



RJC

Russian Junior Company

CAPABILITY STATEMENT

2019



Information on professional capabilities of the company

RJC is an independent Russian geology company with more than a hundred completed full-cycle exploration projects at different subsurface resource sites. Over a decade of experience we managed to conceive and make easy-to-use the new principles and technologies of field and office processing of exploration projects at any development stage, including the ones for operating mining enterprises. The new technologies developed and patented by the Company help to accelerate exploration process and avoid duplicating during field and office processing. The works we perform cover all stages of operations on a subsurface resource site: from developing an exploration plan and project elaboration to preparing a mining feasibility study and final reports containing reserves estimation according to the Russian and international standards; from maintaining a mining feasibility study and reports containing reserves estimation to their successful approval by state mining authorities.

The majority of RJC employees are highly qualified experts with broad practical experience, having PhD in geological and mineralogical sciences, being members of the Russian society for subsurface resource management experts, as well as Australian Institute of Geosciences.

Our employees take various educating classes and skill improvement programs. RJC actively participates in industrial, social and scientific events (PDAC, Minex-Russia, Minex-Asia, Minex-Far East, Mining World, Techgourmet-21 century and others), regularly being also a co-organizer of workshops and conferences.

RJC Capabilities

We offer our clients a full scope of services related to field and office processing of exploration works, as well as consulting services for a project at any stage:

1. Acting as a general contractor during exploration works.
2. Development of an exploration project.
3. AGR Software-based documentation for mining sites.
4. Automatic reports (hole and trench passports, graphical reports).
5. Comprehensive informational support during field exploration.
6. Generating and submitting reports on exploration works to state authorities.
7. Elaborating, submitting and defending a mining feasibility study at the Russian State Commission on Mineral Reserves.
8. Elaborating, submitting and defending a report containing reserves estimation at the Russian State Commission on Mineral Reserves.
9. Computer-based modelling of deposits using geostatistical methods.
10. Quick correction of exploitation models; quick comparison between prospecting/planning data and actual mining.
11. Generating a report containing reserves estimation according to JORC and NI-43-101 (Competent Person Report) standards.



Examples of works performed by RJC

Geological exploration

Geological services provided in the course of core hole drilling at South Uguisk licensed area, Russia (2009 – 2010)

By the order of Nerungri Metallic LLC, RJC participated in the development of geological documentation, cutting, testing and sample processing for more than 70 000 running meters of exploration drill hole cores at a large site with gold ore mineralization.

The site documentation was developed by means of the AGR Software. The core samples were documented in accordance with a standard of an electronic system AGR, especially designed for South Uguisk sites. A unified documentation standard enabled geologists with different experience to document the holes using the same terminology and observing the same requirements. Thanks to digital representation of the data, office processing was done timely, namely creation and update of the site documentation database, plotting of geological columns and sections within the mining and geological system environment.

The continuously updated database helped to create computer models in order to assess the resources and estimate reserves.

Working procedures applied by RJC and solutions used for automation of the core samples description allowed to execute the exploration program at the state-of-art level and in extremely tight deadlines. As a result, the field team achieved the exploration speed of 2000 m of drilling core a day.

Information and consulting support of exploration activities held at the gold prospective area of Meyverud, Iran (2008 – 2011)

By the order of Mining and Geological Company, LLC (Georgia) and Neva-Rus Investment Company, RJC participated in exploration activities at the site prospected to be a porphyry copper-gold deposit. The program included about 10 000 meters of exploration holes.

On the basis of the detailed mineralogical and petrologic study of rocks and ores at the prospected area, as well as its structural analysis, RJC employees developed structural and material location criteria and provided geological support of the drilling operations.

The operation was performed on the basis of the AGR Software system, as well as the electronic standard of drill hole documentation, which allowed to obtain the unified description of rocks with focus on the most important visual indicators of their ore content. The data were exported from the standard electronic documentation into a single site database and then used to plot geological section within the mining and geological system environment. The documentation database integrated with the results of core and trench sampling was used for computer modeling of the deposit and resource calculation.



Information and consulting support of exploration drilling at Aleksandrovsky gold deposit, Russia (2008 – 2011)

By the request of CJSC Rudnik Alexandrovsky, RJC employees participated in exploration of previously suspended gold ore field. At the preliminary stage, in close collaboration with the Customer, all historical data gathered in the course of exploration and operation activities were converted into digital form and added to a database. RJC prepared a computer model of the field, which was used as a basis for assessment of the field structure and grounding of the drilling hole grid with total length of 25 000 meters.

RJC employees performed special field researches, as well as mineralogical and petrologic studies of rocks and ores in order to precise the structural and material criteria of ore body locations. Using the results, they determined the most important visual indicators of ore content, which must be stated in the drill hole documentation. An electronic standard was developed and suggested for the field description of test hole core in the AGR Software system.

RJC regularly updated the database of exploration data, timely created intermediate computer 3D models of the field, performed resource calculations. These models were used to correct the drilling program, perform consolidated mining, technical and economical calculations in order to pre-assess financial indicators of the future mining enterprise.

RJC supported the geological exploration to timely obtain and represent the site data in formats recognized by global mining and geological business. This contributed to an effective dialogue between the Customer and foreign auditors and investors.

Exploration of the central area of Sardana field (2012 – 2013)

By the order of Siberian Non-ferrous Metals, LLC, RJC, as the general contractor, explored the central area of Sardana field. The documentation was developed using the AGR Software system. In the course of the project, the main principles of geological exploration management were tested on the basis of the AGR data management module.

Additional studies of integrated titanium magnetite ores in the course of the first stage of industrial development of Kuranakhskiye titanium magnetite field (2012)

By the order of Olekminsky Rudnik, LLC, RJC performed additional studies of integrated titanium magnetite ores in the course of the first stage of industrial development of Kuranakhskiye titanium magnetite field, in an actively developed quarry.

The geological documentation for core samples was developed using the AGR Software system.

RJC was the general contractor for the operations, including hole drilling, geophysical hole studies, geological supervision of drilling, topographical and geodesic works. The results of the geological exploration were summarized in a report.



Additional exploration of flanges of Garinskoye iron ore field (2010 – 2011)

By the order of Garinsky Mining and Metallurgical Plant, LLC, RJC performed additional exploration of flanges of Garinskoye iron ore field. The company acted as the general contractor.

RJC carried out a large scope of works: drilling operations; magnetic susceptibility logging activities; topographical survey, as well as geological works, including core samples documentation by means of the AGR Software system, core tests, creation and updates of the database for the field flanges, computer modeling of the field flanges.

Performance of drilling operations and geophysical studies in holes of Lebedinsky, Ust-Garinsky and Imchikansky parts of Orlovsko-Sokhatinsky area (2011)

By the order of Orlovsko-Sokhatinsky Rudnik, LLC, RJC, as the general contractor, performed drilling operations and geophysical studies in holes of Lebedinsky, Ust-Garinsky and Imchikansky parts of Orlovsko-Sokhatinsky area.

RJC drilled the holes, carried out topographical survey operations, and provided full support for the geological operations.

Geological services, geological documentation and drill core logging and sampling at Zun-Holbinskoye gold ore field (2010 – 2011)

By the order of OJSC Buyatzoloto (part of Nordgold company), RJC provided geological services, developed geological documentation by means of the AGR Software system, performed drill core sampling at Zun-Holbinskoye gold ore field.

Core logging was developed using the AGR software. Mineralogical and petrologic studies were performed to create a preliminary computer model of the field.

Geological support of exploration drilling at Pavlik field, development of the test-hole drilling electronic database (2010 – 2011)

By the order of OJSC PAVLIK Gold Ore Company, RJC performed the full scope of works related to geological support of exploration drilling at the Pavlik field area.

Geological documentation of the drill holes core provided high level of detailed elaboration of rocks and ores. The operations were performed in the AGR Software system. The customer used the database created as the result of these activities to calculate the reserves.

Geological documentation in AGR Software system at a licensed area of Bolniysky region, Georgia (2011 – 2012)

By the order of Caucasian Mining Group, LLC, RJC developed the documentation to describe geological exploration pits and created the database for a licensed area of Bolniysky region (Georgia). The documentation was developed by means of the AGR Software system.



Geological documentation in AGR Software system at Shatyrcul, Zhezkazgan, Syak, Misesk, Nurkazgan, Boschekul, Zhama-Aybat fields, Kazakhstan (2010 – 2013)

By the order of TOO Kazakhmys Exploration, RJC developed the geological documentation of the hole core (over 180 km) for a number of Kazakhstan fields. All the documentation was developed by means of the AGR Software system.

Geological documentation in AGR Software system at Keulik-Kenerimskaya area (2012)

By the order of Pechengageologiya, LLC (NORNICKEL), RJC developed the geological documentation of the brill hole core of Keulik-Kenerimskaya area of Allorechensky ore region.

The documentation was developed by means of the AGR Software system.

In addition, RJC implemented the documentation technique by means of the following AGR software modules: "Documentation", "Template Editor", "Data Management". Replication methods were deployed to transfer the data from the site to the main office.

Geological services of mining and drilling operations at Uriakhskiye ore field (2012 – 2013)

By the order of Northern Gold Ore Company, LLC (part of Nordgold company), RJC provided geological services in the course of mining and drilling operations at Uriakhskiye ore field (Irkutsk region, Bodaybinsky district).

RJC employees performed works related to development of an electronic standard of the hole core geological documentation by means of the AGR Software system, geological services in the course of the process of drilling, process of sampling, geological services in the course of RC drilling, geological services in the course of exploration trenching, geological survey traverses.

Geological exploration activities at Diappe field (2013)

By the order of Diappe, LLC, RJC performed geological and exploration activities at Diappe field. RJC employees developed a geological exploration project, submitted it for approval by government expertize, provided full topographical survey, as well as geological support of the geological exploration activities using all capabilities of the AGR Software system. The first year of operation resulted in a significant raise of the field resources.

Topographical survey operations at Maletoyvayamskay licensed area (2013)

By the order of CJSC OGK Group, RJC performed topographical survey operations at Maletoyvayamskay licensed area. In the course of the operations, RJC employees created a reference surveying grid, set out drill holes and trench locations.



Geological exploration activities at Tualoy field (Chechen Republic) (2013 – 2014)

By the order of Tualoy-Alam, LLC, RJC provided topographical survey and geological support of exploration activities by means of the AGR Software system. The works resulted in confirmation of the site prospects.

Prospect evaluation activities at Viksha area (Karelia Republic) (2014)

By the order of Semchenskoye Zoloto, LLC (OJSC Polymetal UK), RJC performed prospect evaluation activities at Viksha licensed area. The works included development of geological and geotechnical documentation of the drill holes core by means of the AGR Software system, sampling, hydrogeological studies, as well as generation of the report to describe results of the activities.

Prospect evaluation activities at Adygaya and Olyndzha areas (Magadan region) (2014)

By the order of Omolonskaya Gold Ore Company, LLC, and CJSC Serebro Magadana (OJSC Polymetal UK), RJC performed prospect evaluation activities at Adygaya and Olyndzha licensed areas. The scope of works included development of the drill holes core and trench documentation by means of the AGR Software system, geological traverses, as well as bulk rock geochemical sampling in primary and secondary dissemination aureoles. Results of the activities were summarized in the geological exploration report. RJC also developed recommendations for additional studies of separate regions of the licensed areas. All the reporting materials were successfully accepted by the customer.

Geological exploration project at Tomtor field, Yakutia (2014 – 2018)

By the order of Vostok Engineering, LLC (a joint venture of the ROSTEC state corporation and the IST Group), RJC performed a scope of works related to geological support, sample processing, process sampling, hydrogeological tests, topographical and geodesic support of the program of additional studies of Tomtor rare metal field, Buranny area. Employees of RJC and VBK set up a field village in the Extreme North conditions. The project works began timely, in spite of the abrupt change of economic conditions. Geological support of the works is performed by means of the AGR Software system. The system supports reception of data from an X-ray fluorescence analyzer. Results of the geological exploration activities has been summarized in the report. Data collected during the works were used for the feasibility study reserves estimation.

Development of a schedule for geological exploration activities at Chashma-i-Shafa quartz sand field (Afghanistan) (2015)

By the order of Yasmin Mining Ltd (Afghanistan), RJC employees developed a detailed schedule of additional exploration of the quartz sand field in order to provide raw materials for a new constructed window-glass plant located at Mazari-Sharifa, Afghanistan. Based on the results of previous studies (performed by Soviet and German geologists), a 3D field model was created, a drilling works schedule was developed, sampling methods were suggested, and drilling equipment was selected. These works laid the foundation of a training program aimed to raise qualification of Afghan geologists.



Geological support of drilling operations at Lichkvaz-Tei field, Republic of Armenia, Syunik region (2015 – 2016)

By the order of LV Gold Mining, CJSC (Polymetal UK), RJC employees provided geological support of drilling works. The scope of works included geological and geotechnical description of core using the AGR Software system, control over drilling and sampling. Databased on the results, a single geological database was created. Upon completion of the works, the technical report on the performed exploration projects and final geological sections were generated. The overall amount of the documented core reached 15 213 running meters.

Geological support of exploration works at Perevalnoye field, Omsukchansky district of Magadan region (2015)

By the agreement with Khabarovsk Geological and Exploration company, LLC (by the order of Polymetal company), RJC employees provided geological support of drilling operations. The scope of works included geological description of core in the AGR Software system, control over drilling and sampling, creation of drill holes logs and geological sections. Based on the results, an electronic database on prospective sites was created. The overall amount of the documented core reached 10 000 running meters.

Geological support of drilling operations at OJSC Norilsk Nickel GMK mines (2016 – 2018)

By the order of OJSC Norilsk Nickel GMK, RJC employees provided geological support of exploration at the operating mines. The scope of work included geological and geotechnical documentation for drill holes core, core sampling, channel sampling, developing of drill logs and electronic database on prospective sites. Totally 130 thousands of core meters RJC geologists have documented and sampled for Norilsk Nickel Company.

Geological and geotechnical support of drilling operations at the mine Oktyabrskiy OJSC Norilsk Nickel GMK (2018)

By the order of OJSC Norilsk Nickel GMK, RJC employees during six months provided geological support of the spatial drilling at the operating mines. The scope of work included geological and geotechnical documentation of oriented core with photo imaging on the special stand and further sampling and developing of drill logs and electronic database in conditions of underground mine.

Geological support and topographic services for exploration works at Lunnoe field, Omsukchansky district of Magadan region (2016 – 2018)

By the agreement with Dukatskaya Mining-and-Geological Company JSC (by the order of Polymetal company), RJC employees provided geological and topographic survey support of drilling operations. The scope of works included core logging in the AGR Software system, control over drilling and sampling, generation of drill holes logs and geological sections. Based on the results, an electronic database on prospective sites has been created as well as a report with the result of exploration project. The overall amount of the documented core reached 74 000 running meters and 1 000 meters of trenches.



Geological support and topographic services for exploration works at Goltsovoe deposit, Omsukchansky district of Magadan region (2016 – 2018)

By the agreement with Dukatskaya Mining-and-Geological Company JSC (by the order of Polymetal company), RJC employees provided geological and topographic survey support of drilling operations. The scope of works included core logging in the AGR Software system, control over drilling and sampling, generation of drill holes logs and geological sections. The overall amount of the documented core reached 9 100 running meters.

Geological support, topographic services and sample treatment for exploration works at Ametistovoe, Kumroch and Maletovayam fields (2017 – present time)

By the order of Interminerals Management LLC, RJC performs a scope of works related to geological support (documentation of drill holes and trenches in AGR Software system), sample processing, process sampling and topographical and geodesic support of the exploration projects at Ametistovoe, Kumroch and Maletovayam fields (Kamchatka region). RJC employees constructed and landscaped a rotation village, including core logging areas and two mobile laboratories (RockLabs equipment (RockLabs equipment)). RJC provides sample transportation from the exploration site to the analytical laboratory IRGIREDMET in Irkutsk with tracking and control of assays. During exploration work RJC updates the electronic database and geological cross-sections. During field season 2018 extra field geologists were mobilized in a short time to the project for soil sampling at Vodopadnoe prospective site. The overall amount of the documented core to be expected is more than 150 000 meters.

Geological support and topographic services for exploration works at Primorskoe deposit, Omsukchansky district of Magadan region (2018)

By the agreement with JSC «Silver of Magadan» (Polymetal Company), RJC employees provided geological and topographic survey support of drilling operations. The scope of works included core logging in the AGR Software system, control over drilling and sampling, generation of drill holes logs and geological sections. Based on the filed project results, an electronic database on prospective sites has been created as well as a report with the result of the exploration project. The overall amount of the documented core reached 7 500 running meters и 1 000 meters of trenches.

Development of the Exploration project of Khangalas deposit of gold and author's supervision of the expertise with positive opinion (2018)

RJC employees developed for LTD «GRK «Dvoynoi Duk» an exploration project at gold deposit Khangalas in Yakutia. The necessity for exploitation at the operating mine came from the management demand to increase gold reserves by 7 tones and rise production one and a half time.



Development and support of databases, creation of computer models, resource assessment and calculation of reserves

Creation of the database, 3D modeling and resource estimation of Lunnoye gold and uranium field (2006 – 2007)

By the order of Seligdar, RJC employees gathered geological exploration data, created the database and 3D models, estimated resources of the multicomponent gold, silver and uranium field Lunnoye.

One of the goals was to prepare a report aimed to attract investors to the Zoloto Seligdara project.

Modeling and resource estimation for Kostomukshskoye iron ore field (2007 – 2008)

By the order of OJSC Karelsky Okatysh (OJSC Severstal-Resource), RJC employees performed modeling of the field, including the complex of enclosing rocks, as well as resource estimation necessary for further strategic and operating planning of open mining activities.

Results of the works passed an audit performed by the international company (WAI).

Modeling, resource estimation for iron ore fields of Olenegorsk group (2007 – 2008)

By the order of OJSC Olkon (OJSC Severstal-Resource), RJC employees performed computer modeling and resource estimation for Olenegorskiy, Komsomolskoye, Kirovogorskoye, Yuzhno-Kakhoserskoye fields, as well as the field named after the 15th Anniversary of the Great October Revolution. The evaluation results were necessary for further strategic and operating planning of open mining activities.

The results of the works passed an international audit (WAI).

Modeling and resource assessment for Kimkanskye iron ore field (2008)

By the order of Aricom (PETROPAVLOVSK-Iron Ore), RJC employees performed modeling of the field, resource and reserves estimation of iron ore, as necessary for further mining feasibility study and design activities.

The works were carried out for the company to go for IPO.

Creation of the database, modeling, resource and reserves estimation for Zhireken and Sorskoye copper and molybdenum ore fields, strategic planning of open mining activities (2008 – 2009)

By the order of Basic Element, RJC employees gathered geological exploration data, created the database and the models, and then estimation of resources and reserves of two large Russian copper and molybdenum ore fields: Zhireken and Sorskoye.



On the basis of the field models they created, RJC employees performed geological and technological typification of ores, created a space distribution model for various types of ore. This made it possible to prepare the calendar schedule of the field development taking into account ore quality.

The results of these activities passed an audit performed by SRK Consulting and were used later on, in the course of preparation of the holding resources to IPO.

Modeling, resource and reserves estimation for Korshunovskoye, Rudnogorskoye and Krasnoyarskoye iron ore fields, strategic planning of open mining activities (2008 – 2009)

By the order of OJSC Mechel, RJC employees performed modeling of the fields and estimation of iron ore resources, as necessary for the further optimization, strategic and operating planning of the open mining activities.

The developed field models, as well as the results of resource assessment passed an audit performed by Marston & Marston. On the basis of these results, RJC performed strategic planning of mining activities.

Modeling and resource estimation for Kovdorskoye apatite and magnetite field (2008 – 2013)

By the order of OJSC Myrmanskaya Hydraulic Power Plant and OJSC Eurochim, RJC employees performed modeling of the field, as well as resource estimation of magnetite and apatite ores. The works were performed in several stages, including: creation of the electronic database, block modeling of the field, update of the block model on the basis of the results of additional exploration of deep horizons. Developing of the block computer model for the purposes of reserves calculation to be performed by the method of geological blocks.

The results of these activities were recognized in the course of the audit of OJSC Eurohim resources which was done by an international company.

Creation of the database, modeling and resource estimation for Elginskoye coal field, strategic planning of mining activities (2008 – 2009)

By the order of OJSC Mechel, RJC employees gathered geological exploration data, created the digital database, performed modeling and resources estimation of the largest Russian caking coal field, as necessary for further planning of its development.

RJC employees performed strategic planning of open mining activities, grounding of the primary design decisions and open-pit field parameters, as well as the optimal sequence of reserves development taking into account design capacities of the future enterprise: 30 million tons of coals a year.

Modeling of Karaagashskoye chromium field, Kazakhstan (2009)

By the request of OJSC Mechel, RJC employees created a model of Karaagashskoye chromium field (Kazakhstan). Based on this model, planning of geological exploration activities was performed with a budget of more than \$5 million.



Creation of the database, modeling and resource estimation, techno-economic calculation of capabilities of effective open mining development of near-surface part of deposits at Badran gold ore field (2009 – 2010)

RJC employees gathered and systematized geological exploration data, transferred them into digital form, performed wireframe modeling of underground openings and already developed spaces, calculated the block model of the field, and assessed the resources.

Later on, by the order of CJSC West GRK, RJC employees assessed the ability to obtain economic benefits from open mining development of near-surface parts of deposits at Bardan field. They selected the optimal quarry layouts, grounded capacities necessary to perform open mining works and process low-grade ores.

The results of these activities passed an external audit (AI Maynard & Associates and SRK) and were also used to attract investments.

Modeling of Nickolayevskoye and Arkhangelskoye gold ore fields, Krasnoyarsk Territory (2012)

By the order of OJSC Vasilievsky Rudnik, RJC employees performed computer block modeling for Nickolayevskoye and Arkhangelskoye gold ore fields, Krasnoyarsk Territory. Upon completion of the works, block models of the fields were submitted to the customer.

Creation of Garinskoye iron ore field model taking into account the geological exploration data collected in 2007-2008 and 2011 (2012)

By the order of Garinsky Mining and Metallurgical Plant, LLC (PETROPAVLOVSK-CHM), RJC employees performed block modeling of Garinskoye iron ore field.

In the course of the works the initial data provided by the customer were systematized, processed and analyzed, wireframe and block models of the field were created. The works were quite specific because the majority of the geological exploration data was gathered in 1950ies by core drilling with grit. Taking into account the results of the confirmatory drilling performed in 2011, the geological and structural model of the field was updated. This made it possible to correct communication of remnant ores significantly. In the course of the works, the block model was created taking into account industrial types of ores. The model passed an audit performed by WAI.

Modeling of Lefa gold ore field (2012 – 2013)

By the order of Nordgold, RJC performed 3D block modeling of Lefa field, in order to prepare the basis for the Grade Control system.

Modeling of Gross gold ore field (2012 – 2013)

By the order of Nerungri-Metallic (Nordgold), RJC performed modeling of Gross gold ore field. The project was executed in conditions of continuous updates with new geological exploration data. This made it possible to obtain intermediate results of the field assessment and assess the operational increase of the resources.



Modeling of Pogromnoye gold ore field (2012)

By the order of CJSC Rudnik Aprelkovo (Nordgold), RJC performed wireframe and block modeling of the field, as well as resources estimation. Based on additional field exploration, additional operations were performed in order to assess increase of resources.

Modeling of Bissa gold ore field (2013)

By the order of BISSA GOLD CA (Nordgold), RJC performed 3D wireframe modeling of Bissa gold ore field. In the course of the works the initial data were systematized, processed and analyzed, in order to assess density of the exploration grid on areas of the field with various ores of industrial types.

Creation of a resource model of Zhdanovskoye, Tundrovoye, Bystrinskoye and Zapoliarnoye fields (2015)

By the order of OJSC Norilsk Nickel GMK, RJC performed activities aimed to create the resource models of Zhdanovskoye, Tundrovoye, Bystrinskoye and Zapoliarnoye fields, taking into account detailed and operating exploration data. The models were intended for calculation of reserves, prospective planning and design of mining activities, as well as for economic analysis of the existing mines of OJSC Kolskaya GMK at Pechengskoye ore field. The resource model was developed on the basis of detailed and operating exploration data and demonstrated high correlation with the development data. In order to design the development blocks, wireframe models of all types of mine excavations were created in accordance with the requirements of the surveying service of the company.

Wireframing for mine excavations and developed spaces over the sites of Oktyabrskoe field (2015 – 2016)

By the order of OJSC Norilsk Nickel GMK, RJC performed 3D modeling of mine excavations and developed spaces in order to carry out monitoring and design in accordance with the requirements of the surveying service of the company.

Update of the resource model of Zhdanovskoye, Tundrovoye, Bystrinskoye and Zapoliarnoye fields (2016 – 2017)

By the order of OJSC Norilsk Nickel GMK, RJC updated the previously created resource model of Zhdanovskoye, Tundrovoye, Bystrinskoye and Zapoliarnoye fields. Within the scope of works, RJC employees provided consulting services related to the use of geological information system for solving geological and surveying tasks aimed to quickly calculate the reserves and manage their movement at the mines of OJSC Kolskaya GMK.



Geological and economical assessment of solid mineral fields, assessment of reserves

Analysis and estimation of resources for a number of gold ore sites, further assessment of perspectives of Vorgavozh Khalmeriynskaya gold bearing area by depth, selection of lots for subsequent geological exploration activities (2005 – 2006)

By the order of OJSC REP Berezovskoye (Government of Khanty-Mansiysk Autonomous District – Yugra), RJC performed the analysis and resource assessment for a number of gold ore sites at Khalmeriynskoye ore field.

A large scope of petrographical studies was performed (more than 1200 transparent sections), which made it possible to detect metasomatic changes governing the gold ore mineralization. Vertical zoning of the ore bearing rock was detected, as well as confinedness of the gold ore mineralization to the particular zone. RJC employees proved that perspectives of Khalmeriynskaya area were limited due to a deep erosional truncation that destructed the richest zones. Within the area, some lots with the smallest truncation were selected for high priority studies. Local criteria for searching for ore bodies were specified.

Material and petrographical studies performed by RJC, as well as activities aimed to map the metasomatic changes by depth allowed to assess the site perspectives without cost intensive drilling.

Later on, the results of these activities were used for preparation of Ygra Resources (performed by SRK-Consulting).

Feasibility study of constant exploration conditions for Kluchevskoye gold ore field (2006 – 2008)

By the order of West GRK, RJC performed feasibility study of constant exploration conditions of Kluchevskoye gold ore field (Chita Region). In the course of the works, analyses and estimated of the field resources were performed several times. Later on, the results were used when the field was sold to SUN-Gold (the deal was supported by AMC).

Computer modeling of the ore field, Feasibility study of operating conditions at the 3d area of Buruktalskoye nickel silicate field (2007 – 2009)

By the order of OJSC Yuzhuralnickel (OJSC MECHHEL), RJC employees performed feasibility study of operating exploration conditions of the 3d area of Buruktalskoye nickel silicate field with operating calculations of ore reserves sufficient for 3 years.

Prospect assessment of commercial development of Yauriyokskoye molybdenum field, Murmansk region (2008 – 2009)

By the order of Regional Development, LLC, RJC assessed commercial prospects of the molybdenum mineralization at the North of the Kola Peninsula. Also RJC performed an audit of the geological exploration plan aimed at additional exploration of the field.



RJC employees performed special operations necessary to review the field resources taking into account not just relatively rich vein ores, but also weak impregnation ores. The data received in the course of computer modeling of the field were used as a basis for the resource estimation, selection of the most effective methods and systems for the deposit development. A consolidated economic model of the mining enterprise was developed.

RJC activities showed that additional exploration and development of Yauriyokskoye field, nowadays and in the nearest future, is not practical from the economic point of view. This conclusion allowed the resource manager to avoid large financial losses.

Feasibility study of constant exploration conditions and estimation of reserves at Riabinovoye gold ore field (2008 – 2011)

By the order of CJSC Seligdar, RJC performed feasibility study of constant exploration conditions of Riabinovoye gold ore field (Yakutia). The feasibility study and the estimation of reserves were successfully approved by the State Commission for Reserves.

Feasibility study aimed at optimization of capital investments and production costs of open cut mining of Aleksandrovsky gold ore field (September 2010). Preparation of the additional exploration results report with techno-economic assessment of open cut mining at Aleksandrovsky gold ore field (2009 – 2010)

By the order of CJSC Rudnik Aleksandrovsky, RJC employees, among other geological exploration support activities, performed optimization of production costs and capital investments to increase the confidence of the investment model.

The activities allowed to assess more precisely the possible borders of open cut mining, as well as the amount of reserves to be processed.

The results of these activities passed an audit (Al Maynard & Associates) and were used to attract investments.

Feasibility study of constant exploration conditions of the 3d area of Buruktalskoye nickel silicate field (2010 – 2012)

By the order of OJSC Yuzhuralnickel (OJSC MECHHEL), RJC employees performed feasibility study of constant exploration conditions of the 3d area of Buruktalskoye nickel silicate field. In the course of the activities a dump and low-grade ores drilling plan was developed and executed within the existing quarry. This allowed to determine the balance participation of 6 million tons of low-grade ores, as well as to suggest a technology of their processing. The feasibility study was successfully approved by the State Commission for Reserves.

Feasibility study of Kuranakhskoye titanium magnetite field (2011)

By the order of Olekminsky Rudnik, LLC (PETROPAVLOVSK-CHM), RJC employees performed geological and economical estimation of Kuranakhskoye field. In the course of the works, the balance participation of titanium, the iron satellite component, was determined, and titanium and vanadium reserves within approved boundaries of iron reserves were calculated.



The results of these activities allowed the company to receive approval of the titanium reserves as the balance ones, raise its raw material resources and expand the product range.

Reassessment of ferruginous quartzite resources of Kirovogorskoye field (2011 – 2014)

By the order of OJSC Olenegorsk Mining and Processing Plant (OJSC Severstal-Resource), RJC performed ferruginous quartzite reassessment of Kirovogorskoye field.

The scope of works included as follows: elaboration and determination of the degree of complexity of the field geological structure, comparison of exploration and operating data collected in 1989-2011, calculation of the rock reserves within the quarry boundaries suitable for break stone production, calculation of ferruginous quartzite reserves within the open mine boundaries grounded by the techno-economic assessment of the constant exploration conditions related to ferruginous quartzite, verification on the basis of the block model, preparation of the reserves calculation report. The activities encountered some difficulties caused by low quality of some geological exploration data, so it was necessary to perform additional comparison of the calculation results with the field development data. The reserves calculation report successfully passed an audit performed by the State Commission for Reserves.

Reassessment of ferruginous quartzite resources of the field named after the 15th anniversary of the Great October Revolution (2012 – 2013)

By the order of OJSC Olenegorsk Mining and Processing Plant (OJSC Severstal-Resource), RJC performed ferruginous quartzite reassessment of the field named after the 15th anniversary of the Great October Revolution.

The scope of works included as follows: techno-economic calculations held in order to precise parameters of conditions within the open mine boundaries, precisizing of degree of complexity of the field geological structure, grounding of density and geometry of the exploration grid, comparison of exploration and operating data collected in 1989-2011, calculation of ferruginous quartzite reserves remaining within the open and underground mine boundaries (separately). Calculation of the rock reserves within the quarry boundaries suitable for break stone production was performed. The reserves estimation report successfully passed an audit performed by the State Commission for Reserves.

Estimation of reserves of Denisovskoye coal field (2011 – 2012)

By the order of UK Kolmar, RJC estimated the reserves of Denisovskoye stone coal field in 2011. In 2012 the calculation report was approved by the State Commission for Reserves.

Development of the techno-economic assessment of constant exploration conditions for Vereteninskaya iron ore deposit of Mikhailovskoye field, KMA (2011 – 2013)

By the order of OJSC Mikhailovsky Mining and Processing Plant (OJSC METALLINVEST), RJC performed techno-economic assessment of constant exploration conditions for Vereteninskaya iron ore deposit of Mikhailovskoye field.



The techno-economic assessment of constant exploration conditions was successfully approved by the State Commission for Reserves.

Feasibility study of constant exploration conditions for Kovdorskoye apatite and staffelite ore field (2012 – 2013)

By the order of OJSC Murmansk Geological Exploration Party OJSC Eurochim, RJC employees performed feasibility study of constant exploration conditions for Kovdorskoye apatite and staffelite ore field.

The scope of works included as follows: development of the reserves calculation method, preparation of hydrotechnical, engineering and geological grounding of the constant field conditions, comparative analysis of the field reserves, mining and technical, technological, ecological and economical grounding of the constant field conditions. The feasibility study passed the state audit in the State Commission for Reserves.

Feasibility study of constant exploration conditions, calculation of the reserves of Garinskoye iron ore field (2013 – 2015)

By the order of OJSC Garinsky Mining and Metallurgical Plant (PETROPAVLOVSK-CHM), RJC performed feasibility study of constant exploration conditions for Garinskoye field (Amur region), prepared the calculation report to be submitted for a state audit. All the report materials were successfully approved by the State Commission for Reserves.

Feasibility study and repeated estimation of iron ore reserves of Vereteninskaya iron ore deposit of Mikhailovskoye field, Zheleznogorsk district of Kursk region, to reflect the current state of the field (2014 – 2015)

By the order of OJSC Mikhailovsky Mining and Processing Plant (OJSC METALLINVEST), RJC performed feasibility study and repeated estimation of iron ore reserves of Vereteninskaya iron ore deposit of Mikhailovskoye field (Zheleznogorsk district of Kursk region). The estimations were based on the new approved conditions. All the materials successfully passed an audit in the State Commission for Reserves.

Mineral resources estimation and mine design of Lichkvaz field, Armenia (2014 – 2015)

By the order of Polymetal Company, RJC employees performed estimation of mineral resources of Lichkvaz field and suggested the optimal mine design method. As a result, the customer received the digital database, the simulation field model as well as the report containing resource estimation, recommendations on pre-mining exploration and evaluation of the development method.

Prefeasibility study aimed at assessment of cost efficiency of development of Breckchia field at Churinskaya gold ore area. Development of the Feasibility study of constant exploration conditions, calculation of the reserves (2014 – 2015)

By the order of OJSC ZDK Altayskaya Korona, RJC performed prefeasibility study of Breckchia field parameters (Altai Territory). The field is developed by means of open mining. Based on these calculations, the feasibility study of the



constant conditions was developed, and the reserves calculation report was prepared. In the course of these activities, RJC assessed risks related to development of the field in current gold costs conditions. The feasibility study and the reserves report successfully passed an audit performed by Novosibirsk branch of the State Commission for Reserves.

Reserves estimation of the Buruktal area One at the nickel-cobalt silica ore deposit (2015 – 2016)

By the order of Vi-Holding, RJC prepared a report on Exploration of the area One at the nickel-cobalt silica ore deposit with reserves estimation as of 01.01.2015. As the project benefit, RJC has also redressed the balance of the deposit and developed recommendations on exploitation exploration.

Report on Exploration of tailing dump at Khingan tin deposit carried out in 2014-2015, Jewish Autonomous Oblast with reserves estimation as of 01.01.2016. JORC Reporting (2015 – 2016)

By the order of the Company Resources of Malyi Khingan, RJC carried out a complex estimation of resources and reserves of tin for the tailing dump of Khingan Processing Plant. The estimated reserves were utilized for the preparation of the field development plan.

Mineral resources estimation of Centralnoe and Beriozovoe tin deposits in the area of Khingan tin deposit, Jewish Autonomous Oblast. JORC reporting (2016)

By the order of the Company Resources of Malyi Khingan, RJC carried out a complex estimation of resources and reserves of primary tin ore within the areas Centralnoe and Beriozovoe.

Estimation of reserves of copper-nickel ores at Sputnik field (2016 – 2017)

By the order of OJSC Kolskaya GMK, RJC performed calculation of reserves for Sputnik field. The works are aimed at preparing the field for industrial development.

The scope of works performed by RJC includes comparative calculation of reserves remaining within the open mine boundaries, calculation of reserves remaining within the open and underground mine boundaries as of 01.01.2017, as well as submitting reports for an audit to ROSNEDRA State Commission for Reserves and passing the audit.

Feasibility study of constant exploration conditions and calculation of reserves related to constant conditions of tin alluvial deposit at Tirekhtyakh Creek (2016 – 2018)

By the order of Yanolovo OJSC, RJC performed feasibility study of constant exploration conditions for tin alluvial deposit at Tirekhtyakh Creek, Sakha Republic, Yakutia. RJC also prepared estimation of reserves related to constant conditions. During the project work, RJC has implemented principals of estimation of ore deposits (productive zones and dilution allocation) in evaluation of the big places deposit. It allowed avoiding conservative methods of reserves estimation and increased quality of productive material. All the reporting documents have passed expertize of the State Committee of Resources.



Operational calculation of reserves of gold-silver deposit Ametistovoe by the results of exploration campaign 2014-2107 and gold deposit Kumroch by the results of exploration done in 2013-2017 (2016 – 2018)

By the order of Interminerals OJSC RJC, RJC prepares reports on operational calculation and reserves gain for gold and gold-silver deposits of the Company Zoloto Kamchatki. During the work RJC employees provided supervision on assays receipt as well as the internal and external laboratory control, in purpose of QA/QC of exploration project. In addition, a reconciliation of resources estimation, results of additional in-mine exploration and processing plant reduction was carried out. The final report will be submitted to the State Committee of Resources.

Audit, expert and cost assessment

Complex resource assessment of Maikhura tungsten and polymetal field, Republic of Tajikistan (2007)

By the order of OJSC Takobsky Mining and Processing Plant, RJC employees gathered the data, created the database and the field models, assessed tungsten and satellite component resources, performed techno-economic assessment of the best design decisions related to ore extraction and processing.

The field model and subsequent calculations performed by RJC allowed the customer to determine the optimal production capacities, proportion of the component in the ore, as well as ore processing parameters necessary to obtain the maximal NPV of the field development. These values were used as the basis for assessment of investment volume required for the development project.

Independent audit (due diligence) of Barun-Kholbinskoye gold ore field (2009)

By the order of an investment company, RJC performed complex audit of Barun-Kholbinskoye gold ore field owned by OJSC MNPO Polymetal. The audit included a field study of mine excavations, inspection of the processing plant equipment, state assessment of engineering systems and the rotation village. Besides, RJC performed an underground survey of storages for salable ore and ore tails, took audit samples of ore and ore processing waste material. In order to inspect the reserves prepared for development and to assess expenses necessary to resume the operations, RJC performed computer modeling of the left bank part of the field.

Results of the RJC activities allowed the customer to assess risks of the investment decision.

Mining and geological audit and cost assessment of subsurface resource sites owned by CJSC Gold Star Gold Processing Company (2012)

By the order of April-Invest, LLC, RJC employees performed the mining and geological audit and cost assessment of the following subsurface resource sites owned by CJSC Gold Star Gold Processing Company:



- Mayskoye and Tibekskoye fields (Khakassia Republic, Ust-Abakan district);
- Kuznetsovskoye and Chazy-Gol fields (Khakassia Republic, Askiz district);
- Yelovoye field (Khakassia Republic, Ordzhonikidze district);
- Babushkina Gora field (Krasnoyarsk Territory, Motyginisk district);
- Bogolubovskoye field (Krasnoyarsk Territory, Motyginisk district).

In the course of the works, RJC performed audit of geological exploration activities, inspected the existing development system, the exploration sampling system and the mine laboratory, reviewed the quality control procedures implemented by the company. The whole scope of geological data, as well as resources and reserves of the field were analyzed. RJC analyzed technological aspects of ore processing, as well as ecological aspects of the company activities. The information collected was used for assessment of capital investments and operating costs.

RJC also performed expert assessment of CJSC Gold Star development program, provided recommendations on cost of the business.

General prospect assessment of raw material base expansion at Mnogovershinny mine taking into account the current conditions (2012 – 2013)

By the order of CJSC Mnogovershinnyaya Company, RJC performed the general prospect assessment of the raw material base expansion at Mnogovershinny mine.

The following activities were performed: prospect assessment of reserves increase at flanges and deep horizons of explored ore bodies; assessment of exploration degree and perspectives of commercial gold ore content of the detected ore zones (Medvezhia, Smezhnaya, Skrytaya, Salali); prospect assessment of commercial gold ore content of ore occurrences (Chainoye, Ozernoye, Kim, Konechnoye, Sredneulskoye, Evatak, Kulibina, Zonalnoye, Temnoye, Udachnoye, Osenneye); prospect assessment of gold ore content of the ore field beyond the known ore zones and occurrences, as well as adjacent territories beyond the ore field; consolidated geological and economical assessment of predicted resources of the field.

The results of the performed activities allowed the customer to obtain an expert opinion on perspectives of the raw material base expansion at Mnogovershinnyaya mine, as well as on the first stage directions of works.

Analysis of geological exploration data collected at Soumber and Biluut fields (2012)

By the order of PETROPAVLOVSK-CHM, RJC analyzed the data collected in the course of geological exploration activities performed in 2011 in order to assess increase capabilities of coal reserves of measured and indicated categories at Soumber and Biluut fields (Mongolia).

An expert opinion report to describe the assumed field capacities was prepared.



Expert assessment of investment attractiveness of 13 gold ore fields in Ukraine (2011)

By the order of EXTRAWAY LTD (Smart-Holding), RJC performed expert assessment of investment attractiveness of the fields. Upon completion of the activities, RJC employees provided the customer with a report that contained an expert opinion on necessity of additional geological exploration works, technological and other studies, as well as on possible methods of the field development and ore processing.

Besides, an expert assessment of investment attractiveness of the fields was performed.

Technical audit of the Konder field development program (2013)

By the order of OJSC Artel Starateley Amur, RJC performed technical audit of the Konder field development program (in order to obtain credit support from GASPROMBANK).

In the course of the works RJC analyzed technical documentation of the company, performed expert estimation of resources and reserves, state of plans of raw material extraction and processing, commercial material production. The audit included analysis of availability of water, power, materials and manpower resources at the customer facilities, quality of transportation and production infrastructure. Assessment of capital investments and operating expenses was performed to analyze the production costs. Upon completion of the works, a report was prepared. It contained all the expert conclusions and professional opinions of the RJC employees related to the project development.

Appraisal of 100% shares in Carpathian Ore Company, LLC (Transcarpathian Region, Ukraine) (2013)

By the order of KRK, LLC, RJC performed cost assessment of owner rights for Muzhievskoye and Beregovskoye gold and polymetal fields, analyzed risks related to their development. Cost assessment of the business project of the field development was performed.

Geological, technological and economical assessment of dumps of stripping material and primary ores at Kluchevskoye gold ore field (2014)

By the order of Mangazea Mining, RJC performed expert assessment of development reasonability of dumps of stripping material and primary ores at Kluchevskoye gold ore field, as well as of investment attractiveness of the latter. The company inspected the whole scope of geological exploration and survey data and indicators of extraction and factory processing of ore, starting from the earliest stages of the field development. It was determined that the dumps were already several times used as a source of ore during mining delays, high grade ores were processed as far back as in Soviet times. This raises the risks of primary ore development, makes the project sensible to gold costs, especially if the finished product will be sold in the form of gold concentrate. Investment decisions were made taking into account the RJC recommendations.



Expert feasibility study of a development program for Vassilievsky Rudnik JSC (2017)

By the order of Krastsvetmet OJSC and PricewaterhouseCoopers auditing company, RJC performed an expert feasibility study of a development program for Vassilievsky Rudnik JSC. The works performed by RJC employees included expert estimation of the following things: mineral resources; mine schedule; possibility of achieving the declared ore mining performance based on the mining equipment, both existing and planned to be acquired; technological knowledge of ores and possibility of achieving the declared technological indicators of ore processing and commercial material production. Besides, RJC employees performed an expert assessment of the economic model in terms of reasonability of assumed capital investments and operating costs for the implementation of the declared project of field development. Investment decisions were made taking into account the RJC recommendations.

Ore processing study

Material composition analysis of processing ore samples taken at gold ore fields (2008 – 2012)

In 2008 - 2012, by the order of local branches of CJSC Polymetal, RJC performed material composition analysis of processing ore samples taken at the following fields: Tamunier (5 samples), Varvarinskoye (5 samples), Mayskoye (2 samples), Kabanskoye (4 samples), Prognoznoye (5 samples), Albazinskoye (3 samples).

RJC employees analyzed mineral and chemical compositions for each of the above mentioned fields, performed detailed studies of ore minerals and occurrence forms of commercial components, estimated the material balance of metals found in the samples. They performed detailed studies of free gold found in ore samples, conducted preliminary processing tests of precious metal extraction by gravity, flotation and hydrometallurgical methods.

In the result of the studies, RJC employees made conclusions on content of major elements, trace contaminants and noble metals in the ore samples.

The following conclusions were made: on the share of large free gold particles, its morphology and properties, phase composition of small gold particles, share of small particles of free and embedded gold, share of non-recoverable gold. Also, conclusions on chemical composition of the minerals were made.

Determination of material properties of host rocks and tails aimed at grounding of construction of hydraulic engineering facilities, warehouses and waste storages (2010 – 2012)

In addition to ore studies, RJC employees determine material properties of host rocks and tails aimed at grounding of construction of hydraulic engineering facilities, warehouses and waste storages. In 2010-2012, they analyzed host rocks of Oroch, Albazinskoye, Mayskoye, Sopka Quartsevaya, Prognoznoye, Maminskoye, Varvarinskoye fields; desalination tailings and cakes of Birkachan, Sopka Quartsevaya, Vorontsovskoye, Mayskoye, Burgali, Podgornoe fields. In the course of these activities, RJC employees studied petrologic composition of the rocks, mineral and chemical composition of the samples, composition of aqueous extracts, as well as general physical and mechanical properties of the rocks.



Studies of ore enrichment tailings at Vorontsovskoye field performed for the purposes of gold extraction (2011)

By the order of CJSC Northern Ural Gold, which is a member of Polymetal holding, RJC analyzed material composition and process properties of dump desalination cakes of gold at Vorontsovskoye field.

The activities performed by RJC employees demonstrated the capability of efficient enrichment of the gold extraction plant filtration cakes by means of the 'carbon in pulp' technology. The suggested process flow consists of a number of simple operations, including material classification, flotation and gravity enrichment. This makes it possible to produce commercial sulphide concentrate containing about 60% of gold. The techno-economic calculations performed by RJC showed that such processing of the material may be economically feasible provided that costs of gold concentrate are about 500 rubles per gram. This means that the processing is quite feasible.

Scientific research activities aimed at determination of material composition of processing samples taken at an ore occurrence area of Podgornoye field (2013)

By the order of CJSC Polymetal Engineering, RJC analyzed material composition of processing samples taken at an ore occurrence area of Podgornoye field.

In the course of the activities, RJC employees determined chemical and general mineral composition of the samples, extracted free gold from the samples, performed mineralogical studies of silver and gold occurrence forms, as well as composition studies of gold and silver concentrate minerals by means of an electronic microscope. The results were summarized in a scientific research report.



OUR CONTACTS:

196247, Russia, Saint-Petersburg
Leninsky pr., 153A,
office 501
Phone/fax: +7 (812) 384-48-09
rijc@rjcgroupp.ru

664025, Russia, Irkutsk
Semen Lagoda st., 4/6,
office 307
Phone/fax: +7 (3952) 700-353
sibir@rjcgroupp.ru

010017, Kazakhstan, Nur-Sultan
Baurzhan Momyshuly pr., 12A,
section B, office 603
Business Center Meruert
Phone/fax: +7 (705) 288-19-12
astana@agrsoftware.ru

www.rjcgroupp.ru