



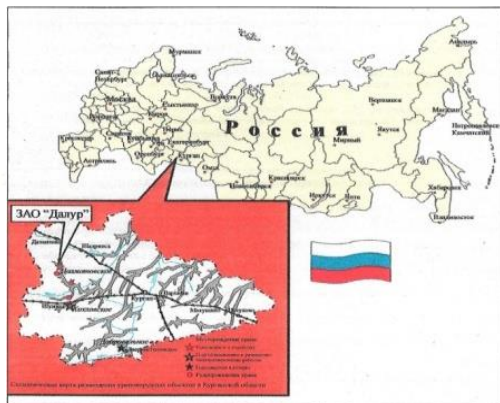
ГОСУДАРСТВЕННАЯ КОРПОРАЦИЯ ПО АТОМНОЙ ЭНЕРГИИ «РОСАТОМ»

STATE ATOMIC ENERGY CORPORATION ROSATOM

Scandium ancillary mining

2018

Dalur Joint-Stock Company



Review map



Administration building



Main building

Dalur, JSC was founded in June 13, 2001. Since August 2008 Dalur, JSC is included in Rosatom State Corporation, 98.89% belongs to Atomredmetzoloto, Joint Stock Company (ARMZ Uranium Holding Co.).

The enterprise is located in Dalmatovskiy District of Kurgan region. Dalur, JSC carries out industrial exploitation and development of deposits related to Zauralsky uranium-ore district (Dalmatovskoye, Khokhlovskoye and Dobrovolnoye). Available reserves provide stable operation of Dalur, JSC.

The enterprise carries out the implementation of Scandium project, providing production of high-purity scandium oxides and Aluminum-scandium ligatures. In September 2016 delivery of scandium was provided for scandium reserve balance at Dalmatovskoye deposit that allows to carry out its mining with the right of commercial sale.



Khokhlovskoye deposit OPU

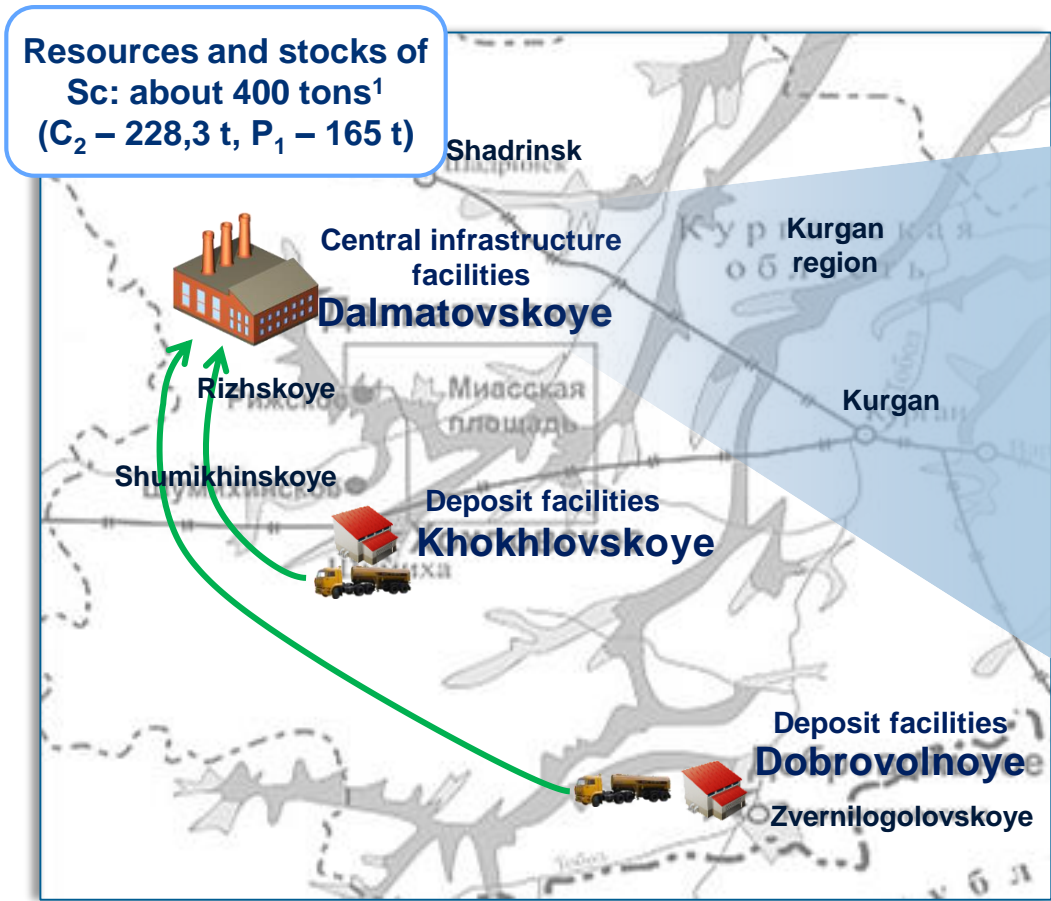


Zapadnaya LSU

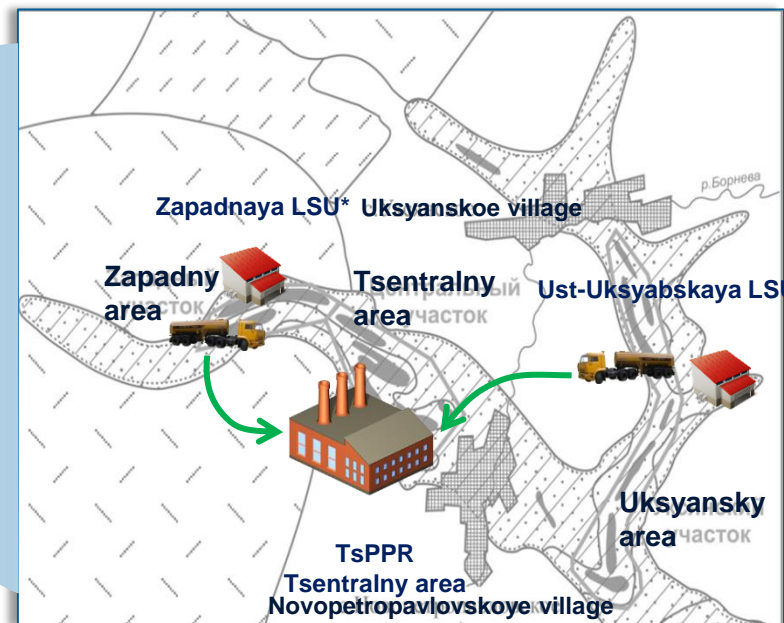


Ust-Uksyanskaya LSU

Scandium raw material base



Scheme of Dalmatovskoye deposit areas



Currently Dalur, JSC holds licenses for subsurface resources, granting rights for development and mining at all three deposits.

Dalur, JSC is provided with stocks for more than 20 years of work.

Products manufactured at sample area



Solutions after uranium sorption



Volume for scandium sorption – 150 m³/hr from 900 m³/hr of uranium sorption volume

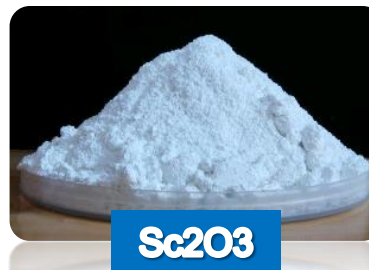
Scandium fluoride production



Intermediate process product (non-commercial)

We produce:
1050 kg/year.
We can increase production up to 2500 kg / year.

Scandium oxide production 99,9%



Standardized commercial product with wide customer circle

We produce:
570 kg/year.
We can increase production up to 1500 kg/year.

Aluminum-scandium ligatures production



Raw material product for aluminum alloys (basic field of scandium application)

We will be able to produce 24,5 t/year since end 2019. We can increase production up to 64 t/year.

Description of end product: scandium fluoride



| | Mass fraction, % |
|---|--------------------|
| Scandium fluoride (ScF₃) | 98,0 – 94,0 |
| <u>Impurities, including</u> | 2,0 - 6,0 |
| <i>Sodium fluoride (NaF)</i> | 1,0 – 3,0 |
| <i>Silicium oxide(SiO₂)</i> | 0,5 – 2,0 |
| <i>Rear-earth metal oxides (REM Oxides)</i> | 0,02 – 0,07 |
| <i>Thorium oxide (ThO₂)</i> | 0,005 – 0,008 |
| <i>Other</i> | 0,475 – 0,078 |

Scandium fluoride fully complies with requirements of further production :

- scandium oxide;
- aluminum-scandium ligatures;
- metal scandium.

Description of end product: scandium oxide (99,9%)



Sc₂O₃

| | Mass fraction, % |
|--|------------------|
| Scandium oxide(Sc₂O₃) | 99,9 |
| Impurities, including | 0,1 |
| <i>Ferrous oxide (Fe₂O₃)</i> | <i>0,003</i> |
| <i>Copper oxide (Cu₂O)</i> | <i>0,005</i> |
| <i>Rear-earth metal oxides (REM Oxides)</i> | <i>0,010</i> |
| <i>Zirconium oxide (ZrO₂)</i> | <i>0,007</i> |
| <i>Titanium oxide (TiO)</i> | <i>0,005</i> |
| <i>Other</i> | <i>0,070</i> |

TU 95.148-77

Scandium oxide fully complies with requirements of further production:

- Aluminum-scandium ligatures;
- metal scandium;
- solid oxide fuel elements for electrochemical current generators.

Description of end product: Aluminum-scandium ligature



Aluminum-scandium ligatures (AlSc2 (A)) (samples are obtained at laboratory plant. Scandium fluoride obtained at OPU was used)



Aluminum-scandium ligature fully complies with requirements of further production:

- Airspace industry;
- Machinery;
- Sports equipment production.

| | Mass fraction, % |
|--------------------------------------|------------------|
| Scandium (Sc) | 2,3-1,7 |
| Aluminium (Al) | 97,35-97,95 |
| Impurities, including | 0,35 |
| <i>Silicium (Si)</i> | 0,05 |
| <i>Ferrum (Fe)</i> | 0,05 |
| <i>Cuprum (Cu)</i> | 0,01 |
| <i>Manganese (Mn)</i> | 0,01 |
| <i>Magnesium (Mg)</i> | 0,10 |
| <i>Fluorine (F)</i> | 0,01 |
| <i>Calcium (Ca)</i> | 0,01 |
| <i>Rear-earth metal oxides (REM)</i> | 0,01 |
| <i>Other</i> | 0,10 |

GOST R 53777-2010

Management system



Quality management system and ecological management system are maintained at the enterprise since 2012.

Introduced by Order No. _____ dated _____
Revision No. 5

ECOLOGICAL POLICY

Strategic purpose, provision of ecologically oriented development of Company at maintaining high level of ecology safety and decreasing ecological risks

Key principles

- compliance principle – provision of Company activity in compliance with legislative and other regulatory requirements and standards, including ISO 9001 and ISO 14001 international standards;
- principle of assuming potential ecological danger of Company activity – recognition that any activity may negatively influence environment;
- principle of scientific justification of decisions – scientifically justified approach to making ecologically significant decision;
- agreement principle - combination of ecological, economical and social interests of Company, population and outside organizations;
- ecological efficiency principle – provision of high rates of environmental activity results, decrease in negative influence on environment;

Basic tasks and principles of their implementation

- improvement of ecological policy implementation system, including compliance with requirements of ISO9001 and ISO 14001 international standards;
- improvement of regulatory provision in environmental protection and ecological safety fields;
- decreasing negative influence;
- provision of ecological safety and radiation safety;
- improvement of ecological and radiation monitoring and control;
- development of international cooperation in environmental protection field;
- improvement of public cooperation;
- increasing level of ecological education and ecological culture of Company employees and ecological instruction of population in area of Company allocation.

Assumed obligations

1. Carry out prediction estimate of consequences of activity influence on environment in order to decrease ecological risks and prevent accidents at all stages of product life cycle.
2. Provide minimization or decrease of specific indices of emissions to environment, volume of waste generation, including radioactive wastes.
3. Provide ecological efficiency of made management decisions.
4. Implement and maintain best methods of environment protection and ecological safety management according to national and international standards.
5. Develop and implement best available technologies in field of atomic energy use.
6. Provide activity on environment protection and ecological safety with necessary resources.
7. Improve production ecological management and monitoring system.
8. Attract in the prescribed manner interested citizens and public organizations, so that they could take a part in discussion of planned activities.
9. Provide cooperation and coordination of activity in environment protection and ecological safety field with agencies of State administration of the Russian Federation, agencies of State administration of subdivisions of the Russian Federation and local authorities.
10. Provide reliability, transparency, availability and objectiveness of information about Company influence on environment in areas of its allocation as well as taken measures on environment protection and educational safety.
11. Assist formation of ecological culture, development of ecological education for all Company's employees and ecological instruction of population in area of Company allocation.

Director General Signed 18.05.2018 N.A.Popovnin

Introduced by Order No. 099/212-P dated 08.06.2018
Revision No. 3

QUALITY POLICY

Strategic directions:

- Safe uranium mining by well in-situ leaching based on efficiency of quality management system application with observation of regulatory and legislative requirements.
- Provision of competitive product cost.
- Development of new business directions due to realization of projects in metal mining and related industries, providing increase in depth of mineral-raw material base exploration and entrance into Russian and International market with competitive proposals.
- Dynamic social-economic development in area of Company allocation.

Basic principles

- Full meeting of Customer needs at obligatory observance of quality level for carried out works and manufactured products, providing economical efficiency and all-round safety of production.
- Provision of quality management system, which meets to ISO 9001 international standard requirements.

Assumed obligations

- Continuous development and increase in efficiency of quality management system.
- Organization of enterprise activity according to ISO 9001 requirements and requirements for production safety provision.
- Implementation of up-to-date technological processes and equipment, continuous improvement of management methods.
- Carrying out enterprise activity within acting legal field and observance of the Russian Federation legislation.
- Creation of conditions required for promoting personal in work, increasing production efficiency and agreement of each employee interests with purposes of the enterprise and work prospects.

Dalur, JSC management accepts responsibility for realization of the principles and observance of the assumed obligations and preaches employees for their understanding and support.

Director General Signed N.A.Popovnin

CERTIFICATE

This is to certify that

Dalur, JSC
Lennina str., 42
641750, Ulyayanskoje village
Dalmatovskiy district
Kurgan region
Russian Federation

has implemented and maintains an **Environmental Management System**.

Scope:
Production of uranium by underground leaching, obtaining of a concentrate of natural uranium (ammonium polyuranate), delivery of the finished product to the consumer. Production of scandium by underground leaching, obtaining of scandium fluoride, scandium oxide, production of aluminio-scandium alloy and delivery of the finished product to the consumer.

Through an audit, documented in a report, it was verified that the management system fulfills the requirements of the following standard:

ISO 14001 : 2015

Certificate registration no. 31101225 UM15
Valid from 2018-08-02
Valid until 2021-08-01
Date of certification 2018-08-02

DQS GmbH
Stephan Heitz
Managing Director

Accredited Body: DQS GmbH, August-Straße 21, 56433 Frankfurt am Main, Germany
Administrative Office: QDO SSU, DEK, ES, Republikensdamm str. 3, 152003 Yaretskoye, Russian Federation

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► Quality and ecological policies are actualized

► New certificates are obtained on the results of re-certification audit in August 2018