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**Rubanov M.V. master of specialty 185 Oil and gas engineering and technologies**  
**Scientific supervisor: Pashchenko O.A., Ph.D., Associate Professor of the Department of**  
**Oil and Gas Engineering and Drilling**  
(Dnipro University of Technology, Dnipro, Ukraine)

### IMPROVEMENT OF HYDRAULIC FRACTURE TECHNOLOGY

An important scientific and technical problem of the development of oil fields is the simultaneous provision of high levels and rates of oil production with the most complete extraction of oil from the subsoil and high technical and economic indicators of the work of oil production enterprises [1].

One of the ways to solve these problems is the implementation of effective methods for the near-bore zone of wells in the field development practice. Peculiarities of the geological structure, variety of geo-industrial conditions and characteristics of productive reservoirs require, in specific conditions, the application of effective methods of influencing the near-outlet zone of the reservoir, the development of new improvement of existing methods [2].

The introduction of the field into the late stage of development increases the role of the methods of intensification of oil production, which is achieved due to constant work on the fund of wells. This work is primarily aimed at maintaining the wells in working condition by carrying out various geological and technical measures in them, which include the treatment of the outcrop zone, the engagement and shooting (overshooting) of layers, the reduction of the idle fund, the carrying out of repair and isolation works, the elimination of accidents with underground equipment etc. [3].

It is known that the productivity of wells depends on the natural permeability of the productive layer as a whole and the near-bore zone in particular. In addition, the nature and zone of permeability changes during the pumping and operation of wells have a great influence on the further productivity of the object. Deterioration of the collector properties of the productive layer can occur due to the swelling of clays, the precipitation of various salts from the formation waters, the formation of stable emulsions, the deposition of paraffins and corrosion products in the filter part of the wellbore [4].

The essence of hydraulic fracturing is that with the help of fluid injection at high pressure, the opening of natural or artificial cracks in the productive layer occurs, and with the subsequent injection of a sand-liquid mixture or acid solution, the formed cracks are unwedged while maintaining their high permeability after the end of the process removal of excess pressure. During the fracturing process, a pressure of 80-130 MPa is maintained in the annular space of the well in order to reduce the pressure drop on the tubing and packer.

Hydraulic fracturing technologies differ primarily in terms of injection volumes of process fluids and proppants and, accordingly, in the sizes of cracks created. Local hydraulic fracturing has become the most widespread as an effective tool for the near-cut zone of wells. It is sufficient to create cracks 10...20 m long with the injection of tens of cubic meters of liquid and units of tons of proppant. In this case, the output of wells increases by 2...3 times.

Conducting hydraulic fracturing with the formation of extended cracks leads to an increase not only in the permeability of the near-breakout zone, but also in the coverage of the formation by influence, involvement in the development of additional oil reserves and an increase in oil production in general. At the same time, it is possible to reduce the current water content of the extracted products. The optimal length of a fixed fracture with a reservoir permeability of 0.01...0.05  $\mu\text{m}^2$  is usually 40...60 m, and the volume of injection is from tens to hundreds of cubic meters of liquid and from units to tens of tons of proppant.

A 1...3% (depending on the type of surfactant) surfactant solution is used to sell the acid. Hydraulic fracturing is one of the most effective methods of intensifying oil production from low-permeability reservoirs and increasing the production of oil reserves. Based on the experience of using hydraulic fracturing, industrial tests of various technologies, as well as taking into account the peculiarities of the license area, proven hydraulic fracturing technologies should be used. It is necessary to improve this technology in the following areas:

1. Selection of wells for hydraulic fracturing, with the possibility of obtaining significant additional volumes of oil (determined by taking into account the condition of the wells' PZP, permeability of the reservoir, thicknesses, etc.).

2. Conducting hydraulic fracturing with a high concentration of proppant - 1000 kg/m<sup>3</sup> or more.

3. Interval hydraulic fracturing of the formation in order to increase the coverage of formations by impact.

4. Increasing the crack length (deep-penetrating fracturing) due to the pumping of large volumes of proppant (primarily behind the AC12 layer). It is necessary to investigate the possibility of increasing the length of cracks to the size of 5-6 times the effective thickness of the formation (optimal sizes of cracks for connecting unreached zones of discontinuous formations).

5. Improvement of the filtration properties of the reservoir in the zone adjacent to the crack (hydro-acid fracturing of the reservoir, hydrofracturing, foam fracturing).

6. Improving the quality of proppant fixing in cracks for operating conditions with increased depression on the layer with the help of fixing additives (resins, sand-cement mixtures, low-polymer gels), the use of special fibers PROP NET by Schlumberger Dowell or SMA by Halliburton.

7. Addition of reagents to the proppant capable of entering into exothermic reactions (magnesium salts, etc.) in the following OPZs.

8. Strict compliance with the fracturing technology for extracting proppant pushing into the reservoir with a buffer.

9. The use of oriented perforation of formations before hydraulic fracturing allows to orient the crack in relation to the main stresses in the formation and avoid its distortion in the vicinity of the well.

10. Additional studies on determining the orientation of natural cracks in the deposits of the deposit for more accurate prediction of the direction of cracks-rupture during hydraulic fracturing.

11. In order to increase the efficiency of the PPD system, it is proposed to carry out hydraulic fracturing on the well injection fund. This will make it possible to strengthen the impact on remote stagnant zones with immobile reserves, to activate the drainage of low-productivity and highly fragmented layers.

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