SIBERIAN GEOCHEMICAL COMPANY

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'The problem of mineral exploration by essentially your own - a problem geochemical "
A. E. Fersman

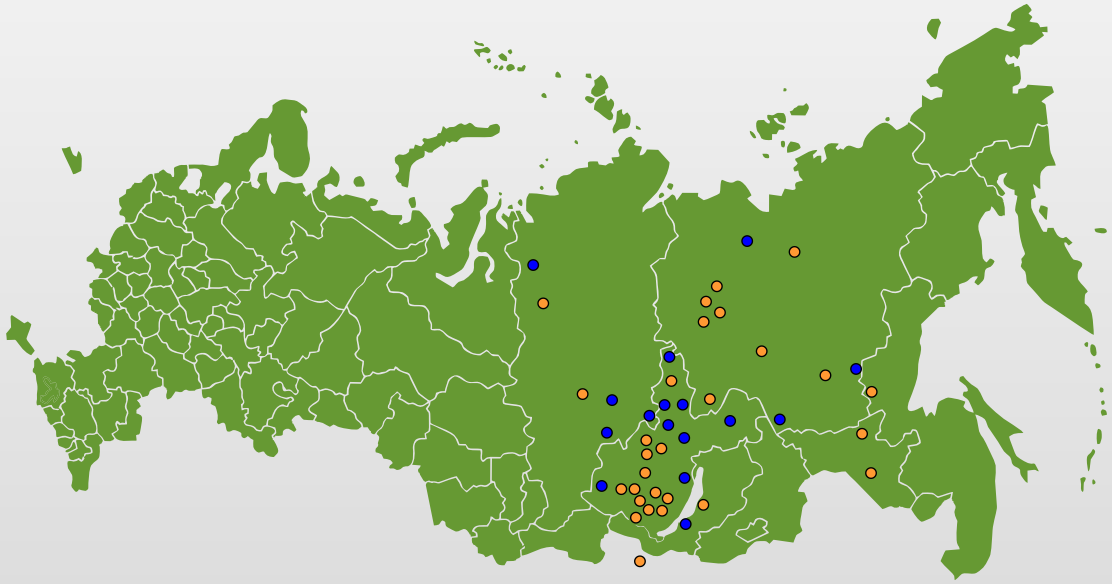
Innovative geochemical technologies of prospecting and exploration of mineral deposits

ABOUT COMPANY

- PGK Sibgeokom Ltd. - service geochemical company performing for 20 years geochemica and environmental work on territories of Eastern Siberia and the Far East.

- The main activity of the company are geochemical prospecting and ore exploration,placer and hydrocarbon and deposits, geoecological Ltd PGC research.

- PGC «Sibgeocom» performs full cycle exploration including design, field and chemical analysis, complex processing and interpretation of the results. Geochemical studies are conducted in modifications 2D, 3D, 4D.Performed computer simulation of oil and gas systems and litho gas-geochemical processes in the halo of dispersion over hydrocarbon clusters (solving a direct problem of geochemistry) and analytic continuation of geochemical fields to the level of potentially productive complexes (solving an inverse problem of geochemistry).



- Our partners

РОСГЕОЛОГИЯ
Российский геологический холдинг

ГАЗПРОМ

РОСНЕФТЬ

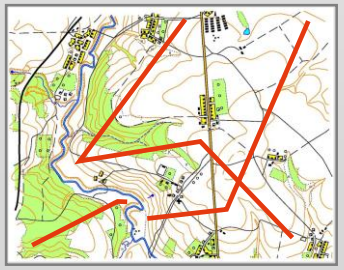
ИРКУТСКЭНЕРГО

ИРКУТСКАЯ НЕФТЯНАЯ КОМПАНИЯ
ИНК

A FULL CYCLE OF GEOLOGICAL AND GEOCHEMICAL WORK

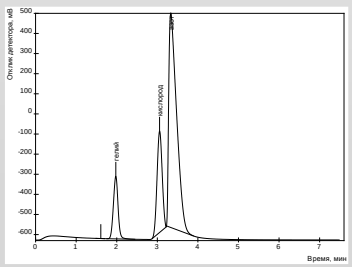
The company operate field units that carry out ground geochemical and environmental work, oil-field geochemical studies and deep coring wells. The analysis of field samples (soil, rocks, natural waters and gases) is performed as certified in the system of Federal service for accreditation of specialized chemical analytical laboratory of the company.

Among the company's priorities are safe working conditions, social protection of employees and environmental protection. The company has a quality system according to GOST ISO 9001-2011 and ISO 9001:2008, ISO 9001:2015, ISO 14001:2015, OHSAS 18001: 2007.

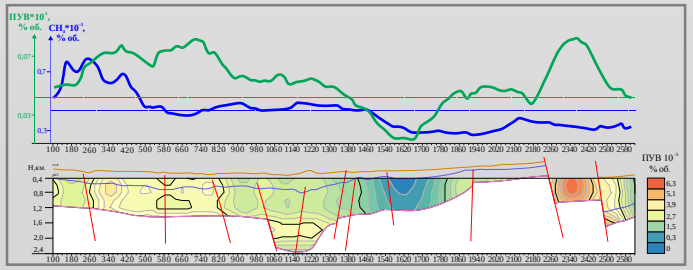


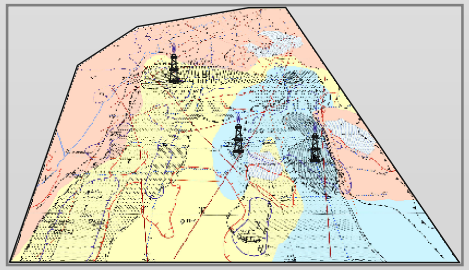
Design works

Field work



Chemical-analytical works





Processing and interpretation of geological and geochemical data

TECHNICAL EQUIPMENT

The company is armed with all – terrain wheeled and(URAL-4320, GAZ-33081, MTLB),mobile field laboratories), various ATVs, snowmobiles, boats, outboard motors, modern geochemical field equipment and devices including tracked equipment portable hydrogeochemical laboratories, gas chromatographs, helium and gas-port analyzers, route and borehole radiometers, radon analyzers necessary for performing rapid analysis of geochemical and radio-metric samples in field conditions The technical equipment of the field geochemical divisions allows for year-round research in difficult and difficult climatic conditions both in the waters and on land.

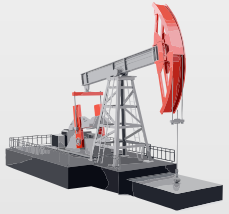
METHODS OF GEOCHEMICAL WORKS

- **Geochemical prospecting -** an effective, mobile, inexpensive and environmentally friendly method for predicting, prospecting and exploration of hydrocarbon deposits.
- The effectiveness of geochemical methods is increasing in the complex geological and climatic conditions of Eastern Siberia (the predominance of deposits of non-reservoir type, the widespread development of trap magmatism, salt tectogenesis, etc.).
- Geochemical methods, in addition to geophysical studies, make it possible to predict the petroleum potential of a sedimentary section not only on a geological-tectonic basis, but also to make a quantitative and qualitative assessment of the hydrocarbon potential of the subsoil.

- **Geochemical search methods:**
- atmogeochemical survey, hydrogeochemical survey
- snow shooting
- litogazogeochemical studies
- helium survey, radon and radiometric surveys
- gazortut shooting, microbiological survey
- technology of seismic and chemical prediction of petroleum potential
- borehole geochemistry methods
- methods of prospecting for ore and placer deposits
- physical and chemical modeling of natural processes and hydrocarbon systems

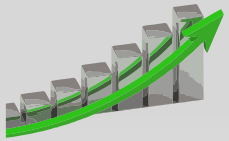
THE COMPANY SERVICES

All cycles of geochemical studies



Oil and gas prospecting

- seismic and geochemical forecast of oil and gas saturation of the sedimentary section;
- analytical modeling of geochemical fields;
- geochemical studies in the modification of 3D, 4D in the search, exploration and operation of oil and gas objects;
- identification and contouring of "secondary" accumulations of hydrocarbons, zones of development of gas hydrate sequences in the HDF, tectonic disturbances with an assessment of their conductive (screening) properties;
- computer physical and chemical modeling of the processes of generation, migration and accumulation of hydrocarbon systems, including lithogeochemical processes in the zone of influence of hydrocarbons



Searches and exploration of ore and placer deposits and hydromineral raw materials

- search for new sites with different types of mineralization;
- search for buried placers of different genetic types;
- search for mineralized and radon waters

Environmental work

geoecological support of oil and gas exploration from the start of production of exploration to the end of the development of oil and gas fields

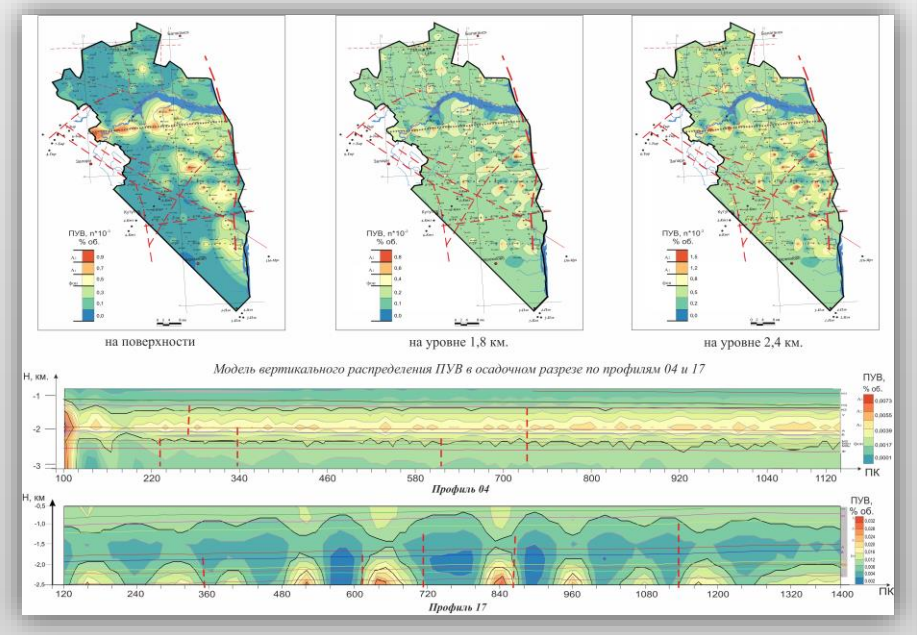
Laboratory studies

laboratory studies of natural objects (rocks, soils, natural waters and air)

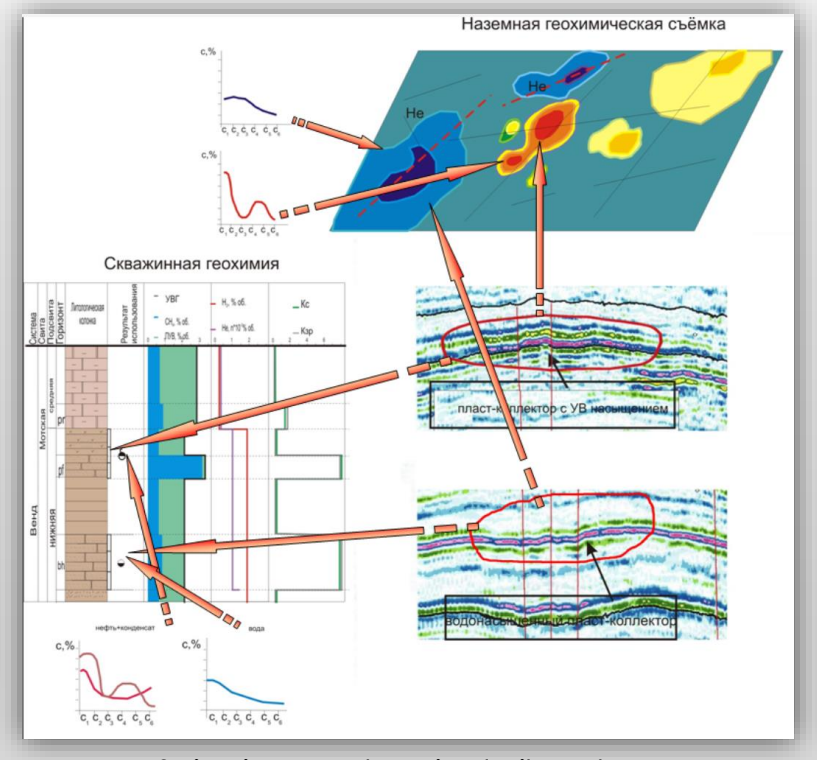
Geohimical management

- supervisory control of geochemical and environmental work at federal facilities and license areas;
- consulting services in the field of geological, geochemical and environmental studies, physical and chemical modeling of oil and gas systems

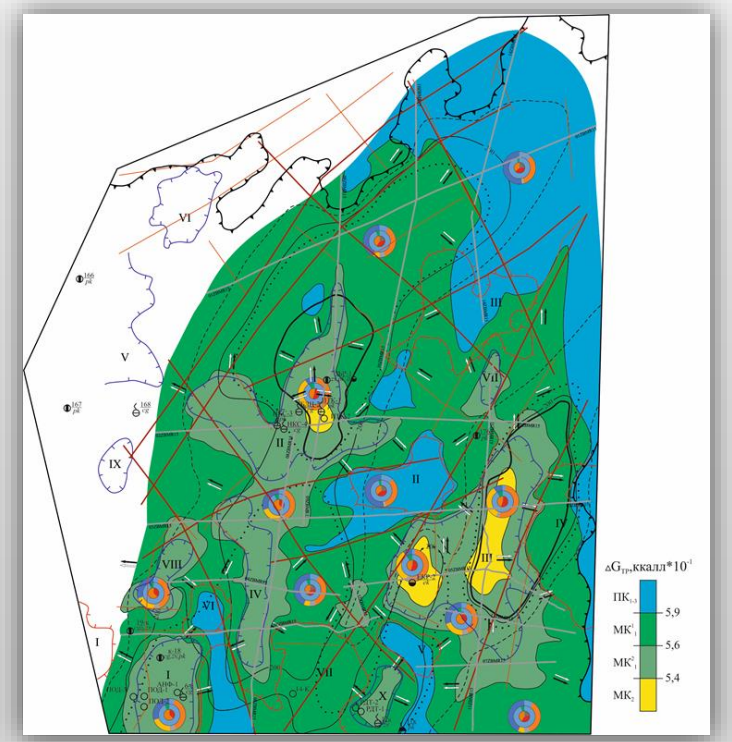
INNOVATIVE GEOCHEMICAL TECHNOLOGIES



Analytical continuation of geochemical fields to the level of potentially productive sediments



Seismic-geochemical oil and gas potential forecast based on well and surface geochemical methods and 2D, 3D seismic surveys



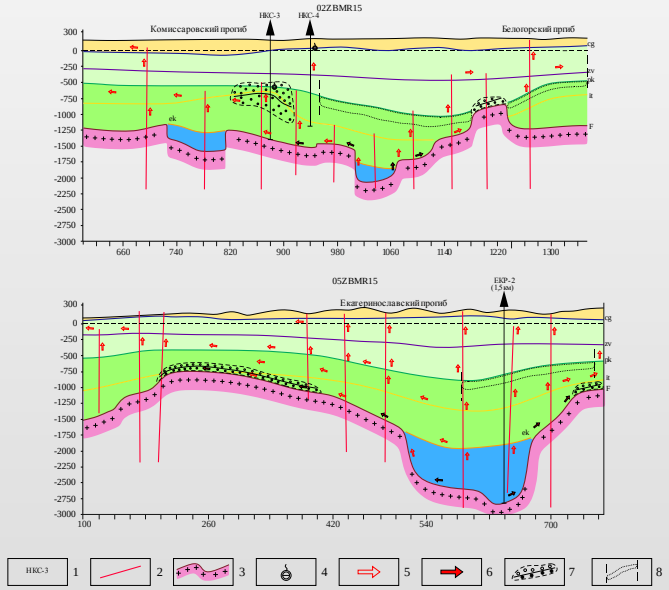
Modeling of foci of generationand ways of migration and accumulation of hydrocarbons (See-Bureinsk depression)

REGIONAL RESEARCH

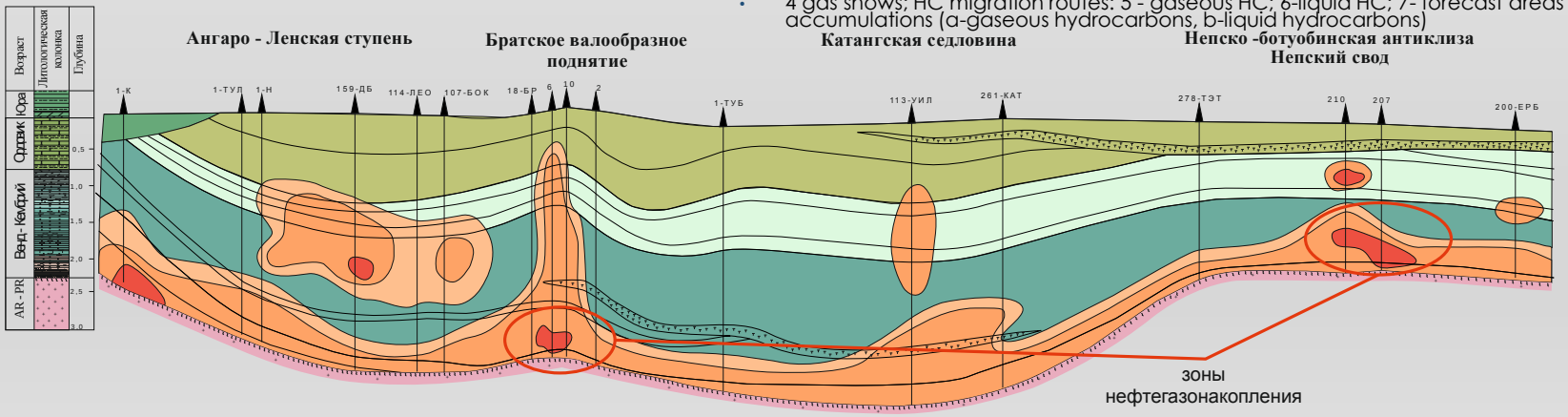
The aim of the work: the study of the basic laws of the geological and geochemical structure of sedimentary basins and the assessment of the prospects for oil

At this stage, the following methods are used:

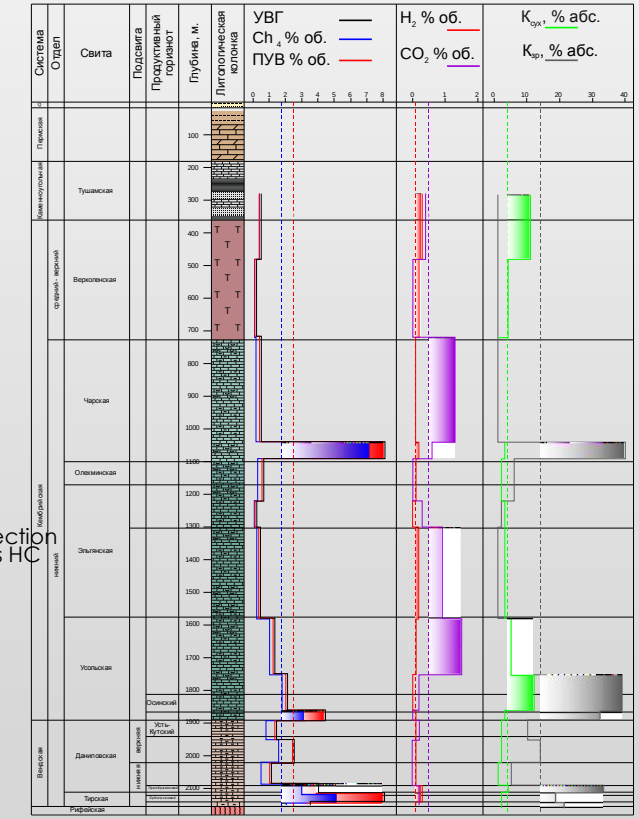
- Deep well log data processing
- Modeling of generation, migration and accumulation of hydrocarbons



- Scheme of migration and accumulation of hydrocarbons in the sedimentary section
- 4 gas shows; HC migration routes: 5 - gaseous HC; 6-liquid HC; 7- forecast areas HC accumulations (a-gaseous hydrocarbons, b-liquid hydrocarbons)



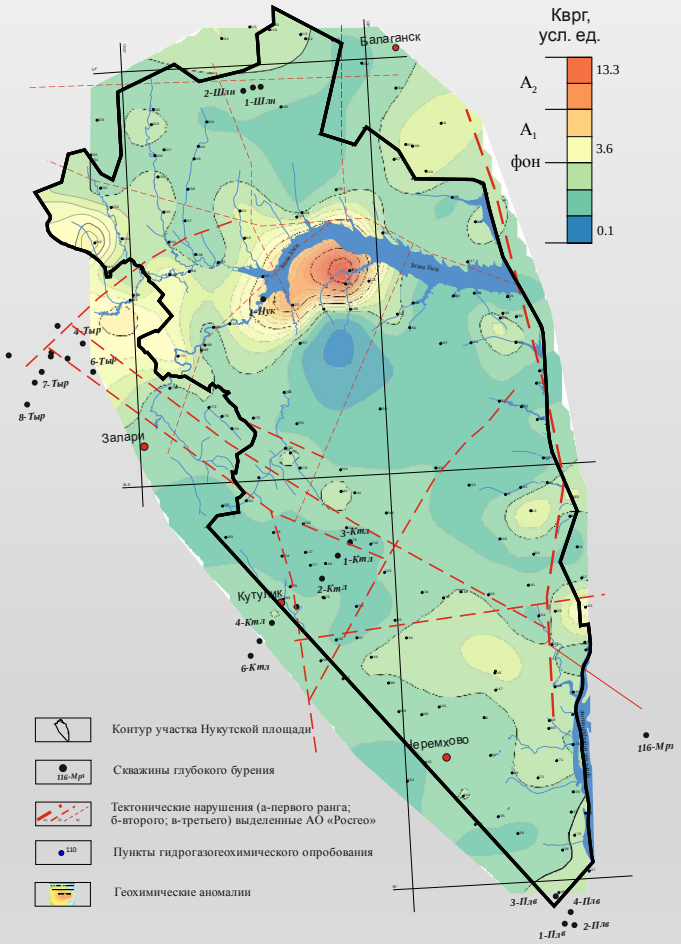
Allocation of zones of regional and local oil and gas accumulation on the basis of materials processed by the Civil Code (Irkutsk Region)



Generalized gas-geochemical model of the sedimentary section and the productive horizons (ALS, Eastern Siberia)

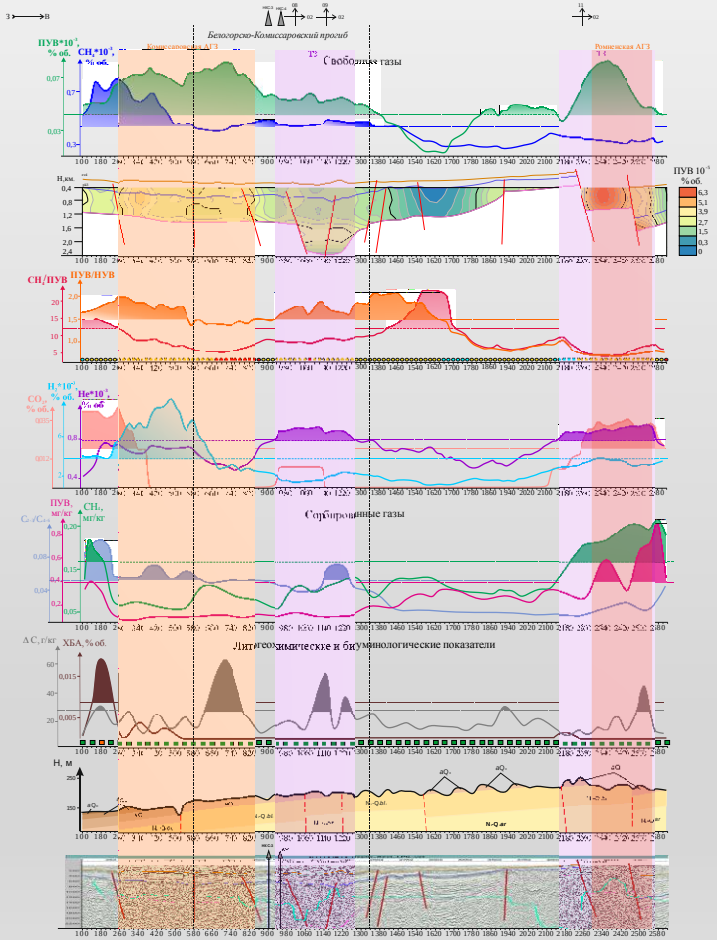
REGIONAL RESEARCH

- Gidrogazodinamika survey (scale 1:500 000 -1:200 000



Map of the change in the complex index of KVR of water-dissolved gases of the surface waters of the Nukutskaya area

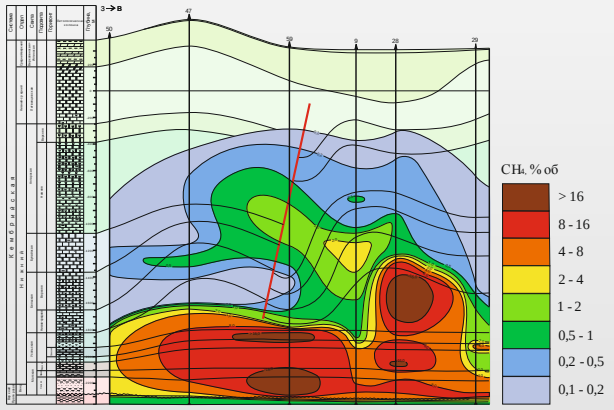
- Litogazogeochemical survey (scale 1: 100 000)



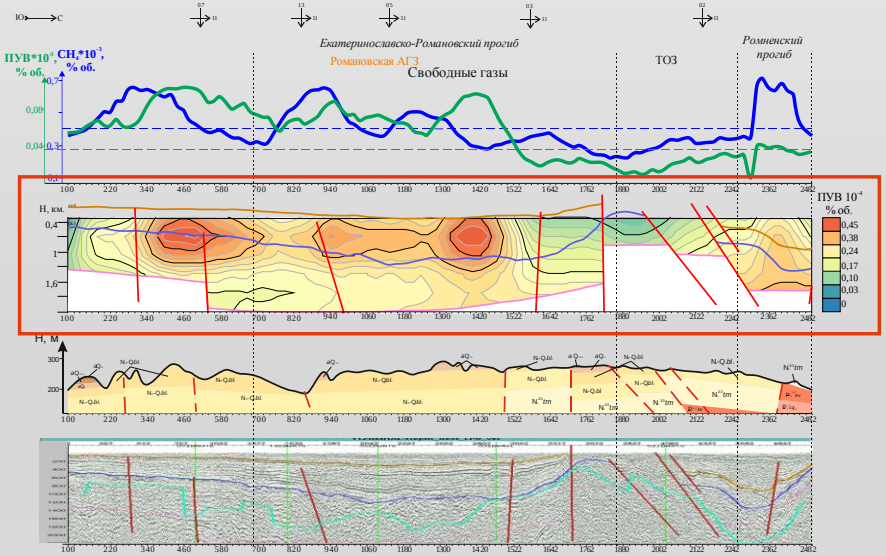
Graphs of the distribution of litho-geochemical indicators for seismic profiles in the Nukutskaya area

SEARCH RESEARCH

- The aim of the work: building a model of the geological and geochemical structure of the site, identifying promising areas of oil and gas accumulation, assessing the role of faults (conductive or shielding)
- **Tasks**
- • Delineation of zones of oil and hydrocarbon deposits
- • Evaluation of phase saturation and HC safety conditions
- • Refinement of oil and gas saturation of potentially productive horizons
- • Detection and contouring of oil and gas perspective traps
- At this stage, the following methods:
- • Gas logging • Hydrogeochemical survey (scale 1: 200 000) • Litogas-geochemical survey (scale 1:50000)
- • Analytical continuation of geochemical fields to the level of potentially productive horizons



Methane distribution in sedimentary section



Аналитическое продолжение геохимических полей

Analytical continuation of geochemical fields to the level of potentially productive horizons

SEARCH RESEARCH

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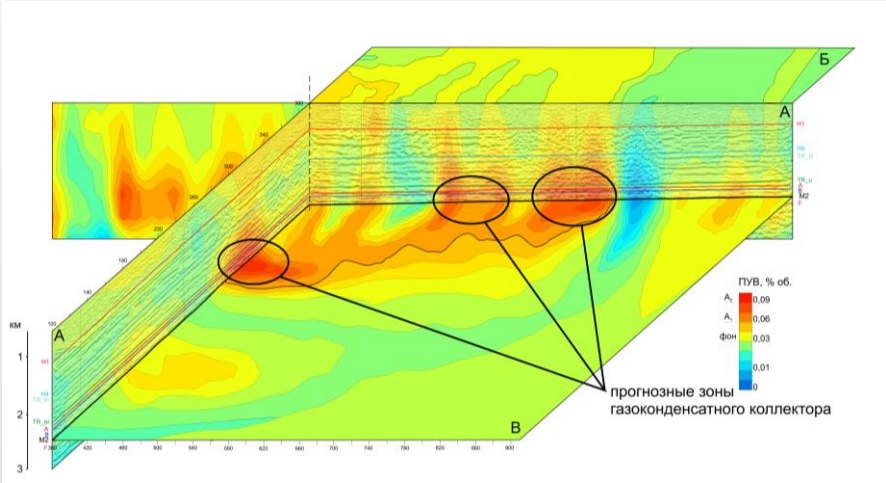
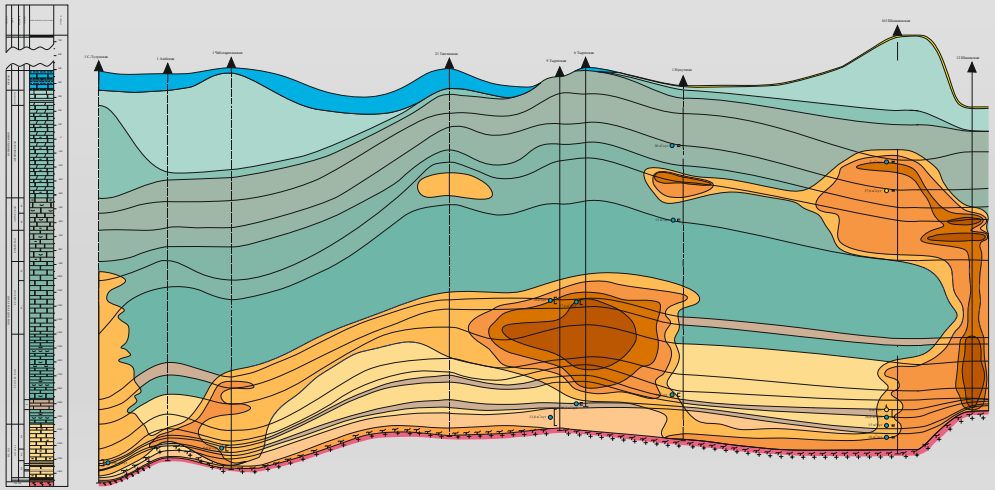


Methane distribution in sedimentary section



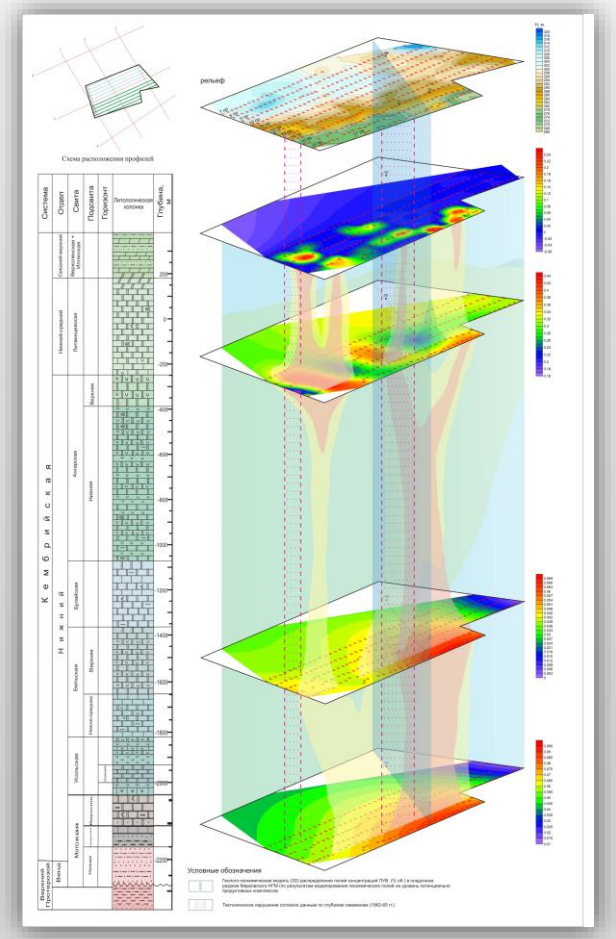
Analytical continuation of geochemical fields to the level of potentially productive horizons

OILFIELD SURVEYS

The purpose of the work: the solution of a number of problems arising at the stage of development and mining of minerals

Tasks:

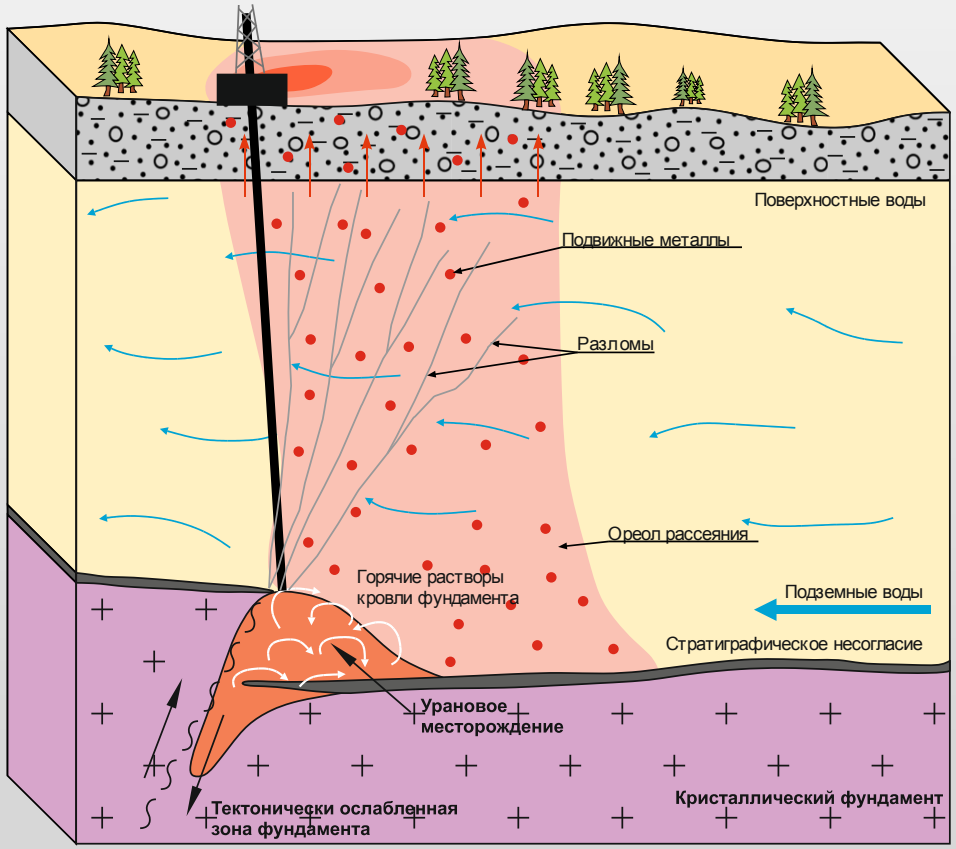
- Monitoring the composition and physico-chemical properties of reservoir fluids
- Prevention of interfacial fluids;
- Warning of hydrocarbon annular overflows;
- Observations of the chemical composition of groundwater during acid and proppant fracturing;
- Ecological and geochemical studies to monitor the state of the environment at existing fields.



Geological and geochemical model of the distribution of fields of concentrations of the PUV in the sedimentary section of the Markovskiy NGM

SEARCHES FOR ORE DEPOSITS

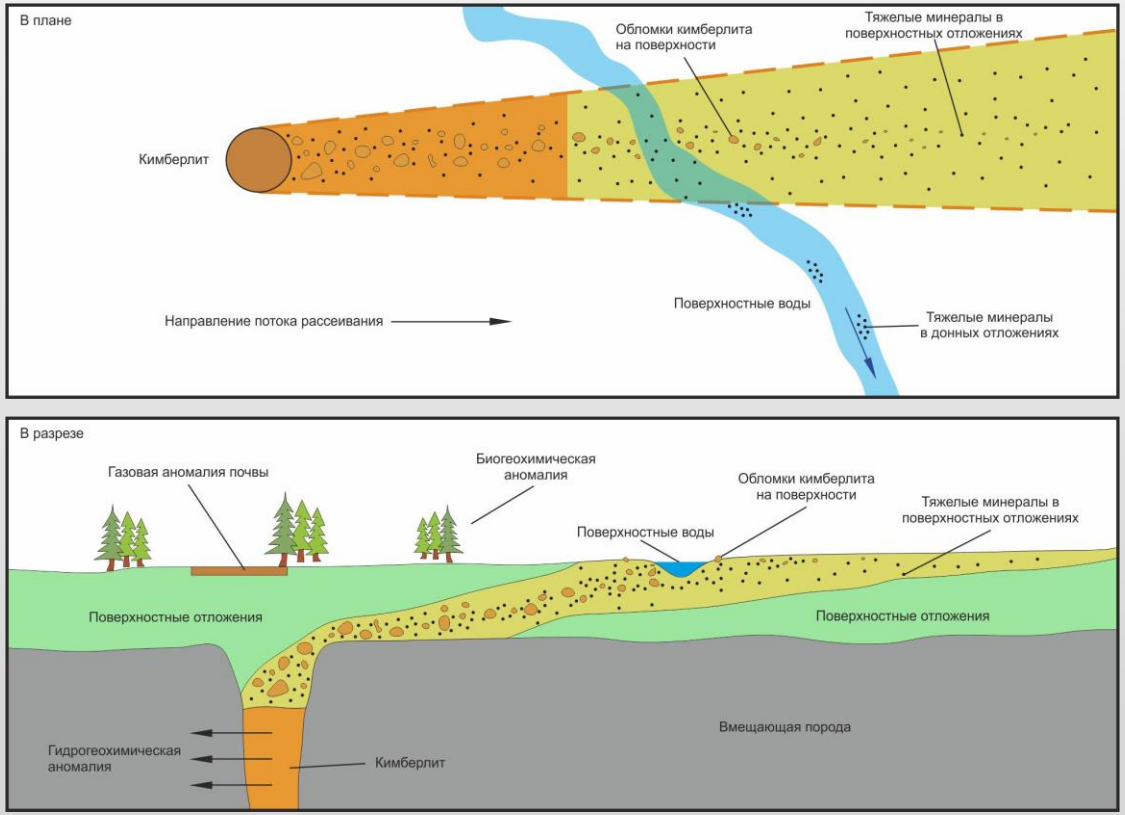
- Purpose of work: search and contouring of ore mineral deposits
- Tasks:
- Search for new ore-bearing objects in the areas of existing mining enterprises;
- Search for highly profitable weathering crusts and ore bodies of disseminated-sulfide and veinlet-sulfide types in developed gold-bearing regions;
- Advance searches from the day surface alluvial deposits, followed by carrying out an estimated mining and drilling work on prospective anomalies and alluvial mining sites;
- Survey of large undeveloped areas with the release of ore-promising local areas and sites, followed by detailed searches;
- Search for the bottoms of modern river valleys for ore and placer gold;
- Searches for buried placers of different genetic types;
- Exploration in the vicinity and on the flanks of explored and exploited deposits.



Model of dispersion haloes and surface anomalies of ore deposits

METHODS OF ORE GEOCHEMISTRY

- The company uses high-performance geo-chemical exploration methods of ore and placer deposits:
- Bacterial - geochemical method, characterized by ultra-high resolution (depth of research), which allows to predict hidden and hidden - overlapped (under allochtons) ore objects, as well as placers at any depth. It is also used to identify and contour in the conditions of closed landscapes of kimberlite pipes;
- Mercury-salt lithogeochemical method for salt superimposed halos of highly mobile ore elements, including the closed type;
- Lithogeochemical method for scattering flux, has a highly informative and reliable prognosis;
- The quartz-geochemical method is based on the peculiarities of the placement of detrital fractions in the hypergenic zone of hydrothermal quartz, as the main mineral-forming component of gold ore formations;
- Hydrogeochemical method is carried out in two versions - for river and slope waters;
- The phytogeochemical method is used when searching for deposits of noble metals with the use of plants that are the most widely spread in natural landscapes as objects of survey.

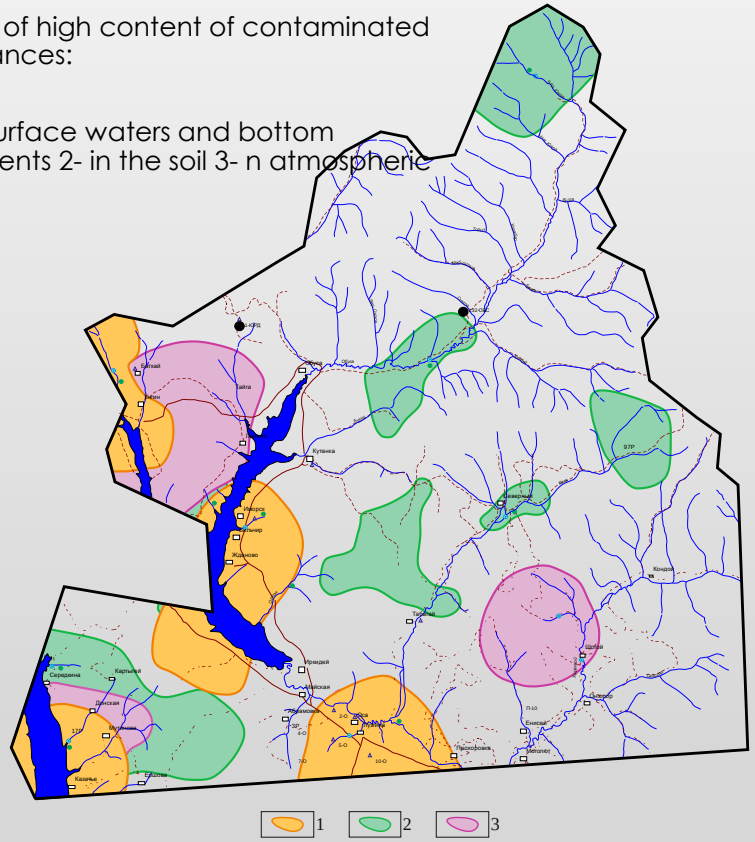


Model of geochemical scattering flows of kimberlite pipes

ECOLOGICAL RESEARCH

- The company performs ecological and geochemical work, both at the initial stage of geological exploration of poorly studied areas, and together with geophysical studies at the regional stage of exploration:
- • environmental support of geological exploration in prospecting and exploration of ore and oil and gas deposits;
- • Ecological and geochemical monitoring of the territory in areas of development of deposits and industrial enterprises;
- • integrated ecological-geochemical investigations for engineering-prospecting works;
- • ecological and geochemical control of the tightness of gas and oil storage facilities, gas and oil pipelines;
- • detection and control of foci of methane formation in coal mines and industrial sites;
- • gas-geochemical survey on snow cover, soils and soils, natural waters;
- • radon and gamma surveys on soils, natural waters, air of the working zone of industrial and residential premises;

- Areas of high content of contaminated substances:
- 1- in surface waters and bottom sediments 2- in the soil 3- n atmospheric air



Integrated map of man-made loads at Raduysky LU

CHEMICAL-ANALYTICAL WORKS

- Chemical and analytical studies are conducted in a specialized geochemical laboratory certified in the RosAccreditation system (Accreditation Certificate No. RA.RU.21SB09 of 06/22/15) equipped with modern domestic and imported analytical and laboratory equipment and include
- gas desorption from water and soil (rock) samples using the method of thermal vacuum degassing;
- pyrolytic desorption of gas from soil samples, rocks and sorbents;
- chemical quantitative analysis of natural and waste waters, soils and rocks;
- determination of heavy metals and toxic substances in water, soils and rocks;
- determination of organic substances, petroleum products and their derivatives in water, soil and rock;
- gas chromatographic analysis of saturated and unsaturated hydrocarbons and their aromatic compounds (C1-C15), as well as nitrogen, oxygen, carbon dioxide, hydrogen, helium, argon in water, soil and rock;
- determination of mercury, radon, helium in water, air and soil;
- determination of organic carbon and chloroform bitumoids in soil and rock;
- determination of physico-chemical parameters of water, soil and rocks

РОСАККРЕДИТАЦИЯ

ФЕДЕРАЛЬНАЯ СЛУЖБА ПО АККРЕДИТАЦИИ № 0002056

АТТЕСТАТ АККРЕДИТАЦИИ

№ RA.RU.21СБ09 выдан 22 июня 2015 г.

Настоящий аттестат выдан Обществу с ограниченной ответственностью Производственно-геологическая компания "Сибгеоком"

ИНН:3812140550

664074, РОССИЯ, Иркутская область, Иркутск, мкр. Университетский, д. 83, 115

и удостоверяет, что Химико-аналитическая лаборатория ООО Производственно-геологической компании "Сибгеоком"

664528, РОССИЯ, Иркутская область, Иркутский район, рабочий поселок Маркова, ул. Индустриальная, д. 1

соответствует требованиям ГОСТ ИСО/МЭК 17025-2009

аккредитован(о) в качестве Испытательной лаборатории (центра)

в соответствии с областью аккредитации, область аккредитации определена в приложении к настоящему аттестату и является неотъемлемой частью аттестата.

Дата внесения сведений в реестр аккредитованных лиц 18 мая 2015 г

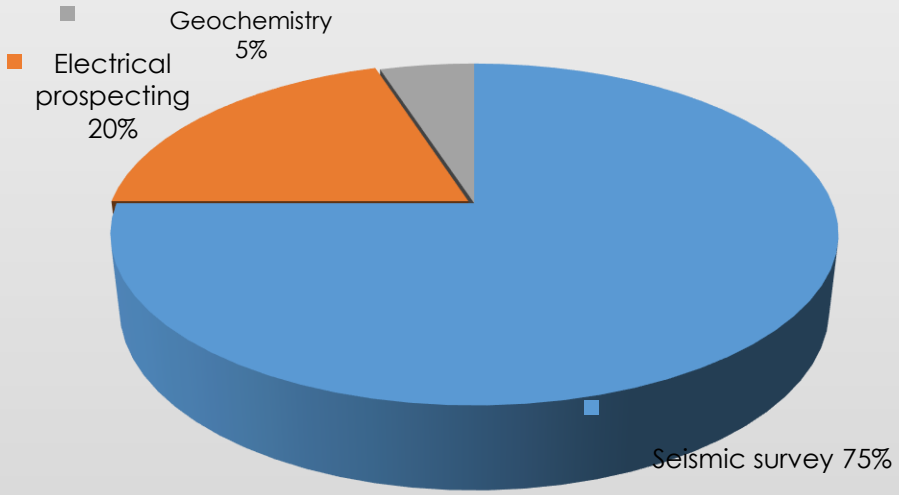
М.П.

Руководитель (заместитель Руководителя) Федеральной службы по аккредитации М.А. Якутова

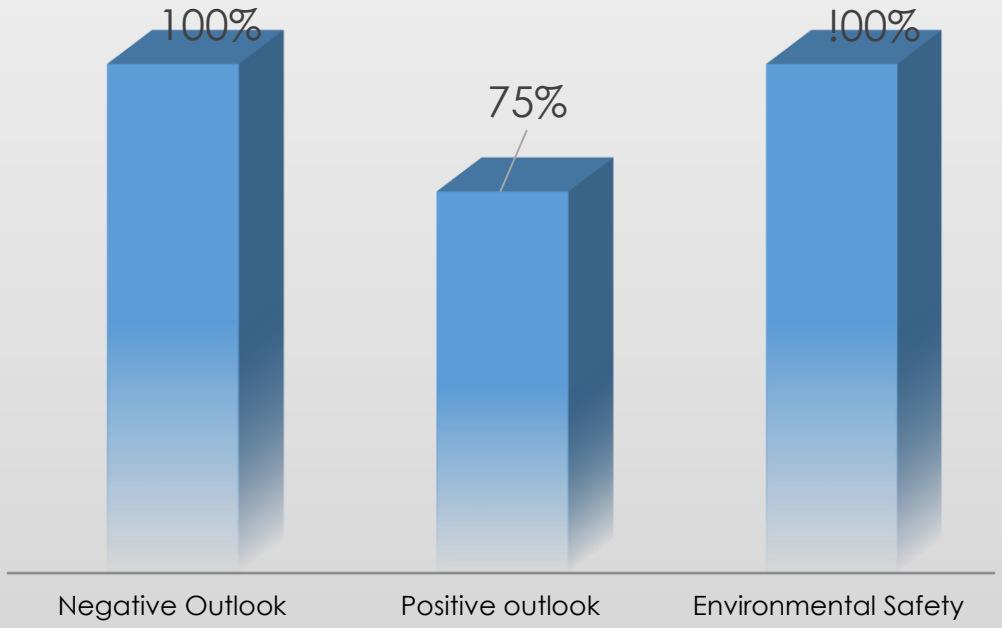
GEOCHEMICAL MANAGEMENT

- The company provides a variety of consulting, supervisory, expert and environmental services for oil exploration and mining companies:
- supervisor's support geochemical and geoecological works, including quality control perform field, laboratory and cameral (processing and interpretation) works for oil and gas.
- information and consulting services in the field of geochemical prospecting and exploration of oil and gas fields, ore and precious metals;
- expert evaluation of the hydrocarbon potential of license areas for geological, geochemical and geophysical data;
- consulting services in the field of Geochemistry of hydrocarbons, ecology and computer modeling of processes of oil-gas and ore formation;
- environmental assessment of exploration projects for oil and gas, ore and precious metals, engineering survey and construction work;
- radiation monitoring and expert examination of industrial and residential properties, farmland, etc.;
- expert assessment of the quality of petroleum products (crude oils, condensates, produced water) and their physico-chemical properties; chemical-analytical study of natural objects (gases, water and rocks) certified in the system of Federal service for accreditation of the laboratory.

EFFICIENCY OF GEOCHEMICAL RESEARCH



Share of costs during geological exploration



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