

**WE
RECOVER**
the
UNRECOVERABLE

Oil Tech

Oil Tech Co. Riyadh Group

Since 1998 we have side-tracked over 1200 oil wells





About the Company

- OILTECH – is a Bahraini-Russian Joint Venture company between “ Samara EOR & WO Co.” one of the largest independent oilfield servicing companies in the Russian Federation - a specialist in providing integrated service solutions for the oil & gas industry, with over 25 years of experience in its field and Riyadh Investment, a subsidiary of the Riyadh Group, a renowned Investment House in the Middle East with diversified strategic Investments throughout the energy sector.

- OILTECH was established to provide comprehensive services relating to the field development system improvements in the oil and gas industries in the MENA Region.

- The Company’s objective is to develop and implement the latest technological solutions in enhanced oil recovery and stimulation, well service and work-over operations, sidetracking, drilling fluids and well completion technologies, along with engineering and consulting services.

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Integrated solutions in oil and gas field servicing include:

- Research and development work.
- Preparation and laboratory testing of chemical agents used in oil production.
- Engineering services in WO, EOR and reservoir stimulation techniques.
- Field-engineering support in technology integration.
- Provision of services using our own equipment and workforce.

We have supplied our vast-ranging technological solutions on multiple occasions to many oil companies and their subsidiaries.

Some of our main customers include:

**GAZPROM-Neft,
SURGUTNEFTEGAZ,
ROSNEFT**





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Personnel & Equipment

Since 1998
we have
side-tracked
over 1200
Oil Wells

- Our Company currently has a workforce of around 3000 highly qualified and experienced employees comprised of:

- 32 Work-over crews
- 14 Side-tracking crews
- 10 EOR crews

- The majority of the employees have been trained on specialist courses in leading technical schools and universities.

- Approximately 45% of the Company's employees have completed higher education in Technical Universities and Institutes.

- Our staff has amassed extensive experience in geological analysis and reservoir engineering. Moreover, knowledge of physical and chemical properties of agents and experience in the successful application of different technologies in a variety of geological field conditions are essential to achieving a high-level performance, thus ultimately satisfying our customers' requirements.

- All the crews are equipped with state of the art work-over rigs, equipment and instruments.

- There are 4 Maintenance Bases in different regions of activities complete with over 250 Heavy-Duty Units of special machinery, all necessary facilities for supporting the main Company's activity.



Range of Services

- Side-tracking Operations
- Work-Over & Well Servicing
- Enhanced Oil Recovery (EOR) & Well Stimulation
- Sandblast Jet-Assisted Mechanical Slot Perforation
- Drilling Fluids Service
- Well completion
- Well Cementing Engineering
- Integrated Project Management & Consulting



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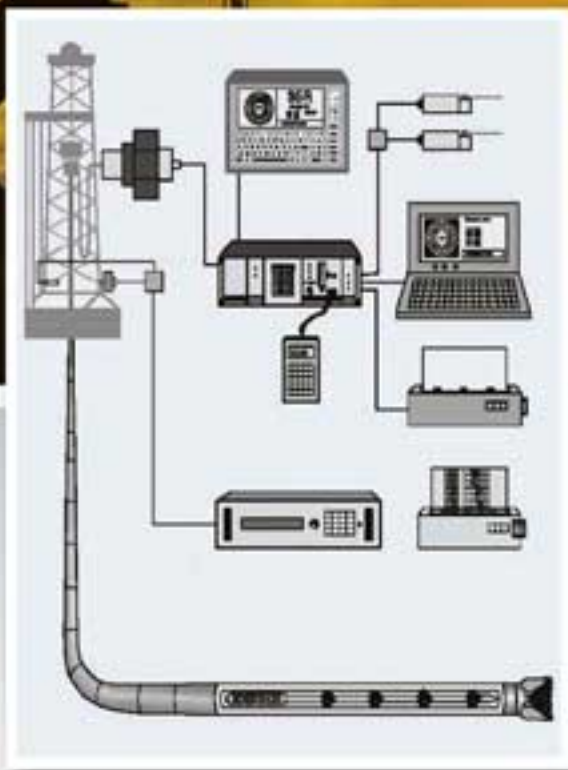
Oil Tech
provides
advanced
technological
solutions
for Oil and Gas
well recovery



Side-Tracking

- Side-tracking is one of the most effective technologies that enables to reduce natural oil production falls at old oilfields, to increase the oil recovery ratio, and to restore and even bring back to operation previously shutdown and abandoned wells that have been abandoned because of various geological and technical reasons. The technology also affords the bringing into production the previously disabled reservoir areas as well as oil reserves whose recovery was not supposed to be possible.
- Our Company was among the first companies in Russia to initiate side-tracking operations in 1998. With over ten years of experience in this field we are today recognized as a market leader in side-tracking operations. We are currently involved in side-tracking operations in the Central areas of Russia and Western Siberia.
- We use only state of the art equipment and technologies for all our side-tracking jobs, including modern drilling rigs equipped with top drives, drilling bits and hydraulic down-hole motors, telemetric systems and geonavigation methods.

Since 1998
Our Company performed 1200 side-tracking jobs
including over 800 jobs using
the telemetric systems



SIDE-TRACKING WITH DOWNHOLE TELEMETRIC SYSTEMS

- Directional drilling at sites with inclination of over 50° has imposed restrictions on the use of conventional survey methods and wire - run equipment, moreover it requires special measures in order to deliver the down hole instruments to the test interval.

The solution to this problem is wireless metering systems and run down-hole with drilling tools.

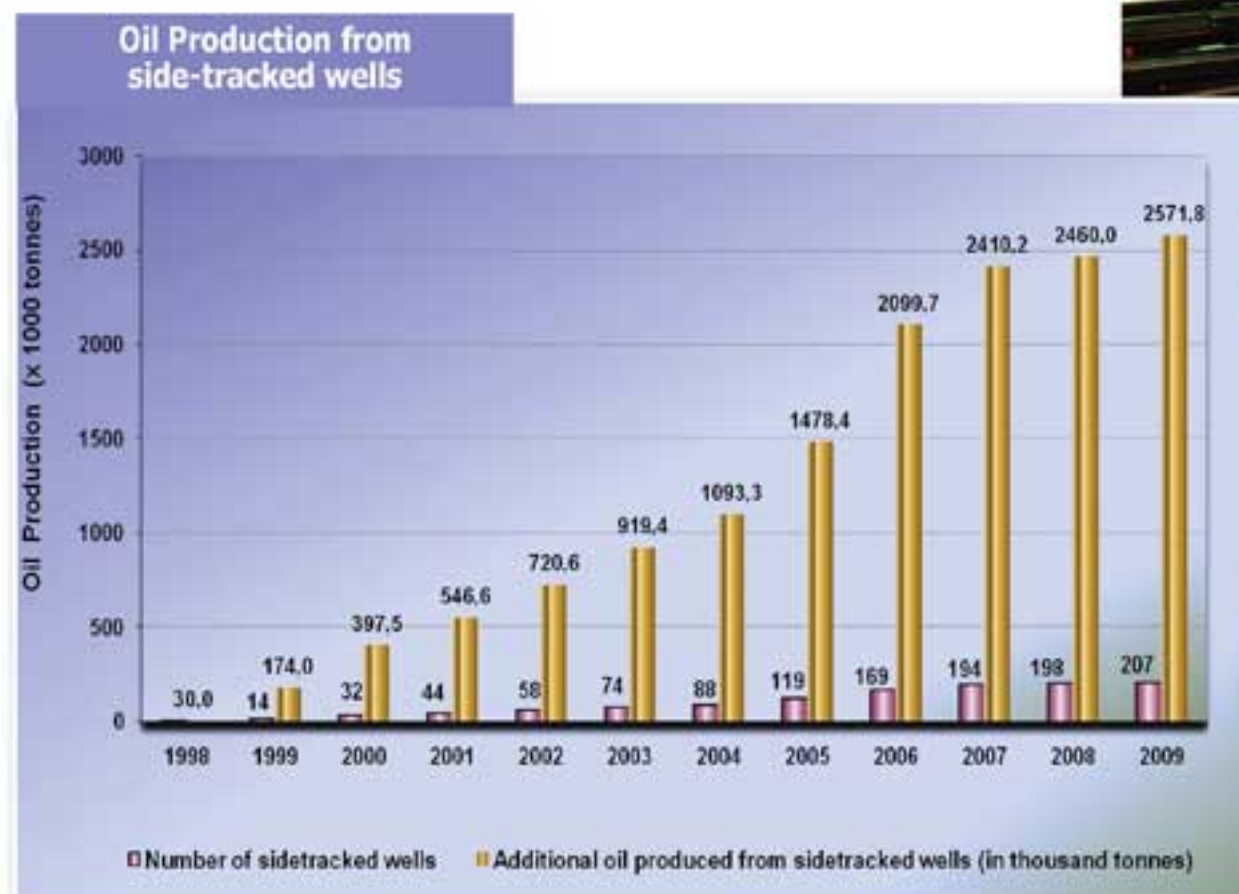
- We use MWD telemetric systems (Baker Hughes INTEQ, Sperry-Sun, others) to drill wells with the diameter size ranging between 95 -171.5 mm.

A fluid data communication channel is a link through natural medium as it uses a fluid column in the drilling string as a means of communication. This hydraulic channel enables a vast range of operations.

Types of Sidetracking Profiles

We carry out different types of side tracking such as:

- non-oriented "blind" side-tracking
- side-tracking of slightly sloping bore holes
- side-tracking with horizontal sections of bore hole
- multilateral side-tracking



Number of Side-tracking Jobs by Years

1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
3 well	14 wells	32 wells	44 wells	58 wells	74 wells	88 wells	119 wells	169 wells	194 wells	198 wells	207 wells

Total number of side-tracked wells drilled by the Company in the period 1998 – 2009 is 1200 wells



Work-Over & Well Servicing

- Wide spectrum of Work-Over operations cover the complete cycle of well's service life, from its start-up until its abandonment



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Scope of Work-Over Operations:

- Casing damage repair and integrity recovery.
- Water influx isolation jobs.
- Elimination of cross-flows.
- Shut-off of individual water-flooded intervals, and re-completion to other horizons.
- Installation of intermediate casing liners.
- Casing reaming.
- Fishing jobs.
- Downhole milling jobs.
- De-waxing jobs.
- Well cleaning-up.
- Removal of the damaged equipment.
- Well conservation jobs.
- Well plug and abandonment jobs.

Casing Leak repair with the use of Steel Patches

- Is a highly effective way of casing leak repair in oil and gas production wells.

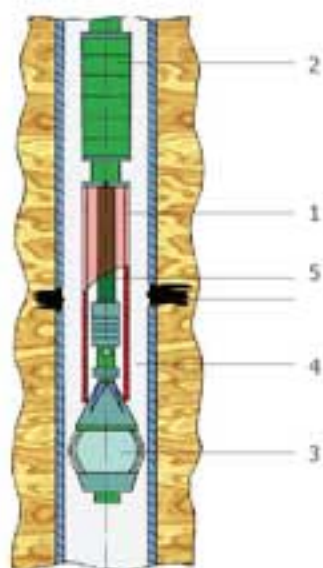
Advantages:

- The technology enables recovery of both horizontal and vertical well casings in case of threaded connections damage in order to block punched holes and repair local damage (cracks, deterioration, corrosion).
- Low cost value in line with the high technological value labels this technology so efficient for casing repairs of various diameters.

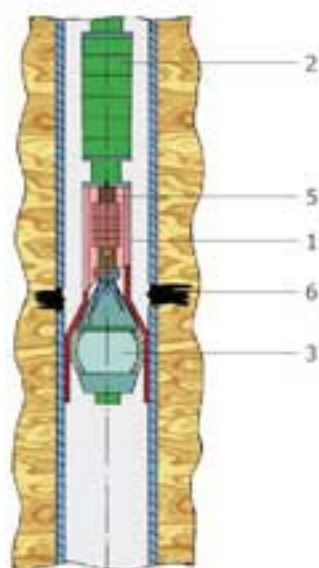




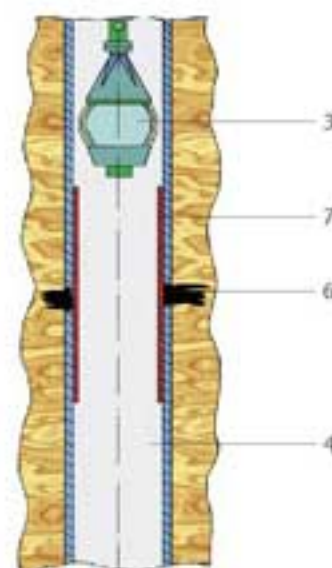
Steel patch
run in hole (RIH)



Steel patch
expansion

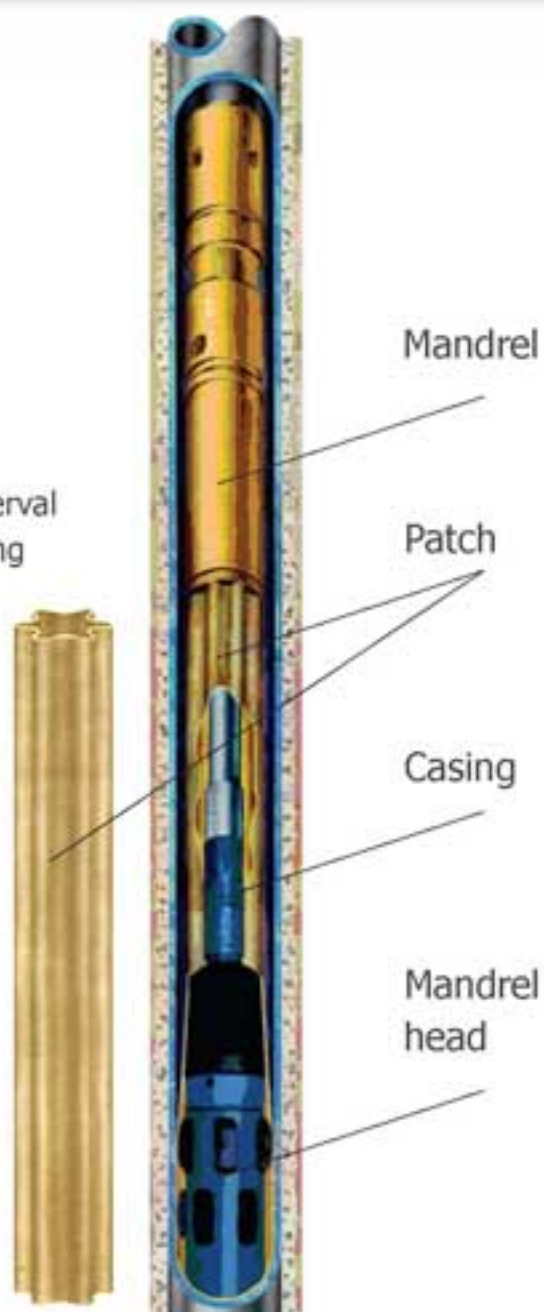


Patch installed. Tools
being pulled out of hole (POH)



Steel Patch Installation Sequence

1. Corrugated steel patch
2. Hydraulic jack
3. Mandrel head
4. Casing
5. Rod
6. Casing integrity damage interval
7. Steel patch set into the casing



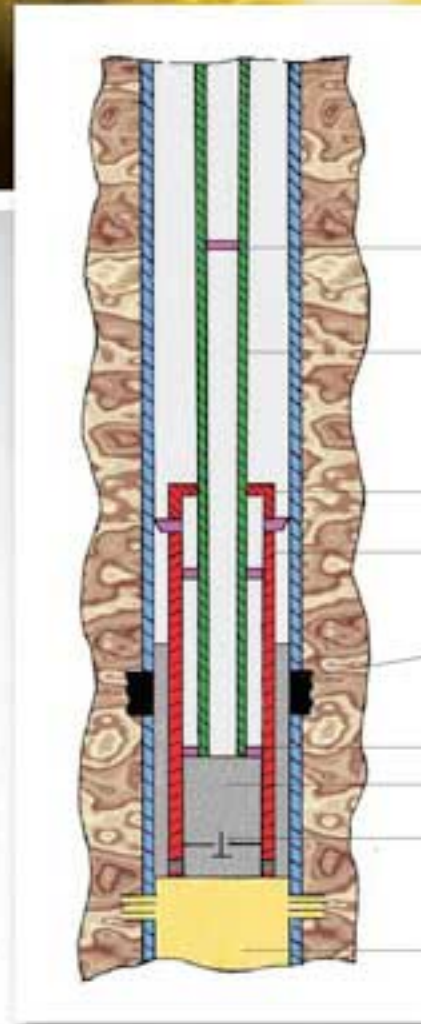
- The patch is a special longitudinally corrugated metal-plastic pipe with a length of 8 to 10 meters. The outside perimeter of the corrugated pipe is slightly more than the inner perimeter of the damaged casing to ensure press-fit installation. The external surface of the corrugated pipe is covered with a special plastic sealing material, which given the tightness between the patch and the casing also serves as anticorrosive layer when installed.

- Placed on a mandrel head, the patch is run into the hole to the damaged interval. The mandrel then straightens the patch at the target depth by pressing the patch against the casing, due to the pressure increase (18-25 MPa) in the tubing, thus recovering the casing integrity. The decrease of the casing inner diameter using this technology is insignificant - less, or equals to, 7 mm, which will not cause any problems for future RIH operations and well exploitation.

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Casings Integrity Recovery using smaller diameter Liner

- The installation of smaller diameter protection casing liners is wide spread within casing impermeability recovery operations provided by our Company.
- The technology is especially effective in cases of serious damages of casings.
- The technology is based upon the run in hole of smaller diameter string which is up to 1000 meters long. The string overlaps the target interval including leaky ones as well as corroded and damaged casing areas.



- Upper Plug
- Tubing
- Sub
- Liner
- Damaged Casing interval
- Lower Plug
- Cement solution
- Check Valve
- Sand Plug

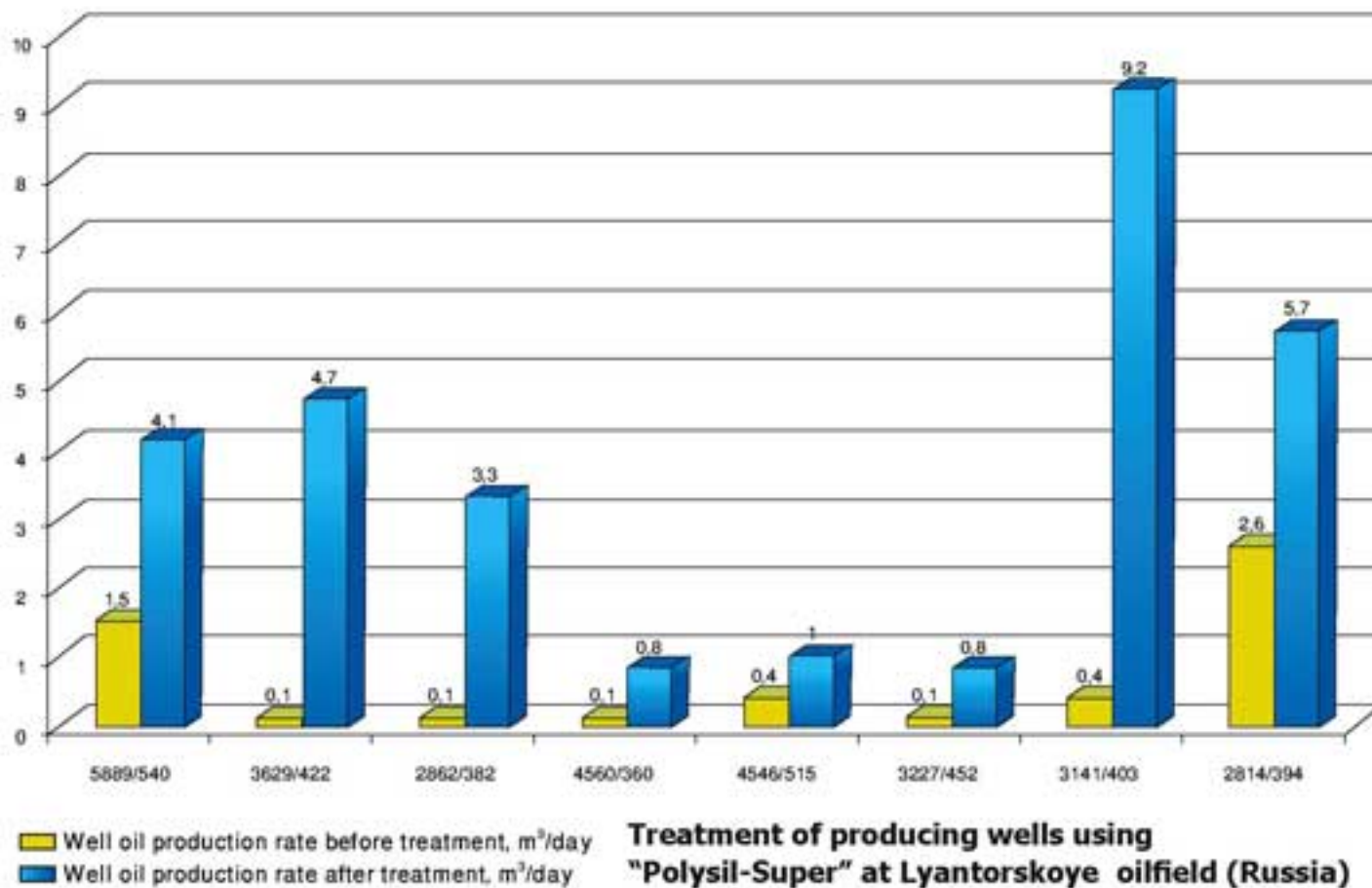
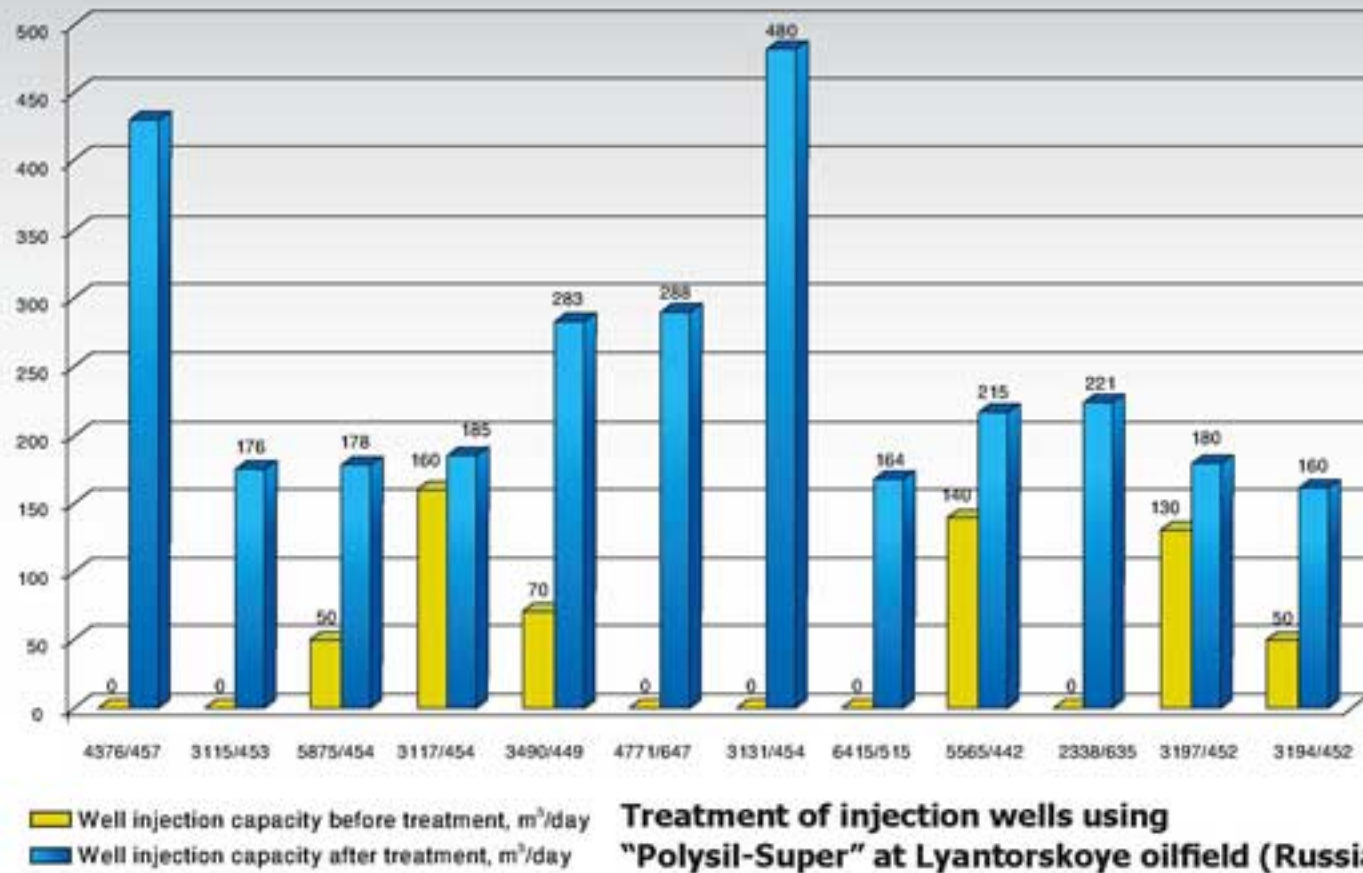
Enhanced Oil Recovery & Well Stimulation

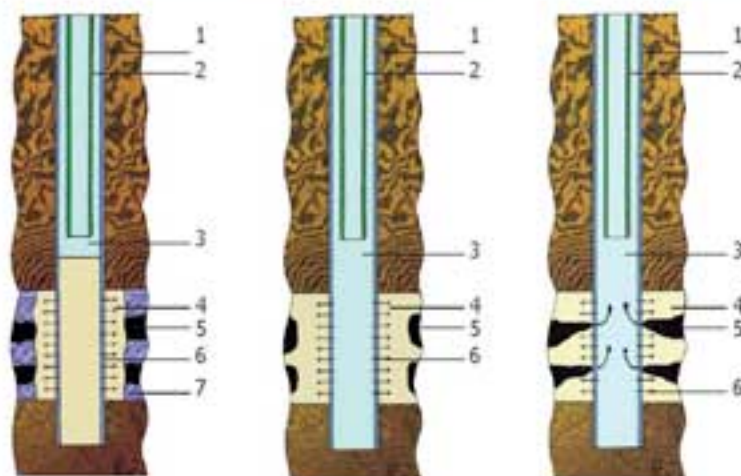
"Polysil Super" - superhydrophobical material usage

- Originally developed for military purposes the "Polysil Super" material is a unique chemical agent which has proven to be an ideal substance used to increase a well injection capacity (water-intake capacity) and to improve the oil flow rates.
- "Polysil-Super" can be used to treat both terrigenous and carbonate reservoirs with permeability ranging from 30 to 2000 mD in wells with water-cut rate between 0 and 98% .The higher the level of the water-cut in a reservoir the more effective the application of this technology will be.
- Depending on the technology used for the bottom-hole formation zone treatment, either a total or selective increase of oil permeability can be achieved.
- The chemical is effective as a mean of injection well's water-intake capacity increase. After a well has been treated with 5-10 kg of "Polysil-Super" its injection capacity usually increases while the injection pressure decreases as the bottom-hole formation zone permeability grows.
- Extensive test results have shown that per 1kg of "Polysil Super" applied to a reservoir an additional output of 60 to 100 tons of oil per year will be achieved.

• Company specializes in providing comprehensive services relating to field development system improvement, including well control, bottom hole treatment (BH) in producing and injecting wells, as well as enhanced oil recovery (EOR).







1. Casing
2. Tubing
3. Displacement fluid
4. Paraffin suspension
5. Oil
6. Perforated interval
7. Water production

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Paraffin Suspension for isolation of reservoir water intrusion

- Isolation operations using paraffin suspensions have proven to be a very effective means of water production limitation when treating terrigenous and carbonate reservoirs.
- The key point of said technology is – the pumping of an isolating composition of “cold” paraffin suspension into the stratum of the well’s formation.
- The suspension is prepared by emulsification - mixing the discontinuous phase of paraffin with water solution of the emulsifying agent (diethanolamine or fatty acids). The melted paraffin is being emulsified at a temperature higher than paraffin fusing point. Once the paraffin solidifies as the solution cools off the emulsion turns into suspension. Finally, the prepared suspension is stable at disperse state and stays liquid due to the diethanolamine emulsifying agent and can be pumped.
- After being pumped into the water saturated interval the composition stays at the target depth for long enough for paraffin to melt as the in-situ temperature recovers.
- As the composition is based on an emulsion and is hydrophilic, when pumped, it penetrates into the water-saturated intervals thus forming a large protective screen and reducing the relative permeability of water-saturated pores by 10-15 times.
- Some paraffin may reach into the oil-saturated intervals, however, paraffin dissolves in oil and easily leaves the pores.

Advantages:

- The paraffin suspension can be prepared at the well site
- The “cold” paraffin can be pumped into the strata
- Permeability selectivity (the hydrophilic suspension penetrates mostly into water saturated intervals providing large protective screens)
- Change of relative permeability and reservoir filtration characteristics
- The paraffin suspension is not flammable
- The compounds used are non-toxic and non-hazardous to handle it
- The treatments do not cause any difficulties or limitations for further development





Impermeability Damage Control Operations

- The company Oiltech uses widely various chemicals, different sludging, gelling and hardening plugging compositions to prevent bottom water and injection water inrush to production well bottom.
- Impermeability damage control operations are based upon total insulation and limitation of water inrushes caused by different geological and technical factors.

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Water Shut - Off operations with the use of Organosilicon Plugging Solutions

Organosilicon plugging solutions are used for selective water production limitation. Once the plugging solution is prepared (diluted to a certain proportions and mixed with other chemicals), it is pumped through the tubing along with the buffering agents (polyglycol, dry oil) and forced entirely into the reservoir.

A crucial advantage this impermeability damage control procedure has over well work-over using cement solution is that there is no insulating material left inside the production casing and the well is entirely washed out with 30-35 cubic meters of kill fluid as soon as the plugging material has set (24 to 48 hours). Finally the formation is drilled-in if necessary, and oil inflow is stimulated again.

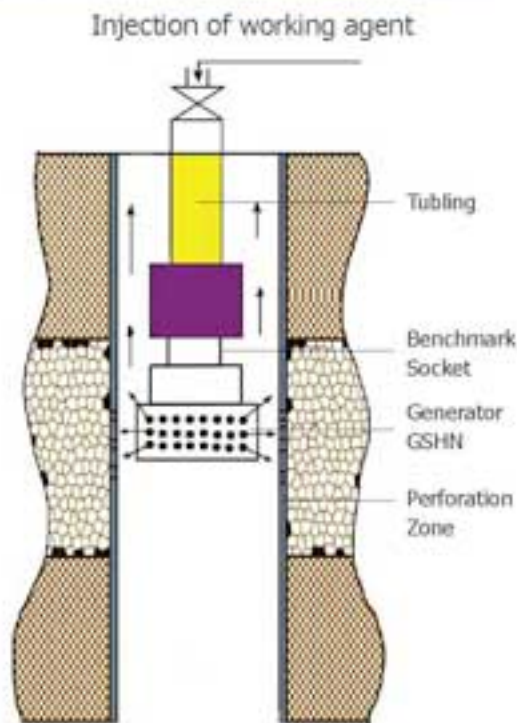
The key of organosilicon plugging solutions-based operations is the selected plugging of water-bearing horizons whilst the oil-saturated horizons continue to conduct fluid.

The choice of material and its quantity depends on the drill log of a certain well, the area of the reserves of oil to be produced and its character of water inflow.



Impermeability damage control operations using Cement Solution

- A pre-calculated amount of dry oil-well cement with distinctive cement additives (antifoaming additives, plasticizing agents) is delivered to the wellhead and pumped into a cement surge tank in order to homogenate the cement's density and structure. The other pump unit is used to pump the cement solution downhole through tubing and force it into the oil reservoir by displacement fluid.
- Next, the tubing is lifted to a certain depth so that the cement column is left inside the production casing. Subsequently, the cement excess is washed out of the well, tubing is lifted to a safety depth, and the well is kept closed until the cement has set. Once the cement has set, cement plugging top is located by means of tubing string running in the hole; the cement plug is drilled.
- At last the cement plug is totally washed out with 30-35 cubic meters of fluid. The productive formation should be exposed again, and oil inflow should be stimulated.



BOTTOM-HOLE TREATMENT PROCEDURE USING SUPERSONIC HIGH-FREQUENCY NON-LINEAR GENERATOR (GSHN)

The technology is intended for EOR application and oil production stimulation, both at individual wells and at specific areas of the fields as a whole.

FEATURES:

- Increase in well injection capacity (well water-intake capacity)
- Rehabilitation of abandoned wells
- Heavy oil recovery
- Partial replacement of reservoir hydro-fracturing
- Increase in filtration area

The essence of this procedure includes the arrangement of the guided and 'controlled' cavitation beam by means of pumping the working agent through the upper stage of constrictors installed, which makes a specific angle with the super diffuser surface and result in vortex flow. The basic part of the subsurface equipment is the supersonic high frequency nonlinear generator (GSHN) as a result of which the cavitation volumetric field penetrates through the perforation holes.

Bottom-Hole Treatments

TECHNOLOGY OF BOTTOM-HOLE TREATMENT USING HYDROPULSATOR GP5-88

The hydropulsator is a device intended for the intensification of oil inflow as a result of reservoir permeability increase by excitation in well bore fluid of the intensive elastic fluctuations of various frequency, which are destroying rocks in near-wellbore zone with formation of a network of micro cracks.

The technology can be applied to all categories of wells in which skin-effect is shown as a result of pollution by various colmation materials, and also because of the blocking influence of phases – oil, water or gas; a filtrate of a drilling fluid; a stable emulsion.

During the technology implementation the combination of physical and chemical action is provided, including injection of various reagents into a reservoir; creation of underbalanced and overbalanced pressures on a reservoir.

The following chemicals and materials are necessary for the implementation of the technological process:

- Concentrated Hydrochloric Acid (HCl);
- Hydrofluoric Acid (HF);
- Surface-active reagents (Neonol, Sulfonic);
- Fresh or brackish water.



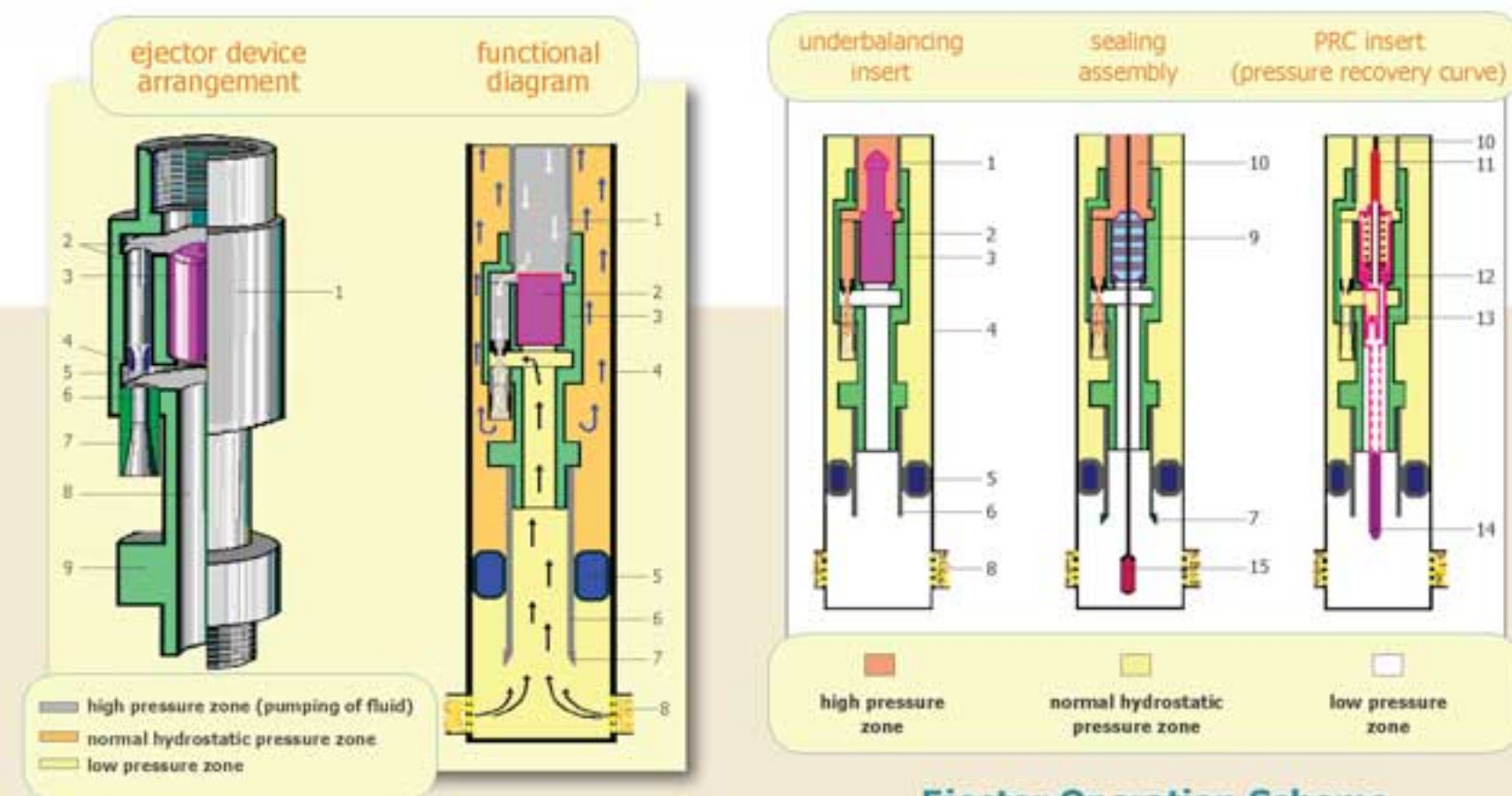


BOTTOM-HOLE TREATMENT USING EJECTOR (JET PUMP) WITH PACKER

- This device is designed for increasing of oil production by recovery and increase the fluid conductivity of oil producing wells, as well as for initial well development, oil inflow stimulation, well testing (hydrodynamical study).
- By injecting of water into tubing at the wellhead, a series of cyclic and alternate overbalanced and underbalanced pressures underneath the installed packer zone is created, thus cleaning out the contaminated near-well bore zone of the reservoir. Level of overbalanced and underbalanced pressures and cyclicity is controlled on the surface by regulating the work pressure level of the pumping unit. Controlled underbalanced pressures of any magnitude can be created.

Similarly, the device is used for increase of injection capacity (water-intake capacity) of injection wells.

- As a preliminary step for the effect improvement the oil reservoir can be treated by the acids or diluents.
- The efficiency of the jet pump treatment is about 90 % - 95 %.
- Well production rate rises from 1.5 to 3 times compared to its original level.



Ejector Arrangement & Principle of Operation

Ejector device:

- 1- body , 2- discharge channel,
- 3- functional insert , 4- nozzle
- 5- suction channel,
- 6- mixing chamber, 7- diffuser
- 8- passthrough channel,
- 9- reflector

Functional diagram:

- 1- tubing , 2- functional insert
- 3- body, 4- casing,
- 5- packer, 6- tubing shank
- 7- tubing shank end
- 8- reservoir

Ejector Operation Scheme

- 1- tubing, 2- underbalancing insert
- 3- body, 4- casing, 5- packer,
- 6- tubing shank, 7- tubing shank end,
- 8- reservoir, 9- sealing assembly,
- 10- cable, 11- remote pressure gauge,
- PRC insert, 12- registration & overflow valve,
- 13- check valve,
- 14- autonomous pressure gauge,
- 15- logging device.



WATER INFLOW CONTROL PROCEDURE USING SODIUM SILICATE BASED GEL COMPOSITIONS

This procedure is intended to:

1. Control of the injected water intrushes in high-permeable layers
2. Isolation of bottom water
3. Selective isolation of water inflow intervals
4. Filtration flow redistribution in injection wells

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WASHOUT OF PARAFFIN AND HYDRATE DEPOSITIONS

Accumulating in pipes or casing and tubing annuluses in certain intervals (from 20 up to 700 m), paraffin or hydrate depositions cause partial or complete blockage, thus breaching normal operation of a well. In order to restore the circulation (pass) a thermal influence based technology is applied, using the special well washout equipment set – "KOPS". The thermal method is based on the characteristic of paraffin and hydrate to melt at temperatures above 50 °C. This demands application of a special working agent directly delivered to the area of the depositions.

The "KOPS" set is mounted on the wellhead for sealing purposes and prevention of oil and gas shows during washout process of paraffin or hydrate depositions. To washout paraffin or hydrate depositions in wells equipped with 2" tubing, 1 1/4" (d=33mm) tubing is applied, and in wells equipped with 2 1/2" tubing, 1 1/2" (d=48mm) tubing is applied.

As a heat-transfer fluid, brines of Sodium Chloride (NaCl), Calcium Chloride (CaCl₂), Polyglycol, anti-caking, surface-active reagent are used.



MULTIFUNCTIONAL COMPOSITION TC 3 FOR CASING INTEGRITY RECOVERY AND BEHIND CASING CROSS-FLOW CONTROL

The TC-3 is a three-component (Ammonium Chloride, Urea-Formaldehyde and Acetone-Formaldehyde resins) based composition.

The TC-3 is used for isolation jobs when the formation requires a solid gas water-proof screen:

- Isolation of water flooded layers;
- Elimination of annulus water-gas-circulation;
- Limitation of reservoir bottom water production;
- Elimination of through damages of casing;
- Sealing of threaded joints etc.

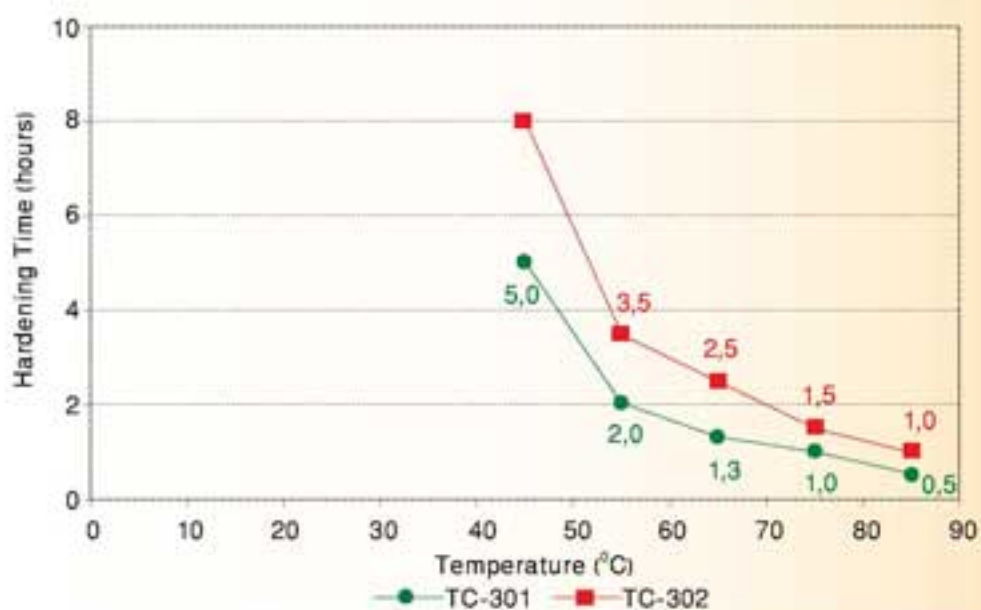


The TC-3 composition has the following properties:

- In contrast to cement solutions the TC-3 composition is well percolating into low permeability oil-water-filled formations;
- It hardens/bonds with formation of monolithic stone or gel;
- The hardened composition is highly adhesive with formation's surfaces and the casing (steel);
- The time of hardening can be controlled being subject to reservoir temperature at the depth of the damage interval;
- The components used for preparation of the TC-3 are environmentally friendly;

Subject to the required amount of composition necessary to carry out isolated jobs the two compositions of TC-3 can be prepared: TC-301 and TC-302, both having different characteristics depending on the mixture of the various additives. The TC-3 composition is prepared directly at a well site.

Diagram of TC-3 Hardening Time - Temperature Relationship



VERIOUS BOTTOM-HOLE TREATMENTS & ACIDIZING

- Hydrochloric acidizing
- Mud acidizing (hydrochloric & fluoric acids)
- Solvent treatment
- Surfactant treatment (surface-active substance)
- Thermo-chemical treatment (magnesium & hydrochloric acid reaction)
- Thermo-hydraulic depression treatment (bottom rapid combustion of special substance)
- Foam acid treatments
- Vibration treatments



Perforation Schemes

Hydro- Sandblast
Jet-assisted
mechanical
slot perforation



Cumulative
perforation
(standard)



Oil incoming into
the well



Oil and water
incoming
into the well
(standard)



Hydro-Sandblast Jet-assisted mechanical slot perforation

- Sandblast jet-assisted mechanical slot perforation is a technology of a secondary expose of the formation of the following:
- The perforator runs into the well bore on tubing with depth positioning to the preset formation by a geophysical method.
- Cutting longitudinal slots into the production casing with a special hydraulic bottom-hole motor and cutter. Cavities are subsequently flushed out by the powerful jet of abrasive completion fluid (sandy mixture) which is aimed through the slot at the set cement in the casing annulus and at the reservoir formation.

Advantages of the jet-assisted mechanical slot perforation

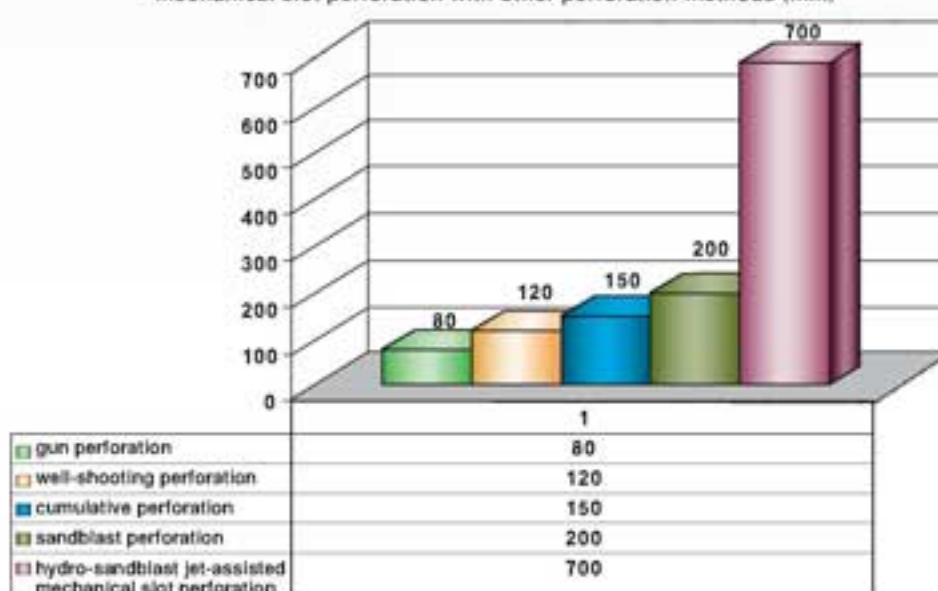
- Allows cutting a slot along the casing in a precisely pre-set interval;
- The accuracy of this technology allows it to perform casing slot cuts during a single run of desired length anywhere between a few centimeters up to 30 meters.
- Higher hydrodynamic quality of formation perforation;
- Makes better use of all potential capabilities of the producing reservoir;
- The specific oil inflow area is 80 - 90 % more, and the depth of perforation is twice larger than at using of cumulative perforation;
- No impact effects on the production casing and set cement outside of the perforated interval (quality of set cement behind the casing is maintained; cracks are not formed);



- Exact tying to depth (depth positioning) and selective penetration into the effective pays without damaging the shale breaks between them;
- Possibility of well completion with use of crude oil or any other non-damaging fluid;
- The bottom hole can be treated simultaneously;
- An additional amount of oil may be produced owing to a better perforation;
- The cost of our hydro-sandblast jet-assisted slot perforation is not higher than that of a standard cumulative perforation technique, thus our technology' advantages far outweigh those of the conventional methods.

Application of this method makes it possible to increase oil inflow up to 1,5 – 5 times and even more as compared with initial output.

Comparison of Hydro-Sandblast Jet-assisted mechanical slot perforation with other perforation methods (mm)

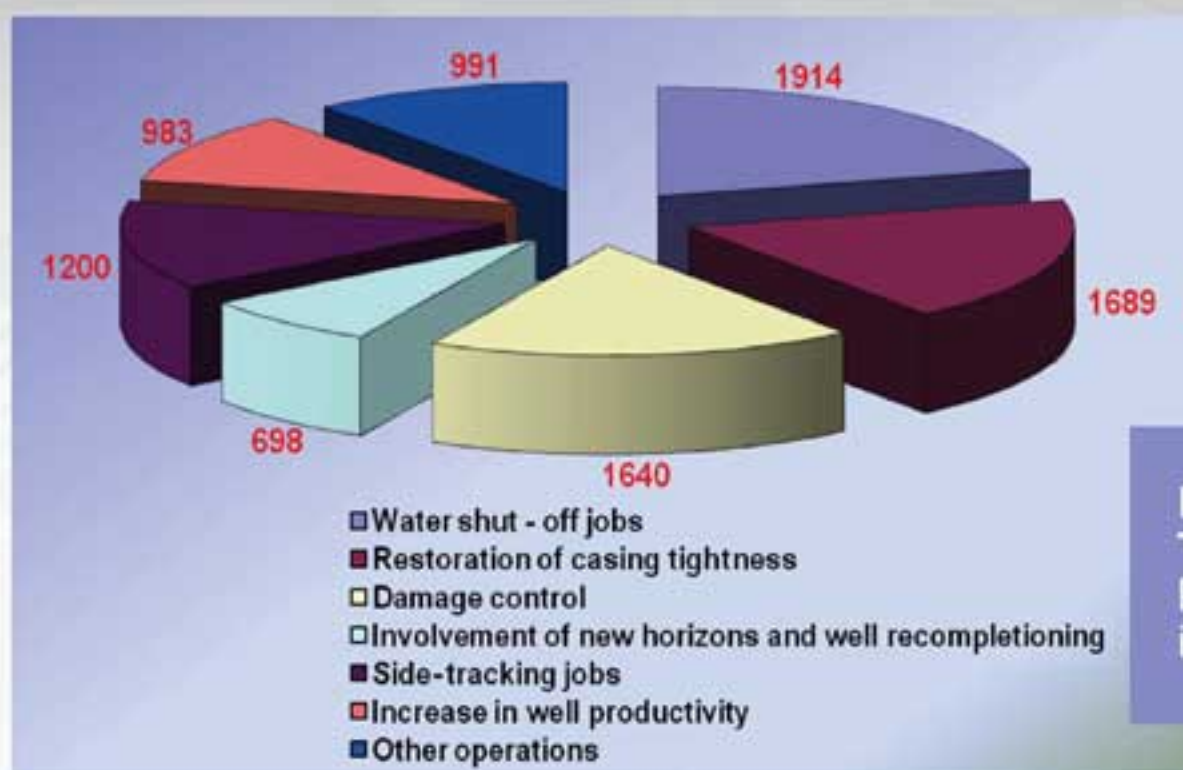


Drilling Fluids Services

The Company's drilling fluids services consists in the following:

- Determination of technological parameters of drilling fluid to ensure the trouble-free fulfillment of well drilling and preservation of natural filtration properties of reservoir;
- Determination of optimum chemical composition of the drilling fluid to provide meeting the determined and estimated parameters;
- Providing to the well site all necessary components (materials, chemical reagents, etc.) for preparation of the determined drilling fluid composition;
- Field service (engineering & laboratory equipment): control of drilling fluid parameters whilst drilling a well.





Number & Type of Operations
Performed by the Company
in 1998 - 2009



Incremental Oil Recovery
from restored wells
by types of jobs
carried out by the Company
in 1998 – 2009 (x 1000 tonnes)

EQUIPMENT SUPPLY

Oiltech's equipment supply department can offer the supply of superior equipment, tools and materials from its partners, the largest and most valued manufacturers of high-quality oil and gas equipment not only in the Russian Federation, but also on a global scale.

Advanced technologies and highly qualified personnel, latest innovations and modern equipment in conjunction with extensive research and operational experience & expertise all combine to enable Oil Tech to ensure that its Customers are provided with reliable, high - tech, high - quality and cost effective service support.

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