust-Uksyanskaya local sorption unit (LSU) site;
- commissioning of the redundant OHL VL-10 kV at Ust-Uksyansk section;
- completed reconstruction of the sulfur acid warehouse at the near-rail base;
- completed standardization of the operating process at the finished product shipment section within the RPS framework.

##### 2013-2015

- receipt of the license for exploration and development of the Khokhlovskoye deposit;
- commissioning of the uranium compound suspension drier;

- implementation of the enterprise motorcar fleet upgrade program.
- commissioning of the trial production plant for associated scandium extraction at the central section of Dalmatovskoye deposit;
- receipt of the license for exploration and production of minerals at Dobrovolnoye deposit in the Zverinogolovskoye district.



**Figure 23. Uranium Production and Reserves in 2015-2017**



**2017 RESULTS:**

Plans declared in Report 2016	Results
Production of 580 tonnes of uranium (-11 tonnes versus 2016)	Completed. Uranium production program 2017 was implemented in full (592 tonnes)
Continued development of ROSATOM Production system within the subsidiary	Completed. Works on the Development of ROSATOM Production System (RPS) Continue
Receipt of the positive conclusion from FGU Glavgosekspertiza of Russia for the project of pilot production work at Khokhlovskoye deposit	Completed. Receipt of the positive conclusion from FGU Glavgosekspertiza of Russia for the project of pilot production work at Khokhlovskoye deposit
Approval of the exploratory scoping FS and reserve calculation report for the Khokhlovskoye deposit by the State Reserve Commission	Completed. Approval of exploratory scoping FS and reserves of Khokhlovskoye deposit by Rosnedra GKZ
Receipt of the subsoil use license for Dobrovolnoye deposit and commencement of design work for the deposit	Completed. Receipt of the subsoil use license for Dobrovolnoye Deposit
	The Central Production Site completed construction and installation work in the associated scandium extraction and started commissioning operation to produce sample scandium concentrate
	The enterprise migrated to the new electric power supply circuit with gas piston generation

**PLANS FOR 2018:**

- production of 591 tonnes of uranium;
- performing engineering surveys and developing design documents for LSU-2 and the near-rail base at Khokhlovskoye Deposit;
- performing engineering surveys and developing design documents for the PP at Dobrovolnoye deposit;
- extending the subsoil use license for Dalmatovskoye Deposit;
- commencing construction of the pilot production facility for production of aluminum and scandium master alloys.

**MID-TERM PLANS:**

- starting commercial production and obtaining high-purity scandium oxide, organizing aluminum and scandium master alloy production;
- commercial development of Khokhlovskoye deposit;
- construction of infrastructural facilities and performing mining refining and mining preparatory operations at Dobrovolnoye deposit.

**JSC Khiagda**

**PERFORMANCE FOR 10 YEARS:**

**Within 10 years, the uranium mining using ISL has increased materially (from 24 tonnes in 2007 to 693 in 2017)**

**2007-2008**

- trial production work had been completed and feasibility of further production expansion had been proven;
- startup of Khiagda 110/10 SS.

**2009**

- material increase of production was achieved;
- the bridge across the Vitim river was built Construction started of the first stage of the settlement, sulfur acid plant, power and warehousing facilities;
- the project was developed and Glavgosekspertiza approved the technical and economical FS for development of Khiagda deposit.

**2010-2011**

- field operations at Istochnoye and Kolichikanskoye deposits;
- Dybrynskoye, Koretkondinskoye and Namaruskoye Deposits completed natural hydrogeological studies and started exploration drilling.

**2012-2013**

- construction completed of two new production facilities being the finished product warehouse and the checkpoint in the production site;
- geological exploration was completed and reserves were confirmed at Dybrynskoye, Koretkondinskoye, Namaruskoye, Kolichikanskoye and Vershinnoye Deposits;
- work completed for additional exploration of Khiagda deposit.

**2014-2015**

- commissioning of the first construction stage facilities (the main building, sulfur acid warehouse, finished product warehouse, sorbent warehouse, fire depot,

- etc.). completion of the second construction stage facilities (power supply facilities, second lifting station, sodium nitrite storage site, etc.);
- construction completed of the sulfur acid production workshop;
- development started at Istochnoye Deposit.

**2016**

- commissioning of the third construction stage facilities being the sulfur acid production plant, auxiliary power supply site, water turnover cooling station, packaging warehouse with the painting section, etc.;
- development started at Vershinnoye Deposit.

**2017**

- construction and commissioning completed for places 11 at Istochnoye Deposit;
- construction completed of the first local sorption plant at Istochnoye Deposit.



**Figure 24. Uranium Production and Reserves**



**2017 RESULTS:**

Plans declared in Report 2016	Results
Production of 663 tonnes of uranium (+123 tonnes versus 2016)	Completed. Uranium production program 2017 was implemented in full (694 tonnes)
Commencement of Vershinnoye Deposit development: construction and outfitting of drill holes, commencement of the acidification stage as well as commencement of commissioning work at the local sorption plant	Physical launch completed of the mining and processing complex ensured at Vershinnoye Deposit
Commissioning of placer four at Khiagda deposit.	Completed. Placer 4 with complex hydrogeological conditions was commissioned within the framework of pilot operations for construction of new design process drill holes using NPPVC and new hydro insulation mixtures
Commissioning of the power supply turbine	Pending. A number of actions for power audit is being taken
	Uranium mining in the pilot commercial operation mode at Istochnoye Deposit is in progress
	Actions were taken to ensure obtaining the status of the RPS enterprise

**PLANS FOR 2018:**

- Production of 827 tonnes of uranium (+133 tonnes versus 2017);
- commissioning of Istochnoye Deposit;
- commencing development of design documents for Kolichikanskoye Deposit;
- ensuring competence development and implementation of new RRO methodologies;
- commissioning of Dzhilinda 110/10 kV SS;
- implementation of the Smart Mine project.

**MID-TERM PLANS:**

- increasing uranium output with subsequently reaching the rated capacity of 1000 tpa of uranium;
- completing construction of infrastructural facilities and performing mining refining and mining preparatory operations to increase production output.

**JSC RUSBURMASH**

**PERFORMANCE FOR 10 YEARS:**

- construction of over 1.6 thousand process drill holes for JSC Khiagda's uranium mining using the ISL method;
- construction of over 2 thousand process drill holes for JSC Dalur's uranium mining using the ISL method;
- drilling of over 2 million meters for PJSC PIMCU;
- since 2014, implementation has been in progress of the full cycle of geological exploration, design and survey operations within the framework of Pavlovskoye Field development in Novaya Zemlya Archipelago;
- 244 actions were taken within the Performance Improvement Program framework;
- the Ready Polygon Engineering Center was created;
- construction competencies were obtained within the business diversification framework;
- Construction Site Five standalone business unit (SBU) was created to perform construction and installation work for development of mining polygons;
- AMK KND-M (AINK-49) hardware and methodological suite was developed with unique technical specifications.

JSC RUSBURMASH is a comprehensive geological exploration company with a powerful drilling service. The company is involved in geological exploration works for the benefit of JSC Atomredmetzoloto and construction of all types of wells in the solid minerals deposits.

In 2017, JSC RUSBURMASH performed drilling operations for three operational uranium mining enterprises: JSC Dalur, JSC Khiagda and PJSC PIMCU.

**2017 RESULTS:**

**Table 11. JSC RUSBURMASH Completed Drilling Operations, thousand ML:**

Customer	2015	2016	2017
PJSC PIMCU	403.76	310.64	255.58
JSC Khiagda	47.18	47.26	36.48
JSC Dalur	83.32	146.98	93.80
<b>In total:</b>	<b>534.26</b>	<b>504.89</b>	<b>391.86</b>

**'PREPARED TESTING GROUND' CONCEPT – IT IS A PROJECT ENVISAGING THE REDUCTION OF COST OF CONSTRUCTION OF WELLS AND PIPING OF COMPONENTS THROUGH OPTIMISATION OF PROCESS SOLUTIONS**

Plans declared in Report 2016	Results
Completion of 100% of drilling operations for JSC Khiagda, 30.391 thousand ML	Completed. Increasing drilling operations on the Customer's initiative
Completion of 100% of drilling operations for PJSC PIMCU, 268.75 thousand ML	Not completed due to the Customer's failure to provide work scopes
Completion of 100% of drilling operations for JSC Dalur, 115.209 thousand ML	Not completed due to prolonged development of drill holes given hydrogeological features of the units
Completion of the field stage of geological engineering surveys within the framework of the Mining and concentration Works based on Pavlovskoye Lead-Zinc Field project in Novaya Zemlya Archipelago	Completed. Field stage 2017 for the Mining and concentration Works based on Pavlovskoye Lead-Zinc Field project in Novaya Zemlya Archipelago was completed in full

Updating sections of the Operating Conditions FS for 2016-2020 of Streltsovskoye Ore Field for submission to FBU GKZ	Completed. Sections were updated and the Operating Conditions FS for 2016-2020 of Streltsovskoye Ore Field successfully completed its expert examination at FBU GKZ
Implementation of prompt fission neutron well logging (KND-M) at JSC Khiagda for the purposes of refining uranium ore radiology and identifying undeveloped rocks and uranium redistributed in the course of ISL	Completed in accordance with the scope set forth in the executed agreement
Continuation of geological and geophysical support of the drilling of production and exploration wells on uranium deposits of JSC Dalur and JSC Khiagda	Completed. Geological and geophysical support of the drilling of production and exploration wells on uranium deposits of JSC Dalur and JSC Khiagda are being performed in full
Development of the geological exploration project for Dobrovolnoye deposit	Not completed. In the course of the bidding procedure, another contractor was selected to develop the geological exploration project for Dobrovolnoye deposit
Continuing operations for implementation of KND-M (fission neutron logging) at deposits of the Holding Company's uranium mining enterprises as well as for development of the geological exploration project for Dobrovolnoye deposit at different development stages throughout the lifecycle	Completed partially. Operations for implementation of KND-M are included into JSC Khiagda's investment program (IP) for 2018. The geological exploration project for Dobrovolnoye deposit is being developed by the third party outside ROSATOM
Further implementation of new drill hole designs using NPPVC pipes provided the Holding Company's mining enterprises are interested.	Completed. 20 drill holes were constructed at JSC Khiagda's deposits and 14 pilot drill holes were constructed at JSC Dalur's deposits
Implementation of construction processes (subsoil reinforcement, vibration floatation and jet grouting)	Completed. Pilot operations were performed for restoration of the runway in Chkalovsky airfield
Execution of profitable agreements for traditional types of geological exploration and drilling services for customers outside the Holding Company as well as for new construction services both inside the Holding Company and for external customers to ensure that the enterprise achieves break-even operation	Completed. Execution of the profitable agreement for collection, study and review of file and archive materials on development, residual balance reserves and non-balance ore dumps of Zavitsinskoye deposit for evaluation of dump reserves of Pervomaysky Mining and concentration Works (the Customer is NYaU MIFI). Execution of the agreement for compiling reporting materials on exploration of Khokhlovskoye deposit Agreements for construction work executed with JSC Dalur
Continuing streamlining activities	Completed. 28 streamlining activities were performed with savings of RUB 236 MM

**PLANS FOR 2018:**

- completion of 100% of drilling operations:
  - PJSC PIMCU 268.816 thousand ML
  - JSC Khiagda 49.158 thousand ML
  - JSC Dalur 127.663 thousand ML
- completion of the program for implementation of new process drill hole designs at JSC Khiagda and JSC Dalur;
- completion of 100% of geological exploration, drilling and construction (including LSP) operations at JSC Khiagda and JSC Dalur;
- integration of the Ready Polygon concept into the practice of deployment and liquidation of mining units of uranium deposits using in-situ leaching.

**LONG-TERM PLANS:**

- completion of the Holding Company's production program for drill hole construction within the set deadlines;
- development of construction competencies for construction of in-situ leaching polygons for the Holding Company and third party customers;
- continuing business diversification including entering external markets for provision of geological exploration and drilling services for solid minerals, development of competencies and provision of services for geological mathematical modeling, geological engineering surveys, rehabilitation of radiation environmental risk territories, engineering surveys, construction, etc.

## JSC VNIIPromtehnologii

JSC VNIIPromtehnologii is ARMZ Uranium Holding Co.'s engineering center.

Its core business lines are implementation of mineral mining projects in the EPCM format, environmental consulting and upgrades of existing production facilities.

### 2017 RESULTS:

Plans declared in Report 2016	Results
In 2017, it is planned to reach break-even operation by orientation to the external market (outside the Company loop and the industry), as well as through the inventory of the JSC VNIIPromtehnologii's competencies, the optimization of production processes and the increase in labor productivity at the institute	Pending. In 2017, the enterprises' financial rehabilitation program was approved to ensure that it achieves the break-even point. Current expenses were audited and production costs and employees were cut with the required competencies preserved

JSC VNIIPromtehnologii's key task for 2017 still remains implementing the approved plan for achieving the break-even point. Although the past year was quite complicated for the uranium mining industry, JSC VNIIPromtehnologii implemented some projects in its capacity of ARMZ Uranium Holding Co.'s engineering center.

In 2017, work continued with key customers being JSC Khiagda and JSC Dalur. Work was completed to design Mine No. 6 (Argunskoye and Zherlovoye fields) for PJSC PIMCU, the project was upheld and approved. This project is strategic both for PJSC PIMCU and Russian uranium industry in general. The project is to be launched as early as 2018.

In 2017, JSC VNIIPromtehnologii was gradually migrating to 3D processes to minimize costs and durations of design. Migration to development of all designs in 3D format is scheduled for 2018.

### PERFORMANCE FOR 10 YEARS:

- The key result of ten years of operations is creation of ARMZ Uranium Holding Co. Engineering Center based on JSC VNIIPromtehnologii as well as implementation of scientific and applied solutions of the institute in Holding Company's uranium mining and business diversification projects.



JSC VNIIPromtehnologii's management underwent material changes as well. In 2017, migration to the new organization structure was completed, the remuneration system was modified and harmonized, incentive components were developed for development of projects, quality and client focus standards were implemented.

### PLANS FOR 2018:

In 2018, JSC VNIIPromtehnologii's key objective is increasing its order portfolio, decreasing the share of internal intra-division customers in its revenues as well as developing the strategy for entering the external market to increase its revenues from its external counterparties. In 2018, migration to 3D design will be completed, a number of projects material for the industry will be implemented, designer workplaces will be refurbished and new laboratory is scheduled for commissioning.

## JSC The First Ore Mining Company (FOMC)

FOMC is developing Pavlovskoye lead-zinc field and is the subsoil user in the Bezmyannaya River basin in Novaya Zemlya Archipelago in the Arkhangelsk Region.

### 2017 RESULTS:

Plans declared in the Report for 2016	Results
Completion of integrated field engineering surveys, process testing of semi-industrial designs and continuation of design operations	Completed. Integrated field engineering survey operations were completed for construction of the mining and concentration works (the MRW) and engineering surveys were completed for construction of onshore facilities of the marine port complex. Key process solutions were developed, process studies of semi-industrial designs were completed, the process regulation for lead and zinc ore refining was developed
Construction and startup (after completion of engineering surveys, design and other required operations) of the mining and concentration works, mining and processing of lead and zinc ores for further sales of lead and zinc concentrates	Pending. Prospective plans after completion of the project and receipt of positive expert conclusions for it
	The project is included into the Social and Economic Development of the Arctic Zone of the Russian Federation state program approved by resolution of the Government of the Russian Federation No. 366 dd. 4/21/2014 (as amended with resolution of the Government of the Russian Federation No. 1064 dd. 8/31/2017)

### PLANS FOR 2018 AND MID-TERM PLANS:

In 2018, FOMC plans to complete engineering surveys for construction of seaport facilities and submit results of such surveys for state expert examination. It is also planned to complete design work for MRW and seaport facilities and also submit the project for state expert examination. Further FOMC's plans after its receipt of the positive conclusion from FAU Glavgosekspertiza of Russian including commencing construction of the MRW and seaport facilities for the purposes of commercial operation of Pavlovskoye Field.

In 2018, FOMC plans to obtain the status of the priority investment project for Arkhangelsk Region to obtain tax benefits and other preferences in the course of project implementation.

FOMC's further prospective plans include organizing meetings and negotiations as well as executing relevant protocols and agreements (memorandums, contracts, etc.) with potential investors and/or product consumers of the MRW being created.

## Elkon Mining and JSC Metallurgical Plant (JSC Elkon MMP)

Elkon MMP, JSC is engaged in geophysical operations, exploration, mining and processing of uranium ores.

### 2017 RESULTS:

Plans declared in Report 2016	Results
Preserving the «sleeping mode» for Elkon project until December 2017	Completed. By ROSATOM's resolution, the sleeping mode is extended until December 2019
Continued operations of Elkon MMP, JSC project operators and EGMK Project, JSC to preserve competences and previously developed project materials.	Completed. Operations of Elkon MMP, JSC project operators and EGMK-Project, JSC are supported with a view to preserve competences and previously developed project materials
If macroeconomic environment improves, it is planned to consider resuming the active phase of pre-design operations	Expecting improvement of the macroeconomic environment

### PLANS FOR 2018:

- preserving the «sleeping mode» for Elkon project until December 2019.

## LLC United Uranium Plants (LLC UUP)

UUP trades in natural uranium in the Russian market and also deals with intermediary, consulting and marketing activities.

### 2017 RESULTS:

Plans declared in Report 2016	Results
Customers' approval of the structure and time schedules of material deliveries in 2018	Completed. The amendment agreement for 2018 to the long-term agreement with JSC TENEX was executed
Execution of the mid-term agreement with JSC TENEX for feedstock deliveries from 2018	Completed. The long-term agreement with JSC TENEX was extended until 2030
Extension of the long-term agreement with JSC TVEL until 2026	Completed. The long-term agreement with JSC TVEL was extended by execution of the amendment agreement until 2026
Conducting the observation audit of JSC Dalur jointly with representative of Fortum energy company (Finland) within the framework of interactions for control of JSC TVEL's supply chain by the nuclear fuel buyer	Completed. The observation audit of JSC Dalur was conducted jointly with Fortum's representatives

### PLANS FOR 2018:

In accordance with ROSATOM's resolution, UUP started the voluntary liquidation procedure with formation of JSC Atomredmetzoloto's Commercial Directorate and UUP's assignment to ARMZ of agreements with the former's customers being JSC TENEX and JSC TVEL as well as agreements related to sales to uranium feedstock customers.

## LLC ARMZ Service

LLC ARMZ Service is the authorized body for organization of procurement procedure for ARMZ Uranium Holding Co.'s enterprises.

### 2017 RESULTS:

Plans declared in Report 2016	Results
Further consideration of the matter of applying the project for transfer of integrated functions for forming and supporting competitive procurement procedures for PJSC PIMCU's needs	Completed. Consideration of the project resulted into transfer of integrated functions for forming and supporting competitive procurements procedures to LLC PIMCU Services
Further provision of procurement procedure organizer services to enterprises of the Company	Completed. 477 procurement procedures were completed to satisfy the needs of the Holding Company's enterprises  The savings from competitive procurement procedures amounted to RUB 231.5 MM (5.05%) of budget prices of ARMZ Uranium Holding Co.'s enterprises
Continued work on organization of centralized procurement for the needs of the Holding Company as a part of category management	Completed. In accordance with ROSATOM's order No. 1/547-П dd. 6/20/2016 On Preparing and Conducting Centralized Procurement of MTR&E, Work and Services, the special clothing centralized procurement procedure was performed for JSC Khiagda, JSC Dalur, JSC RUSBURMASH and JSC VNIIPromtehnologii
Continuing project activities as part of ARMZ Uranium Holding Co.'s new business development program	Completed <ul style="list-style-type: none"> <li>Processing of Pyrite Cinders into Ferrosilicium Pilot Industrial testing was organized resulting into ferrosilicium output. Examination of PJSC PIMCU's RMZ was organized resulting into purchase of the furnace for installation in RMZ casting workshop for further pilot production tests</li> <li>Manufacturing of molybdenum products at PJSC PIMCU's idle production capacities. Examination of PJSC PIMCU's facilities was organized resulting into execution of the molybdenum feedstock processing agreement by and between PJSC PIMCU and MC SHIMKO GROUP, LLC. Under the agreement, the CRL developed the molybdenum product manufacturing process</li> </ul>

Operations were also performed for coal sales and expansion of coal sales market. The entire volume of coal produced for commercial sales in the amount of 1.7 MT was sold. Operations for coal sale market expansion resulted into increasing of the number of buyers from three in 2016 to ten in 2017 ensuring coal sales growth by 29%.

### PLANS FOR 2018 AND THE FUTURE:

LLC ARMZ Service's business priority in 2018 is provision of services to the Holding Company's enterprises including authorized body services, services for development of the package of documents for conducting competitive procurement procedures as well as services for reviewing (approving) category strategies, including in ROSATOM; issuance of recommendation aimed at improving economic efficiency of procurement of MTR&E, works and services as well as formation of competitive environment for preparation and performance of procurement procedures, transport

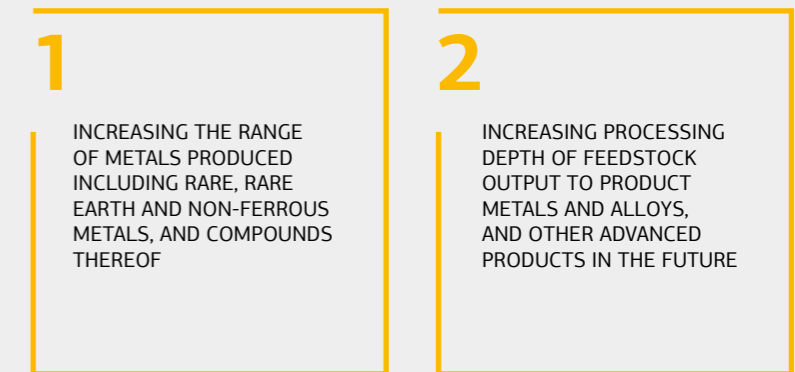
services, employee labor provision services and coal sale agency services.

Mid-term, consolidation of procurement procedures and development of the harmonized procurement approach within the framework of the Holding Company's enterprises is planned focusing on engaging immediate manufacturers to participation in competitive procedure by approving key terms and conditions of draft agreements to improve economic efficiency of procurement procedures and minimizing the risk of production process interruption.

## 4.1.3. Business Diversification

### 4.1.3.1. . Development of New Businesses

Development of promising business lines remains one of the priorities of ARMZ's strategy. The Mining Division has been proclaimed the center of responsibility for supplying the industry and the Russian Federation with uranium and other strategic metals. Within the framework of the set strategic objective to increase the non-uranium businesses' share in revenues to 30% by 2030, the division's business lines for feedstock production and manufacturing of different products develop in two directions:



Both directions are scheduled for development jointly with ROSATOM's adjacent divisions giving new opportunities to the division itself.

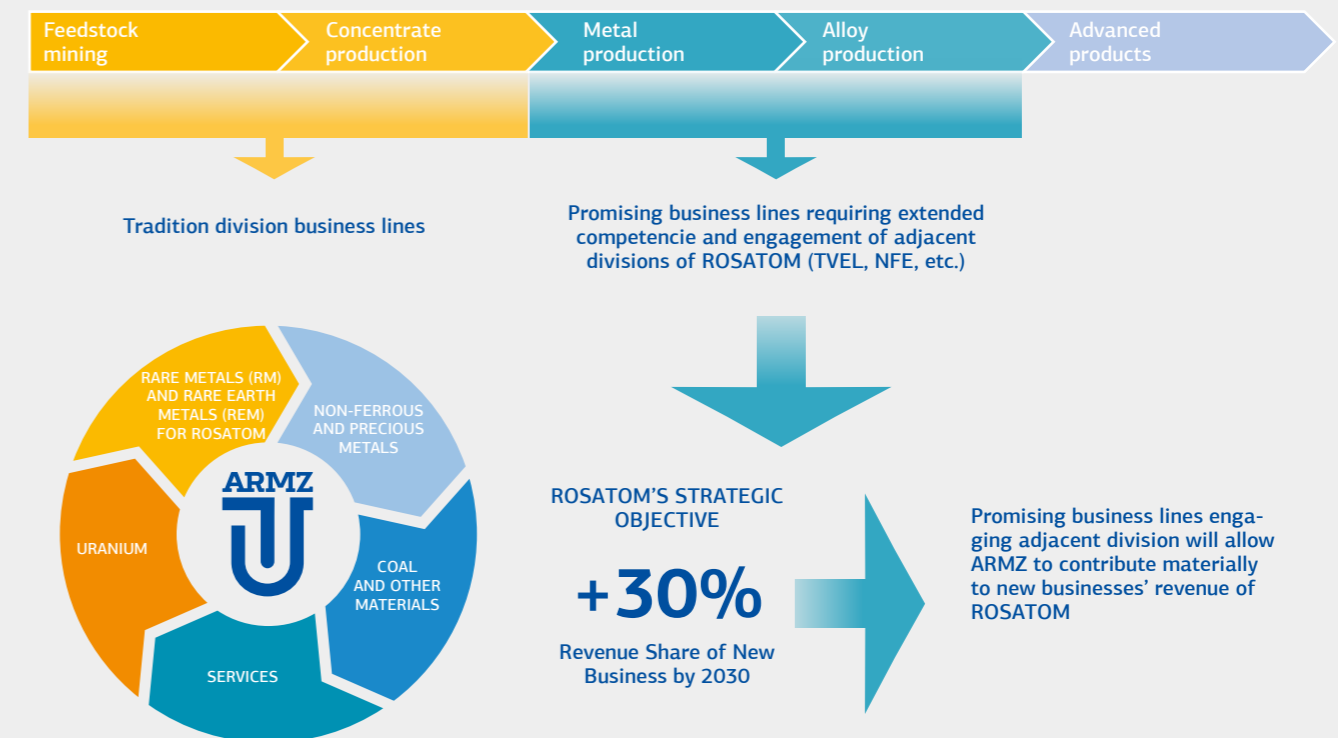


Figure 25. Mining Division – Center of Responsibility for Supply of Uranium and Other Strategic Metals

No product portfolio expansion is possible without expanding the new business development geography. Currently, JSC Atomredmetzoloto both independently and jointly with its partners is implementing several projects in different parts of Russia. In its traditional operating region being Trans-Baikal Territory, the division's migration from mining to production of increased energy value (sized) coal allowed increasing

the range of its consumers. Processing of manmade wastes from pyrite cinders allows solving environmental problems. Restoring lithium concentrate production at Zavitinskoye deposit will supply the country's new business lines with feedstock. Manufacturing of new products started due to increasing processing depth of the mineral resource base of scandium oxide and fluoride, and aluminum and

scandium master alloys in the future in the Kurgan Region in the Urals. Operations for a number of new large-scale projects implemented jointly with our partners from non-uranium industries are conducted in Novaya Zemlya (Pavlovskoye project for production of lead and zinc concentrates), the Tomsk Region (titanium and zirconium sands) as well as gold and silver in the gold and uranium deposit in South Yakutia.

#### NEW BUSINESS PROJECT GEOGRAPHY

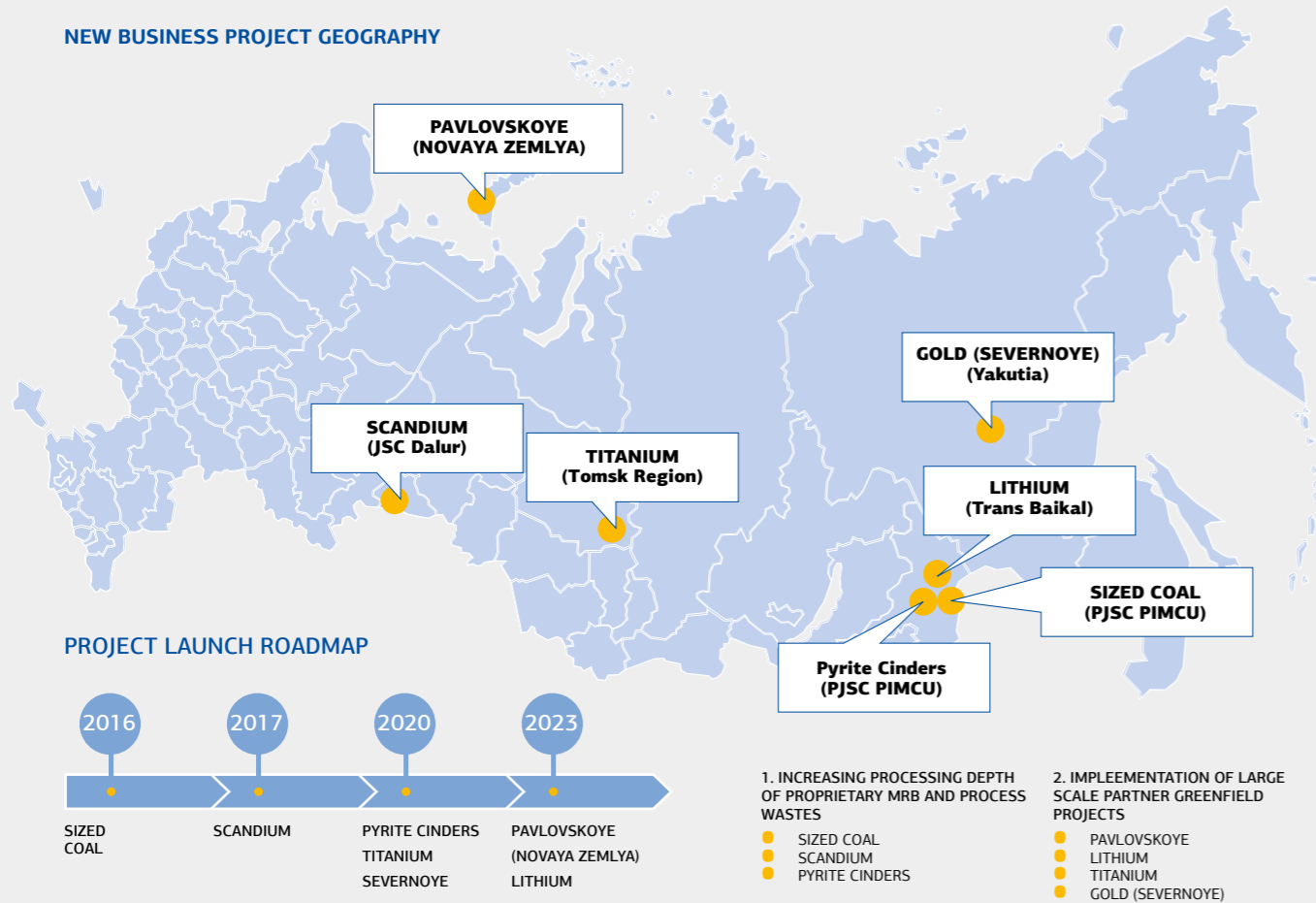


Figure 26. Product Portfolio of Existing and Emerging Businesses JSC Atomredmetzoloto

Considering its new product types, the Mining Division casts a wider glance at possible implementation of projects for production of other types of feedstock to satisfy current and future needs of ROSATOM. Here, the primary priority is mining metals used in the most advanced development

sectors of modern economy such as additive processes, robotics, energy accumulation, high temperature and renewable power, etc. Some relevant projects are being developed already including scandium, lithium, zirconium, titanium and other metals. To maximize use of feedstock production

competencies, developments concepts are considered and negotiations are conducted with potential consumers and partners from other industries regarding supplying them with feedstock (rare earth metals, boron, antimony, niobium, other metals and compounds thereof).

ROSATOM'S NEW BUSINESS DEVELOPMENT PRIORITIES	PRODUCT LINES													
	Sc	Zn	Pb	Li	Au	Ti	Zr	REE	Cu	Ag	B	Fe (B4)	Nb	Be
Additive processes	☑					☑						☑		
Robotics						☑		☑						
Composite materials						☑	☑				☑			
Power accumulators			☑	☑				☑						
Integrated power structure engineering								☑	☑	☑				
VSTP based power systems								☑	☑		☑		☑	
Renewable power								☑			☑	☑		
Nuclear medicine								☑			☑		☑	
Other ARMZ initiatives		☑			☑									☑

Sc SCANDIUM  
 Zn ZINK  
 Pb LEAD  
 Au GOLD  
 Ti TITANIUM  
 Zr ZIRCONIUM  
 REE REE  
 Cu COPPER  
 Ag SILVER  
 B BORON  
 Fe (B4) HIGH PURITY IRON  
 Nb NIOBIUM  
 Be BERYLLIUM

Current division projects Promising division projects Potential division projects

Figure 27. Mining Division's Potential for Participation in Supply of Feedstock for ROSATOM Strategic Initiatives

#### 4.1.3.2. Project for Load-Haul-Dump Machines for Underground Mining Operations

##### 2017 RESULTS:

Plans declared in Report 2016	Results
Manufacture of ten load-haul-dump (LHD) machines at PJSC PIMCU's RMZ	Completed. 10 LHD machines manufactured.
Reconstruction of foreign machines using Russian analogue parts	Completed One narrow-cut LHD machine was restored/reconstructed.
Replacement of parts for the parts manufactured by RMZ	Completed partially. Some hydraulic assemblies are imported

Table 12. PD-2E LHD Machine Manufacturing Statistics in 2015-2017

	2015	2016	2017
Machines Produced	9	11	10

##### PLANS FOR 2018 AND MID-TERM PLANS:

- Continued manufacturing of PD-2E (3 pcs.) and PD-1E (3 pcs.) LHD machines

#### PROJECT FOR LOAD-HAUL-DUMP MACHINES FOR UNDERGROUND MINING OPERATIONS (GORTECH)

THE PROJECT for Organization and Deployment of Domestic Production Load-Haul-Dump Machines by PJSC PIMCU's mechanical repair plant (RMZ)

##### PROJECT OBJECTIVES :

- Creation of domestic production of accumulator and diesel load-haul-dump machines



Figure 28. Machine PD-2EE

**2017 RESULTS:**

- manufacturer testing started of the electric load-haul-dump machine PD-2EE designed for PJSC PIMCU's underground mining operations;
- the machine with improved technical and economic specifications was created:
- electric power consumption decreased to 30%;
- reducing hydraulic oil operating temperature will allow replacing it once every two years;
- planned reduction of maintenance and repair (M&R) costs to 40%;
- use of advanced ergonomics, control and measurement hardware. The machine has the system for automatic control of its hydraulic assemblies by processing input signals from its controls being electronic pedals and joysticks. The system is combined into the single information channel with the thrust electric drive control system. The visualization environment was developed allowing to see more detailed machine parameters;
- the machine has the device for remote equipment status monitoring. It allows the service personnel to receive information on operation of all PD-2EE systems under specific technical parameters for the last 20 days. If GSM communications are available in the mine, the data may be received online. Based on results of operations and analysis of data received from the recorder using the debugger kit, one may edit the executive program and its parameters;
- electric power drive is used instead of hydrostatic transmission;
- modular assemblies ensure accessibility for maintenance and repairs and allow further retrofitting the machine using power accumulator energy source based on lithium ion cells.



**Figure 29. JSC Dalur's Pilot Commercial Production Unit (Central Section of Dalmatovskoye Deposit)**

**PLANS FOR 2018:**

- certification of the products with Russian and foreign scandium oxide producers;
- completing development of design documents for creation of the master alloy pilot commercial production facility;
- commencing construction of the master alloy pilot production facility.

For details of scandium use, see Annual Report 2016.

**4.1.3.4. Project «Processing of Pyrite Cinders at PJSC PIMCU»**

**THE PROJECT** of the pilot hydro metallurgical workshop of PJSC PIMCU's central research and development laboratory aims at increasing processing depth of the existing manmade feedstock. Pilot production operations continue for processing pyrite cinders to manufacture finished products in the form of non-ferrous and precious metal concentrates, ferrous alloys and high-purity iron, pigments and coagulants.

**PROJECT OBJECTIVES :**

- increasing processing depth of the proprietary feedstock base;
- revenue diversification;
- solving environmental problems;
- creating new jobs at PJSC PIMCU.

**2017 RESULTS:**

Plans declared in Report 2016	Results
Completion of the gold extraction pilot production operations	Completed. Semi-commercial testing completed within the fully closed cycle. The commercial gold extraction process was developed with the end-to-end extraction degree in excess of 70%. Production of Dore gold is underway
Commencement of design of the commercial gold extraction unit	The gold extraction unit is planned to be designed within the framework of the integrated project for pyrite cinder processing to produce gold and iron containing products
Engagement of partners for testing processes of additional commercial product manufacturing from pyrite cinders (iron oxide pigments, coagulants for mine water treatment, ferrous alloys, etc.)	Completed. The agreement was achieved with MC SHIMKO GROUP, LLC to organize the joint venture for production of ferrous alloys and molybdenum. The Collaboration Agreement was executed. Joint ferrosilicium pilot production operations started.  Negotiations are in progress with four other companies for implementation of different projects involving pyrite cinder processing
	Laboratory studies were performed for deposition of zinc and copper pyrite cinders from leaching solutions
	Laboratory studies were completed for production of iron oxide pigments. Proper quality pigment prototypes were obtained
	Sample iron coagulant solutions were produced for use at waste treatment facilities

**BUSINESS CASE: 2017 IMPORT SUBSTITUTION NATIONAL FORUM**

In September 2017, the First Import Substitution 2017 National Forum held at Crocus Expo exhibition center saw presentation of prototypes of self-propelled mining machinery to be produced at PJSC PIMCU (Gortech Project) Models of mining machinery developed within the project framework were appraised highly by specialists and delegation of the Russian Federation Government lead by the Russian PM, Mr. D.A. Medvedev. In the course of the event, it was noted that the machinery is planned for production at new uranium mine six construction whereof started in Trans Baikal Territory. Assembly manufacturing of self-propelled mining machinery will satisfy PJSC PIMCU's proprietary needs and is scheduled for external market sales as well.

**For reference:** PD-2EE cargo capacity is 2.6 tonnes, its ladle volume is 1.16 cu.m., the dimensions are 6315x1500x1990 mm

**4.1.3.3. Project «Production of Associated Scandium at JSC Dalur»**

In 2017, JSC Dalur started producing high-purity scandium oxide.

**2017 RESULTS:**

Plans declared in Report 2016	Results
Completion of construction and startup of pilot commercial production of scandium oxide	Completed. In April 2017, the Central Section of JSC Dalur's Dalmatovskoye deposit saw the commissioning startup of the scandium oxide pilot commercial production unit with the capacity of 1.5 tpa
Completion of R&D operations for development of the process for production of aluminum and scandium master alloys and commencement of creation of the master alloy pilot commercial production facility	Completed. Development of the aluminum-scandium master alloy production process was completed. The process ensures product quality at low production cost of aluminum and scandium master alloys. The process was successfully tested in at the Industrial site of JSC Dalur. The deadlines for commencement of the master alloy production facility construction were adjusted to 2018

For details of the project and market demand for its products, and its prospects, see Report 2016.



**PLANS FOR 2018:**

Within the framework of PJSC PIMCU's Pyrite Cinder Processing project, the following key objectives have been set:

- design of the commercial gold production unit;
- development of the program and process regulation for production of ferrous alloys from pyrite treatment processing products after gold extraction;
- organization of experimental production of ferrous alloys at PJSC PIMCU's production site;
- ferrous alloy pilot production operations;
- creation of the joint venture (PJSC PIMCU and its ferrous alloy production partner);

- launch of the ferrous alloy production plant;
- development of the methodology for semi-commercial testing of iron coagulants.



**4.1.3.5. Project «Creation of Lithium Carbonate Production based on Zavitsinskoye Deposit»**

**THE PROJECT** – Creation of Lithium Carbonate Production Project.

**PROJECT OBJECTIVES :**

- business diversification;
- ensuring import substitution of strategic feed and satisfaction of JSC TVEL's needs for creation of power accumulator production facilities;
- creating new jobs at PJSC PIMCU.

**2017 RESULTS:**

Plans declared in Report 2016	Results
ROSATOM's approval and commencement of implementation of the project for creation of the lithium production facility based on feedstock sources of Zavitsinskoye deposit	Completed. In May 2017, ROSATOM passed its positive resolution to start implementing the project
Participation in the Russian Education and Science Ministry's competition for obtaining budget co-financing of R&D operations for development of commercial process for production of lithium concentrate and lithium carbonate	Completed. In March 2017, PJSC PIMCU won the Russian Education and Science Ministry's competition and received the budget subsidy for development of the Industrial process for lithium carbonate production
Start of design and survey operation for creation of pilot lithium concentrate and lithium carbonate production units	Completed. In 2017, process development operations started and technical audit of sites for placement of pilot and commercial production facilities was performed

**PLANS FOR 2018:**

- completing the preliminary technical economic feasibility study for the project;
- formulation of the corporate model, obtaining ROSATOM's approval and creating the project operator joint venture.

**4.1.3.6. Project «Gold Mining Organization»**

**THE PROJECT** for creation of the gold ore mining and processing facility with production of base gold based on Severnoye deposit.



**PROJECT OBJECTIVES :**

- increasing processing depth of the proprietary feedstock base;
- increasing business scales;
- revenue diversification;
- development of Elkon gold and uranium ore hub.

**2017 RESULTS:**

Plans declared in Report 2016	Results
Continued operations with the possibility of initiating one or several gold mining projects and commencing practical implementation thereof	Completed. In September 2017, ROSATOM passed its positive resolution to start implementing the project for organization of gold mining at Severnoye deposit

**PLANS FOR 2018:**

- exploratory ditching and trenching;
- exploratory and hydrogeological drilling.

**4.1.3.7. Project for Organization of Titanium and Zirconium Concentrate Production at Tuganskoye Deposit**

**THE PROJECT** for creation of the mining and concentration works for production of zirconium and titanium ore concentrates based on Tuganskoye ilmenite and zircon sand deposit (Tomsk Region).

**2017 RESULTS:**

- initiation of the project, start of the due diligence procedure.

**PLANS FOR 2018:**

- Commencement of design work at the first production stage (0.575 mtpa).



**PROJECT OBJECTIVES :**

- import substitution of titanium and zirconium concentrates within the Russian Federation, including for ROSATOM and Rostec's consumers, and revenue diversification.

**4.1.4. ROSATOM Production System. Compliance with Product Quality Requirements**

**IMPLEMENTATION OF RPS PROJECTS**

In 2017, operations within the RPS framework, aimed at:

- scaling the RPS culture and ideology at the Holding Company's enterprises;
- identification and promotion of the production system leaders;
- creation of the RPS enterprise at JSC Khiagda.

- Circa 1,300 people were engaged into implementation of different RPS programs in 2017.
- 48 people were proclaimed RPS leaders.
- 1782 people were trained in RPS tools and methodologies.

**OVER RUB 450 BN**  
IS THE ACTUAL SAVINGS OF RPS ACTIONS  
TAKEN IN 2017

**RUB 1.3 BN**  
IS THE TOTAL ACTUAL SAVINGS  
FROM OPERATION PERFORMANCE  
IMPROVEMENT ACTIVITIES

## 2017 RESULTS:

- implementation of the project for improvement of value chain management performance named Products of the Nuclear Fuel Cycle Initial Stage (NFC IS) resulted into acceleration of the finished products shipping from JSC Khiagda's warehouse to the customer by 64% (from 30 to eleven days);
- implementation of process solutions and streamlining of treatment production processes at PJSC PIMCU resulted into additional production of 3275 tonnes of ore during implementation of the project for Application of Selective Ore Extraction during Development of Structural Accumulations at Mine No. 8;
- labor organization, loss reduction, operation standardization and accurate planning of work allowed PJSC PIMCU to accelerate the process of manufacturing oil radiators for PD-2E by 42% (from 111.22 to 64.61 hours) during implementation of the project named Process of Manufacturing Oil Radiators for PD-2E;
- dissemination of JSC Dalur's results under the project for Acceleration of Processes during Stripping and Preparation of Reserves allowed achieving the effect of RUB 8.3 MM at two units;
- JSC Dalur's further operations under the project for Replacement of Carbon Ammonia Salt for Waterless Ammonia in the Commercial Desorbate Deposition Cycle resulted into the savings of RUB 13.6 MM;
- the total actual annual savings from implemented activities for operation performance improvement exceeded RUB 450 MM.

## PLANS FOR 2018:

- continuing operations within the RPS framework in three key directions:
  - production;
  - business process performance;
  - management performance;
- acceleration of processes, reduction of pending reserves and unclaimed valuables at enterprises;
- acceleration of mining polygon construction;
- equipment and staff performance improvement;
- conducting theoretical and practical staff training by the Holding Company's licensed trainers within the framework of personal and electronic courses under programs approved by ROSATOM's Corporate Academy (over 2000 people);
- recertifying JSC Dalur's management systems for ISO compliance: ISO 9001:2015, ISO: 14001:2015 and auditing JSC Atomredmetzoloto, PJSC PIMCU and JSC Khiagda for compliance with the same standards.

## COMPLIANCE WITH PRODUCT QUALITY REQUIREMENTS

JSC Siberian Chemical Works is consumer of ARMZ Uranium Holding Co.'s enterprises (PJSC PIMCU, JSC Khiagda and JSC Dalur).

Products of uranium mining enterprises of PJSC PIMCU, JSC Khiagda, JSC Dalur must comply with Technical Specifications TU 95 1981-2009 for Uranium Oxide Concentrate and TU 95-2002 for Ammonium Polyuranate (yellow cake).

In 2017, there were no consumer claims against finished products of mining enterprises of PJSC PIMCU, JSC Dalur and JSC Khiagda. All product batches manufactured were compliant with technical specifications.

In December 2017, JSC Atomredmetzoloto, PJSC PIMCU and JSC Khiagda were given certificates of ISO compliance 9001:2015 – quality management system; ISO 14001:2015 – environmental management system.

## INTEGRATED ENERGY SAVINGS AND EFFICIENCY IMPROVEMENT PROGRAM

For implementation details of the Energy Savings and Energy Efficiency Program, see Report 2016.

## RESULTS OF IMPLEMENTING THE INCENTIVE SYSTEM IN 2017:

- staff KPIs (for process engineers, executives, specialists, etc.) include the energy savings and energy efficiency indicator.

In 2017, JSC Atomredmetzoloto spent 52,200 l of motor gasoline (the mean price per liter is RUB 41 – RUB 2,140,200.00).

Other power resources types (coal, fuel oil, natural gas) are not used at the Company. The Company rents its office premises. Under the office lease agreement, consumed power is included in the common list of municipal services and is paid for on a monthly basis under a separate bill. In the reporting period, the Company consumed electric power for the total amount of RUB 4.495 MM.

## 2017 RESULTS:

### PJSC PIMCU:

- activities for reduction of electric power consumption and capacity in the wholesale market during maximum hours in the Trans-Baikal Territory's power system;
- activities for reduction of capacity purchase costs;
- daily submission of the electric power consumption for the next day, compliance control and equipment operation balancing;
- implementation of the regulation on energy resource consumption planning;
- commissioning of the automated mill management system at the hydro metallurgical plant;

- replacement of light fixtures with energy saving ones at the mechanical repairs plant.

### JSC Dalur:

- partial replacement of low-efficiency light sources with LED lights;
- acquisition of control stations for VFD submersible pumps;
- automation of the central production site's street lighting operation;
- for the first time, ROSATOM has implemented its 4 MW power center with heat recuperation at the investor's expense.

### JSC Khiagda:

- reconstruction of the lighting system;
- upgrading of the pumping equipment control system;
- purchase and installation of the solar water heating system;
- reconstruction of the primary building's heating system;
- acquisition of control stations for VFD submersible pumps.

## BUSINESS CASE: IMPLEMENTATION OF THE ENERGY CENTER AT JSC DALUR

Business Case: Implementation of the Energy Center at JSC Dalur

For the first time, ROSATOM State Atomic Energy Corporation has implemented its 4 MW Power Center with heat recuperation. At the expense of the external investor, construction of the Energy Center was completed and its operation started in 2017 with electric powers sales at the price 10.9% below the market one. JSC Dalur, in addition to 10.9% decrease of the final price of consumed electric power, reduced its boiler gas consumption by 95%. Process communication of the investor's Energy Center ensure heat recuperation and results into saving without investments in the amount of RUB 6.2 MM (in 2017) and RUB 41.5 MM (scheduled for 2018-19). Under conditions of suppliers of last resort and power sale companies' monopoly on electric power prices, it is the precedent of competitive struggle for the major consumer who confirmed the potential of electric power price decrease by locating the Energy Center in its immediate proximity to rule out the grid component and to minimize losses.

Table 14. Energy Resource Savings versus the Baseline Year under Comparable Condition in 2015-2017, Million RUB, %

Plant	2015 (baseline year 2009)		2016 (baseline year 2015)		2016 (baseline year 2015)	
		%		%		%
PJSC PIMCU	68,985	9.5	210,278.58	14.45	201,659	13.85
JSC Dalur	9,232	14	1,442.72	0.82	2,128	1.20
JSC Khiagda	7,525	24.9	16,385.14	10.63	4,324	2.80

## PLANS FOR 2018:

For implementation of the incentive system:

Further implementation of the incentive system for creation of infrastructure, development and maintenance of the energy saving and energy efficiency culture, tasking line executives, employees, specialists and other service employees for the long term including:

- inclusion of the energy saving indicator into KPIs of top managers and chief specialists, process engineers, mechanics, etc. with the share of at least 10% for non-energy employees and 20% for energy employees.

For energy savings and energy efficiency:

### PJSC PIMCU:

- reduction of electric power consumption for heating of firefighting tanks in wintertime;
- quantitative adjustment of heating medium in input assemblies;
- replacement of low-efficiency light sources;
- streamlining or length reduction of surface trunk pipelines of compressed air grids.

### JSC DALUR:

- acquisition of control stations for VFD submersible pumps;
- partial replacement of low-efficiency light sources with LED lights.

### JSC KHIAGDA:

- reconstruction of intake and exhaust ventilation systems of JSC Khiagda's production site;
- reconstruction of heat stations of the heating system of JSC Khiagda's production site.

## RESULTS OF IMPLEMENTATION OF THE ENERGY SAVINGS AND ENERGY EFFICIENCY PROGRAM IN 2017:

Table 13. Results of Implementation of the Energy Savings and Energy Efficiency Program in 2017

Plant	Electric power		Motor gasoline*		Diesel fuel	
	TDZh	thousand RUB	TDZh	thousand RUB	TDZh	thousand RUB
JSC Atomredmetzoloto	3.3	4,495	1.7	2,140	0	0

\* JSC Atomredmetzoloto procures transport services from LLC ARMZ Service

## 4.2. Financial Capital

### 4.2.1. Financial Management

#### PERFORMANCE FOR 10 YEARS:

- implementation of financial risk management mechanisms ensuring high level of working capital management performance and acceptable liquidity values;
- development of the production costs management system to improve financial performance and preserve liquidity under conditions of restricted working capital of the Holding Company, regular cost cutting activities and implementation of the cost cutting program;
- revision of the inventory management to allow reducing them to the minimum permissible level for several years continuously;
- creation of the harmonized system for prompt response to deviations from targets. Development of solutions for key business forks such as production or selling, proprietary capacities or outsourcing, profitability or liquidity. Implementation of consolidated annual and mid-term budgets for the entire Holding Company. Refining

of processes for informing the top management of key indicators of the Holding Company's financial and economic condition;

- development and implementation of the target tree focusing on customized targeting for key business lines, products and processes;
- proactive investment activities in terms of both corporate mergers and acquisitions, and development of proprietary production and feedstock potential (Apollo project for consolidation of foreign uranium assets, major projects for diversification of the mining business: Pavlovskoye, Lithium, Titanium, Lunnyoye and Severnoye gold; projects for large-scale refurbishment and retrofitting of the country's major existing uranium assets (PJSC PIMCU); projects for super-long-term development of domestic uranium mining (JSC Khiagda until 2054, JSC Dalur until 2036, EGMK, JSC up to 50 years);

- implementation of project management best practices;
- institutes of collegial investment decision taking bodies (IDTBs) allow comprehensively analyzing projects and ruling out voluntarist decisions;
- the system of internal and general industrial regulatory and methodological documents based on ROSATOM's Investment Policy;
- elements of the matrix management structure that allows engaging all required functional experts of the Management Company in the project;
- SIRIUS, the industrial automated system for investment project management.

#### 2017 RESULTS:

- Throughout the year, the Holding Company's performance was influenced by the following external factors:
- decreasing USD exchange rate;
- decreasing global natural uranium prices.

The combined impact of the above factors resulted into revenue and profit decreasing by RUB 5.6 bn.

- the unit cash cost of producing 1 kg of uranium was reduced by 2% versus 2016 actual by increasing the share of uranium production at enterprises producing uranium using in-situ leaching with lower production cost;
- the Holding Company's efficient management of working and loan

capital allowed, for the first time in many years, to obtain positive balance (profit) for interest income and expense and reduce the borrowings amount by 77% year on year;

- given high cost of working capital in financial market, operations continued to consolidate temporarily free cash of the Holding Company's companies on a daily basis resulting into surplus profit due to accelerated capital turnover;
- reduction of management and commercial expenses by 2% was ensured;
- implementation of the program for reduction of the Holding Company's inventories continued. Use of systemic management of

warehouse inventories resulted into two-fold reduction thereof within two years. We focus on the following:

- reducing the Holding Company's finished uranium product stockpiles;
- reducing the annual program for procurement of primary and auxiliary materials without compromising primary production;
- revision towards reduction of rated insurance provisions of valuables.

# 77%

REDUCTION OF BORROWINGS  
IN 2017

**In 2017, we were able to limit the growth of costs to the inflation level and reduce the unit production cost of uranium mining by 2% versus 2016 actual.**

**Such high results could not be achieved without streamlining the volumes and cutting the underground uranium mining costs at PJSC PIMCU, and increasing in-situ leaching production volumes at JSC Dalur and JSC Khiagda (+14% vs. 2016).**

**\* Unit production cost of uranium at effective prices (without depreciation, leasing or provisions).**

\*Specific production cost of uranium in current prices (without depreciation, leasing, reserves).

### 4.2.2. Financial Management Performance

Due to the lack of legislative requirements or other needs, JSC Atomredmetzoloto has not been preparing any consolidated financial statements under IFRS since 2016. Consolidated indicators from the financial performance statement and financial condition statement set forth below have been formulated based on data from individual RAS accounting statements of the Holding Company's enterprises under JSC Atomredmetzoloto's control and included into the budget consolidation framework.

As noted in previous annual reports, ROSATOM's strategic resolution passed in 2013 to spin off the international segment of uranium mining assets into the separate holding company (managed by Uranium One Group, JSC) resulted into inclusion of only Russian uranium mining and service companies into JSC Atomredmetzoloto's control framework.

For details, see JSC Atomredmetzoloto's Annual Report 2013.

As the process of legal transfer of foreign assets has not been completed yet, IFRS financial performance data set forth in previous annual reports include performance both of Russian and foreign subsidiaries of JSC Atomredmetzoloto.

This is why the financial indicators for the previous reporting periods presented in this Report may not coincide with the similar financial indicators presented in the reports for the previous years.

**Table 15. Consolidated Financial Performance States of JSC Atomredmetzoloto and Russian Companies under Its Control and within Its Consolidation Framework,\* Million RUB**

Indicator	2015	2016	2017
Sales Revenue	21,353	22,182	17,759
Cost of Goods Sold (COGS)	-15,703	-15,967	-17,161
Gross profit (loss)	5,650	6,215	598
Management and Commercial Expenses	-1,544	-1,493	-1,469
Interest receivable	419	426	248
Interest payable	-926	-916	-218
Other income and expenses	-4,340	930	-6,809
Profit (Loss) before Profit Tax	-742	5,162	-7,650
Profit Tax	-779	-557	-226
Net profit (loss)	-1,521	4,605	-7,876

\* The consolidation framework includes JSC Atomredmetzoloto; PJSC PIMCU; JSC Dalur; JSC Khiagda; JSC VNIIPromtehnologii; JSC RUSBURMASH; LLC ARMZ Service; JSC Elkon MMP; and JSC EGMK Project.

In 2017, revenue decreased by RUB 4.4 bn versus 2016 on negative external factors (decreasing USD exchange rate and market prices of natural uranium). Decrease could have been greater (RUB -5.6 bn) but material contribution to the revenue in the amount of RUB

1.2 bn from uranium (+4%) and non-uranium sales as well as increasing share of in-situ leaching allowed mitigating the negative market from RUB -5.6 bn to RUB - 4.4 bn.

The bulk of net loss was formed by the amount of depreciation (RUB

6,115 MM) of financial investments into Mantra Resources Limited (owner of Mkuju River mine in Tanzania) due to revision of the asset's production program and changes to the uranium price forecast.

**Table 16. Consolidated Statement of Financial Position of JSC Atomredmetzoloto and Russian Companies under Its Control and within Its Consolidation Framework, Million RUB**

Indicator	2015	2016	2017
Fixed Assets	128,361	131,091	127,180
Intangible Assets and R&D	6,181	6,468	6,432
Property, Plant and Equipment (PP&E)	31,244	33,132	32,742
Fixed Financial Investments	86,604	86,812	83,111
Other non-current assets	4,332	4,678	4,895
<b>Current assets</b>	<b>13,351</b>	<b>10,353</b>	<b>9,400</b>

Indicator	2015	2016	2017
Reserves	5,016	4,393	2,787
Receivables	4,477	2,453	3,255
Financial investments	1,042	495	0
Cash	2,648	2,833	2,826
Other current assets	169	180	532
<b>TOTAL ASSETS</b>	<b>141,712</b>	<b>141,444</b>	<b>136,580</b>
<b>Capital and Reserves</b>	<b>124,589</b>	<b>135,447</b>	<b>131,187</b>
Capital (Authorized, Surplus and Reserve)	84,296	90,532	94,073
Retained Earnings	40,293	44,915	37,114
<b>Fixed Liabilities</b>	<b>11,002</b>	<b>50</b>	<b>217</b>
Borrowings	10,878	0	0
Other Fixed Liabilities	124	50	217
<b>Short-term liabilities</b>	<b>6,121</b>	<b>5,947</b>	<b>5,176</b>
Borrowings	1,294	2,027	462
Payables	3,433	2,515	3,291
Income of future periods	76	213	219
Provisions for liabilities and charges	1,093	1,039	967
Other liabilities	225	153	237
<b>TOTAL CAPITAL AND LIABILITIES</b>	<b>141,712</b>	<b>141,444</b>	<b>136,580</b>

Repayment of the bulk of borrowings in 2017 was due to efficient management of the Holding Company's proprietary sources subject to coverage of expenses aimed at financing of the Mining Division's investment program by the shareholder's (JSC Atomenergoprom) contribution to the authorized capital.

Table 17. Key Financial Performance Indicators of JSC Atomredmetzoloto in 2015-2017

Indicator	2015	2016	2017	Change 2017/2016
<b>Financial Stability Indicators</b>				
Gearing	0.5	0.4	0.4	0.0
<b>Liquidity Indicators</b>				
Current Ratio	2.2	1.7	1.8	+0.1
Quick Ratio	1.3	1.0	1.2	+0.2
<b>Return on Sales Indicators, %</b>				
Return on Sales	26.5%	28.0%	3%	- 25%

The main financial indicators are within the average regulatory values, which characterizes the Company as a financially stable entity capable of timely meeting its assumed obligations. Improving financial performance resulted from reduction of fixed assets formed due to depreciation of existing financial investments of JSC Atomredmetzoloto and systemic management of inventories that allowed reducing the stockpile of the Holding Company's finished uranium products.

Liquidity indicators confirm absence of money shortage risks and high level of solvency of the Company.

Return on sales depends directly on decreasing revenue in 2017.

### 4.2.3. Investments

The Holding Company's investment activities aim at achieving strategic objectives of ROSATOM and the Mining Division.

Total investments of the Holding Company in 2017	RUB 4.9 bn
Key Investment Targets	Development projects of PJSC PIMCU, JSC Khiagda, JSC Dalur, JSC The First Ore Mining Company and investments into upkeep of operational production facilities

Investments into development and upkeep of operational uranium mining enterprises amounted to RUB 3.9 bn and were aimed at:

- construction and installation work at production facilities, infrastructural and power facilities;
- design of production facilities;
- capital mining and preparatory mining operations;
- upgrades and refurbishment of production facilities;
- information and technical support;
- design and R&D;
- safety assurance;
- procurement of production and drilling equipment.

Year on year, investments in 2017 remained at the comparable level. In 2018, we are planning to increase the investment program by 54% due to accelerated upgrading and replacement of legacy equipment for PJSC PIMCU's uranium and coal business, construction of Mine No. 6 and development of new deposits at JSC Dalur and JSC Khiagda.

The structural changes performance of the Company's investment program result from diversification and development of non-uranium projects. Year 2017 saw further implementation of Pavlovskoye project aimed at creating the economically efficient production complex based on Pavlovskoye lead and zinc deposit including the mine and refinery, and further work on the non-uranium project for Organization of Associated Scandium Mining at JSC Dalur. Year 2018 will see launch of the project for gold mining at Severnoye deposit in the Elkon District.

In the structure of investment by key areas of the Company in 2017, investment in the development of the existing uranium mining enterprises continues to play the key part with 89% thereof accounted for by JSC Khiagda, PJSC PIMCU and

JSC Dalur (including non-uranium projects of the enterprises).

In 2017, investments into operations of uranium enterprises within the Holding Company framework were allocated as follows:

#### JSC Khiagda

The following operations have been performed (39% of the Holding Company's investment program):

- acidification of placer four at Khiagda deposit;
- physical launch of the mining and processing complex ensured at Vershinnoye Deposit;
- receipt of the nuclear site license for Istochnoye and Vershinnoye Deposits;
- receipt of the commissioning permit for Istochnoye Deposit (Placer No.1);
- execution of the agreement for purchase of primary power equipment for Dzhilinda substation;
- purchase of diesel fuel tanks for the consumption warehouse for Dzhilinda substation.

#### JSC Dalur

The following operations have been performed (19% of the Holding Company's investment program):

- completion of construction and commissioning of Unit No. 15 of Ust-Uksyansky section of Dalmatovskoye deposit;
- physical launch of the first stage of the pilot plant for 1.5 tpa of scandium oxide;
- receipt of the positive conclusion from FAU Glavgosekspertiza for Russia for the Pilot Production Site for Uranium ISL at Khokhlovskoye Deposit;
- approval of the exploratory scoping FS and reserve calculation report for the Khokhlovskoye

## 3.9

### RUB BN INVESTMENTS INTO DEVELOPMENT AND UPKEEP OF OPERATIONAL URANIUM MINING ENTERPRISES IN 2017

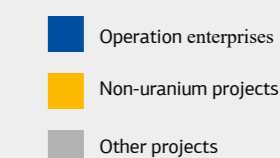
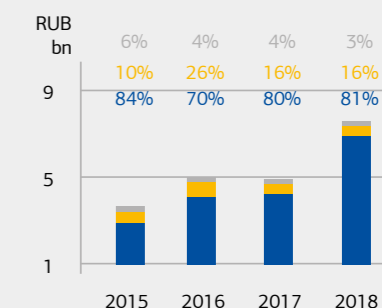


Figure 30. Investment Performance by Project Groups in 2015-2017 and Plans for 2018\*

\* Percentage changes result from re-grouping of projects, but the total investment amount of past years remains unchanged.

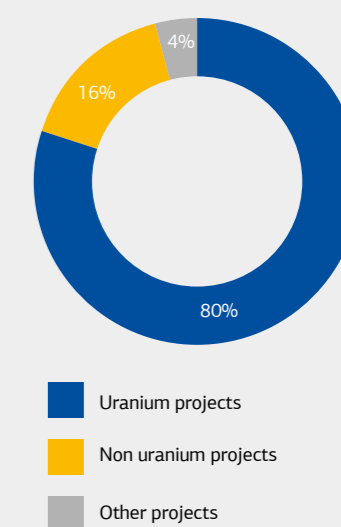


Figure 31. Investment Structure in 2017

deposit by the State Reserve Commission;

- completion of construction and commissioning of Unit No. 14 of Ust-Uksyansky section of Dalmatovskoye deposit;
- receipt of the subsoil use license for Dobrovolnoye deposit and commencement of design work for the deposit;
- development of design documents for additional construction of Dalmatovskoye deposit and submission thereof for ROSATOM's review and assessment.

#### PJSC PIMCU

The following operations have been performed (31% of the Holding Company's investment program):

- completion of the first stage of reconstruction of Sredneye tailings' dump (compliance conclusion received);
- receipt of the positive conclusion for the operation scoping FS for deposits of Streltsovskoye ore field;
- startup of the ash dump at Krasnokamensk TPP;

- commissioning of the automated access control system suite at Mine No. 8;
- commissioning of the additional exploration Horizon No. 7 of Mine No. 8;
- operation startup of the plant for production of granulated explosive substances;
- start of initial operations for construction of Mine No. 6.

#### JSC THE FIRST ORE MINING COMPANY (FOMC) (PAVLOVSKOYE PROJECT)

The following operations have been performed (7% of the Holding Company's investment program):

- completion of the second stage of engineering surveys for the MRW;
- completion of semi-commercial testing of the deposit's ores for refinement process;
- development of the final report on key technical solutions.

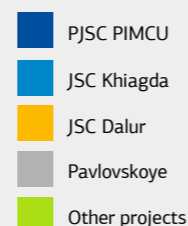
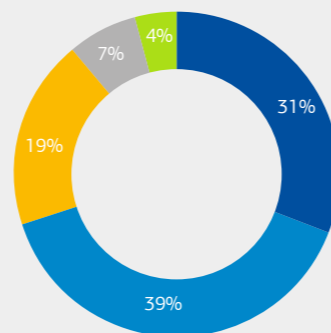


Figure 32. Key Investments of ARMZ Uranium Holding Co. in 2017

#### 2017 RESULTS:

Year 2017 saw further streamlining of uranium mining enterprises' investment programs including:

- streamlining of upkeep projects resulted into reduction of scheduled need for investments by 14% in 2018 to 2019 versus the initial need of the enterprises without reducing scheduled production volumes;
- reduction of the budget for PJSC PIMCU's Integrated Uranium Production Performance Improvement project was RUB 110 MM. (from RUB 134 MM to RUB 24 MM) due to application of a more efficient solution (construction of the explosive substance plant at PJSC PIMCU's site).

The following actions were taken in 2017 to improve economic efficiency and increase investment transparency:

- further operations for development of the Sirius Industrial information system for investment project management including the investment business unit's active

participation in implementation of new units of the system such as Risks, KPIs, etc;

- improvement of the Annual Investment Program Management Regulation, more stringent control of annual investment program planning accuracy and control of monthly investment payments. In this connection, the enterprises were granted additional powers for independent investment decision taking;
- further implementation of project management within the Holding Company. Based on ROSATOM's assessments of maturity and efficiency of the investment and project management system, JSC Atomredmetzoloto ranked second. In particular, highly appraised were template investment programs, Annual Investment Program Management Regulation, project approach to creation of project work teams with role assignment using the matrix control logic;

- the RPS project was implemented to improve investment project management process. RPS project resulted into acceleration of project data sheet drafting, improvement of card completion in the Sirius IS due to implementation of the template presentation for submission to review by the investment decision taking body (IDTB), follow-up of the project finance and economy model (FEM) and streamlining of the process of expert approval of materials.

Measures taken to improve the efficiency of investments and optimize the investment process within the division allowed to improve profitability, reduce the amount of equity and own sources of funding applied to current maintenance of equipment and infrastructure, Industrial sites, increase responsibility of staff of the division's entities for implementation of investment activities and achievement of their target financial indicators by the projects. The integral investment performance indicator was 102%.

#### PLANS FOR 2018 AND MID-TERM PLANS:

In accordance with the mid-term business plan, the investment program of JSC Atomredmetzoloto in 2018 to 2021 may amount to more than RUB 31.8 bn according to preliminary estimates. The key trend will be increased efforts for implementation of diversification projects («Pavlovskoye», «Processing of Pyrite Cinders at PJSC PIMCU», «Organization of Associated Scandium Production at JSC Dalur») and introduction of new optimization solutions to reduce the cost of uranium produced.

In relation to development of ARMZ's core uranium business, one of the key tasks on the Holding Company's mid-term agenda is construction PJSC PIMCU's Mine No. 6. Within the project implementation framework, working documents for the above-

ground part of the mine have developed, construction of the primary reducing substations has started and active negotiations with potential investors are underway.

Additionally, the near future will see commissioning of new uranium deposits at JSC Khiagda (Kolichikanskoye, Dybrynskoye) and JSC Dalur (Dobrovolny) primary operations for which have already begun.

Year 2018 will see completion of construction of the drainage duct of Urtuysky Strip Mine ensuring coal production in the next decade.

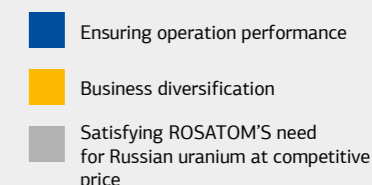
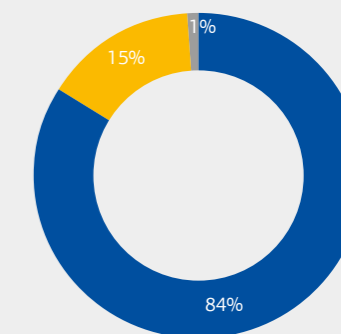


Figure 33. Mid-Term Investment Structure in 2017 to 2019

## 31.8 RUB bn.

THE AMOUNT OF JSC ATOMREDMETZOLOTO'S INVESTMENT PROGRAM FOR 2018 TO 2021 EXCEEDS

## 4.3. Intellectual Capital

#### PERFORMANCE FOR 10 YEARS

##### PJSC PIMCU:

- creation and implementation of the integrated process for development of lean uranium ores using geotechnological methods;
- development of scientific methodological recommendations for identification of stability parameters of the rock mass with filling of the developed space with solidifying filler by not more than 67%;
- streamlining of the uranium ore agitation stripping process allowing to reduce manganese dioxide by more than two times and cut feedstock ore treatment costs;
- creation of the geodynamical polygon of Streltsovskoye ore field;
- development of integrated geophysical methods for controlling the process of uranium ore heap leaching.

##### JSC Dalur:

- development and implementation of unique innovative mining and geological computer processes

- and software to allow improving development efficiency of Dalmatovskoye and Khokhlovskoye uranium deposits;
- development and implementation of the acidifier application process for drill hole in-situ leaching.

##### JSC Khiagda:

- development and implementation of the Khiagdit software suite to allow improving development performance of uranium deposits in Khiagda ore field;
- development and implementation of the new process drill hole design using new materials for casing pipes, filters and annulus hydro insulation;
- development of new processes and methods for repairs, restorations and performance recoveries of process drill holes.

##### JSC RUSBURMASH:

- Development and certification of the hardware and methodological new

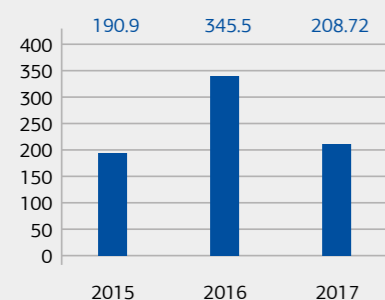
generation logging suite for direct identification of uranium in drill holes using the instantaneous fission neutron method.

##### JSC VNIIPromtehnologii :

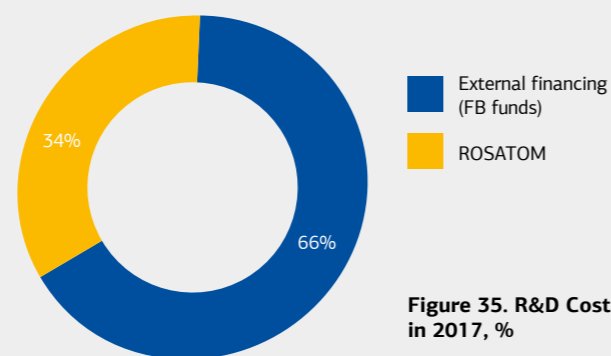
- development of process solutions for development of uranium deposits as well as mining security solutions;
- operations for assessment of statuses of underground nuclear explosion sites and development of activities for rehabilitation thereof;
- development of process solutions for burying of solid nuclear wastes and assessment of statuses and operation prospects of liquid industrial and nuclear waste pumping stations;
- integrated operations within the framework of activities set forth in the Federal Target Program for Assurance of Nuclear and Radiation Safety of Russian in 2016 and until 2030 aimed at creating the Harmonized National RAW Handling System.

## 4.3.1. Intellectual Capital Management

In 2017, the Holding Company's innovative costs amounted to RUB 208.72 MM of which RUB 135.9 MM for R&D including RUB 90.0 MM from external sources (under the subsidy of the Ministry of Education and Science of the Russian Federation).



**Figure 34. Implementation Costs of the Holding Company's Innovative Development Program in 2015-2017, Million RUB**



**Figure 35. R&D Cost Structure in 2017, %**

### Innovative Development Program

ARMZ's innovative development program is the integral part of ROSATOM's Innovative Development and Process Upgrading Program until 2030.

**Analysis**  
JSC Atomredmetzoloto's scientific and technical activities in 2012 to 2016 conducted in 2017 shows that ARMZ's R&D project portfolio in 2012 and 2016 is technologically and economically efficient.

**Table 18. Key Projects of the Holding Company in 2017**

**Scientific and technical support to development of uranium deposit using the underground mining development method (UMD).**

**Scientific and technical support to development of uranium deposit using the in-situ leaching (ISL).**

The key objectives of ARMZ's Innovative Development Program until 2030 are as follows:

- improving uranium mining performance at operational uranium mining enterprises;
- break-even operation of uranium mining enterprises;
- production diversification.

**Table 19. IPR in 2012-2016, pcs., %**

IPR	2012	2013	2014	2015	2016	2017	Total, pcs.	Of which implemented
Invention patent	2	6	2	3	2	5	20	6
Utility model patent	-	-	-	1	-	-	1	1
PC certificates	1	1	5	9	4	11	31	31
Database	-	-	-	-	1	-	1	1
Know how	-	-	-	-	2	-	2	0
<b>TOTAL:</b>	<b>3</b>	<b>7</b>	<b>7</b>	<b>13</b>	<b>9</b>	<b>16</b>	<b>55</b>	<b>39 (70.9%)</b>

## KEY PROJECT 1

### SCIENTIFIC AND TECHNICAL SUPPORT TO DEVELOPMENT OF URANIUM DEPOSIT USING THE UNDERGROUND MINING DEVELOPMENT METHOD (UMD)

- Purchase and installation of 500 hydraulic thrust anchors by Atlas Kopco. The use of this type of reinforcement will significantly reduce the cost of fastening of mine workings and improve the safety of the production staff;
- The use of surfactants significantly increased uranium extraction;
- Laboratory studies confirm efficiency of the process for sintering of fine ore feedstock fractions for further processing using the heap leaching method developed by PJSC PIMCU's Central R&D Laboratory (CRDL) (uranium extraction is on the average 10% higher than that for leaching of non-sintered feedstock). Purchase of the sintering unit and stacker is scheduled for 2018 for pilot production operations;
- Year 2017 saw commencement of operations for total exclusion or replacement of pyrolusite in the process of hydro metallurgical processing of ore feedstock for cheaper acidifiers. Research operations imply development of the process for producing the alternative acidifier the feedstock for which would be pyrite cinders. The work is scheduled for completion in 2018 after semi-commercial testing.

## KEY PROJECT 2

### SCIENTIFIC AND TECHNICAL SUPPORT TO DEVELOPMENT OF URANIUM DEPOSIT USING THE IN-SITU LEACHING (ISL)

#### JSC Dalur

- Further implementation of innovative mining and geological computer processes and software developed by the Seversk Technological Institute of NRNU MEPhI. The implementation of the created program-informational complex serves a base for creating the «Smart Mine ISR» system and allows to achieve additional accuracy when counting the reserves, additional quality when designing producing blocks and additional efficiency when developing the Dalmatovskoye and Khokhlovskoye uranium deposits.

Intellectual property rights to the software suite belong to JSC Dalur and are protected with Rospatent's certificates.

Implementation of the software and information suite covering all aspects of the enterprise's business from geological exploration to decommissioning of units and environmental impact assessment allowed qualifying JSC Dalur's products as innovative as of 2016. Revenue from innovative product sales in 2017 amounted to at least RUB 2.3 bn.

- In 2017, pilot production operations will continue for development of new process drill hole designs. Taking into account the results of the completed works, a decision to implement the developed design of holes commercially which allowed to significantly reduce their capital construction costs. As of 2018, all newly constructed drill holes will have improved designs;
- Results of pilot production operations for implementation of integrated logging using the instantaneous fission neutron

logging method (KND-M) and impulse neutron-neutron logging method (INNK) for direct identification of uranium during mining preparatory operations at Khokhlovskoye deposit were approved by FBU GKZ in 2017. Currently, development of the project of exploration of Dobrovolnoye deposit is underway with inclusion of KND-M and INNK integrated logging methods into geophysical studies of drill holes. Operations at Dobrovolnoye deposit are scheduled for completion in 2019 to 2020;

- Pilot production operations continue for associated scandium extraction from uranium production mother liquors and creation of the advance aluminum and scandium master alloy production.

#### JSC Khiagda

- Pilot production work continued for development of new designs of process drill holes for operation under conditions of ubiquitous distribution of permafrost rocks;
- Work continued to adapt and implement the software suite developed by Seversk Technological Institute of NRNU MEPhI. 11 programs of the Khiagdit suite were granted Rospatent certificates confirming JSC Khiagda's intellectual property rights;
- Work continued to implement new methods of repair and restoration of process drill holes. Purchasing additional equipment to increase production volumes and improve performance of repair and restoration work is scheduled for 2018;
- April 2017 saw pilot testing of the ultrasonic equipment prototype for restoration and performance improvement of process drill holes;
- In 2017, pilot production operations were performed to implemented integrated logging using KND-M and INNK methods and AMK KND-M hardware at JSC Khiagda's facilities Work performed allowed successfully solving a number of problems for clarification of primary radiological specifications of ores and performance of process drill holes during mining preparatory operations at units B1.11 and B1.12 of Vershinnoye Deposit as well as for assessment of residual performance of operational unit X3.13 of Khiagda deposit. Year 2018 is planned to see further operations using AMK KND-M at JSC Khiagda's facilities for clarification of radiology of ore placer section B1 (Vershinnoye Deposit), assessment of residual reserves in placers being developed and certification of 3D modelling results in control drill holes.

## 4.3.2. Innovative Performance

### 2017 Results:

- receipt of 16 state security documents for intellectual property;
- five invention patents (PJSC PIMCU, JSC Dalur and JSC VNIIPromtehnologii);
- 11 PC software certificates (JSC Khiagda);
- 15 patent applications were submitted for state registration of intellectual property;
- 11 applications for PC software certificates (JSC Khiagda);
- four invention patent applications (JSC Dalur).

### Knowledge Management System (KMS)

- Three people participated in ROSATOM's training seminars (JSC Atomredmetzoloto and JSC VNIIPromtehnologii);
  - Within the framework of filling ROSATOM's scientific and technical information portal, we placed:
  - full-text copies of the book Russian Experience in Uranium Geotechnology and Creation and Development of the Domestic Nuclear Industry's Mineral Resource Base;
  - reviews of JSC VNIIPromtehnologii's scientific and technical reports for operation performed in 2016;
  - 5,839 documents from JSC VNIIPromtehnologii's scientific and technical information archive were digitized (engineering surveys and construction documents) amounting to over 700,000 pages;
  - The number of publications in peer-reviewed global nuclear power sources (annually per 100 researchers and developers):
- 2015 – 17.5;
  - 2016 – 7.5;
  - 2017 – 42.5.

## 4.3.3. Digital Economy Performance

Year 2017 saw first steps towards digitalization. JSC Khiagda is developing 3D models of developed active reserves of PJSC PIMCU, JSC Khiagda and JSC Dalur to allow compliance with the digital production standard in the future.

**THE SMART MINE PROJECT** is an example of business digitalization at JSC Khiagda within the framework whereof smart methods of modelling in-situ leaching processes are being developed. These include the IT system based on the digital model map of reserves and production operations.

Using integrated geological and mathematical methods, advanced video surveillance tools and smart sensors, the system will be tracking and adjusting production processes in real time.

The system will allow:

- rapidly and precisely localizing ore within the deposit, identifying ore body parameters and the best uranium mining mode, etc.;
- modelling drill hole operations;
- planning mining priorities, equipment repair time schedules, etc.

Scheduled for 2018 are pilot production operations to allow fairly assessing effects of the project.

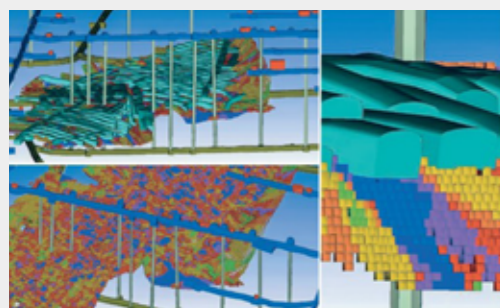


Figure 36. Flowchart of the Smart Mine

## 4.4. Natural Capital

### PERFORMANCE FOR 10 YEARS: PJSC PIMCU

- construction of the new sulfur acid workshop without pyrite cinder formation;
- reconstruction of TPP boiler units and implementation of more advanced dust containment equipment;
- construction of the new ash dump at the TPP;
- relocation of residents of Oktyabrsky township from the industrial zone to Krasnokamensk;
- reconstruction of the sealing curtain to minimize dissemination of contaminants in Shirondukuy ravine;
- reconstruction of Sredneye tailing dam. Extension of the main bund wall.

- implementation of the integrated management system (ISO 9001 and ISO 14001);
- regular environmental monitoring.

### JSC Khiagda

- construction of waste treatment facilities of the rotation camp;
- construction and startup of the sulfur acid production facility;
- switch of the coal boiler to standby (migration to heat production using the sulfur acid production facility) reducing air pollution emissions;
- creation of the remote control system of continuous operation of pumping equipment;

- construction of the solid household and production waste polygon;
- implementation of the Integrated Management System (ISO 9001 and ISO 14001);
- regular environmental monitoring.

### JSC Dalur

- implementation of the Integrated Management System (ISO 9001 and ISO 14001);
- regular environmental monitoring.

### 4.4.1. Natural Capital Management Environmental Policy

The environmental policy of JSC Atomredmetzoloto went into effect in 2013 and has since been a basis for implementation of the main statutes of the Constitution of the Russian Federation and other laws of the Russian Federation, the

International ISO 14001 standard and the environmental policy of ROSATOM. For ARMZ's Environmental Policy, see <http://www.armz.ru/development/environmental/>

For details of the Environmental Policy and its objectives, see Report 2014.

Class 6 radioactive waste were placed into Verkhnee and Sredneye tailings' dumps of PJSC PIMCU. Radioactive waste handling is compliant with requirements of Federal Law No. 190-FZ dd. 7/11/2011 on Radioactive Waste Handling and Amendment of Certain Laws of the Russian Federation.

### 4.4.2. Natural Capital Management Performance

#### 4.4.2.1. Protection of Land Resources and Biodiversity

In 2017, no recultivation work was performed by PJSC PIMCU. Construction work for reconstruction of Sredneye tailings' dump resulted into stripping of 85,000 cu.m of topsoil (42.5 ha) and respectively the same 42.5 ha of land was disturbed.

The technical stage of recultivation of the water drain trench from the system of Umykeysiye Lakes to Khara-Nur Lake was completed.

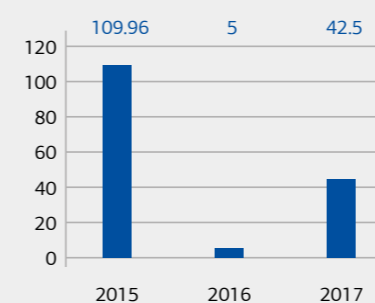


Figure 37. Total Number of Lands Disturbed at PJSC PIMCU in 2015-2017, ha

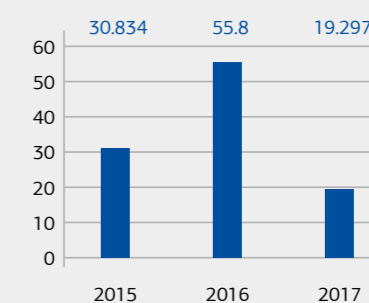


Figure 38. Total Number of Lands Disturbed at JSC Khiagda in 2015-2017, ha

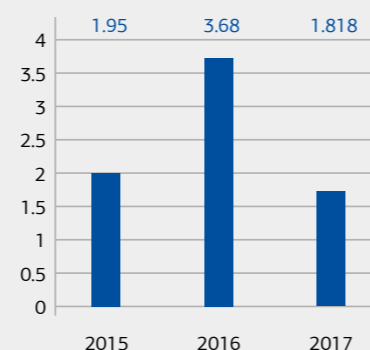
In 2017, JSC Khiagda disturbed 19.297 ha of land including:

- 13.0 of disturbed land area during development of mineral deposits (construction and development of operation units of Vershinnoye Deposit of Khiagda ore field);
- 6.1 ha of disturbed land area during construction;
- 0.197 ha of disturbed land area during placement of Industrial wastes (including construction ones) and solid domestic wastes.

JSC Dalur performed the following work associated with disturbing the topsoil:

- preparation of construction site (in the form of vegetation soil layer removal with the mean thickness of 0.2 m) to perform construction and installation at the following sites:
  - single-apartment residences;
  - operation units for ISL uranium mining at Khokhlovskoye uranium deposit;
  - operation unit of Central Placer of Dalmatovskoye uranium deposit.

All work was performed in compliance with the approved documents. The vegetation topsoil was fully used at the final stage of construction to improve the area around constructed facilities.



**Figure 39. Total Number of Lands Disturbed at JSC Dalur in 2015-2017, ha**

## 4.4.2.2. Water Resource Protection

### WATER INTAKE

**Table 20. Water Intake by Purposes and Holding's Companies, in 2015-2017, mcm**

Plant	2015	2016	2017
<b>Water intake for production purposes</b>			
PJSC PIMCU	22.275	22.714	19.503
JSC Dalur	0.048	0.051	0.053
JSC Khiagda	0.156	0.188	0.159
<b>Water intake for household and drinking purposes</b>			
PJSC PIMCU	5.127	4.94	5.193
JSC Dalur	0.058	0.052	0.052
JSC Khiagda	0.035	0.037	0.047
<b>Total water intake</b>			
PJSC PIMCU	34.466	34.174	31.304
JSC Dalur	0.106	0.103	0.105
JSC Khiagda	0.195	0.228	0.215
<b>Underground sources</b>			
PJSC PIMCU	28.666	28.374	25.703
JSC Dalur	0.106	0.103	0.105
JSC Khiagda	0.195	0.228	0.215
<b>Exceeding set limits</b>			
PJSC PIMCU	0	0	0
JSC Dalur	0	0	0
JSC Khiagda	0	0	0

PJSC PIMCU reduced its mine water intake in the past period due to temporary conservation of mine two. Due to reduced water inflow to the stripping mine field during autumn and winter floods as well as in summertime, intake of stripping mine waters decreased and water drainage performance decreased versus 2016.

JSC Khiagda's reduced water consumption is associated with the following activities:

- creation of the system for remote control of continuous operation of pumping equipment for the first and second water elevators with automatic maintenance of the set level in reserve tanks (ruling out the possibility of overflow of such tanks, non-accountable water intake and occurrence of any leakages in the water supply area from the first to the second water elevators).

At JSC Dalur the change of water intake indicators in 2017 versus 2016 doesn't exceed 5%.

## EFFLUENT WATER DISCHARGE

**Table 21. Effluent Water Discharge at PJSC PIMCU in 2015-2017, mcm**

Year/Water Volume	2015	2016	2017
Effluent Water Discharge Volume	11.724	11.375	11.039

## 4.4.2.3. Air Protection

**Table 22. Air Pollution Emissions in 2015-2017 by PJSC PIMCU, tonnes**

Year/Pollutant	2015	2016	2017
Carbon oxide	796	1,006.318	894.113
Sulfur dioxide	5,059.0	5,248.446	6,021.38
Nitrogen oxides (NO2 equivalent)	1,594.0	1,796.751	1,666.098
Specific pollutants (inorganic)*	172.3	163.05	164.719
Specific pollutants (organic)*	5,908.82	7,974.61	7,861
<b>Total*</b>	<b>13,785.2</b>	<b>16,427.59</b>	<b>17,270.316</b>

\* added instead of inorganic dust and other coal ash

**Table 23. Air Pollution Emissions in 2014-2017 by JSC Khiagda, tonnes**

Year/Pollutant	2015	2016	2017
Carbon oxide	190.865	19.307	7.394
Sulfur dioxide	49.825	185.155	301.796
Nitrogen oxides (NO2 equivalent)	14.827	9.275	8.116
Specific pollutants (inorganic)*	1.035	0.002	28.521
Specific pollutants (organic)*	18.911	6.387	0.25612
Other	13.115	15.9	2.645
<b>Total</b>	<b>288.578</b>	<b>236.026</b>	<b>343.639</b>

\*added instead of inorganic dust and other coal ash

**Table 24. Air Pollution Emissions in 2015-2017 by JSC Dalur, tonnes**

Year/Pollutant	2015	2016	2017
Carbon oxide	8.104	8.094	6.261
Sulfur dioxide	0.000416	0.0071	0.006
Nitrogen oxides (NO2 equivalent)	2.898	3.009	2.247
Specific pollutants (inorganic)*	0.664	0.959	0.664
Specific pollutants (organic)*	0.00032	0.006	0.162
<b>Total</b>	<b>13.013</b>	<b>13.142</b>	<b>10.396</b>

\*added instead of inorganic dust and other coal ash

## JSC Dalur, JSC Khiagda

Given the closed process cycle, no effluent water containing hazardous chemical and radionuclides was discharged. Domestic effluent water from the sewage system is remove to waste treatment facilities of the SPV under the agreement.

In 2017, PJSC PIMCU recorded increase of sulfur acid and sulfur dioxide emissions by 3.234 and 772.934 tonnes, respectively, due to increase of sulfur acid production by 7% versus 2016.

Due to reduction of coal burnt at the TPP in 2017 versus 2016, nitrogen oxide and carbon oxide emissions have decreased. The quantity of coal burnt by the TPP in 2016 was 715,395.91 tonnes of conventional fuel versus 704,392.43 tonnes of conventional fuel in 2017.

Thermoelectric power plants' soot and fuel oil ash emissions (vanadium equivalent) have increased by 56% and 78%, respectively. Increased carbon (soot) formation is associated with changes to physical and chemical properties of coal supplied to the TPP such as higher coal ash-content (the maximum ash-content in 2016 was 17.1% versus 18.2% in 2017) and combustibles in fly-ash content (3.32% in 2016 versus 5.24% in 2017).

The reduction of overall emissions versus 2016 is connected with a change to receiving heat energy due to a surplus of heat that appears during the production of sulfur acid. In this connection, the coal boiler was switched to standby resulting into emission reduction (including in terms of carbon oxide and nitrogen oxides).

Increasing sulfur dioxide and sulfur acid emissions are associated with increase of sulfur acid production by 38%

Overall, the enterprise's pollutant emissions show no material increases or decreases except for CO (due to reduction of boiler emissions) associated, in its turn, with increase of the mean ambient temperature in the past year.



#### 4.4.2.4. Waste Management

Table 25. Waste Generation of all Hazard Classes in 2015-2017, tonnes

Hazard Class	Year	PJSC PIMCU	JSC Dalur	JSC Khiagda
Hazard class I	2015	2.158	0.032	0.1
	2016	2.769	0.199	0.039
	2017	2.539	0.174	0.143
Hazard class II	2015	0.846	0.144	0.286
	2016	0.031	0.22	0.554
	2017	1.111	1.006	0.501
Hazard class III	2015	155.12	0.518	7.646
	2016	104.79	1.038	2.5
	2017	122.42	1.604	5.769
Hazard class IV	2015	2,001.6	77.852	514.1
	2016	1,547.1	39.452	187.9
	2017	1,453.1	42.8	480.2
Hazard class V	2015	23,508,303.42	11.623	1,455.03
	2016	24,268,198.8	24.927	180.6
	2017	22,509,520.4	17.049	59.9
Total	2015	23,510,463.14	90.169	1,479.77
	2016	24,287,844.4	65.809	371.57
	2017	22,511,099.54	62.670	546.513
Wastes used at the enterprise and located at facilities in operation, tonnes	2015	26,345,843.3	0	1,000.9
	2016	24,286,078.27	0	249.522
	2017	4,537,903.29	0	41.883
Wastes transferred to SPV contractors for disposal and decontamination, tonnes	2015	9,883.321	23.048	471.68
	2016	8,979.67	27.053	0
	2017	17,969,493.01	21.198	352.08
Exceeding set limits	2015	no	no	no
	2016	no	no	no
	2017	no	no	no

\* Due to waste removal streamlining, they were transferred to contractor SPVs in 2017.

#### PJSC PIMCU :

- reduction of hazard class I waste generation (mercury lamps) by 0.23 tonnes due to replacement of mercury lamps for LED ones in the previous years and reduction of the number of mercury lamps used at the business units;
- occurrence of new hazard class II wastes (Waste Lead Accumulators, Undamaged and Containing Electrolyte);
- vanadium catalyst for sulfur acid production, under the new Federal Catalog of Waste Classes is hazard class IV (former class III);
- pyrite cinders, under the new Federal Catalog of Waste Classes, are hazard class V (former class IV);

#### JSC DALUR :

- increased formation of class II and III wastes results from higher consumption of repair materials for the motorcar fleet.

#### JSC KHIAGDA :

- increase of hazard class I wastes (mercury lamps) generation by 0.104 tonnes due to replacement of mercury lamps with LED ones;
- increase of hazard class IV wastes generation by 273.8 is due to increase of unsorted residential waste (excluding bulky ones), garbage and sand contaminated with oil and oil products. Increased generation of hazard class IV wastes is due to increased production volume and increased use of relevant chemicals;

- decreasing generation volumes of ash and slag mixture from coal burning;
- decreasing generation volumes of kitchen foodstuff wastes;
- decrease of hazard class V waste generation by 120.7 is due to decreasing quantity of coal used for operations of the redundant coal boiler.

#### 4.4.2.5. Environmental Costs

Table 26. Holding Company's Environmental Protection Costs in 2017, RUB'000

Measures	PJSC PIMCU	JSC Dalur	JSC Khiagda
Air Protection	46,834.137	194	1,044
Protection of Water Resources	58,465.784	370	961.873
Subsoil Protection	48,128	-	-
Waste Management	46 932	390.62	1,899.427
Sustainable Use, Protection and Rehabilitation of Lands	75,323.89	98	11,259
<b>Total</b>	<b>398,871.497</b>	<b>6,618.182</b>	<b>22,977.529</b>

The 'total' costs of environmental protection comprise the current expenditure for environmental protection, the investments in fixed

assets aimed at protecting the environment and rational use of natural resources, and the costs of the integrated management system.

Data for 2016 have been adjusted subject to investments into fixed assets for performance of work for recultivation of Sredneye tailings' dump and construction of ash dump at PJSC PIMCU; RUB 288 MM in the data set forth in Report 2016 do not include investments into fixed assets.

Reduction of the amount in 2017 is due to reduction of construction costs as the bulk of expenses occurred in 2016.

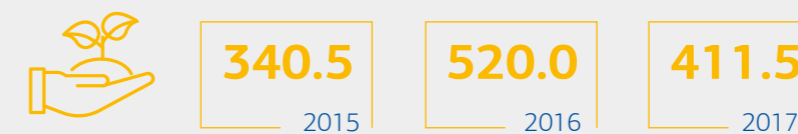


Figure 40. Holding Company's Total Environmental Protection Costs in 2015-2017, Million RUB

\* Data for 2016 are recalculated taking into account the data related to investments in fixed assets aimed at protecting the environment and rational use of natural resources.

#### 4.4.2.6. Community Relations in Environmental Protection

The Holding Company's employees have always been active participants of environmental protection events, preservation of valuable natural objects and restoration of forests.

In Krasnokamensk, over 600 PJSC PIMCU's employees and their family members participated in spring environmental subbotniks for area cleaning and planting.

JSC Khiagda is contacted by students of universities and colleges from Chita

and Ulan-Ude who wish to complete their environmental traineeship.

Environmental matters of the enterprise are reflected in the Khiagda Vestnik newspaper and at the enterprise's web site.

JSC Dalur's staff participated in the Green Spring All-Russian Environmental Subbotnik. Jointly with administration of Uksyanskoye village circa 400 pines were planted, 265 decorative shrubs were bought and planted in the areas

of the enterprise, Uksyanskaya and Peshano-Koledinskaya middle-schools, 11 information posters were manufactured and installed in littered areas, several events and activities were performed for improving and planting at adjacent settlements, production and recreation areas



JSC Dalur is the award-winner of the Environmental Culture: Peace and Harmony Project for Environmental Culture in Industry and Energy.

**24 April - 2 May** – the Ecology and Us environmental subbotnik was conducted;

**on 17 May** – the Give Nature a Chance event was conducted;

**5 June - 5 August** – My Village and My City photo exhibitions had been conducted to promote national, spiritual and environmental values of the home village and city

### Ensuring Radiation Safety

In the reporting period, the individual effective dose at the Holding Company's enterprises did not exceed 20 mSv for any single worker. No individual doses in excess of 100 mSv had been recorded from 2013 until 2017.

**Table 27. Average Effective Dose in 2015–2017, mSv**

	Mean Effective Dose in 2015	Mean Effective Dose in 2016	Mean Effective Dose in 2017
PJSC PIMCU	3.42	3.53	3.44
JSC Dalur	1.46	1.58	1.50
JSC Khiagda	1.16	1.05	1.08
JSC VNIIPromtehnologii	1.33	1.31	1.20

The level of annualized effective dose for staff employed at radiation hazard sites of PJSC PIMCU (underground mines, hydro metallurgical plant) remains at the same acceptable level. No INES level 2 and higher events.

#### 2017 RESULTS:

PJSC PIMCU performed targeted operations to improve the radiation situation in mining works including:

- insulating concrete and wood partitions were installed at underground mines one and eight (20 pcs.);
- ventilation doors DV-1000 (four) were restored and commissioned;
- based on results of individual dosimetry control, timely staff rotation was conducted within units with uranium content exceeding 0.5%.

The following actions were taken to improve the radiation situation at PJSC PIMCU HMP:

- cleaning and washing for removal of radioactive dust from intake and exhaust vent ducts of several production buildings;
- capital repairs of feedstock hoppers B and C including replacement of hopper sheet lining, inspection of RC support structure, repairs of protective structures and fences at the LCS feeder transition assembly and re-welding of weld joints;
- capital repairs of crusher SMD-111 and SMD-111A including replacement of crusher plates (lining), crusher, replacement of fixtures and adjustment of crusher work openings;

- current repairs of the packaging assembly including cleaning of the hopper, pressurization restoration, repairs of the ventilation system and repairs of assemblies with replacement of elements and bearings.

In the past year, no decommissioning or liquidation of nuclear or radiation hazard facilities were performed by operators.

### OCCUPATIONAL SAFETY

#### INJURIES

In 2017, there were no accidents subject to investigation in accordance with federal norms and regulations at JSC Atomredmetzoloto.

In the reporting year, there were four Industrial accidents at the plants managed by JSC Atomredmetzoloto. No fatal injuries occurred

#### 2017 RESULTS:

**Table 28. Injuries at JSC Atomredmetzoloto's Enterprises for 2002–2017, cases.**

	2015	2016	2017
Target	0.7	0.6	0.54
Result	0.23	0.44	0.28

The following actions were taken to ensure safe working conditions:

- improvements of the general safe labor culture with key focuses here aimed at active promotion of safe labor and development of the safety culture;
- PJSC PIMCU's Mine No. 8 commissioned the automated system for staff alcohol testing;
- all operator subsidiaries developed and enacted regulations on actions of business units' executives and specialists for examination of their staff for intoxication;
- work is underway to improve the system for exchange of safety information to ensure maximum staff coverage and improve employees' awareness;
- all operator subsidiaries implemented the monthly assessment of business units' executives regarding organization of occupational safety and health operations;
- within the framework of migration to international safety management standards, PJSC PIMCU implemented the project for development of the safety culture, system and practice

for management of occupational safety and health. The program for analysis of results of completed behavior safety audits, Regulation on Safety Culture Management System and safety culture self-assessment methodology were developed.

**Table 29. Fatal Injury Frequency Rate (FIFR)**

2015	2016	2017
0.02	0	0

**Table 30. Lost Days Rate (LDR)\***

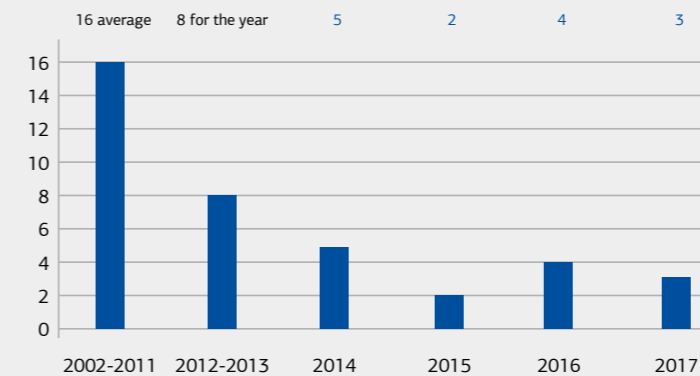
2015	2016	2017
9.85	17.67	27.4

**Table 31. Occupational Disease Rate (ODR)\*\***

2015	2016	2017
0.75	0.93	0.56

\* LDR data have been calculated as follows: Number of lost days from accidents and occupational diseases/number of man-hours worked) \* 200,000.

\*\* ODR data have been calculated as follows: The total number of occupational diseases for the year/number of man-hours worked) \* 200,000.



**Figure 41. Injury occurrence dynamics at the enterprises of JSC Atomredmetzoloto for 2002–2017, no. cases.**

#### PLANS FOR 2018 AND THE FUTURE:

- ensuring functioning of the electronic occupational safety and health room for conducting trainings, briefings and knowledge on occupational safety and health, education and attestation of engineers and technicians;
- revising and improving criteria for assessing preventative operations by executives of the Company's occupational safety and health, and fire safety business units within the framework of the Personal Responsibility Regulation;
- assessing PJSC PIMCU's safety status within its business units in accordance with the Regulation on Internal Audit of Business Units/ Workshops' Occupational, Industrial, Radiation, Environmental and Fire Safety Activities.

## 4.5. Human Capital

### PERFORMANCE FOR 10 YEARS:

- implementation of the single harmonized remuneration system at the Holding Company's enterprise;
- implementations of the Record performance management system;
- development and implementation of the Career and Succession Planning process;
- migration of all Holding Company enterprises to the information and analysis HR management system based on SAP ERP HCM;
- the ROSATOM Person of the Year annual industrial recognition program;
- the ROSATOM Cares for Your Opinion annual engagement survey shows increase of the employee engagement from 42% to 66%;
- the team of highly promising young business troubleshooters was formed;
- annual professional mastery competitions are held at the Holding Company's enterprises;
- the annual division professional mastery contest under the World Skills methodology is held with its winners

participating in the annual industrial worker championship Atom Skills within the Mining Division's combined team;

- mass cultural and sporting events are held for employees and their children.

### 4.5.1. HR Policy Management System

The HR policy of JSC Atomredmetzoloto is aimed at creating effective HR management system that would increase the efficiency of the Holding Company. Employees of the Company are JSC Atomredmetzoloto's key asset.

Their involvement in implementation of the corporate strategy, qualification and responsibility determine its long-term competitiveness. The company, strictly following the requirements of the labor Code of the Russian Federation, brings

social orientation to its personnel policy, is committed to providing its employees with favorable conditions for successful work and professional growth.

### 4.5.2. HR Policy Management Performance

#### 4.5.2.1. Human Capital Features

##### NUMBER OF EMPLOYEES

Table 32. Average Headcount Dynamics of the Company in 2015-2017, persons.

	JSC Atomredmetzoloto	PJSC PIMCU	JSC Dalur	JSC Khiagda	JSC VNIPIprom- technologii	JSC RUSBUR- MASH	LLC ARMZ Service	TOTAL
2017	151	4,720	448	527	272	440	99	6,657
2016	149	5,137	443	496	352	597	100	7,275
2015	151	5,961	446	451	389	685	100	8,183

The trend toward decreasing staff number continued in 2017 albeit at decreasing rates ensured due to development of the mineral resource base and new businesses.

Key changes to average staff number in the reporting year occurred at the following enterprises:

- PJSC PIMCU (-417 people) due to reduction of mining volumes, conservation underground mine 2, migration to the five-days working week and increased duration of the working week for certain employees based on results of the special labor conditions assessment, transfer of dormitories to the municipal administration of Krasnokamensk and exclusion of the housing and utility department from the enterprise;
  - JSC RUSBURMASH (-157 people) due to reduction of drilling volumes and absence of geological projects;
  - JSC VNIPIpromtechnologii (-80 people) due to decreasing revenue under design contracts requiring, in its turn, organizational actions to streamline staff number;
  - JSC Khiagda (+31 people) due to commencement of operations at production facilities of Istochnoye Deposit;
  - JSC Dalur (+4 people) due to creation of the new associated scandium production facility.
- Staff number change trends in operation regions are characterized with material reduction of staff number in the Trans-Baikal Territory (-545 people):
- PJSC PIMCU (-417);
  - JSC RUSBURMASH (-96 people);
  - JSC VNIPIpromtechnologii (-33 people);
  - JSC Khiagda (+1).
- Staff number fluctuations in other operation regions are primarily due to its changes at JSC RUSBURMASH:
- Moscow (+4);
  - Kurgan Region (+20);
  - Irkutsk Region (-37);
  - Trans-Baikal Territory (-96);
  - Republic of Buryatia (-48).

### REGIONAL STAFF NUMBERS

Table 33. Average Headcount Dynamics in Key Operation Regions in 2015-2017, persons

Key Operation Regions	2015	2016	2017
Moscow	637	603	562
Kurgan Region	581	595	619
Irkutsk Region	91	39	2
Trans-Baikal Territory	6,432	5,747	4,996
Republic of Buryatia	442	290	478
<b>Total:</b>	<b>8,183</b>	<b>7,275</b>	<b>6,657</b>

In 2018 and the near future, the average staff number is planned to grow due to development of new production and business diversification expected at PJSC PIMCU (due to transfer of 1,109 people from Allianttransatom, JSC as of 10/1/2017), at JSC Dalur (startup of the territorial remote experimental section of Dobrovolnoye deposit), at JSC Khiagda (start of development of Vershinnoye Deposit) and at JSC RUSBURMASH (growth of drilling and geological exploration).

Table 34. Average Staff Number Trends by Classes in 2015-2017, persons

Classes	2015	2016	2017
Executives	1,089	997	981
Specialists	1,514	1,426	1,283
Service Employees	52	31	37
Workers	5,529	4,821	4,356
<b>Total:</b>	<b>8,183</b>	<b>7,275</b>	<b>6,657</b>

Workers dominate the average staff number with their share decreasing for the last three years from 67.6% (2015) to 65.4% (2017) due to reduction of worker job positions at PJSC PIMCU from 4,461 (2015) to 3,401 (2017) and creation of advanced jobs at JSC Khiagda and JSC Dalur.

Table 35. Personnel Distribution by Employment Type in 2015-2017, persons

Personnel Distribution by Employment Contract and Employment Type	2015	2016	2017
Actual number of staff on the payroll as of Reporting Period End	7,725	6,957	7,347
Employed under indefinite term employment contracts	7,278	6,690	6,957
Employed under fixed term employment contracts	447	267	390
Part-time employees	41	51	89

Personnel Distribution by employment type shows increasing share of part-time employees from 3.8% in 2016 to 5.3% in 2017 with JSC VNIPIpromtechnologii accounting for the bulk whereof where year 2017 saw staff number reduction activity.

The share of fixed term employment contract employees in the total actual number of staff on the payroll as of the end of the reporting period increased from 0.7% in 2016 to 1.2% in 2017 due to the growing number of executed fixed term employment agreements at JSC RUSBURMASH.

### GENDER AND AGE STAFF STRUCTURE

Table 36. Staff Allocation by Gender in 2015-2017, persons

Staff Allocation of Gender	2015	2016	2017
<b>Men</b>			
Number	5,432	4,878	5,472
% of total number	70.3%	70.1%	74.5%
<b>Women</b>			
Number	2,293	2,079	1,875
% of total number	29.7%	29.9%	25.5%

Year 2017 saw further decrease of the share of young specialists from 42.0% as of 12/31/2015 to 33.8% as of 12/31/2017. The main reason for decrease of the young professionals' share was a preference given to keeping the more highly qualified and experienced employees during layoffs and/or the reduction of number of employees at PJSC PIMCU and JSC VNIPIpromtechnologii as well as transfer of 1,109 employees whose average age is 47.3.

## AGE ALLOCATION OF STAFF

**Table 37. Distribution of Company Personnel by Age in 2015-2017, persons**

Age Allocation of Staff	2015	2016	2017
<b>under 35</b>			
Number	3,244	2,615	2,480
% of total number	42.0%	37.6%	33.8%
<b>36 to 50</b>			
Number	2,763	2,688	1,970
% of total number	35.8%	38.6%	40.4%
<b>Over 50 years</b>			
Number	1,718	1,654	1,897
% of total number	22.2%	23.8%	25.8%

## HR LIQUIDITY

**Table 38. Personnel Liquidity in 2015-2017, persons**

Personnel Liquidity	2015	2016	2017
JSC Atomredmetzoloto	11.2	20.2	8.6
PJSC PIMCU	29.3	18.5	18.1
JSC Khiagda	16.2	14.3	16.9
JSC Dalur	15.7	12.0	9.4
JSC RUSBURMASH	64.4	58.0	63.7
JSC VNIPIpromtehnologii	47.5	27.5	54.7
ARMZ Service, LLC	29.9	28.9	25.2
<b>Total:</b>	<b>31.3</b>	<b>21.7</b>	<b>21.8</b>

## PERSONNEL LIQUIDITY BY GENDER

**Table 39. Staff Liquidity by Gender in 2015-2017, persons, %.**

Personnel by Gender	2015	2016	2017
<b>Men</b>			
Men dismissed/resigned due to any reasons, persons	1,959	1,045	1,023
% of AVERAGE STAFF NUMBER	25.4%	15.0%	13.9%
<b>Women</b>			
Men dismissed/resigned due to any reasons, persons	606	531	428
% of average of number of employees	7.8%	7.6%	5.8%

**Table 40. Number of Dismissed/Resigned Employees by Operation Regions in 2015-2017, persons**

	2015	2016	2017
Moscow	238	184	203
Kurgan Region	103	79	92
Irkutsk Region	64	50	73
Trans-Baikal Territory	1,942	1,172	985
Republic of Buryatia	218	91	98
<b>Total:</b>	<b>2,565</b>	<b>1,576</b>	<b>1,451</b>

Year 2017 saw further decrease of the share of young specialists from 42.0% as of 12/31/2015 to 33.8% as of 12/31/2017. The main reason for decrease of the young professionals' share was a preference given to keeping the more highly qualified and experienced employees during layoffs and/or the reduction of number of employees at PJSC PIMCU and JSC VNIPIpromtehnologii as well as transfer of 1,109 employees whose average age is 47.3.

Deceleration of staff number decrease at PJSC PIMCU allowed keeping the total Holding Company's staff liquidity at the level not exceeding 22% in 2016 to 2017.

In this connection, the total staff liquidity level at JSC RUSBURMASH and JSC VNIPIpromtehnologii increased versus 2016 to 63.7% and 54.7%, respectively.

In accordance with the applicable Russian labor legislation, employees are notified of a substantial change of their working conditions at least 2 months before the event.

## 4.5.2.2. Remuneration System

Remuneration is paid to employees according to the Unified Standard Remuneration System of ROSATOM's organizations (USRS), which allows for a unified approach to the formation of wages in the Holding Company and stable income of employees.

Under conditions of fluctuating product prices and sales on which the revenue depends currently, the share of total payroll costs remains at the level of 30% to 37% among other things due to the fixed (guaranteed) portion of the employee wage exceeds 75%.

**Table 41. Wages and Insurance Contributions in 2015-2017, thousand RUB**

Indicator	2015	2016	2017
Payroll, total	5,489.855	5,204.010	4,959.312
including:			
Payroll	4,266.722	4,034.232	3,865.782
Vacation Provision Accrual	726.346	671.341	638.767
Annual Bonus Provision Accrual	483.553	483.894	447.602
Payroll of Civil Law Contract Employees	13.233	14.542	7,161
Taxes (Insurance Contribution) on Payroll	1,618.373	1,534.339	1,475.251

The structure of payroll costs did not change despite reduced staff number and remained proportional to 2016.

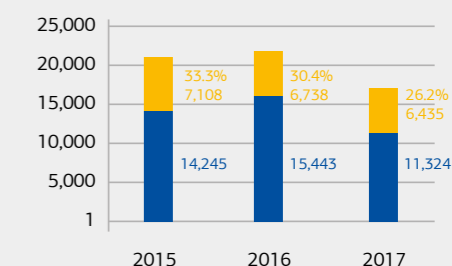
The average monthly wage amount for the Holding Company overall increased by 4.3% year on year to RUB 62.0 thousand in 2017.

## AVERAGE MONTHLY WAGE

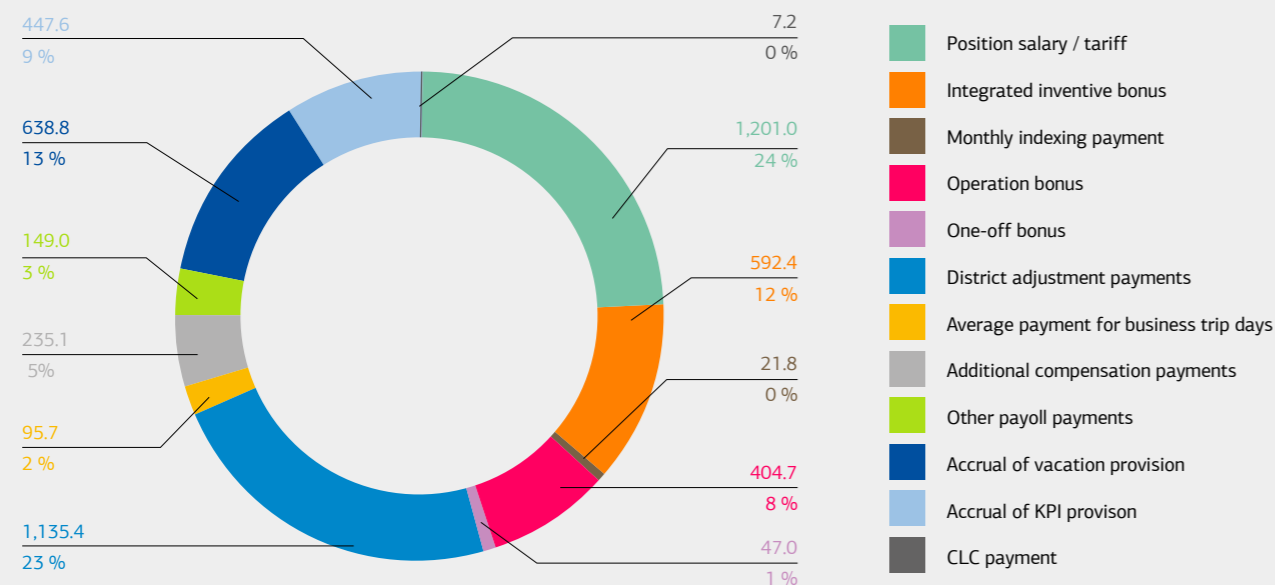
**Table 42. Average Monthly Wage at Enterprises of the Company in 2015-2017, RUB**

	2015	2016	2017	Relative share, 2017/2016, %
PJSC PIMCU	43,125	45,316	48,393	106.8%
JSC Khiagda	58,513	60,919	63,202	103.7%
JSC Dalur	39,105	40,832	43,309	106.1%
JSC RUSBURMASH	63,591	70,688	65,799	93.1%
JSC VNIPIpromtehnologii	10,924	112,672	118,235	104.9%

Wages at PJSC PIMCU, PJSC Khiagda and PJSC Dalur grew due to indexation of wages as of 9/1/2017 by setting the monthly indexing payment or changing its amounts and at JSC VNIPIpromtehnologii due to retirement payments on reduction of staff number.



**Figure 42. Share of Payroll Costs in Revenue in 2015-2017, Million RUB**



**Figure 43. Structure of Payroll Costs (exclusive of Insurance Contributions) in 2017, million RUB, %**

The wage structure showed growth of the share of one-off bonus payments from 0.5% in 2016 to 0.9% in 2017, monthly indexing payment from 0.1% to 0.4% and payment of business trip days from 1.6% to 1.9% on the average. At the same time, the share of operation bonus payment decreased from 9.1% to 8.1% and the share of compensation payments decreased from 5.0% to 4.7%.

In 2017, all Holding Company's enterprises removed restriction on grades and positions for bonuses for critical tasks (CTs) as well as bonus payment amount to employees for CTs per one achievement and for the year in total which resulted into increase of CT bonus payment cases from 594 in 2016 to 959 in 2017 and increase of one-off bonus payment amounts from RUB 20.4 MM to RUB 28.5 MM.

As of 1/1/2017, there were changes to the salary structure at JSC Khiagda and JSC Dalur and operating bonus payments were introduced for the employees of the production divisions. Operating bonus payment recipients were 826 employees whom over 7.5 thousand bonuses were paid in 2017 for the total amount of RUB 30.2 MM.

In 2018 to 2019, the following actions to improve remuneration system performance at the Holding Company's enterprises are planned:

- harmonizing wage matrices at PJSC PIMCU, JSC RUSBURMASH and JSC VNIIPromtehnologii;
- revising target matrices for operating bonuses and target amount of operating bonuses, including by increasing the operating bonus amount by

not more than 20% of the IAI transferred to the operating bonus;

- increasing the share of variable payment in the wage structure to 25% by 2019;
- implementation of project bonuses.

The minimum basic wage (the amount of salary set for the employee, integrated additional incentive and monthly indexing payout) at all the Holding Company's enterprises exceeded the subsistence minimum for capable population set forth in the operating regions.

#### MINIMUM WAGE AMOUNT IN OPERATING REGIONS

**Table 43. Ratio of the subsistence minimum for capable population in the operating region and the initial level wage, RUB.\***

Region	2015	2016	2017
<b>The minimum base wage (subject to regional ratios and northern bonuses) at the Holding Company's enterprises in the operating regions</b>			
Moscow			
JSC RUSBURMASH	50,000	45,000	45,000
JSC VNIIPromtehnologii	26,890	25,000	35,800
Kurgan Region			
JSC Dalur	10,499	10,500	10,500
JSC RUSBURMASH	15,112	11,007	11,007
Irkutsk Region			
JSC RUSBURMASH	29,700	38,254	38,254
Trans-Baikal Territory			
PJSC PIMCU	8,746	12,600	12,600
JSC Khiagda	13,049	13,647	15,312
JSC RUSBURMASH	16,974	16,974	16,974
JSC VNIIPromtehnologii	15,150	18,375	64,500
Republic of Buryatia			
JSC Khiagda	15,129	15,129	16,974
JSC RUSBURMASH	18,900	23,510	23,510
<b>Subsistence Minimum Amount for Capable Population set forth in the Regions (as of Q4 2015)</b>			
Moscow	17,296	17,487	18,453
Kurgan Region	9,418	9,864	10,371
Irkutsk Region	10,410	10,450	10,450
Trans-Baikal Territory	10,633	11,023	11,254
Republic of Buryatia	9,859	10,005	10,489

\* The operating regions – is the constituent of the Russian Federation where the Holding Company operates: Moscow, Trans-Baikal Territory, Kurgan Region, Republic of Buryatia, Irkutsk Region

### 4.5.3. HR Professional Development

Personnel training and development is one of the Company's HR policy priorities.

#### 2017 RESULTS:

To ensure timely, continuous and targeted development of knowledge and formation of new skills, actions were taken to train and upgrade the Holding Company's employees using different forms of education (external, internal and remote ones).

In 2017, the Company continued developing the remote form of education (1,264 man-courses completed). Twelve employees of the Holding Company's enterprises trained under RPS programs were successfully certified by ANO ROSATOM Corporate Academy. 484 persons were trained under the Executive School

Program and 97 persons were trained under the Business Performance Management Program. Within the HR School framework two HR directors successfully completed their certification under the HR Management Program at ANO ROSATOM Corporate Academy.

Based on PJSC PIMCU's Course Training Complex, course training was organized and conducted in the following jobs: Mining Breakage Face Worker, Timber Man, Mining Worker for Fire Prevention and Firefighting, Elevator (Tower) Operator, Pump Unit Operator, Electrician for Maintenance and Repairs of Equipment, Track Builder, Elevator (Tower) Cradle Worker, Shunter, etc. 2,411 people were trained in total.

Within the implementation framework of the Career and Succession

Management Industrial Project, career roadmaps and requirement profiles were developed for positions up to the specialist level. Succession plans for key positions in the Holding Company were drafted resulting into promotions of five employees in 2017.

#### ARMZSkills

For the first time in March 2017, the ARMZSkills divisional professional mastery contest was conducted under the World Skills methodology in four competencies: Chemical Analysis, Welding Processes, Dosimetry, Network and System Administration where 59 participants and experts from the Holding Company's enterprises participated. The contest was the selection one for formation of the team that took part in the second Industrial professional mastery Atom Skills

2017 championship of the ROSATOM State Atomic Energy Corporation in Ekaterinburg.

**PLANS FOR 2018:**

- expanding the list of programs for training localization at the Holding Company's enterprises;
- implementation of training plans and programs aimed at developing managerial skills of senior, middle and junior managers;;
- holding the second divisional professional mastery ARMZSkills contest under the World Skills methodology in six competencies: Laboratory Chemical Analysis, Welding Processes, Dosimetrist, Special Motorcar Driver, Engineering Design, Network and System Administration;
- drawing up succession plans for all critical positions in the division;

- development of mentorship for transfer of critical knowledge.

**TALENT POOL**

In 2017, 67% of employees appointed to Top 1000 positions were selected from the senior and middle management talent pool. 63% of employees included in senior, middle and line management talent pool were promoted to a new position.

**CHANGE LEADERS 2.0 CONFERENCE**

One of the most important events aimed at minimizing the risks of the employees' destructive behavior was the second Change Leaders 2.0 conference. In Krasnokamensk, the conference was held for more than 100 employees of PJSC PIMCU and JSC RUSBURMASH's business units. During the conference in the form of live communication and dialog, participants, jointly with PJSC PIMCU

and Holding Company's executives, were discussing changes at the enterprises and plans for the future. Special attention was paid to the following problems. In the course of brainstorming and master classes, Change Leaders were looking for solutions and actively developing projects within their teams to be used for solution of critical problems at enterprises.

**4.6.1. Social Investment Management**

Social capital management and establishing partnerships in operating regions is the part of the Mining Division strategy. ARMZ strives towards recognition and fair appraisal of its employees' achievements. The Company is sure that additional social protection initiatives for its employees allow them to feel comfortable. Therefore, the Company provides its employees with the full set of statutory social guarantees and allows them to use additional social programs.

Internal social investment programs have the following priorities:

- employee development, job and qualification upgrading of employees;
- corporate culture formation;
- recreation and health rehabilitation of employees and their family members;
- attracting and supporting the youth including educational programs;
- sporting events;

- provision of pecuniary aid;
- aid to veterans;
- implementation of children programs.

**4.6.1.1. Work with Youth and Students**

**CHANGE SUPPORT TEAM**

In 2017, the members of the change support team (CST) who are the most active employees of the Holding Company such as increasing the level of awareness of values and strategic objectives at the division's enterprises, introduction of new employees to the corporate culture and assistance to organization of events dedicated to the 10th anniversary of the Holding Company.

**AFTERBURNER 2017**

The Afterburner 2017 international forum of young power and production employees had been held from 9 until 15 July 2017 in Kaluga Region. The Afterburner is a unique project, a consortium of inter-corporate and inter-industry scale. Development of Hard-to-Access Areas and Pure Energy Projects where employees of the Mining Division took part ranked the first and second within the forum framework.

**THE 19TH FESTIVAL OF YOUNG PEOPLE AND STUDENTS**

The Festival had been held since the 15th until the 19 of October in Sochi. Seven people participated in the Future Industries science and education stream at the Festival. Participants were analyzing current global challenges and trends, and forecasting how the world, technologies, business and social environment would change in the near decades. The result of this large work were young people's initiatives for improvement of social life to become foundations of the Global Declaration of the World's Young People. The document would reflect key values of the future: longevity and high quality of life, development of new territories and space as well as security and equal rights for everyone. Afterburner and the Festival have an important objective in common. It is promoting ROSATOM State Atomic Energy Corporation's brand as the international leader in innovations, technologies and leadership.



**Table 44. Training Hours per Person by the Company's Enterprises, man-hours**

Category	2015	2016	2017
JSC Atomredmetzoloto	21	14.32	22.8
PJSC PIMCU	18	24.86	15.91
JSC VNIPIpromtehnologii	31.22	29.47	19.25
JSC Dalur	68.8	67	93.8
JSC RUSBURMASH	12	95	18.66
JSC Khiagda	82	76.3	55.8
JSC Atomredmetzoloto	26.3	18.5	19.75
PJSC PIMCU	36.19	38.02	31.3
JSC VNIPIpromtehnologii	39.8	33.76	29.79
JSC Dalur	24.2	40.1	93.1
JSC RUSBURMASH	28	60	86.17
JSC Khiagda	83	64.3	39.6

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**4.6. Social Capital**

**PERFORMANCE FOR 10 YEARS:**

- formation of ROSATOM's CTG to allow increasing tax proceeds of the regional budget of Trans Baikal Territory;
- use of increased proceeds of the regional budget to take actions aimed at improving quality of life in Krasnokamensk, financing of waste treatment facilities of the first and second stages, airport, Krasnokamensk to Matsievskaya

motorway, Dauria Culture Club, construction of the Sporting Facility, commerce and entertainment center, reconstruction of the children park, etc.;

- kindergarten for 240 places (with the swimming pool, gym and a unique playground) opened in Krasnokamensk;
- commissioning of the apartment block for 60 apartments in Krasnokamensk;

- Chita to Krasnokamensk flights of Aero service airline from Chita. Procurement of the new L-410 airplane;
- reconstruction of the Argun gym in Krasnokamensk;
- inauguration of the advanced school for 270 places in Uksyanskoye Village of Dalmatovsky District of Kurgan Region.

**Literature club**

Since 2017, ARMZ has been hosting its Literary Club, the platform where anyone can be a speaker, a place for exchange of knowledge and development of public speaking skills. Within the Literature Club framework, the Creation and Development of the Mineral Resource Base of Domestic Nuclear Industry book and the Uranium Geotechnology were presented.

**What? Where? When?**

Within the framework of the Holding Company's tenth anniversary, the intra-divisional championship for the What? Where? When? game was held. Seven teams represented the Holding Company's enterprise. The game included three tours of ten question each. The key topic of the question was history of the nuclear industry including creation of its feedstock complex. The players also made good use of their general knowledge of thermodynamics and molecular physics and, of course, there were humorous general logic and intellect questions. JSC Khiagda's team became the absolute.

### 4.6.1.2. Implementation of Children Programs

#### NUCKIDS-2017

The Holding Company supported staging of the Just A Summer Rain musical created by participants of ROSATOM's Nuclear Kids International Creative Children Project. Dauria Culture Club (Krasnokamensk) hosted the selection tour in which 50 children of PJSC PIMCU's employees and 30 children of Krasnokamensk resident took part. Five participants entered the final.

#### ROSATOM SCHOOLCHILD

On the threshold of the jubilee date, the ROSATOM Schoolchild Collect a Bag of "Excellent" Scores Industrial project with 42 registered participants from comprehensive schools of Moscow and Moscow Region.

In June, the celebration dedicated to the Russia Day was held where 109 schoolchildren, winners of the ROSATOM Schoolchild contest, were given valuable prizes.

#### «Pack Your Schoolbag!»

In May Krasnokamensk hosted the Pack Your Schoolbag celebration in the course of which 240 future first-graders were given schoolbags with PJSC PIMCU and JSC Atomredmetzoloto's logos.

#### Trans Urals Navigator Technological Job Orientation Park

Within the implementation framework of the project senior schoolchildren from Uksyanskaya Comprehensive School visit JSC Dalur's production sites on an annual basis.

Year 2017 also saw the following events hosted in Krasnokamensk:

- PJSC PIMCU's I Am For Healthy Living quest game;
- the Best Voice City Contest dedicated to the People's Unity day;
- the first Smart Boys and Smart Girls game championship;
- completion of tests from the All-Russian Physical Education and Sporting Complex I Am Ready to Labor and Defense;
- contest of drawings and artworks named Our Glorious Victory in which more than 200 children and adults participated;
- traditional track and field competition for schoolchildren and college students;
- the theatrical contest It's Good to Live Without the War;
- Spring and Winter songs soiree program;

### 4.6.1.3. Sporting Events

#### ARMZ SPARTAKIAD

On 23 September 2017, Krasnaya Presnya Stadium in Moscow hosted ARMZ's Fifth Anniversary Spartakiad. Participating in it were combined teams of the managing company and of all

the Holding Company's enterprises as well as family members of employees of organizations from the Moscow Region. For the fourth year in a row, PJSC PIMCU's combined team ranked

the first. Combined teams of ARMZ and JSC RUSBURMASH ranked the second, the JSC VNIIPromtehnologii's team ranked the third.

### 4.6.1.4. Support to Retired Veterans

Table 45. Number of Registered Unemployed Retirees in 2015-2017, persons.

Number of registered unemployed retirees	2015	2016	2017
<b>Total</b>	3,172	2,998	2,463
of which			
Nuclear Industry Honorary Retirees	1,169	1,183	1,103
Nuclear Industry Honorable Retirees	2,003	1,815	1,360

Since June 2017, unemployed retirees registered with JSC Atomredmetzoloto have been entitled to partial (not exceeding 90%) reimbursement of the cost of travel vouchers bought independently. Since 2017, two nuclear industry honorary retirees have exercised this right.

Year 2017 saw start of PJSC PIMCU and PIMCU Veteran Council's new social project, PJSC PIMCU's Veteran Soiree hosting monthly warm and friendly meetings of PIMCU's business units veterans with young employees, students of sponsored schools and creative studios of Dauria Culture Club. Presentation of the Creation and Development of the Domestic Nuclear Industry's Mineral Resource Base monograph written by veterans and published for the tenth anniversary of ARMZ Uranium Holding Co.



### EVENTS HOSTED BY THE PUBLIC VETERAN ORGANIZATION OF JSC ATOMREDMETZOLOTO IN 2017:

- meetings of representatives of the veteran organization with the Company's management on the Victory Day and Nuclear Energy and Industry Employee Day (to receive pecuniary aid and gratitude for many years of good faith labor, large contribution to development of nuclear industry and in connection with the 10th anniversary of incorporation of ARMZ Uranium Holding Co.). Invitations to the celebration concert at the Russian Army Theater were also issued;
- inclusion of memoirs of veterans, Alexander S. Babkin, Vladimir G. Fomenkov, Yuri S. Borozdin, into the ROSATOM's Living History section of ROSATOM's electronic library, www.memory.biblioatom.ru;
- lecture What Is Atom about peaceful uses of nuclear power. Nikolai P. Petrukhin, the veteran of nuclear industry and representative of the veteran organization of JSC Atomredmetzoloto, shared his knowledge, professional experience and wisdom with students of Moscow school 1317.



### 4.6.1.5. Trade Unions and Collective Bargaining Agreements

Currently, there are three collective bargaining agreements in force within the Holding Company (PJSC PIMCU, JSC VNIIPromtehnologii and JSC Dalur) and two trade union organization (PJSC PIMCU and JSC VNIIPromtehnologii). At JSC Dalur, employee interests are represented

by the Staff Board, which takes active participation in interaction with the employer.

The share of trade union organization members in the total staff number of the Holding Company exceeded 45% as of 12/31/2017.

Enterprises' transfers to trade union organizations' account for hosting sporting and cultural events within the authorized activities framework of the trade union decreased from RUB 11.3 MM (in 2016) to RUB 8.7 MM (in 2017).

Still, other trade union upkeep costs (payroll, stationery, office equipment, motorcars, cleaning, communications, etc.) increased by 1.8 times in 2017 versus the actual level in 2016 and the share of production planning section (PPS) functioning costs within total transfers to accounts of trade union organization increased from 9.5% in 2015 to 26.0% in 2017.

Table 46. Number of Employees Covered with Collective Bargaining Agreements and Being Trade Union Members in 2015-2017, persons

	2015	2016	2017
Number of Employees covered with Collective Bargaining Agreements	6,300	5,651	6,040
Number of Trade Union Organizations within the Holding Company	3	3	3
Number of Trade Union Organization Members	4,539	3,748	3,357

Table 47. Upkeep Costs of the Holding Company's Trade Union Organizations, Million RUB, %

	2015	2016	2017
Transfers to accounts of trade union organization for hosting sporting and cultural events	10,199.9	11,280.7	9,358.0
PPS Functioning Costs	1,076.3	1,851.8	3,281.0
Share of PPS functioning costs in total transfers to PPS accounts of trade union organizations	9.5%	14.1%	26.0%

#### PLANS FOR 2018:

- hosting the corporate spartakiad among the Holding Company's enterprises dedicated to the 50th anniversary of the primary uranium mining enterprise PJSC PIMCU;
- hosting contests, the Best ARMZ Employee and What? Where? When?;
- hosting the uranium-related quest for schoolchildren within the framework of the ROSATOM Schoolchild: Collect a Bag of "Excellent" Scores Industrial program;
- hosting presentation of job-related books within the Literature Club framework and promotion of ROSATOM's Industrial library;
- organization of change support teams at the Holding Company's enterprises.

Engagement is emotional and intellectual condition motivating employees to work as efficiently as possible.

## 4.6.2. Social Capital Management Performance

RUB 212.9 MM were spent on events and social obligations in 2017.

Within the structure of social costs (SCs), the share of private retirement insurance increased from 22.7% in 2016 to 24.0% in 2017 and the share of hot catering costs for rotational staff increased from 3.7% to 7.4%. On the other hand, the share of voluntary healthcare insurance of employees decreased from 19.6% to 18.2%

and the share of gratuitous travel to vacation, medical, etc. locations decreased from 17.7% to 16.5%.

Unit social payment costs excluding the payment of gratuitous travel to the vacation location increased, for the Holding Company overall, from RUB 23.9 thousand per employee in 2016 to RUB 26.5 thousand in 2017.

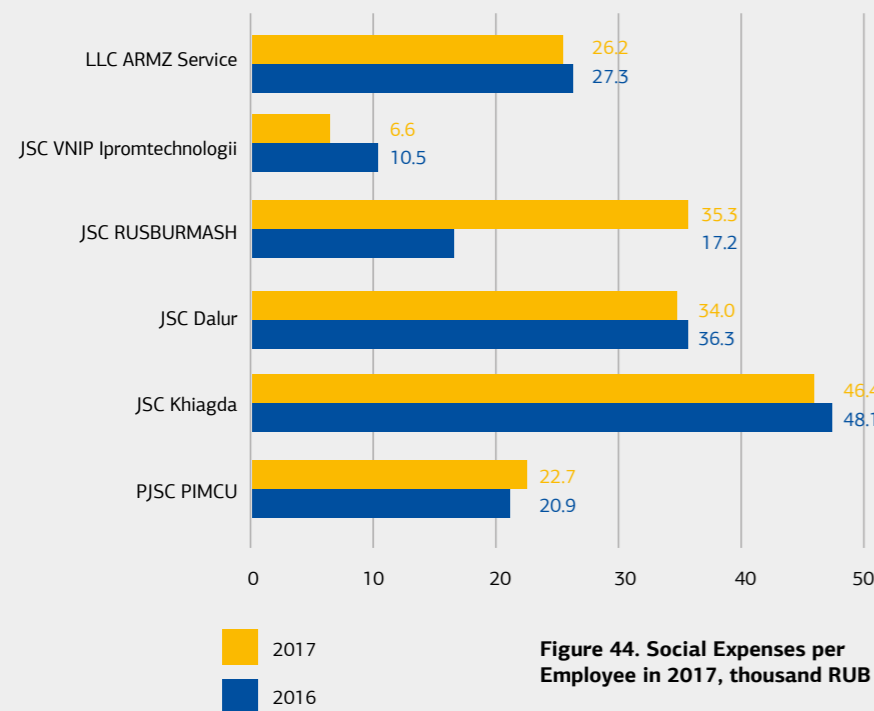


Figure 44. Social Expenses per Employee in 2017, thousand RUB

Year 2018 is forecast to see increase of social costs to RUB 262.6 million and increase of unit social payment costs to RUB 33.3 thousand per employee p.a.

PJSC PIMCU is expected to show the largest growth as the share of private retirement insurance costs there will exceed 40% of the enterprise's SC structure and the total amount thereof may increase by 1.7 times versus the

actual level of 2017 due to material increase of employee retirements.

### PERSONNEL ENGAGEMENT

In keeping with the tradition, the employees of the Company took part in the annual industry nomination program «ROSATOM's Person of the Year», which is intended to recognize the best industry employees' achievements

### BUSINESS CASE: PROMOTION OF RPS PROJECTS AMONG PIMCU'S EMPLOYEES

Year 2017 saw implementation of the integrated PR project Promotion of Implementation of Performance Improvement Projects within the Framework of ROSATOM Production System among PJSC PIMCU's Employees. Creating the constantly positive internal information field, forming positive images of RPS leaders, using hotlines, hosting contests and information meetings with employees, etc. allowed increasing employees' activity for development, submission and implementation of RPS projects and SR. Actions taken within the internal communications domain resulted into increase of the number of implemented RPS projects from 16 in 2016 to 144 in 2017 (nine-fold increase!) and increase of the number of SRs submitted from 207 in 2016 to 826 in 2017 (four-fold increase!).

at the very top level of ROSATOM's management.

In 2017, JSC Khiagda participated in the annual engagement level survey ROSATOM Cares About Your Opinion for the first time. Based on results obtained from the enterprises, action plans were developed to increase employee engagement level.

### PLANS FOR 2018:

Implementation of talent pool development programs «ROSATOM Wealth», «ROSATOM Capital» and «ROSATOM Talents» as well as carrying out new selective measures with a view to form the pool of high-potential middle and junior managers for preparation to work on key positions and projects.

Table 48. Personnel Engagement in 2015-2017, %

	2015	2016	2017
JSC Atomredmetzoloto	83	85	83
PJSC PIMCU	46	54	59
JSC RUSBURMASH	68	69	76
JSC Khiagda	-	-	58
<b>Division Total:</b>	<b>54</b>	<b>62</b>	<b>66</b>

## 4.6.3. Contribution to Development of Operation Areas

Infrastructural investments are an important aspect of the Holding Company's social responsibility as the Holding Company's enterprises are located in different regions of the Russian Federation, Kurgan Region, Republic of Buryatia and Trans-Baikal Territory. The Company takes into account the possible social and economic consequences of the decisions

made and closely cooperates with all the stakeholders.

### TRANS-BAIKAL TERRITORY

Since 2013, ROSATOM has been using the Consolidated Taxpayer Group (CTG). PJSC PIMCU's participation in the CTG results into material additional profit tax transfers to the budget of the Trans-

Baikal Territory. In 2017, the Territory's additional income amounted to RUB 246 MM. Subsidies are preserved for air carriage along the Chita to Krasnokamensk to Chita route to maintain the airline ticket prices at the level accessible to residents of the city.

### BUSINESS CASE: CO-FINANCING OF FIBER OPTIC LINE CONSTRUCTION

On 2 June 2017, ROSATOM and the Government of Yakutia Republic executed the protocol for implementation of the Collaboration Agreement of 2012, the framework whereof provided for co-financing of the fiber optic line (FOL) construction along the route Sosnovo-Ozerskoye-Romanovskoye-JSC Khiagda's Production Site. JSC Khiagda contributed RUB 41 MM.

In January 2018, PJSC Rostelecom announced completion of the FOL construction. The last stage

saw laying of 91 kilometers of communication lines at the section from Romanovka village to the final destination, JSC Khiagda's mine. The total FOL length was 218 km. The sum of joint investments with Rostelecom, PJSC was RUB 123 MM.

Implementing the project will allow JSC Khiagda to accelerate information exchange between its production site in Bauntovsky Evenki District and its office in Chita. In the near future, videoconferencing will become possible between the enterprise's

business units and video surveillance will be organized to improve process safety. Prospects opened for implementation of the Smart Mine Project, the system for automation of all levels of production processes. One of activities within the Smart Mine Project framework was the Smart Helmet project to allow controlling physical condition of the employee, its location, pulse and body temperature.

In August 2017, cooperation of the Government of the Trans-Baikal Territory and JSC Atomredmetzoloto resulted into inauguration of the last reconstructed section of the regional motorway from Krasnokamensk to Matsievskaya with solid asphalt pavement. It is a reliable way for delivery of cargo to Krasnokamensk, an alternative to the railway increasing attractiveness of the Krasnokamensk Priority Social and Economic Development Area (PSEDA).

In 2017, creation of Krasnokamensk PSEDA accelerated. As of December 2017, the following PSEDA residents were registered:

- ATOMSPECCEMENT;
- Azbuka Zdorovia medical clinic;
- Krasnokamenskpromstroy, LLC implementing the project for Construction of the General Construction Cement 100 kt Production;
- Krasnokamensk Antimony Works, LLC planning creation of the new hydro metallurgical production facility for processing of antimony floatation concentrate to produce refined metallic antimony with the rated capacity up to 5,000 tpa

JSC Atomredmetzoloto supports creating new production facilities of the mining and adjacent industries in Krasnokamensk PSEDA. Development thereof will contribute materially to creation of substitute jobs for specialists dismissed from PJSC PIMCU, diversification of economy and social sphere of Krasnokamensk.

### REPUBLIC OF BURYATIA

JSC Khiagda's participation in the project for construction of the high-speed communication line in Bauntovsky District of Republic of Buryatia was the important milestone in 2017.

In furtherance of the subsoil license for deposits of Khiagdinskaya Group as well as for development of its operation area JSC Khiagda executed the Agreement for Assurance of Sustainable Social and Economic Development of Bauntovsky Evenki District of Republic of Buryatia with the administration of the municipality on 24 March 2017. Within the framework of the process, financial aid was provided to the district's social programs for the total amount of RUB 5 MM. Assistance was provided to repairs of local roads, the ATV was purchased to deliver food to remote settlements of the district, equipment was procured for preschools, and heating systems of local

settlements were repaired under the co-financing program.

In December 2017, the provisional process bridge across Vitim River constructed by and the expense of JSC Khiagda in 2009 was officially integrated into the regional motorway from Romanovka to Bagdarin and granted to Republic of Buryatia. The bridge is 233 meters long and over seven meters wide with two lanes, a walkway and lighting. Any vehicles may use the bridge as its cargo capacity is 62 tonnes. The construction cost amounted to RUB 200 MM.

### KURGAN REGION

In the Kurgan Region, JSC Dalur relying on the principles of business social responsibility is providing support to its operation areas within Dalmatovsky and Shumikhinsky Districts. The legal framework for the relationship is the agreement on social and economic partnership of the enterprise and Kurgan Region administration.



**Table 49. Taxes paid by key enterprises of ARMZ Uranium Holding Co. to regional and local budgets in 2015-2017, million RUB**

Regional and Local Budgets	ARMZ Uranium Holding Co.'s Enterprises	2015		2016		2017	
		Company	CTG	Company	CTG	Company	CTG
Kurgan Region	Total inclusive of	128	196	145	45	158	81
	JSC Dalur	121	171	136	43	146	67
	JSC RUSBURMASH	7	25	9	2	11	14
Republic of Buryatia	Total inclusive of	151	234	196	115	230	245
	JSC Khiagda	139	203	184	112	221	232
	JSC RUSBURMASH	12	31	12	3	8	13
Trans-Baikal Territory	Total inclusive of	847	1,680	785	618	713	728
	PJSC PIMCU	793	1,594	736	580	675	687
	JSC RUSBURMASH	25	50	20	6	13	15
	JSC Khiagda	29	36	25	30	25	25
	JSC VNIPIpromtehnologii	-	-	4	2	1	1
Irkutsk Region	Total inclusive of	4	14	5	7	1	0
	JSC RUSBURMASH	4	14	5	7	1	0
Arkhangelsk Region	Total inclusive of	3	5	-	1	-	-
	JSC RUSBURMASH	3	5	-	1	-	-
Amur Region	Total inclusive of	3	1	0	-	0	1
	JSC RUSBURMASH	3	1	0	-	0	1
Republic of Sakha (Yakutia)	Total inclusive of	-	-	2	3	0	0
	JSC RUSBURMASH	-	-	2	3	0	0
<b>Total:</b>		<b>1,136</b>	<b>2,130</b>	<b>1,133</b>	<b>788</b>	<b>1,102</b>	<b>1,057</b>

#### FINANCIAL ASSISTANCE FROM STATE AUTHORITIES

**Table 50. Subsidies to PJSC PIMCU in 2015-2017, million RUB**

Type	2015	2016	2017
The subsidy from the Ministry of Education, Science and Youth Policy of the Trans-Baikal Territory for partial reimbursement of costs of organizing and ensuring recreation and health rehabilitation of children as per the resolution of the Government of the Trans-Baikal Territory	1.49*	11.96**	5.45
Subsidy from the federal budget for reimbursement of radioactive waste handling costs	-	-	80.00

\* As per the Report on Intended Use of Subsidies, 7.02 million RUB were reimbursable for 2015. As of 12/31/2015, PJSC PIMCU had outstanding subsidies in the amount of 5.53 million RUB.

\*\* In 2016, subsidies were received as per the Report on Intended Use of Subsidies for 2016 in the amount of 6.43 million RUB and the indebtedness on subsidies for 2015 was repaid by the Ministry of Education, Science and Youth Policy of the Trans-Baikal Territory in the amount of 5.53 million RUB.

**Table 51. Regional Tax Benefits granted to PJSC PIMCU in 2015-2017, million RUB**

Type	2015	2016	2017
Property tax on power transmission lines and structures being integrated process parts thereof	5.66	6.22	6.06

**Table 52. Regional Tax Benefits granted to JSC Dalur in 2015-2017, Million RUB**

Type	2015	2016	2017
Property tax associated with implementation of the investment project at the territories included into the consolidated registry of investment sites within the Kurgan Region	0.82	11.38	19.74
Property tax on power transmission lines and structures being integrated process parts thereof.	0.88	0.61	4.00
Profit tax for organization making specific investments	1.07	35.04	15.59
Transport tax associated with implementation of the investment project at the territories included into the consolidated registry of investment sites within the Kurgan Region	0	0	0.03

**Table 53. Regional Tax Benefits granted to JSC Khiagda in 2015-2017, million RUB**

Type	2015	2016	2017
Property tax associated with implementation of the investment project in accordance with Law of Republic of Buryatia No. 868-IV of 5/8/2009 On State Support to Investments within Republic of Buryatia	0	47.26	200.28

JSC RUSBURMASH and JSC VNIPIpromtehnologii did not receive financial assistance from the state from the state authorities in 2015-2017.

#### INFLUENCE ON LOCAL POPULATION IN OPERATION REGIONS

Development of its operation areas plays an important part in achievement of its strategic objectives by ARMZ Uranium Holding Co. The Company, given its business geography, includes creating stable new jobs, improving its positive image and reinforcing public thrust into its key objectives.

#### MINIMUM WAGE AMOUNT IN OPERATING REGIONS

The minimum wage (taking into account regional coefficients and northern allowances) in all enterprises of the Holding Company exceeds the subsistence minimum set forth in its operation regions for capable population.

In keeping with the social responsibility principles, the Holding Company carries out the primary recruitment of employees (including executives) from among representatives of the local population. Over half of senior managers of ARMZ Uranium Holding in regions of operation is hired from local population. In the reporting period, the Holding Company did not exert any influence connected with the necessity of resettlement of residents.

**Table 54. Ratio of the subsistence minimum for capable population in the operating region and the initial level wage, RUB.\***

Region	2014	2015	2016
<b>The minimum base wage (subject to regional ratios and northern bonuses) at the Holding Company's enterprises in the operating regions</b>			
Moscow			
JSC RUSBURMASH	45,000	50,000	45,000
JSC VNIPIpromtehnologii	23,450	26,890	25,000
Kurgan Region			
JSC Dalur	9,840	10,499	10,500
JSC RUSBURMASH	15,112	15,112	11,007
Irkutsk Region			
JSC RUSBURMASH	17,940	29,700	38,254
Trans-Baikal Territory			
PJSC PIMCU	9,088	8,746	12,600
JSC Khiagda	12,116	13,049	13,647
JSC RUSBURMASH	16,974	16,974	16,974
JSC VNIPIpromtehnologii	12,877	15,150	18,375
Republic of Buryatia			
JSC Khiagda	14,047	15,129	15,129
JSC RUSBURMASH	16,682	18,900	23,510
<b>Subsistence Minimum Amount for Capable Population set forth in the Regions (as of Q4)</b>			
Moscow	14,330	17,296	17,487
Kurgan Region	8,146	9,418	9,864
Irkutsk Region	9,178	10,410	10,450
Trans-Baikal Territory	9,053	10,633	11,023
Republic of Buryatia	8,659	9,859	10,005

\* The operating region – is the constituent of the Russian Federation where the Holding Company operates.

### INVESTMENTS INTO SOCIAL INFRASTRUCTURE AND CHARITY

ARMZ Uranium Holding Co. exerts material influence on social and economic development of its operation areas not only by participating in the CTG and forming the income base of regional and local budgets but also by implementing integrated social and charitable programs.

Key charity priorities are as follows:

- support to educational programs and projects;
- cultural and educational initiatives, and preservation of cultural heritage;
- support to environmental activities;
- promoting massive and amateur sports, and healthy way of life;
- support to patriotic values and patriotic upbringing.

In 2017, spending of JSC Atomredmetzoloto on charitable aid to companies and individuals amounted to RUB 7 million.

### KEY SOCIAL PROJECTS IMPLEMENTED AT THE COMPANY'S EXPENSE

#### Social project contest in Krasnokamensk

- Social Entrepreneur Day;
- contest of charitable and social projects providing for provision of grants to:
  - social entrepreneurs operating within the City of Krasnokamensk municipality, up to RUB 150 thousand;
  - NPO, up to RUB 200,000;
  - PJSC PIMCU's volunteers, RUB 50,000 each.



Publication of the Illustration Perception Atlas book sets for dissemination among specialized children institutions of Krasnokamensk (Trans-Baikal Territory) and Dalmatovo (Kurgan Region)

#### Program for support to educational institutions in the Kurgan Region.

The Dalur profile class was inaugurated based on Uksyanskaya Comprehensive School for children of enterprise employees to commemorate the 10th anniversary of the Holding Company.

RUB 3.0 million were dedicated for outfitting specialized classes and purchasing laboratory suites for studying and project activities in physics for schools in Uksyanskoye Village of Dalmatovsky District, Trud and Znanie Villages of Zverinogolovskoye District within the framework of the program.

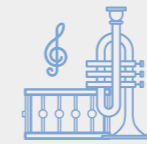


### Volunteer Initiatives of JSC Atomredmetzoloto's Employees 10 GOOD DEEDS TO ARMZ'S 10TH ANNIVERSARY

For the celebration of the Company's jubilee, employees initiated and implemented the 10 Good Deeds to ARMZ's 10th Anniversary program at their own cost and expense.



The Exhibition Window event for procurement of the exhibition window for exhibits of Privokzalnaya School Museum in Volokolamsk.



The Concert event for visiting the concert in the Music Hall proceeds from which were transferred to the Beacon House children hospice.



The Batteries event for disposal of waste batteries.



The Light Bulbs event for disposal of waste light bulbs.



The Clever Decorations project for hosting the fair and exhibition jointly with Safe House and Maria's Children Art Center funds.



The Aleksin Orphanage project for procurement of creative kits for the orphans.



The Good Things project for collection of things for the needy.



The Alma event for collection of things for the Alma animal orphanage.



The Numismatics project for support to the patriotic and educational Numismatics Club.



Old Age is for Joy Project for collection of New Year presents for the elderly at retirement homes.



By the beginning of the school year, employees of JSC VNIPIromtehnologii used their own funds to procure school bags and utilities for children from Elatomsky Orphanage for Retarded Children in Kasimovsky District of Ryazan Region.

JSC Atomredmetzoloto does not provide assistance to commercial organizations, donations to political parties or takes part in state policy development and lobbying.

#### PLANS FOR 2018:

JSC Atomredmetzoloto will continue to provide charitable assistance to individuals and legal entities in accordance with the approved regulations and budget of the Company.

In 2018, the fifth annual social project contest is scheduled in Krasnokamensk.

#### RESOLUTION OF DISPUTES WITH LOCAL COMMUNITIES

Provision of nuclear power development public acceptability is one of the priority strategic tasks of ROSATOM. JSC Atomredmetzoloto carries out activities in this area guided by the information openness principle.

In case of any issues arising during interaction with the public, the Company will be guided by RF legislation and requirements of ROSATOM.

No complaints about the impact on local community have been received at JSC Atomredmetzoloto.

In 2017, all the Holding Company's organizations installed Good Deed Boxes for collection of things for orphans.

Over 100 employees of JSC Khiagda responded to the plea to help unwanted children. The enterprise used the funds collected to purchase children clothing, educational games and essential things for babies. Some presents were sent to Orphanage 1 in Chita and some of them were sent to Territorial Children Hospital in Chita treating orphans.