Purpose:
Intensification of inflow of oil and gas in extractive wells and multiplying injectivity of forcing wells.

Principle:
For treatment of bottom hole formation zone of extractive and forcing wells, with the worsened filtration description, powdery acids are used in mixture with liquids-transmitters (waterless oil, diesel fuel) and in combination with other inorganic acid.

Features:
• Multiplying the volume of scope of productive layer by influence of acid compositions
• Elimination of corrosion risk in oil field equipment
• Safe storage and transportation of acids to the place of application
• Improvement in the chemical activity of acid composition
• Demulsifying action on watered oil
• Decline of viscosity of oil with large maintenance of asphaltic tar substances

Range of application:
Extractive and forcing wells with sandy and carbonates productive collectors (including low-permeable).

Efficiency:
Application of technology on the oilfields of Ukraine, Syria and China has shown a 100% success. Additional extraction of oil on a 1 well-process makes no less than 1000 tons. Ecologically favorable and harmless system of application technologies.
Purpose:
Increasing oil productivity

Principle:
• Acid composition & characteristics:
  • Nitric acid base, and its complex with carbamide:

\[ \text{HNO}_3 + \text{CO(NH}_2\text{)}_2 \rightarrow [\text{CO(NH}_2\text{)}_2\cdot\text{HNO}_3] \downarrow \]
  • Insoluble in hydrocarbon liquids
  • White crystalline substance of density 1746 kg/m³
  • Water content of powdery acid: 0.37 %
  • Corrosion activity of wet powder (before drying): 3989 g/m·h
  • Corrosion activity of dried powder: 0.06 g/m·h
  • Stable as to its physical and chemical composition up to a temperature of 110 °C.

Advantages:
• Decrease in oil viscosity with a considerable content of asphalt-resinous substances
• Reduction in the emulsification of watered oil
• Absence of corrosion of the oil-field equipment
• High chemical activity of acid structure directly in the layer of wall under operation
• Ecologically (environment friendly), safe and harmless system of rendering of services

Range of application:
• Sandstone reservoirs & carbonate reservoirs
• Porous, fissured-porous and fissured reservoirs
• At different depths, pressure and temperature
• Acceptable for both common fields and high-viscous oil fields
• At different climatic conditions Efficiency: Up to 50%

The introduced technology is intended to conduct acid penetration in carbonate-sandy layers, including anhydride and silicates connections. The application is based on pumping-in of new acid composition with an improved dissolubility and low corrosive activity when exposed to metallic parts of well (due to development of protective tape).

At the contact of acid composition with high-mineralized layer water, there will be precipitation of ions of calcium and magnesium, formation of sludge and, as a result, protection of aquiferous part of layer from the further cooperating with acid.

As a result of multiplying resistance of filtration in aquiferous part of layer the basic volume of acid composition starts interacting with oil-containing part of the layer. The new channels of dissolution appear; leading to an improved connectivity of layer with the barrel of well.

The offered technology is developed on the basis of theoretical and laboratory researches and commercial experiments.

Efficiency:
Technology was successfully used on the oilfields of Ukraine, Russia, Bulgaria, Poland, and China.
Purpose:
An increase of injectibility of injection wells in the terrigene formation of layer, containing carbonates.

Principle:
Powdery sulphuric acid, involved on a liquid transmitter is delivered to the bottom hole formation zone of layer (BFZ). At mixing of sulphuric acid with water on bottom-hole of well due to what BFZ clears up from paraffin, resinous calor is discharged. At the chemical interaction of sulphuric acid and the irreducible oil sulfonates are formed, being anionic superficially-active substances (SAS). At the chemical co-operating of sulphate ion and sulphonate-group with salts of calcium of skeleton of formation and buried water, little soluble sulfates and sulphonate calcium are formed. The crystals of those salts side close pores are washed away by water and leads to multiplying local efficiency of water in the area of ousting and working thickness of interval of perforation. In addition, carbonic acid is formed as a result of the cooperation between sulphuric acid and carbonates. Due to the movement of carbonized water, there is a dissolution of Carbonates of calcium and decline of swelled of clays in a layer.

Features and advantages:
• Lower (as compared to chlorhydric acid) speed of co-operation of sulphuric acid with the carbonates of formation allows to conduct deep treatments of bottom hole formation zone of injection wells without addition of special delay agents of a reaction;
• Higher density and viscosity of sulphuric acid enables the treatment of bottom hole formation zone of injection wells to carry out hydro-acid breakage of layer at moderate pressures on the mouth of well;
• Possibility of conducting of treatments of bottom hole formation zone on different technological charts;
• At a jointly-separate method, the basic amount of heat in the barrel of a well is discharged on the depth of lowering of oil well tubing.
• Largely the corrosive operating of acid on equipment goes down, because it is delivered to the bottom hole in a non-active form and passes to the liquid state at entering to the bottom hole formation zone.
• Ecologically favorable and harmless system of application of technologies.

Range of application:
Injection wells in layers, containing carbonates

Efficiency:
Technology got practical application on the deposits of Ukraine, Russia, and Cuba. At maintenance in the terrigene formation of layer 1-2% carbonates, their permeability is multiplied on the average up to 25%.

Purpose:
Stimulation of oil and gas output in production wells and increase of intake capacity of injection wells.

How it works:
For bottomhole treatment in production and injection wells with derated filtration characteristics we use powdery and liquid reagents in liquid-carrier (water-free oil, diesel fuel, high-atomic spirits). A kit of specially selected chemical reagents for this type of reservoir, including its lithological features, allows dissolving selectively the blockers of pore space, increases the diameter of pores, improves the filtration of hydrocarbon fluid component and restrains water filtration.

Specific features:
- low corrosivity;
- safe storage and transportation of reagents to the point of application;
- increase of chemical activity of the chemical composition directly in the reservoir;
- demulsifying effect on the water-cut oil.
Purpose:
Improvement of the productivity of low-permeable (to 20.10-3 mkm2) terrigene collectors with considerable exhaustion of layer energy (<0.9 sizes of hydrostactical pressure)

Principle:
Pumping in the acid solution and spacer fluid in a well is carried out with the use of two options of gasification of type AGU-8k and pump aggregate 4AN-700.

Advantages:
• Rapid and complete enough deleting from the treated part of bottom hole formation zone of products of acid reaction
• Multiplying permeability of collector in 2-4 and more times after pumping of equal volumes of drilling mud acid solution
• Multiplying the depth of penetration of active acid solution in layer
• Destruction of barriers of liquids and exception of their impermeability on deficiency of process.
• Combination of process of acid influence with development of well
• At permeability of layer more than 40-60 mkm2 process can be conducted without intervention from the brigades of underground repair of wells, i.e. without the change of pendant of low-permeable terrigene collectors and raising of deep pump
• Duration process of acid influence with development of well makes 4-6 hours regardless of depth of well.

Range of application:
Oil-wells with low-permeable terrigene collectors on deposits with considerable exhaustion of layer energy

Efficiency:
Technology is successfully realized on the deposits of Ukraine, Russia, Poland, USA. Ecologically favorable and harmless system of application of technologies.

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Purpose:
This technology has been developed for the increase of hydrocarbon output in the fields with carbonate reservoirs.

How it works:
The technology is devoted to the treatment of bottomhole, bottomhole formation zone, and remote part of the layer of both carbonate and terrigene reservoirs by the original formulations of multicomponent acid reagents.

Peculiar features:
● dissolves sediments which block filtration of hydrocarbons;
● increases filtration characteristics of rocks, contributes to the leveling of injectivity profile;
● removes mud filter cake formed during the drilling process;
● removes corrosion products without causing damage on metal equipment;
● can be used as a prior operation before the conduction of other operations (hydrofrac, thermogas dynamic stimulation, well completion, perforation of pay horizon);
● permits to combine acid and thermal methods improving the effectiveness of treatment.

Advantages:
- high efficiency in gypsiferous rocks due to the introduction of special additives;
- doesn’t destroy matrix solid material and prevents clogging of porous space by reaction products;
- doesn’t cause the formation of jellous deposits during treatment of terrigenous reservoirs with high carbonate content.

Application area:
Oil, gas and gas condensate wells in the fields with carbonate reservoirs.
Purpose: Consistently-separate selective affecting by acid compositions the horizontal opened barrel of extractive wells with the preliminary blocking of the unprocessed areas of bottom hole formation zone of layer by a buffer liquid.

Principle: Depending on length and volume of horizontal barrel in a well, a buffer liquid (solutions of water-soluble polymers, suspensions, reverse emulsions and other, easily driven back and taken away from a layer at the challenge of inflow of liquid from a collector and development of well after completion of process of influence) is forced with the subsequent pumping of acid compositions of the prolonged action, which affect separate areas of layer and drive back deep into barrel buffer liquid.

Features: Stimulation of separate areas of layer is achieved by varying the volumes of driving liquid (water with superficially-active substance (SAS) diphasic foam) and alternative festering of different acid compositions, selective treatment of areas of layer and effective scope of layer is thus provided by acid influence. Technology has high technical and economical indicators.

Efficiency: Technology has high technical and economical indicators due to the use of standard equipment and economy of chemical reagents. Ecologically favorable and harmless system of application of technologies.

Purpose: Enhancement of the output of oil and gas wells with the horizontal open bore.

How it works: Sequential-separate, selective treatment of the orizontal open bore of the production well by acid compositions of long-lasting acting including blocking of non-treated bore parts by flush (displacement) fluid.

Advantages: 
- selective treatment of near-bore parts of the productive reservoir without any application of packers and other equipment considered as a potential source of emergencies;
- increase of reliability of technological operations.

Application area: Horizontal oil and gas wells with the open bore in the heterogenous layers.
INCREASE OF THE PRODUCTIVITY OF GASLIFT WELLS BY FOAM SYSTEMS

Purpose:
Increase of efficiency coefficient of gas lift wells with the use of diphasic foams, formed at aeration by gas or air of water with the super-facially-active substances dissolved in it (SAS).

Principle:
At the hit of suds together with the compressed gas in a gas liquid stream structure last applies from beaded (cork) to a point, at which slipping of gas bubbles is almost fully prevented at a lifting of a liquid. In addition, the bubbles of suds, filling roughness and unevenness on the surface of pipes, lower hydraulic resistance in a wall area and create terms for suppression of urbanization in the transversal section of stream. The feature of process is a gradual change in the structure of gas-liquid mixture at its raising of it on a surface, related to the borehole inversion of emulsion in less proof ("oil in water")

Advantages:
• Lowering of bottom hole pressure
• Multiplying the rate of movement of gas-liquid mixture
• Increase of the productivity of gaslift wells
• Decline of expense on preparation of oil in superficial terms.

Range of application:
Oilfields with gas lift exploitation of extractive wells

Efficiency:
Technology is inculcated on the deposits of Ukraine. Results of application of diphasic suds in gas lift wells on Glinsko-rozbyshevskorn deposit of NGDU (OAO"Ukrneft", Ukraine) shown in table(in a number information of debit is resulted to the use of technology, in a denominator-after)

<table>
<thead>
<tr>
<th>Average daily debit of the well</th>
<th>% Efficiency in</th>
</tr>
</thead>
<tbody>
<tr>
<td>On a liquid Ton/day</td>
<td>On Oil Ton.day</td>
</tr>
<tr>
<td>76</td>
<td>103/110</td>
</tr>
<tr>
<td>163</td>
<td>65.9/65.5</td>
</tr>
<tr>
<td>88</td>
<td>300/336</td>
</tr>
<tr>
<td>187</td>
<td>220/236</td>
</tr>
<tr>
<td>91</td>
<td>240/245</td>
</tr>
<tr>
<td>180</td>
<td>180/200</td>
</tr>
<tr>
<td>87</td>
<td>260/260</td>
</tr>
<tr>
<td>127</td>
<td>300/300</td>
</tr>
</tbody>
</table>
Technology foresees the successive pumping in the bottom hole formation zone of layer of two preliminary made foam acid compositions. At forcing of the first acid foam composition in the watered part of layer, as most permeable, there is cooperation of acid with the water of layer, as a result waterproof screens in the watered part of layer. Then the second acid foam composition is given in a bottomhole formation zone, properties of which makes selective operating on oil and watered interlayer of a layer.

Application of new technology is provided by the receipt of acid composition in low-permeable oil-saturated interlayer and receipt of new channels of dissolution. Creation of waterproof screen is an artificial way allows in future to limit entering of layer water into well. This technology is developed on the basis of theoretical and laboratory researches and experiment. The offered technology was successfully used on the deposits of Syria. Technology has high technical and economical indexes.

Efficiency: Technology was successfully used on the oilfields of Ukraine and Russia, on the licensed basis as used on the deposits of Syria, Bulgaria, USA. Ecologically favorable and harmless system of application of technologies.
How it works:
When accumulated fluid contacts with the foaming compound, the two-phase foam is created in the well bottomhole, which is carried out to the surface by the gas incoming from the layer to the well.
A special foaming compound is carried into the well bottomhole in the form of briquets having cover soluble in reservoir fluid.

Advantages:
- simplicity and efficiency of technological process;
- high technical and economic indexes (performance).

Application area:
Gas and gas condensate fields in the late exploitation period complicated by drowning (water encroachment of the developed wells).

Purpose:
This technology is intended to enhance hydrocarbons production on the fields with some development of initial reserves and first signs of flooding.

How it works:
this technology allows treatment of the bottom hole formation zone by amine complexes that contain surface-active substances and have physical and chemical influence on the reservoir.

Peculiar features:
After treatment of the fields having gas-condensate precipitation in the reservoir there is the cleaning of the stratum from asphatic resinous contaminations, rock permeability is increased owing to the reduction of carbonate content, the mobility of precipitated condensate is increased due to dilution by carbon dioxide, which, in this turn, contributes to the condensate carrying out process from the reservoir.
On the fields with the first signs of flooding treatment of the bottom hole formation zone by amine complexes blocks the intrusion of reservoir water and increases output of hydrocarbons. The duration of treatment effect at cleaning of the bottom hole formation zone from precipitated condensate is up to 6 months and at water shutoff is up to 2-3 years.

Advantages:
The reagent used here is corrosive and environmentally safe;
Provides enhancement of gas-condensate and gas production;
Intrusion of reservoir water is blocked.

Application area:
Oil, gas and gas-condensate wells of oil-fields which are at the late stage of development.
THE EXTRA-HEAVY OIL PRODUCTION TECHNOLOGY

**Purpose:**
The technology is aimed for production and transportation of the extra-heavy oil.

**Principle:**
Technology is based on viscosity reduction of the produced and transported oil due to physical and chemical influence on its structure.

**Specifics:**
The technology realization is executed by feeding the modifying components into annular space, which allows significant reducing of the viscosity of the produced and transported extra-heavy oil.

**Advantages:**
The proposed technology distinguishes essentially from the known ones and allows achieving the high exploitation results at relatively low amounts of the feeding chemicals.

**Field of Application:**
The oil wells and systems of transportation, collection, and saving of extra-heavy oil.

TECHNOLOGY OF KILLING GAS WELLS IN THE COMPLICATED CONDITIONS

**Purpose:**
Killing of gas wells, used in the gas underground storages (GUS), at their underground repair.

**Principle:**
Killing of wells is carried out by the use of liquids, represented in a form of water solution of linear polymers with different ingredients.

**Features and advantages:**
The liquids used for killing possess the following advantages:
- Promoted viscosity, preventing its absorption in a layer,
- Does not cause swelling of grounds of collector,
- Easily extracted at development of well.

**Range of application:**
Operating well in the gas underground storages.

**Efficiency:**
Technology showed high efficiency and reliability during conduction of works of repair-restoration the deposit of Giren (Bulgaria).
**Principle:**
Well killing is often accompanied by the absorption of fluids, which significantly reduces the productivity of wells. The stable gel-like solutions of a certain density and viscosity without a solid phase or with acid-destroitive inclusions are the most suitable reagents to apply in the conditions of high repression on the layer. The structural-mechanics, rheological properties as well as stability of the received gels are preserved up to the temperature of 130°C. In this case all gel characteristics remain suitable for usage kill liquid for well workover operations.

**Purpose:**
Preservation of capacitive-filtration properties during well servicing

**Types of BLK:**
- hydrocarbon emulsion having the density from 950 to 1150 kg/m³ and viscosity of more than 150 sec.;
- polymer gel based on chloride salts without a solid phase having the density of 1050 - 1320 kg/m³ and viscosity from 100 sec to non-fluidity;
- weighted polymer acid-destroitive gel based on chloride salts and fine carbonate inclusions of 1320-1550 kg/m³.

**Advantages:**
- easily destroyed by acids, washed and removed by the solutions of surface active substances;
- the operation temperature range is 20-130°C;
- there is low filtration on the productive layer (up to 2 cm³ for 30 seconds at reservoir conditions);
- usage of inexpensive non-deficient environment-friendly materials;
- easy to prepare.

**Application area:**
Oil, gas and gas condensate wells in the process of well servicing.

**Technological**
Chart of isolation of cracks of layer:
In a well, set for treatment, field-geological-geophysical researches have been conducted by the establishment of working and watered intervals of layer. Then in a well by using of the oil-well tubing (OWT) generator of the magnetic field (GMF) is taken down to the interval of localization of cracks, and to the mouth of well aggregates for being injected in the well of isolating solution are connected. Isolating solution is prepared by mixing it in the sand-oil blender of magneto active substances with a liquid-transmitter.

**Liquid-transmitter of necessary viscosity is delivered in tank-cars, from which it is taken out by the aggregate CA-320 on communications to the sand-oil blender, pumping in the insulating solution on the basis of magneto active substances in cracks and porous environment of watered part of bottom-hole formation zone of productive layer as it is made by a pump aggregate. Isolating solution is pumped in into a well through oil-well tubing at the opened annular space in necessary volume. Driving of solution is made by layer water in a volume, equal to the volume of OWT at the closed annular space. Pressure must not exceed pressure of fracturing of layer.

Upon termination of driving solution, the magnetic field is created by the well generator of the magnetic field (GMF creates tension of the magnetic field equal to 110-120 thousands ampere/meter), under act of which in gap between a generator and operating column, and also in cracks and porous environment of layer, an isolating structure is created, which reliably insulates watered horizon from well. A well is developed directly after completion of works on isolation. Ecologically favorable (environment) and harmless system of application of technologies.
**Purpose:**
Technology is used at development of oil fields for isolation and imitation of inflows of waters of layers in extractive wells. It is based on formation and localization of plugging screen in the set interval of layer by the magnetic field.

**Features:**
The offered technology unlike other methods of isolation and limitation of water production provides the selective affecting of the layer. It is also expedient to apply this technology at leakage of cement ring, when a process with the use of pachers appears to be ineffective. Grouting mortars, which contain magneto active substances, promote durability of isolating screen in a layer. Technology is realized on standard commercial equipment at down take to the bottom hole of special generator of the magnetic field. Services of "engineering" type on application of technology are offered.

**Efficiency:**
Technology has high technical and economical indexes due to the use of standard equipment and economy of chemical reagents. Ecologically favourable (environmental friendly) and harmless system of application of technologies.

**Purpose:**
Limitation of water influx into production wells

**Principle:**
By injecting the insulating magneto active solution with attached characteristics of magnetically operated liquid provides an opportunity to hold magneto active insulating solution thought the constant magnet dropped into the well. The well device on permanent magnets is a set of the elementary magnetic systems, consisting of the permanent magnets parallel united between them;
1. plugged in magnetic chain through two magnetic conductors,
2. Permanent magnets 1 are insignificantly shifted in relation to magnetic conductors 2 toward a non-working butt, which multiplies resistance to magnetic stream on the non-working butt of the magnetic system and results in the redistribution of magnetic stream toward working butt. The elementary magnetic systems are placed on a circumference on a cylindrical unmagnetic body 3 so that turned to each other by the same poles. Such placing of the elementary magnetic systems allows avoiding shorting of the magnetic field inside well device and, in addition, results in strengthening of the magnetic field on the working surface of device due to the "extrusion" of the latter outside.

**Efficiency:**
According to the offered charts of technological processes of insulation and limitation of water influx into the wells tests on the row of deposits of Ukraine, Russia, Bulgaria, Poland and China have been already conducted. For the purpose of more wide approbation of technology it has been tested on deposits, with different parameters of layers and containing fluids. In addition, the tests are supposed to be an adaptation of technology to the climate and geographic conditions of deposits locations.
**Purpose:**
Improvement of the productive characteristics of wells and further perfecting of the technology.

**Principle:**
Developed baro-thermo-chemical technology is directed on solution of the problem of increase of output of oil, gas and gas-condensate wells by active thermal methods of influence upon a zone of an open productive stratum by mixtures of a new generation. Combustible (fuel)-oxidizing mixtures-water suspensions on the basis of ammoniac salts. The technological scheme of realization of the new technology (at complete safety of operations that carried out) includes:
- Preparation of a well;
- Injection of chemical mixtures at pitface and as far as possible in a stratum;
- Realization of process of thermo-gas-chemical influence;
- Well commissioning.

**Advantages:**
The technology improves the qualitative state of a collector, increase its permeability for the account of:
- Cracking and possible break of a stratum;
- Intra-formation cracking and pyrolyze of high molecular hydrocarbons and transformation them in benzene and gas factions;
- Short-term intra-formation burning of resinous sediments;
- Removal of skin-effect;
- New kind of acid-alkaline treatment with heating of a stratum and secondary changes of the rock structure. When using thermo-gas-chemical influence, reagents and also the products of their reaction represent ecologically clean systems and render positive effect on operational parameters of fluids.

The products of combustion (at various modes of treatments) can contain: oxides of carbon and nitrogen, the nitrogen, steams of water, that are easy soluble in water. Cost of the thermo-gas-chemical treatment is commensurable with the costs that go on average overhaul of a well. It is cheaper by the order than hydro break.

**Efficiency:**
In comparison with thermal treatment of a well with the help of a steam generator, which requires purchase, transportation and mounting of a steam generator with the heat isolating of pipes, the offered method is cheaper 10 times and is proved to be much more effective, as it provides not only heating but also chemical processing of the asphalt-asphalt-pitch and paraffin-hydrate formations in benzene and gas fractions.

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**Purpose:**
Technology foresees selective insulation of the bedded waters of payout beds amine complexes which creates insoluble inorganic bonds with the bedded waters, not diminishing the capacity of productive belt.

**Advantages:**
- To create indestructible barrier due to crystal-creative admixtures;
- To increase output of the hydrocarbons due to changing of surface active properties of the core;
- To save term of validity of the isolation—more than 2-3 years.
- Isolating jobs do not need major repair crews;
- Used reagents are corrosively and ecologically safe.

**Efficiency:**
The technology is widely used and acknowledged on the gas-condensate fields of Ukraine. The overproduction comprises 350 million m3 of gas and 50 thousands tons of liquid hydrocarbons during using of the technology.
**Purpose:**

This technology has been developed for gas and gas condensate wells. It provides selective isolation formation water in productive layer by amine complexes. The latter together with formation waters form insoluble inorganic compound and do not decrease the pay zone production. This technology is widely and effectively applied on gas condensate fields of Ukraine. Since the time of its introduction and application (25 years) there has been recovered more than 15 billion m³ of gas and 1000 thousand tons of liquid hydrocarbons.

**How it works:**

A special solution of amine complexes is injected into reservoir where it reacts with the formation waters components generating insoluble marble-like structures. Thus, it provides a reliable blockage of reservoir water.

**This technology allows to:**

- create unbreakable barrier due to the crystal-forming additives;
- increase the hydrocarbon output owing to the change of surface-active rock properties

**Advantages of the technology:**

- there is no need to involve workover crews for isolation work process;
- reagents used here are corrosive and environmentally safe;
- the lifetime of formation water influx isolation is no less than 2-3 years.

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**Purpose:**

Multiplying the productivity of watered oil-wells

**Principle:** At pumping in under high pressure in the bottom hole formation zone of layer (BFZ) of the steady foamy systems, stabilized by polyacrylamid or hydrolyzed polyacrylonitrile, oil saturated layers do not lose the properties of filtration, and the water-saturated reduce permeability. Therefore, in enormous cases, the inflow of oil from a layer in a well is substantially multiplied at the simultaneous decline of watering of products.

**Features and advantages:**

1. With the purpose of increase in terms of layers of degree of aeration of the foamy systems, the moistened air, compressed to pressure 11 Mpa, is pumped in casing-formation annulus space, and after-the foam solution with the simultaneous serve of the compressed air. From casing-formation annulus space the stabilized three-phase foam is passed through in a layer of fresh water with addition of SAS.
2. Technology does not require intervention from the brigade of underground. Repair of well, because does not need necessity of moving of column and raising up of pump.
3. Stimulation of inflow is made by smooth method by a well deep pump.

**Range of application:**

Watered oil-wells

**Efficiency:**

Technology has been reported to have practical application on the deposits of Ukraine, Russia, Syria, and Cuba. The results of application of technology on the eldest oil-extracting enterprise of Ukraine in difficult mining-geological terms (pertite deposits) are shown in a table.

**Table:**

<table>
<thead>
<tr>
<th>Well</th>
<th>Average daily debit of the well</th>
<th>Addition extraction of</th>
<th>Amount of effective days of operation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Oil Tons/day Water M³/day</td>
<td>Oil Tons Water m³</td>
<td></td>
</tr>
<tr>
<td>351</td>
<td>2.2/25.6</td>
<td>232.5/232.5</td>
<td>4402</td>
</tr>
<tr>
<td>821</td>
<td>2.0/18.9</td>
<td>112/103.8</td>
<td>1463</td>
</tr>
<tr>
<td>248</td>
<td>4.6/21.7</td>
<td>96/614.7</td>
<td>1653</td>
</tr>
<tr>
<td>68</td>
<td>3.8/5.3</td>
<td>6.7/12.8</td>
<td>327</td>
</tr>
<tr>
<td>52</td>
<td>1.9/3.6</td>
<td>13/221.7</td>
<td>214</td>
</tr>
<tr>
<td>24</td>
<td>4.6/6.0</td>
<td>13/23.8</td>
<td>236</td>
</tr>
<tr>
<td>355</td>
<td>5.2/32.3</td>
<td>64/501.4</td>
<td>541</td>
</tr>
<tr>
<td>50</td>
<td>5.2/10.7</td>
<td>6/3.7</td>
<td>41</td>
</tr>
<tr>
<td>201</td>
<td>1.5/4.0</td>
<td>35/13.9</td>
<td>146</td>
</tr>
<tr>
<td>821</td>
<td>2.6/69.3</td>
<td>111/263.2</td>
<td>1355</td>
</tr>
</tbody>
</table>

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**Purpose:**

EXPRESS-TECHNOLOGY

OF LIMITATION OF WATER PRODUCTION IN EXTRACTIVE WELLS WITH THE USE OF FOAMY SYSTEMS
Purpose:
A selective isolation and limitation of inflow of water in extractive oil and gas wells.

Principle:
In the interval of water production on borehole bottom a thermometer and plugging material is delivered in the form of cylinder with height equal to the interval of water production. In the sealed hermetically well steam with the temperature of 180-200°C is forced, which melts plugging material, whereupon it is driven into a layer by cold water. Appearing in the interval of layer at waterproof barrier selectively blocks the ways of inflow of water in a well.

Features and advantages:
1. Unlike other known methods, the offered technology allows selectively isolate a well regardless of place of inflow of water and type of collector.
2. The method can be effectively used for a control of behind-the casing flows.
3. At permeability of bottom hole formation zone of layer of more than a 150-200 md, method can be used without raising of pipes of pump-compressor and pump or gas-lift elevator.

Range of application:
Creation of reliable isolating screen in watered extractive oil and gas well on deposits with different mining-geological terms and descriptions of productive layers.

Efficiency:
Application of technology in watered wells allows the remove the inflow of water from a layer in a well or the reduction of watering of products up to 20-70%.

Exploration of gas and gas-condensate wells at the modes of development with active pressure of waters of layers becomes difficult from encroachment of the last in bottom hole of workings wells. Irrigation of wells takes place as a result of pulling up of cone of bottom waters and padding ahead advancement of contour waters on the most permeable intervals or layer. Accompany has development technology of limitation of water production in the gas and gas condensate wells, promoting efficiency or repair-isolating in the bottom hole formation zone of wells of foaming agent of lingotting a waterproof screen in a watered gas-bearing layer. This screen is created due to the effect of jamin and effect of two unmixed liquids.

The effect of jamin shows up in a layer as a result of blowing, as the first portion of diphasic foam, formed by mixing of water solution of sul-porous collector at presence of environment, dispersed as biphasic foam, terms are created for the origin of effect of jamin, at which considerably diminishes the phase permeability on water.

The second portion of liquid, forced in a collector after blowing of diphasic foam, creates an isolating screen because of display of effect of unmixed liquids, this effect will show up on a border:
viscoelastic filler-diphasic foam.

A durable shell, impedimental to the process or intersolubility of viscoelastic environments will be created exactly in the areas of scopes-the effect of unmixed arctic liquids (i.e. different density, viscosity, dynamic and statistical tension of change, intermolecular tension and other). This technological process can be applied in the gas and gas-condensate wells, exploiting layers with the high degree of drainage. The offered technology possesses considerable technical and economical efficiency.

Efficiency:
Technology is used on the deposits of Ukraine and Russia with a high technical and economical.
There is breach of the pumped water on the most permeable areas of layer and sharp irrigation of the obtained products at development of oil layers that reduces the coefficient of oil recovery factor. Developed by company Technology of limitation of water production in oil-wells allows to decrease watering of products due to application of plugging composition on the basis of sulfate black lye. Depending on the degree of watering a plugging effect is achieved due to consolidating of waterproof layer, where layer waters gradually penetrate. Consolidating takes place because of multiplying forces of surface-tension between water and polymeric connection (at watering up to 60%) or between water and particles of hard phase. Entering in the mixture of plugging liquid (at irrigation more than 60%) after conducting of works on limitation of water production, it is possible to apply the different methods of intensification, except for fracturing of layer.

Efficiency:
Technology has high technical and economical indexes due to the use of standard equipment and use of inexpensive chemical reagents.

Development of gas and gas-condensate deposits in a late period of exploitation is complicated by irrigation of wells. As a result of accumulation of liquid in bottom hole and multiplying the losses of pressure at motion of gas-liquid stream, the productivity of well goes down and its selfkiling takes place. Developed in a company technology of cleaning of bottomhole of gas and gas-condensate wells from liquid with the use of the special foam-forming composition BP allows to stabilize their productivity.

Composition of BP is taken to the bottom hole of wells as briquets with a soluble in a layer liquid shell. Briquets on the pipes of pump-compressors are delivered to bottom-hole of wells, where the shell of briquette dissolves, freeing foam-forming composition. The last forms at a contact with a liquid diphasic foam, which at a receipt of gas from a layer taken out on a surface. The offered technology has high technical and economical indexes.

Efficiency:
Technology has shown wide application on the deposits of Ukraine and Russia. It is characterized by the high index of success (100%).
How it works:
When accumulated fluid contacts with the foaming compound, the two-phase foam is created in the well bottomhole, which is carried out to the surface by the gas incoming from the layer to the well. A special foaming compound is carried into the well bottomhole in the form of briquets having cover soluble in reservoir fluid.

Advantages:
- simplicity and efficiency of technological process;
- high technical and economic indexes (performance).

Application area:
Gas and gas condensate fields in the late exploitation period complicated by drowning (water encroachment of the developed wells).

Purpose:
Cleaning of the bottomhole and gas and gas-condensate wells' pipes from condensed fluid; prevention of fluid condensation during the wells’ exploitation; inhibition of the corrosion processes of the underground and overground field equipment.

Principle:
At the bottomhole the foamy or foamy-emulsion system is created by mean of mixture of the accumulated at the bottomhole and pipes fluid and surface-active materials. The thermostable and saltstable sulphonates are used as the surface-active materials. Simultaneously the anti-corrosion qualities of the protective film at the surface of the well’s metal and separation equipment.

Specifics:
If there is considerable quantity of the fluid hydrocarbons in the removed fluid which worsen the foam forming conditions, then prior treatment of the fluid by special adjuvant mineral salts additives is conducted. This pre-treatment results in creation of the stable foamy-emulsion system.

Advantages:
- complexity action;
- protection effect from carbonic-dioxide (> 90%) and hydrosulphuric (75-80%) corrosion;
- possibility of the removal of the fluids with high concentration of liquid hydrocarbons;
- possibility of using the working reagents during high bed’s temperatures (140-160° С);
- improvement of the conditions for removal of the gas-condenate accumulated in the bottomhole area;
- simplicity in preparation and pumping of the working agents.

Field of Application:
Gas and gas-condensate wells at stage of exploitation, which is complicated by the fluid accumulation at the bottomhole and the bottomhole area.
**Purpose:**
- To increase the confinement quality of the exploitation column due to deepness enlargement of penetration of slugging solutions into the gas-conductive channels.
- To reach total bridging of the medium and large gas-conductive channels to substantial depth

**Advantages:**
- The wide spectrum of formulations for different conditions;
- Inexpensive (economical) and profitable reagents are used during liquidation of the inter-column cross flows;
- Expenses are reduced and production culture develops because treatment is conducted without well’s killing and its next completion.
- PERIOD OF CONFINEMENT VALIDITY IS NOT LIMITED!

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**Purpose:**
The technology is aimed for liquidation of the intercolumnar gas overflows caused by flow tubing leakage at gas and gas-condensate wells. Thus series of the blocking compositions allow liquidating different-sized gaps and cracks in the flow tubing. The technology was highly appreciated by the field men during 25 years of its implementation.

**Principle of application:**
Processing of the places of the gas overflow into intercolumnar space happens through the annular space of the well by alternating moving of the blocking liquid inside the column. The works are applied in the working well without involving of the capital repair crews, so such technology provides with high manufacturability of the treatment.

**Technology application provides with:**
- increasing of the quality of annular space hermetization due to deeper penetration of the increasing of the bridging particles into pipelines.

**Advantages compared to analogues:**
- the total blockage of the small, medium, and large pipelines at considerable depth;
- wide spectrum of the formulations for different conditions;
- the cheap and un-scarce reagents are used for liquidation of the intercolumnar gas overflows;
- the costs decrease and the culture of the liquidation of the intercolumnar overflows increases, because the operations are applied without killing of well and its following completion.
TECHNOLOGY OF EFFECTIVE RAISING UP OF HIGH-VISCOSITY OIL BY DEEP PUMP

Purpose:
Liquidation of behind-the-casing flows in oil and gas wells

Principle:
At pumping in a well and bottomhole formation zone of layer, the foam-cement solution, because of its small density moves upwards, filling behind-the-casing space and creating a reliable barrier for behind-the-casing flows.

Technical parameters of process:
• Working pressure of pumping in of foam-cement solutions: 10-50 Mpa;
• Working pressure of packer: 15-50 Mpa.

Advantages:
Simplicity and efficiency of technological process, conditional absence of necessity of conducting of expensive works on the perforation of technological openings in a well and to their subsequent locking (back plugging)
• High economical and technical indexes

Range of application:
Oil and gas well, watered from behind-the-casing flows

Efficiency:
Technology is successfully tested on the deposits of Ukraine and Bulgaria. It is characterized by the high index of success (95%).
Purpose:
Essence of technology consists in the periodic sealing of mouth of well by the auto managed valve at a working deep pump. Depending on geological-operating description of well, its extractive possibilities and physical and chemical properties of liquid commercial researches, the possibility is open of translation of well on the impulsive mode of pumping-out, the optimum mode of closing and opening of valve is set. In the set mode the auto-managed valve periodically closes a thrown-out line on the output of well, and a deep pump continues to pump out liquid. On the set period motion of gas-oil mixture in the system pump lift a surface oil pipeline is interrupted, pressure is accumulated in a well, and gas dissolves in oil. The dissolved gas, discharged, is instrumental in raising up of liquid, therefore at the subsequent opening of mouth of well its productivity will be conditioned not only by work of pump, but also by energy of broadening gas, partly or fully dissolved in liquid in the period of closing of valve. The productivity of pump lift after the translation of work of well on the impulsive mode of pumping-out will rise because the real length of motion of plunger piston will increase because of tension of column of barbells, being under pressure on a thrown-out line. It will promote to more rapid, as compared to ordinary, falling of cylinder of oil well pump. When the productivity of well will fall down to primary, a mouth is closed. At the optimum mode of exploitation of well the volume of the pumped out liquid, as mounted at the opened mouth, compensates the volume, which is given less than required at closing of mouth, the productivity of well rises. Commercial experiments confirmed possibility of multiplying the productivity of wells due to the offered method of exploitation up to 10 % (from primary) depending on the productivity of the exploited object. The offered technology possesses considerable technical and economical efficiency.

Efficiency:
Technology enables multiplying the debit of well up to 80% depending on the productivity of the exploited object in its ordinary working mode. Technology was used on the oilfields of Ukraine, Russia, (Western Siberial).

Industrial introduction on the deposits of the CIS has proved possibility of multiplying the productivity of oil-well pumps with the use of electro centrifugal pump at addition to the pumped out liquid of water solution of high molecular connections (HMC). Principal reason of decline of hydraulic resistance of stream of a layer liquid and multiplying the productivity of pump lift is an effect of turbulent exchange.

Water solution with HMC, getting from annular space in a pump and pipes of pump-compressors, forms laminar wall sub layer, which extinguishes turbulent whirlwinds on the internal surface of pipes. After that a liquid moves as though in the hydraulic bearing. An optimum rate of movement of liquid in pipes is 4–8 m/s. the effect of turbulent exchange shows after polymeric addition to the pumped out by a pump layer liquid, both in oil (waterless) and in watered wells, thus brief formation of emulsion (mainly by non-resistant-type “oil-water”), improving hydraulic description of stream in an elevator, does not worsen operating descriptions of pump well.

Efficiency:
Technology has high technical and economical indexes due to the increase of the productivity of electro-centrifugal bore-hole pumps.
**Purpose:**
Preventive measures of the paraffin accumulation in the lifting pipes of the gaslifting wells and the field equipment. Ecologically favorable and harmless system of application of technologies. Technology is used during exploitation of oil-wells by a gas-lift method. It is based on application of reagents, preventing forming of paraffin on deposits on the surface of pipes of pump-compressors and commercial equipment, has high technical and economical indexes. The offered technology unlike other methods provide maximal efficiency of the use of reagents. It is expedient to apply it during exploitation of group of wells by a gas-lift method, when the traditional methods of influence appear ineffective. Technology will be realized on a standard commercial equipment with the use of original technological receptions.

**Principle of Action:**
While adding the high-molecular water solution to the well's production the decrease of the hydraulic losses is achieved. This effect is caused by creation of the laminar wall sublayer at pump's walls and pump-compressor pipes. The turbulent vortexes damping takes place, and the fluid moves in the “hydraulic bearing”. This effect appears at the oil (waterless) wells as well as at watered wells.

**Advantages:**
- the technology is applied using standard field equipment;
- the original technological methods are used;
- there is a possibility of simultaneous application at group of gaslift wells.

**Field of Application:**
The gaslift method exploited oil wells, if production has high paraffin concentration, which falls out during changes of the pressure and thermal well's conditions.

**Efficiency:**
Technology has high technical and economical indexes due to maximal efficiency of the use of reagents.

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**Purpose:**
This technology has been developed to increase the output of oil, gas and gas condensate wells by active impulse physical-chemical treatment of the tailing-in zone by the compositions containing explosive components (EC), torpedo and rocket fuels.

**How it works:**
Multistage process of thermobaric treatment of the layer provides a considerable increase of permeability of the bottomhole formation zone due to the following factors:
- cracking and possible formation fracturing;
- shot-term in-situ combustion of coke formations;
- in-situ cracking and pyrolysis of high-molecular hydrocarbons (asphalt-resinous and paraffin-hydrated sediments) and their conversion into gasoline and gas fractions;
- removal of skin effect;
- new type of acid-alkali treatment including heating of the formation and reinforcement of loose reservoirs by the secondary change of rock structure.

**Advantages:**
- the ability to receive quickly the composition from non-explosive components directly near the well;
- possibility of their usage as a liquid for formation fracturing (hydrofrac);
- ability to detonate in fine cracks and porous media;
- the ability to receive a net of vertical cracks having the length up to 10m at the expense of creation in the treating zone of the pressures up to 1000 MPa and temperatures up to 2000°С.

The technology has been industrially tested in the fields of Ukraine and Russia and having showed a considerable well output incrementation from 2-3 up to 10 times. Comparable results as to the efficiency can be obtained by using the method of hydraulic fracturing (formation fracturing).

All expenses spent for the technology of thermogas dynamic stimulation are fully compensated within 1-2 months of exploitation of both oil and gas condensate wells.

**Application areas:**
Oil, gas and gas condensate wells with the reduced productive characteristics.
**Purpose:**
This technology is directed to the restoration of productive reservoirs filtration properties by destruction of polymer contaminations, which are rests of the drilling mud, decrease of rock argillization, decrease of high-molecular hydrocarbon viscosity due to the application of the developed complex HV and DT reagent destructors.

**How it works:**
HV and DT reagent-destructors are injected into the near-bore zone and are kept there.

**Advantages:**
- the technology offered here is conceptually different from all other technologies known and applied before;
- it contributes to the active destruction of drilling mud (flush fluid) polymer bonds and their elimination from the reservoir even under the conditions of low pressure drawdowns;
- it increases capacitative-filtration rock properties;
- it restores (renews) the reservoir natural productivity;
- there is no corrosive destruction of downhole equipment;
- there is no need in application of tools for well workover operation.

**Application area:**
Oil and gas condensate wells contaminated by polymer agents during primary opening up of the reservoir and well workover operation.

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**Purpose:**
This technology has been developed for sand ingress elimination in the wells of oil and gas condensate fields and underground gas storage facilities.

**How it works:**
According to this technology the agents, easily filtering in porous medium, are injected into the formation and react with each other forming the crystalline mass which affixes the formation zone reliably. The application of this technology provides the following:
- increase in 4-6 times the overhaul life of wells operation;
- eliminate the application of expensive sand filters;
- being environmentally friendly;
- usage of inexpensive and non-deficient materials.

**Advantages in comparison with other analogues:**
- preservation of filtration characteristics of the bottomhole formation zone;
- complete elimination of plugs formation in the wells and of clogging (colmatation) of sand filter during production process.

**Application area:**
Oil, gas and gas condensate wells with unsteady reservoir.
**Purpose:**
Destruction of stable water-oil emulsions which form during water removal from bottomhole with using of surface-active materials and polymers.

**Principle:**
The technology is realized by bringing the demulsifier DT in collective tank or fluid stream.

**Advantages:**
- The new method of emulsion destruction by destruction of the polymeric connections is proposed;
- it allows to achieve high results with small amounts of demulsifier DT, which is a cost-effective method;
- the method allows to decrease of the exploitation costs for preparation;
- hydrocarbon production;
- the expensive equipment is not needed.

**Field of Application:**
Oil and condensate wells, plants of hydrocarbons preparation for transportation.

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**Inhibitors**
are aimed for protection from the field facilities metal construction corrosion.
The inhibitors are the complex compositions of the cationic and anionic organic surface-active substances.

**Application of the inhibitors provides with:**
- increasing of the well’s working period between repairs;
- full ecological security.
- The main point of the protective influence is in creation at the metal surface the mono-layer of the inhibitor molecules, which prevents from chemical as well as electro-chemical corrosion.

**Carbonic acid corrosion inhibitors:**
- are carbonic- and methanol-soluble compounds;
- preserve the protective characteristics in presence of the oil-field waters;
- have low protective concentration;
- localize pitting destructions;
- have high protective effect (95-98%);
- operate in temperature range (-20) - (+140) °C.

**Field of Application:**
The oil wells and systems of transportation, collection.
Purpose:
Increase of effectiveness of wells exploitation by acoustic method

Advantages:
• Increase in the production rate immediately after treatment,
• Duration of effect,
• Possibility of technology use without stop in well’s work,
• No risk of worsening of well’s indices
• Ecological compatibility.

Purpose:
Increase in the productivity of oil-wells, equipped with the deep bar plants (DBP), at the recovery of watered oil.

Principle:
At pumping in annular space of working well of water solution of high molecular connection (HMC) hydro protection of DBP is provided.

Advantages:
• The loss of liquid substantially diminishes in a plunger pair and connection of screw-threads of pipes of pump-compressors;
• Hydrodynamic descriptions of lifting elevator are improved because of decline of coefficient of hydraulic resistance at motion of liquid in pipes of pump-compressors;
• The interrepair period of work of well is multiplied.

Range of application:
Oil-wells with watered products, equipped by DBP

Efficiency:
Application of technology on the oilfields of Ukraine showed its high efficiency (success more than 80%).
Duration of effect: 20-60 days.
Purpose: A selection with the use of the geophysical apparatus of industrially-productive collectors in difficult mining-geological cross-sections, and also edges of gas-saturated and watered layers in the wells of gases with the use of gaseous nitrogen.

Principle:
1. Nitrogen to the layer, changes its neutral description (time of life of thermal neutrons and coefficient of diffusion is multiplied)
2. In layer, which took up nitrogen, amplitude of curves of impulsive generator of neutrons increases in 4-5 times as compared to a background curve.

Features: Research is conducted in the interval of bottomhole formation zone of layer (BFZ) with the use of the small impulsive generator of neutrons through oil-well tubing before and after pumping in of gaseous nitrogen.

Range of application: Control of the process of development of deposit. Selection of entities for the directed affecting of the layer.

Efficiency: Application of technology on the oilfields of Ukraine and Russia showed its high efficiency.

Purpose: Increase in the efficiency of abrasive dissection of productive layer

Principle: For increasing the efficiency of the abrasive penetration and development of well hydro-arenarius mixture with addition of nitrogen is use. Due to it, the additional fall of pressure is created on attachments due to the difference of density of aeration mix in oil-well tubing and annular apace.

Advantages: Pressure creation in well considerably below hydrostatically that eliminates possibility of contamination of channels of perforations by accidental liquids. Kinetic energy hydro-arenarius stream is multiplied.

Range of application: Oil-wells, drilled in layers with pressure below hydrostatical.

Efficiency: Application of technology on the oilfields of Ukraine, Russia, Bulgaria has showed its high efficiency. At gas contents of nitric hydro-gregarious mix, equal to 0.3 length of channel in samples with durability on a compression 60 mpa as multiplied in 1.5 times, and volume-in 2.5 times. Ecologically favorable and harmless system of application of technologies.
A company is a dynamically developing enterprise, specialized on development and introduction of untraditional methods of the applied geophysics in area of search and exploring of minerals. The base method of research is the controlled form distance, nondestructive method of the passive geo-polarational sounding (GPS), allowing the high degree of authenticity to expose geometry of oil-and-gas bearing structures, ore bodies and violations of breaks. It provides the selection of traps of hydrocarbons, deposits of minerals on a depth up to 10 (tem) Km. Finite data can be given both in two-and in three-dimensional interpretation.

Device basis of method is a complex “tezey”, developed by the group of specialists by the candidate of engineering sciences, corresponding member of engineering academy of sciences of Ukraine Bogdanov Y.A., and it is also patented by an enterprise. It includes modifications of devices, intended for the pedestrian, motorcar, aviation and well variants of measuring. The method of GPS provides the survey of territories in the real time and considerably reduces labor costs by complex approach to conducting of works-the geo-polarational sounding of the explored area is conducted with the use of motor transport, aero-survey (by the easy and ultralight piloted airplanes) and with the use of field expeditionary brigades.

It allows to conduct regional, local researches and -if necessary- go into detail for the most difficult and problem areas of surface. In structure of the company specialists work in areas of geology, hydro-geology, engineering geology, geodesy and cartography, Physics, chemistry, instrument-making and ecology. Among them there are an academician of academy of mountain sciences of Ukraine, academician of oil and gas academy of Ukraine, professor of mountain sciences of Ukraine, 2 doctors and 7 candidates of sciences.

Type of rendered services:
1. Search of minerals with the use of the method of the geo-polarational sounding. Provides the selection of traps of hydrocarbons, deposits of minerals on a depth up to 10 km, including foundation. Finite data can be given both in two and three-dimensional interpretation. Thus, a customer is saved from the necessity of the drilling of 40–60% wells with no result.

2. Estimation and prognosis of seismic activity of the earth’s crust. Finding of geodynamic-active and breakage areas. Output information is the thematic map with pointing of breakage and geodynamic-active areas, technical report with the progress of their influence on the external environment. Approximately after two days, there is considerable growth of intensity of signals of radiation prior to beginning of earthquake (EQ). EQ begins when intensity of signal goes down.

3. Diagnostics of the crisis state of technical objects (buildings, weirs, industrial object, power-stations). Finding of the tensely-deformed areas of geological environment in the places of future building: Study of underlying structure of geological environment or artificial objects, submerged in it: Early exposure and estimation of existent sources of threats for ecological safety on difficult technical objects: Diagnostics of soils with the purpose of paining of foundations. Our technology allows to effectively conduct preventive measures and minimize proximate damage from natural influences.

• To the estimation of perspective of oil-and-gas bearing structures, including shelf is Ukraine, United Arab Emirates, Kazakhstan, Turkmenia;
• to the search and exploring of minerals is Ukraine, united arab emirates, Russia, REPUBLIC of south Africa, Kazakhstan, Jordan, Turkmenia;
• to the exposure of areas with the promoted hydrodynamics:
• to the increase of safety of works in mines:
• to the prognosis of seismic activity of regions is turkey, Antarctic continent:
• to diagnostics of the tensely-deformed state of the system: “ground foundation of buildings and constructions” - Russia, Ukraine;
• to geophysical researches of Antarctic continent.