WEB-resource "Estimation of oil and gas reserves / resources"

https://petrolres.nung.edu.ua

User Manual

1. System requirements

1.1. Have a computer or gadget with Internet access.

1.2. The presence of Internet browser in the operating system on the device.

2. Preparation of input data

2.1. Calculation using volumetric method

2.1.1. The following sequence of execution is recommended for preparation of input data:

There are two options:

a) the position of the oil / gas contact is not known.

In this case, the algorithm for preparing the input data is as follows:

- to copy the structural map;
- to calculate the height of the trap as the difference between the modules of the absolute marks of the deepest (H_{deep}) and highest (H_{high}) points of the structure by the formula:

$$H_{trap}=[H_{deep}] - [H_{high}]$$

The values of H_{deep} and H_{high} are calculated as:

$$H_{deep}=H_{last\ isodeth}-0,5*c$$
$$H_{heigh}=H_{first\ isodepth}+0,5*c \ ,$$

where $H_{last\ isodeth}$ is the absolute mark of the last isodepth, $H_{first\ isodepth}$ is the absolute mark of the first isodepth, c is isodepth cut;

- to determine the height of the deposit:

$$H_{deposit}= H_{trap}*K^{reg},$$

where K^{reg} is the regional trap filling factor:

$$K^{reg}=\frac{h_{deposit}^{reg}}{h_{trap}^{reg}},$$

where $h_{deposit}^{reg}$ is average value of the interval, h_{trap}^{reg} is average value of the interval,

- To determine the location of WOC(GOC):

$$H_{WOC(GOC)}=H_{high} - H_{deposit}$$

- To show calculated WOC(GOC) on the map.

b) the position of the oil / gas contact is known.

In this case, you need to copy WOC(GOC) on a separate sheet of paper only.

2.1.2. To prepare input data for oil-bearing/gas-bearing area calculation

- to copy WOC(GOC) on the sheet of paper;
- to draw X and Y axis around the WOC;
- to find on axis X the minimum and maximum value in mm;
- to calculate the step

$$D=\frac{X_{max} - X_{min}}{n}, \text{ mm}$$

where n is even number of cuts;

- To divide the distance between X_{min} and X_{max} on equal cuts using calculated step;
- To find points where divided cuts cross WOC(GOC). The points of intersection of straight lines with the oil / gas contact should be numbered clockwise, starting from the leftmost point;
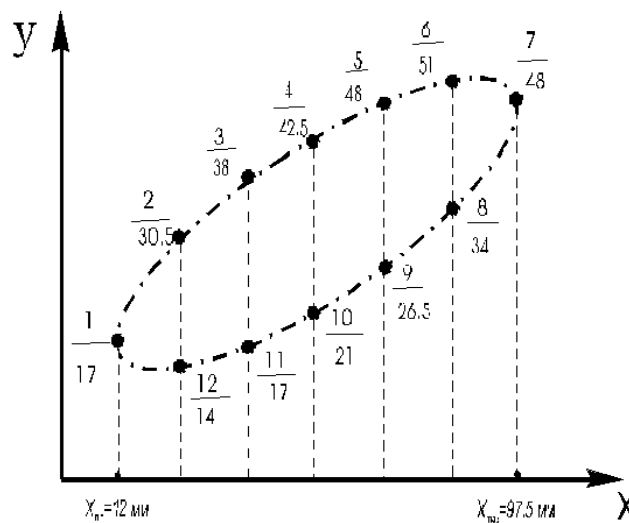- To vertical distance in mm from axis X to each point;

Fig. 2.1. Sample of calculation plan

If the straight lines cross the contour more than twice, you should choose a different coordinate system or conduct calculations for each field separately, and sum the result.

2.1.3. To prepare all other values of calculation parameters, using the method of analogies.

To do this, make a table on a separate sheet according to the sample below.

Software requests	Data and comments
Name and surname	Fedorenko V.M.
Area/field	Example
Deposit/horizon/layer	Menilite formation
Class of resources	C3
Class of reserves	A/B/C1/C2/C1+C2/B+C1+C2/A+B
Scale coefficient	50 (m in 1 mm of the map)
Number of points	12
X_{min} and X_{max}, mm	12 97,5
Ordinates of points Y_i, mm	17 30,5 38 42,5 48 51 48 34 26,5 21 17 14
Effective oil(gas) saturated thickness, m	16,5
Volume coefficient	1,18 (for oil only)
Coefficient of porosity (in fractions of unit)	0,16
Oil(gas) saturation factor	0,82
Oil/gas extractive coefficient (in fractions of unit)	0,32/0,96
Well drainage zone radius, m	250 (for oil reserves of category C1)
Density of oil, kg/m^3	865 (for oil only)
Formation pressure, MPa	30,4 (for gas only)
Temperature, ^{0}C	75 (for gas only)
Gas compressibility factor	0,97 (for gas only)

2.2. Calculation of gas reserves by the method of pressure reduction

To prepare the input data, it is necessary to complete a table according to the sample below.

№ of measurement										
P_{form}, MPa										
$Z (P_{form})$										
$Q_{cum.}$, mln m^3										

3. Data entry, obtaining and analysis of results

Work with the software product should be carried out in the following sequence:

- follow the link https://petrolres.nung.edu.ua and fill in the appropriate fields in accordance with the task;

- check the input data for compliance with the prepared ones. Especially should be checked the data relating to the determination of the of oil / gas bearing. It is recommended to estimate its approximate value as follows. Determine the approximate dimensions (in km) of the length and width of the deposit (within the oil(gas) contour) on the calculation plan. Multiplying them, we obtain the approximate value of the area in km^2 (because of the fact that the area is not a rectangle, its value will be slightly smaller);

- if there are any differences between the prepared and entered information, it is necessary to make corrections;

- click "To calculate". In this case, the approximate value of the area should not differ significantly from that calculated by the program;

- print or save the calculation results in a file. To do this, click "Print!". In the window that appears, select the printer and click "To print", or Microsoft Print to PDF and specify an additional name for the PDF file.