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МАГИСТЕРСКАЯ ДИССЕРТАЦИЯ

Тема работы
Методы подбора скважин-кандидатов на зарезку бокового ствола для выработки запасов на Катыльгинском нефтяном месторождении (Томская область)

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Оглавление

Введение

В последние годы все чаще вводятся в разработку месторождения с трудно-извлекаемыми запасами углеводородного сырья, с неоднородными и расчлененными коллекторами. Зарезка боковых стволов является эффективной технологией, позволяющей увеличить добычу нефти на старых месторождениях, вернуть в эксплуатацию бездействующий или малодебитный фонд скважин, который ранее не мог быть возвращен в работу другими геолого-техническими мероприятиями, позволяет значительно увеличить нефтеотдачу пласта. При зарезке горизонтальных и наклонных стволов в разработку месторождения вовлекаются раньше не задействованные участки пласта, недоступные при их эксплуатации вертикальной скважиной, а также запасы нефти относящиеся к категории трудноизвлекаемых, добыча которых раньше была осложнена или вовсе не представлялась возможной.

Применение технологии зарезки бокового ствола является фактической заменой уплотняющему бурению скважин, способствует увеличению коэффициента извлечения нефти из пласта. Эта технология помогает сохранить существующие скважины и снизить расходы на бурение новой скважины.

Актуальность работы связана с тем, что серьезные последствия некачественного выбора скважин на зарезку бокового ствола, а также большая стоимость самой операции, обуславливает необходимость создания эффективной методики отбора кандидатов для уменьшения рисков и повышения эффективности горизонтального бурения.

На сегодняшний день существуют методики отбора скважин на зарезку бокового ствола, но проблема в том, что каждое месторождение индивидуально, имеет свои особенности которые нельзя выравнивать под одну модель действий, также своими особенными техническими характеристиками обладают сами скважины рассматриваемые в процессе отбора.

В работе рассмотрена методика отбора скважин-кандидатов на зарезку бокового ствола учитывая все особенности месторождения и скважин, она состоит из нескольких этапов:

1.Отбор скважин кандидатов на зарезку бокового ствола по текущим нефтяным запасам

2.Отбор скважин-кандидатов по риску ФНВ

3.Отбор скважин-кандидатов по работе скважин окружения

4.Исследование скважин на техническое состояние

5.Расчёт зарезки бокового ствола

Главной целью работы является нахождение оптимального метода подбора скважин-кандидатов на зарезку бокового ствола на Катыльгинском месторождении.

Для достижения данной цели в рамках работы были определены следующие задачи:

- Изучить основные геологические данные по Катыльгинскому месторождению;
- Получить навык работы с рабочими картами Катыльгинского месторождения;
- Произвести аналитическую выборку скважин на основе геологии района и его карт;
- Исследовать техническое состояние скважин района, по документам полученным в компании владеющей лицензионным участком;
- Сделать расчет зарезки бокового ствола.

Для решения поставленной задачи был выбран участок в восточной части Катыльгинского месторождения.

Исходные данные для проекта:

- Карты текущей нефтенасыщенности выбранного участка;
- Карты эффективных мощностей пласта;
- Карты расстановки добывающих и нагнетательных скважин;

- Геология района;
- Данные добычи.

Аннотация

Объектом исследования является Катыльгинское месторождение Томской области.

Цель работы – нахождение оптимального метода подбора скважин-кандидатов на зарезку бокового ствола на Катыльгинском месторождении.

В первом разделе описаны общие положения по бурению боковых стволов, технологиям бурения а также затронуты ряд проблем встречающихся в процессе бурения.

Во втором разделе магистерской диссертации представлена общая информация о природно-климатических условиях и географо-административном положении Катыльгинского месторождения, о населенных пунктах находящихся неподалеку, информация о плотности местного населения. Рассмотрено тектоническое строение с основными особенностями строения продуктивных пластов, стратиграфическая характеристика геологического разреза с иллюстрацией. Описаны состав и свойства пластовых флюидов, представлена промышленная нефтеносность, информация о текущих запасах нефти и сводная геолого-геофизическая характеристика продуктивных интервалов. Приведена подробная характеристика рабочего фонда скважин по месторождению в целом, с описанием количества добывающих, нагнетательных, поглощающих и водозаборных скважин, и по каждому продуктивному пласту в отдельности, охарактеризовано текущее состояние разработки. Представлены выводы о темпе освоения Катыльгинского месторождения, информация о возможности реабилитации нерабочего и малодебитного фонда скважин и ввода их в эксплуатацию после проведения зарезки бокового ствола и восстановления существующей системы заводнения.

В третьем разделе рассмотрена методика отбора скважин-кандидатов на зарезку бокового ствола учитывая все особенности Катыльгинского месторождения и скважин, так как серьезные последствия некачественного выбора скважин на зарезку бокового ствола, а также большая стоимость самой

операции, обуславливает необходимость создания эффективной методики отбора кандидатов для уменьшения рисков и повышения эффективности горизонтального бурения.

В четвертом разделе описан экономический расчет и сравнение стоимости проведения мероприятия по зарезке боковых стволов скважин на Катыльгинском месторождении между подрядной организацией АО «БСК» и компанией ОАО «Томскнефть». Расчет показал, что привлечение подрядной организации АО «БСК» позволит снизить затраты и количество времени на осуществление ЗБС.

Пятый раздел посвящен изучению социальной ответственности при работе обслуживающего персонала при зарезке бокового ствола на Катыльгинском месторождении. Проанализированы возможные опасные и вредные факторы на производстве, также описаны их источники, в соответствии с нормативными документами. Представлены и обоснованы мероприятия по защите обслуживающего персонала от воздействия вредных и опасных факторов. Приведено описание влияния объекта (горизонтальный ствол) на окружающую среду, обоснованы мероприятия по ее защите. Изучены чрезвычайные ситуации вероятные на объекте, также представлены меры по их предотвращению.

Приложение А

Раздел

Бурение боковых стволов нефтяных скважин

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1. Requirements for the selection of wells for drilling sidetracks

Before starting work on cutting and drilling of directional and horizontal side wells (HSW) to intensify the field development system, increase the recovery factor of oil from productive reservoirs and return on capital investment, a regulation is developed.

All types of work on the construction of the HSW are represented by the following main stages:

- selection of the main trunks for the given wells;
- selection of the window cutting interval in the production column;
- calculation of the profile of the well;
- cutting out the “window” in the production column;
- sidetrack drilling;
- casing the drilled stem of the production column;
- work on development of the well.

When choosing wells for drilling sidetracks out of them, it is necessary to start from the current characteristics of the well operation, the technical condition of the production string, the quality of its fastening, the actual spatial position of the wellbore:

- the production column must be pressed to 100 atm. within 30 minutes, the pressure drop is not more than 5 atm., the production column should be pressurized by the level reduction;
- it is necessary to perform gyroscopic inclinometry;

The following basic requirements should be followed:

- the spatial position of the drilling interval should be optimal from the point of view of economic feasibility (the value of the withdrawal of the drilling site before the beginning of the production face should be minimum, but not less than the value determined by the permissible Intensity of curvature of the lateral trunk), the maximum deviation from the point of drilling up to the beginning of the production face is determined by the technical characteristics of the rig and the probable depth of the drilling;

- the permissible difference in the azimuthal directions of the main trunk and sidetrack shall not exceed the value determined by the technical capabilities of sidetrack drilling;

- the trajectory of the lateral trunk must have a minimum probability of intersection with existing and projected trunks of neighboring wells;

- search for optimal options that meet the technical and economic feasibility of using watered and idle wells for sidetracking should be carried out, as a rule, using automated programs.

2. Substantiation of the profile of boreholes with lateral trunks

In order to involve in the active development of oil reserves blocked by water or gas cones, as well as the creation of additional craters of depressions in the inter-well zones to create backflows of fluids passing from the oil part to the gas or water zones of the formation, sidetrack drilling is proposed.

The main requirements for the sidetracking of horizontal sidetracks are:

- opening of the roof of the formation in 90-110 m from the main trunk;

- drilling horizontally 50-100 m with vertical variation +/- 3m;

- the horizontal part of the trunk must pass not less than 2-4 m from the gas-oil contact (GNK) and oil water contact (OWC);

- the quality of cementation of the second shaft culled space in the interval from the mouth of the cutting - 2 m below the roof of the reservoir, cementing of the horizontal part of the trunk with subsequent perforation or descent of the filters is decided before drilling;

- the direction of the horizontal part of the trunk is determined during the drilling design taking into account the current state of formation of the formation;

- cutting off the first trunk with a cement bridge from operation is determined either immediately before the drilling of the second trunk, or after its testing.

The choice of a well for drilling a second well is determined by the state of operation of the well (water cut of the product, cause of watering or liquid rates), residual stocks, technological efficiency of the applied methods of influence, current oil saturation of the formation and its structure. When choosing a well placement option with branching trunks, we proceed from the fact that during the operation of the second wellbore, oil production reached at least 10-12 thousand tons before the water cut of 95%. With such lower initial indicators, the profitability of the operation of such wells corresponds to the exploitation of the middle production (average oil production rate of 20 tons per day) of the deposit.

The main criteria for selecting wells with second trunks are:

- the current oil saturation at the date of drilling is not less than 46.2%;

- current balance reserves of oil in non-contact areas not less than 65 thousand tons, at contact areas not less than 98 thousand tons:

- oil saturated, contact with gas, the thickness of the formation is not less than 7 m;

- oil saturated, contact with water, thickness of the seam at least bm;

- oil saturated, contact simultaneously with water and oil, thickness not less than 9 m and non-contact oil saturated thickness not less than 4 m.

At the moment, lateral wellbores have different types of profiles, they are classified according to the following characteristics:

1) Horizontal trunks - the maximum angle exceeds 65 °,

2) Gently sloping - the maximum angle is within 48 ° -65 °,

3) Inclined-directed barrels - less than 48 °, drilled on a given trajectory using telemetry systems;

4) Non-orientable trunks of navigational support systems.

3. Preparatory work for drilling sidetracks

The drilling of sidetracks is preceded by the launch of a gyroscopic inclinometer and geophysical instruments to clarify the spatial position of the casing string and the interval of the operational object.

The well is shuttled with salt solution.

Installation of drilling equipment (hoist, circulating system and strapping), dismantling of the fountain fixture is carried out.

The blowout preventer is installed according to the scheme of the wellhead equipment and the crimping is carried out.

Downhole equipment is being upgraded.

In order to determine the technical condition of the production column, possible areas of narrowing, its patterning is carried out. To ensure the free descent of the wedge-deflector and layouts for milling the "window", the production column is marked with a template having the following dimensions:

D = 122 mm for EC 139 mm;

D = 126 mm for EC 146 mm;

D = 144 mm for EC 168 mm;

Lm = 6 m,

Where Dm is the diameter of the template;

LT - length of the template.

Geophysical work is carried out to determine the depth of the face with the recording of collar locator (CL) and qualitative assessment of cementing the stone (QACS). Based on the data of (CL) and QACS, taking into account the results of preliminary profiling of the HSW, the interval of sidetracking is determined. When selecting the spacing interval, the cutting location of the HSW is selected, if possible, closer to the bottom of the main trunk. In the case of poor quality cement stone behind the production column or its absence, work is performed on re-cementing the annulus of the production column in the interval of drilling with preliminary perforating it to pump the oil well. Re-cementing operations can be carried out after installing the wedge-deflector and cutting out the “window” in the production column.

Installation on the face of the liquidation bridge is in progress. The preparation of the wellbore for the installation of the liquidation bridge is carried out in accordance with the procedure established by the governing documents. Isolation work is carried out with the implementation of existing rules and regulations. With economic feasibility, it is possible to combine the installation of the isolation and technological bridges. After installation of the liquidation bridge, the production column is pressurized.

To cut the sidetrack with a deflecting wedge (wedge-deflector), a process cement bridge is installed, which can be created by pumping cement mortar. In this case, the upper part of the bridge is located above the casing coupling in accordance with the operating instructions for the wedge-deflector. The explosive packer is recommended to be used to increase the reliability of the cement bridge before its installation.

For the installation of cement bridges, it is recommended to use special grouting compositions that improve their physical and mechanical properties.

Before launching the explosive packer, the production column in the cement bridge installation area is cleaned with a scraper and the well is washed for one cycle.

After waiting on cement the top of the cement bridge is determined. If necessary, the bridge is drilled to the required depth, the production column is pressurized to the pressure agreed with the Oil and Gas Production Departments. If the results of the crimping of the production column are negative, the cause is clarified, and measures are taken to eliminate leaks.

4. Technology of construction of a lateral trunk with a horizontal section

Construction of sidetracks with a horizontal section is carried out on the basis of technological regulations for drilling from watered and idle production wells.

This regulation is the guiding document for drawing up technical projects for the construction of sidetracks with a horizontal section of previously drilled waterlogged and idle production wells, as well as providing operational technological documentation for the capital repair of wells in the Surgutneftegaz divisions.

When choosing wells to drill sidetracks from them, it is necessary to start from the current characteristics of well operation:

Technical condition of the production column, the quality of its fastening, the actual spatial position of the wellbore;

The condition of the production column is higher than the interval of installation of the pumpequipment according to the data of the relevant instruments and crimping must be technically sound;

The trajectories of the trunks of the selected and neighboring wells should be sufficiently reliable to exclude the intersection of the trunks;

The following basic requirements should be followed:

The spatial position of the spacing interval with respect to the horizontal operational section should be optimal from the point of view of economic feasibility (the value of the departure of the drilling point prior to the beginning of the production face should be minimum, but not less than the value determined by the admissible intensity of curvature of the sidetrack);

The maximum deviation from the point of drilling up to the beginning of the operational horizontal face is determined by the technical characteristics of the drilling rig and the probable depth of the drilling;

The permissible difference in the azimuthal directions of the main trunk and the horizontal section should not exceed the value determined by the technical capabilities of the sidetrack construction;

The sidetrack trajectory should have a minimum probability of intersection with existing and projected trunks of neighboring wells;

The search for optimal options that meet the technical and economic feasibility of using watered and idle wells for drilling sidetracks with a horizontal section should be carried out, as a rule, using automated programs.

5. Technology of opening of a productive layer

One of the main conditions for the effectiveness of drilling sidetracking (ST) is the use of methods of opening productive layers that provide preservation of the natural state of the reservoir and, consequently, the potential production capabilities of the wells.

In the process of opening productive layers, drilling reduces their natural permeability as a result of interaction with drilling fluids. The degree of influence of the factors affecting the deterioration of the reservoir's natural reservoir properties is different and depends on the physical and chemical properties of the drilling fluid, reservoir fluid, pressure drop in the well-reservoir system, reservoir properties of the reservoir, its lithological characteristics and the time of exposure to the solution.

The following factors influence the filtration characteristics of the reservoir:

- clogging of pore channels with a dispersed phase of solutions and cuttings cuttings;
- swelling and dispersion of clay minerals containedin the collector;
- type of clay material, degree of its dispersion;
- the nature of exchangeable cations and the properties of the filtrate;
- narrowing of pore channels due to the formation of adsorption-hydrate layers;
- formation in the collector of stable emulsions or gas dispersions;
- formation of solid insoluble precipitates as a result of chemical interaction of the filtrate and components of solutions with formation fluids;
- migration of solid particles that break away from the surface of pore channels under the influence of filtrate solutions, through the channels of the formation and
- narrowing of their passage section during the deposition of particles;
- the duration of the opening of the reservoir;
- the amount of water penetrated into the reservoir.

Currently, all existing types of drilling fluids to a greater or lesser extent deteriorate the reservoir properties in the bottomhole formation zone (BFZ). There are several possible ways to manage the process of creating a PPP:

- preservation of the natural state of the bottomhole formation zone (Opening of productive strata on depression or on balance);
- isolation of bottomhole zone, which is overcome by perforation;
- temporary insulation, which is then destroyed (mechanically or chemically).

Drilling fluids perform functions that determine not only the success of the mechanical drilling speed, but also the commissioning of a well with maximum productivity.

The most promising for opening a productive layer, at present, are solutions based on biopolymer systems.

The opening of the reservoir should be carried out in a short time with the minimum possible washings. The number of downhole operations must be minimal, the best is to open the formation for one chiselling. The rate of descent of the drill string should prevent the occurrence of additional oscillations of hydrodynamic pressures.

The value of the filtrate penetration zone in the reservoir is influenced by the difference between reservoir and bottomhole pressures, which, under various technological operations, can vary from the minimum, under static conditions, to the maximum, during downhole operations or during intensive flushing of the well.

The minimum drilling mud density during drilling in repression conditions on the reservoir is determined by the safety requirements and depends on the depth of the well, the type of fluid in the strata being opened, and the anomaly of the reservoir pressure. The drilling conditions are varied, and for each specific well, the minimum density is calculated taking into account the current situation.

Reducing repression on the reservoir provides an increase in well productivity and allows opening the productive strata with minimal disruption to reservoir properties of the reservoir.

In general, when recommending a drilling mud for opening a reservoir, one should proceed from the fact that the degree of decrease in formation permeability depends on the composition and properties of the filtrate, the characteristics of the reservoir, and should be determined by experimental studies in conditions close to reservoir conditions.

The choice of the type of profile and its actual trajectory in the oil-saturated part of the deposit make a significant impact on the qualitative opening of the horizontal section of the reservoir.

In productive layers (homogeneous and heterogeneous) of a small thickness (10-15 m at a depth of 800-2000 m), it is advisable to inscribe a horizontal section in the middle part of the formation along a path parallel to the roof and the base of the formation.

In productive layers with a capacity of more than 20 m, the horizontal section can also be posted along a convex profile.

It is advisable to open the layers wavy, when the thickness of the layer and interlayers varies in area, the productive section is not sufficiently stable, and in the immediate vicinity of it lie rocks that require reliable insulation by casing with cementing.

Opening the formation with a parallel or hollow inclined barrel may not be appropriate.

Wavy profile is recommended to be used in the absencein the roof and base of active water-bearing, gas-bearing and absorbing layers.

In the case of stratified heterogeneous layers of small thickness, with interlayering of sandstones with clays, it is more effective to cross the productive formation with a hollow-inclined horizontal trunk from the roof to its sole.

The length and shape of the horizontal section should be clarified with the accumulation of statistical material and the degree of accuracy of the BHA for the local sections of the field.

6. Completion of wells

The main option for completing the CBC is to create an open-face production face. A “shank” with a packer element (PDM type packer, cuff, etc.) descends into the borehole and the filter part in the interval of the operational horizontal face.

The packing element is installed at the beginning of the horizontal section, enabling the “shank” to be fixed and the overlying permeable horizons to be secured, including the water-gas bearing strata, and also the safety of the operational object from the action of the cement slurry.

The filter part of the “shank” can be represented by filters of the hydraulic filter (HF) type or a complex of controlled segregation of the seams (multi-packer system) and other elements of the controlled design of the operational horizontal face.

The arrangement of filters in the horizontal section is calculated based on the reservoir properties of the operational object and ensuring the necessary flow capacity of the hydrodynamic channels, in accordance with the potential productivity of the formation.

The filter elements of the “shank” are centered by rigid centralizers of the appropriate size.

In the interval of the packer element, centralizers of the turbulent type are installed to ensure the quality of the column fastening.

The filter part is equipped with special plugs ensuring leaktightness of the filter part and the possibility of carrying out technological flushing during the descent of the "shank".

In the interval of the productive stratum, special perforating media are placed to prevent contamination of the operational horizontal face in the completion of the wells. The perforating medium is pumped into the interval of the productive formation during cementation of the “shank”. After the descent, suspension and fastening of the “shank”, the cuff of the cuff of the collar cementing is drilled and the plugs are knocked down on the HF -101.6mm using small-sized volumetric engines D1-54 D-43, a flexible pipe or a combined arrangement of drilling (tubing) pipes .

If necessary, due to the geological and physical characteristics of the reservoir, the conditions of its occurrence, the inevitability or a high degree of probability of crossing the water-bearing horizons, a closed-slaughter design is created.

Continuous cementation of the “shank” is carried out. In the interval of the production face, as well as the water-gas bearing strata, the "tail" is necessarily centered.

After drilling the bottomhole is flushed and, if necessary, the fluid is replaced in the well. A necessary complex of geophysical studies is carried out, after which preparation for the secondary opening of the formation is carried out. The wellhead is equipped with small-sized preventor and is pressed together with the column.

Injection of a perforating medium (KPS-1, KPS-1M) is possible during the cementing of the “shank” or in the process of development during the washing of the face before the secondary opening of the formation.

The volume of the perforating medium is chosen from the condition of filling the “shank” by 100-150 m above the perforation interval. Secondary opening of the formation is carried out with small-sized perforators of the type PRK-42S, PRK-54S; PKT-50, PKT-73 on a “flexible pipe” or on tubing, a rigid geophysical cable. It is recommended that perforation be carried out under conditions of depression on the formation. The density of the perforation depends on the geological and physical characteristics of the reservoir and the characteristics of the perforators.

The inflow is triggered by a foam system or a compression method with a nitrogen plant PAKK-9/160, by swabbing, UGIS with obligatory hydrodynamic studies of wells.

In agreement with the geological service of the Oil and Gas Production Departments, the inflow can be called up by a mechanized method.

The magnitude of the depression on the seam is selected taking into account the specific geological and physical characteristics of the formation, the degree of its contamination in the process of opening and the limitations on the permissible pressure drop in the zone of the operational object. For productive strata operated in OJSC “Surgutneftegas” in the conditions of a horizontal production face, this value can be from 1.0 MPa to 5.0 MPa,

In the initial period of operation (within six months) it is recommended to carry out hydrodynamic studies of the ST on steady and non-stationary fluid flow regimes in order to determine the hydrodynamic parameters of the formation (productivity, hydroconductivity), assess the state of the near-barrel zone of the reservoir, resistances in the well (skin factor) .

Based on the results of these studies, the influence of the technological parameters of the completion of wells on the mining capabilities of the operational facility is determined and the applied technology is adjusted.

7. Complex of geophysical studies for sidetracking

Before sidetracking, the GIS complex is performed:

Geophysical studies with a gyroscope from the wellhead to the face in order to determine the most optimal location for sidetracking.

If the column is not hermetically sealed, the GIS is conducted under the injection of a saline solution to determine the location of the impermeability of the casing string.

After installing the bridge in the main wellbore, the GIS are conducted to connect the face. Binding of the face is made with the record of the GC, LM.

When the deflector is lowered 10 meters before the current face, GIS are conducted to orient the deflector.

Also, when drilling a sidetrack, the following GIS complex is carried out.

Standard electrometry is necessary for lithologic dismemberment and correlation of well sections. It is produced every time from the actual slaughter to the shoe of the column.

Lateral electrical sounding (LES), PS is carried out for detailed lithologic dismemberment, determination of UES, zones and character of penetration of leachate filtrate.

Microprobement is necessary for the detailed dismemberment of the geological section of the wells, the separation of the reservoirs and the evaluation of the apparent thickness of the productive horizons, and the refinement of sampling intervals for perforation.

The lateral method makes it possible to disaggregate the geological section in detail, together with the data from other probes, it helps to isolate the reservoir-reservoirs, to clarify their structure and specific electrical resistance, and with a deep penetration of the filtrate, it is approximately to determine the resistance of the penetration zone.

The microbeak method makes it possible to accurately determine the resistance of the washed zone of the formation. The induction method is a reliable method for determining the resistance of rocks in low-resistance sections with a small thickness of the formation and high resistance of the drilling mud.

Resistiviometry is used to interpret lateral electrical sounding materials, lateral method curves and microprobes, to determine the mineralization of formation water along the curves of the substation, the places of tributaries, and places of absorption of drilling fluid in the well of casing string violations.

Carpet and profilometry is carried out to measure the diameter of the well, refine the geological section of the rocks, identify the permeable layers and determine their thickness, correlate the sections, interpret the materials, monitor the technical state of the well, accurately determine the location of the shoe of the column, calculate the volume of the annulus in determining the amount of cement A solution of the casing string necessary for cementation.

Thermometry is used to study the gradient or temperature stage, to determine the height of the cement ring lift, to isolate the gas-bearing strata, to locate the mud absorption site, the inflow and annulus circulation of the fluid, to evaluate the temperature conditions of the drilling tool operation, and also to study the thermophysical characteristics of the rocks composing the section with The purpose of their pathological dismemberment.

Inclinometry. Curvature of the well is investigated in order to determine the true depth of the seams, to properly build geological sections, to determine the location of the face, to introduce correction for determining the normal thickness of the seams, to control the displacement of the well axis from the specified direction in the directional and horizontal wells.

Radiometry.Includes the gamma method and the multi-probe neutron method for thermal neutrons. The gamma method is the main method for lithologic dismemberment of rocks, the correlation of the cuts of the wells, differentiates them according to the content of the clay material, which makes it possible to evaluate the reservoir properties of the seams.

The acoustic method is used in the variants of measuring the speed of propagation of elastic waves in rocks and their attenuation. A method is used to determine the Kp section of the reservoirs.

The main difficulty in carrying out GIS in wells with horizontal termination is pushing the device into the well. To do this, a method is used to push the device through a flexible pipe or other devices.

After the drilling of the lateral horizontal trunk, field geophysical surveys are conducted.

Заключение

Одной из главных проблем для нефтяной отрасли остаётся недостаток капиталовложений в строительство и оборудование новых скважин. Фонд малодебитных и бездействующих скважин увеличивается из года в год. Сейчас в России простаивает больше 40000 скважин. К примеру, бездействующий фонд скважин в Западной Сибири составляет более четверти всех имеющихся скважин. Похожая тенденция увеличения числа нерабочих и малодебитных скважин свойственна другим нефтегазодобывающим регионам России. По этой причине в последнее время основным направлением деятельности многих нефтегазодобывающих компаний становится возрождение старого фонда скважин. Наиболее перспективым и менее затратным методом значительного увеличения нефтеотдачи является бурение бокового горизонтального или наклонного ствола из вырезанного участка обсадной эксплуатационной колонны.

Серьезные последствия некачественного выбора скважин на зарезку бокового ствола, а также большая стоимость самой операции, обуславливает необходимость создания эффективной методики отбора кандидатов для уменьшения рисков и повышения эффективности горизонтального бурения.

В работе рассмотрена методика отбора скважин-кандидатов на зарезку бокового ствола учитывая все особенности месторождения и техническое состояние фонда бездействующих или малодебитных скважин. Методика состоит из следующих этапов:

- Отбор скважин кандидатов на зарезку бокового ствола по текущим нефтяным запасам
- Отбор скважин-кандидатов по риску ФНВ
- Отбор скважин-кандидатов по работе скважин окружения
- Исследование скважин на техническое состояние
- Расчёт зарезки бокового ствола

В результате проведения методики была отобрана скважина №1313 зарезка бокового ствола на которой с большой вероятностью будет наиболее эффективна, а затраты на его строительство будут экономически оправданы.