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DETERMINATION OF PARAMETERS BY SAMPLES CORE FROM THE OCCURRENCE OF PRODUCTIVE LAYERS

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Abstract:
The practice of processing test materials has shown that the most reliable data on the hydrodynamic characteristics of the formation is obtained by processing pressure recovery curves. Qualitative pressure curves during the inflow period serve as an addition to the information obtained from pressure recovery curves. Determination of average flow rates of inflow and fluid components. The percentage component-by-component composition of fluids is determined after lifting the sample accumulator and measuring the volume of fluid components. Extracted from the formation. Depending on the percentage composition, the specific gravity of the fluid (y, g / cm3) is calculated. In the future, y is used to calculate the average flow rate.

Keywords: water saturation, oil saturation, paraffin, carbonate content, clay content, core, oil, gas, wells, resins, oils, asphaltenes, sulfur.

Introduction:
All core samples, oil, water and gas samples taken during drilling and testing of wells must be subjected to laboratory tests. According to core samples taken from the intervals of occurrence of productive layers, the following parameters are determined: total and open porosity, residual permeability: water saturation, oil saturation, carbonate content, clay content. Core samples are also being studied for the determination of flora, fauna and microfauna, and sporopylic analysis. Mineralogical and granulometric analyses of both reservoirs and tire rocks are also performed.

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Methods:

The procedure for core sampling for laboratory studies is as follows: from one layer, in the sense of lithological variability, after 0.25-0.30 m, samples are taken from an inhomogeneous layer after 0.2 m and more often.

According to selected samples of reservoir fluids and gas , it should be determined:

For oil - fractional and group compositions, the content of selikagelivyh resins, oils, asphaltenes, paraffin, sulfur, as well as viscosity and density (both in surface conditions - at a temperature of 20 degrees Celsius and a pressure of 0.1 Mpa, and in reservoir conditions), the amount of oil saturation pressure with gas, changes in volume and viscosity of oil at different pressures in reservoir and surface conditions, elasticity coefficients, bottom-hole pressures and temperatures, gas factor when taking deep samples.

For reservoir water - a complete chemical composition, including the determination of valuable associated components (iodine, bromine, boron, lithium and other elements), the amount and composition of gas dissolved in water, measurement of temperature and electrical resistance of water.

For gas dissolved in oil and free gas - air density, heat of combustion, chemical composition (volume fractions of methane. Ethane, propane, butanes, pentanes, hexanes and heavier hydrocarbons in%, as well as gels, hydrogen sulfide in grams per 100 m3 of gas, carbon dioxide and nitrogen).

Table - List of laboratory tests.

№	Name of the study, analysis	Selection interval	Number of samples
1	Determination of total porosit	0.1-0.5	30-150
2	Determination of open porosity	0.1-0.5	30-150
3	Determination of effective porosity	0.1-0.5	30-150
4	Determination of permeability	0.1-0.5	30-150
5	Determination of oil saturation	0.1-0.5	30-150
6	Determination of the displacement coefficient	0.1-0.5	30-150
7	Determination of clay content	1-2	7-15

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Hydrodynamic parameters are calculated according to various methods using pressure change data recorded by the main (filter registers pressure change directly in the test interval) and additional (pipe) pressure gauges.

All existing methods of processing pressure diagrams are divided into 2 groups: methods of processing pressure recovery curves, methods of processing inflow pressure curves.

Determination of average flow rates of inflow and fluid components. The percentage component-by-component composition of fluids is determined after lifting the sample accumulator and measuring the volume of fluid components. Extracted from the formation. Depending on the percentage composition, the specific gravity of the fluid (y, g / cm3) is calculated. In the future, y is used to calculate the average flow rate.

The accuracy of determining the average flow rate is of paramount importance, because all formulas for calculating the hydraulic conductivity and permeability of the reservoir include flow rate.

The debit is calculated according to the formula.

$Q= V/T$

where V is the volume of the selected fluid; T is the inflow time, the volume of the incoming fluid can be judged by the change in the level of the liquid poured into the tubing on which the CUES are lowered.

$V = (Ncp-Nnp) * S$

where Ncp, Npp is the liquid level in the pipes, respectively, at the end and beginning of the inflow; S is the area of the inner section of the pipes; and by the magnitude of the pressure change recorded by the depth gauges during the inflow

$V= (Rcp-Rnp) *S/g$

Processing of pressure recovery curves (KVD)

The difference between the initial reservoir pressure P pl and the pressure at the bottom of a closed well Pc can be represented as the sum of pressure drops due to the operation of a well with a flow rate of + Q during time T + t and with a flow rate of - Q during time t, where T is the duration of the well before its actual closure; t is the duration of the closed period to the moment in question. Thus , we obtain the order of calculation of reservoir parameters using the formula:

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Pc -Rpl = 0.183 Qm. b lg T + t,
is as follows.
The KW obtained during the test is divided into sections with the t - th number of points. For each point "i" on the curve, the values of Pi are calculated and the value of lg (T +t) / ti is found. After that, a graph is plotted in the coordinates: the abscissa axis lg (T+ ti) /ti, the ordinate axis.
This straight line intersects the ordinate axis at the point Rz = Rpl, because at the same time lg (T +t) / t = 0, which is equivalent to t ~, i.e. an infinitely long period of pressure recovery. Thus, we get the first parameter = the initial reservoir pressure of the Rpl.
Having determined the values of reservoir pressure, flow rate during testing (Qf), initial and final inflow pressures (Rnp, Rcp) are calculated.

Results:
The above-mentioned method of processing KVD was developed under the assumption that immediately after the well is closed, the fluid movement stops and the flow rate is zero, i.e. there is no "afterflow".
In practice, this is feasible only in conditions of intense, high-flow inflows, when the amount of fluid entering the well during its operation per unit of time is significantly (10-100 times) higher than the flow of liquid into the sub-packer zone per unit of time after the well is stopped due to the elastic properties of the sub-packer fluid.
At the same time, during tests, it is often necessary to deal with very low flow rates associated either with low reservoir properties of the reservoir, or with significant contamination of the reservoir, or with large values of the volume of the sub-packer space, which is typical for wells of the Priobskoye field. Therefore, for a reliable assessment of the values of the true permeability of the reservoir, it is necessary to take into account the "after inflow". Before drawing a straight line on the graph, the time of the post-flow effect (the duration of the distorted section of the KVD) is calculated According to the formula
ti = 4Vp/hf

On the graph, the straight line is drawn at points after time t and If the time of the post-flow effect is longer than the pressure recovery time (ti > t), then the KVD is considered incomplete, the reservoir parameters should not be determined.

The degree of contamination of the formation, determined by the skin effect indicator, can be defined as an additional pressure reduction, which should be applied to overcome the resistance of the zone of reduced permeability. Numerically, the skin effect is expressed by a dimensionless number, denoted by S and is found from the equality.

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