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THE RELEVANCE OF WORLD SKILLS AND ENGINEERING EDUCATION IN THE DEVELOPMENT OF OIL RIMS

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An urgent issue today is the interaction of World Skills with the educational process. Since it is WorldSkills in the educational process that demonstrates the knowledge and skills acquired by students in the future in the workflow. While still studying, students undergo training and production practices, but due to their short duration, they are unable to demonstrate the studied competencies in practice, especially in the oil industry. Since today it is known that there are hard-to-recover mineral reserves on the territory of the Russian Federation, namely in Eastern Siberia, which must be extracted using modern methods for their development.

Keywords: *oil, well, flow rate, reservoir, reservoirs, WorldSkills.*

To date, it is known that there are hard-to-recover mineral reserves on the territory of the Russian Federation, namely in Eastern Siberia, which must be extracted using modern methods for their development.

Reservoirs with fluid content (oil, gas, condensate) are of a mixed type, which have the maximum degree of complexity in development. It is worth noting that the operation of the gas cap itself does not raise questions, and the process of developing contact reserves certainly belongs to a complex task [1]. It is also worth noting that contact deposits are caused by minimal oil-saturated strata, which create difficulties in the development process, namely when wiring boreholes and during operation, namely when working with small depressions on the formation, to avoid such breakthroughs as gas breakthrough from the gas cap; water breakthrough from the plantar part of the formation.

It is worth noting that it is possible to prevent a premature breakthrough of gas, as well as reservoir water, by adjusting the modes during development, where a gas-free flow rate due to minimal depression on the formation will also serve as an impetus to reduce the flow rate of oil at the initial stage of development. It is also known that the very limitation of depression on the formation is not rational for a vertical well, due to the fact that the vertical well has the smallest contact area with the formation. Of course, and, the intensification of inflow for a vertical well was accompanied by both a gas breakthrough from the gas cap itself and an increase in the gas factor.

Thanks to horizontal wells, the above situation has improved, since a horizontal well is characterized by a large contact area with the formation, resulting in a larger flow rate with significantly less depression.

As a result, reducing depression reduces the occurrence of a gas breakthrough, and also minimizes the gas factor.

It is worth noting that the operation process is due not only to the complexity of the occurrence of a gas and reservoir water breakthrough, but also the "oblique layering" is a problem.

"Oblique layering" is the angle of inclination of the formation relative to the horizon line. This process, with a slight change in the angle of inclination, does not pose a threat to traditional deposits, unlike contact reserves. For contact reserves, the "oblique layering" has a significant effect on the filtration processes occurring in the reservoir itself [2].

Also, a significant reason for the drop in the oil recovery coefficient during the development of a field with multiphase fluids is an uneven decrease in reservoir pressure in the reservoir, which is accompanied by the movement of fluid contacts.

It follows from the above that during the development of the field, in the case of using a high depression, as well as advancing production, the oil rim is introduced into the gas-oil-water zone.

It is worth noting that in the early years of oil production, the main problem in the operation of contact reserves is the process of formation of gas cones. That is why, in order to maximize the reduction of cone formation, the method of gas injection into the gas-oil zone is used. As a result, a barrier is formed from water, which borders between the gas cap and the oil rim.

But this method also has negative sides, namely, it is not effective in reservoirs with a heterogeneous structure and, as a consequence, low permeability. Also, barrier flooding implies pumping a large volume of oxen and drilling additional injection wells.

It follows from the above that this method is not economically advantageous for oil and gas production.

To date, there are many ways aimed at the development of contact reserves, but the disadvantage of each of them is the need to drill horizontal shafts, which are located quite far directly from the zone of gas-oil contact. It is worth noting that suboptimal wiring near the gas-oil contact can provoke a premature gas breakthrough directly from the gas cap, which can cause a drop in oil production.

It is known that all modern technological solutions for the development of contact reserves are aimed at improving the wiring of wells, as well as optimizing the completion of the wells themselves.

Today, the technology of "Logging while drilling" is known, aimed at optimizing the wiring of wells, as well as logging during drilling. An integral part of this technology is the study of the geological structure during drilling, as damage to the formation is minimized due to the absence of a well stop for real-time assessment of the geological section. The "Logging while drilling" technology allows for real-time assessment of the boundary of water-oil contact and gas-oil contact through comparative analysis of neutron, as well as litho-density logging, as a result of which it is possible to assess the porosity and properties of formations. The "Logging while drilling" method is aimed at choosing optimal well trajectories, and also reduces the risk of suboptimal sinking and, of course, gas breakthrough [3].

It is also worth noting the technology of drilling multi-hole wells and "Multilateral drilling". which is aimed at drilling directional wells, when the main trunk is drilled at the first stage, then the branches are drilled.

It should be noted that the development of oil rims reduces costs when drilling wells from one cluster site, and also increases the flow rate of oil at a lower dispersion due to the large contact of wells directly with the formation itself.

The technology of drilling multi-hole wells itself is aimed at increasing efficiency in the process of mineral development, and is also aimed at reducing the quality of single horizontal wells on the bush site itself. Also, the increase in the contact area is due to the growth content of the gas factor. When drilling horizontal branches, downhole motors are used, which are aimed at deviation from the main trunk, and also allow drilling an additional trunk taking into account the required azimuth, as well as the drilling angle.

It follows from the above that drilling of multi-hole wells has a number of advantages, namely: increasing the flow rate of wells by increasing the contact area with the reservoir itself; increasing the oil recovery coefficient; oil production with low debits; increasing the pick-up rate of injection wells; improving the quality of the trunk wiring near the gas-oil contact and water-oil contact.

Of course, it is worth noting the technology of "Autonomous inflow control devices", which is aimed at limiting the flow of gas directly into the well itself from areas with both increased fracturing and high permeability. This technology involves the use of special discs with a minimum diameter, which allow you to limit filtration into the well.

The technology of "Autonomous inflow control devices" is certainly used on the territory of the Russian Federation and has a number of advantages, namely, the possibility of adjusting the drainage conditions into the well; the possibility of blocking the inner zone (flow pressure) when gas (reservoir water) breaks directly into the well itself; the possibility of limiting well flooding.

As a result, the technology of "Autonomous inflow control devices" allows to increase the flow rate of oil up to 25%.

To date, oil and gas production departments in their activities during the development of deposits use chemical reagents to monitor the state of environmental protection.

Monitoring of changes in the physical and chemical properties of water is carried out with geological study, as well as hydrogeological study of surface and deep sources.

On the territory of the activities of oil and gas departments, a surface map of drains is being built, which is combined with communications for the transport of fluids, as well as their mixtures. Pipelines that pump wastewater deserve close attention. It is worth noting that it is necessary to determine the boundaries of the distribution of the source and channel of the drain, settlements, as well as sources of drinking water.

It is known that in the process of drilling wells in oil and gas fields, it is necessary to adhere to the following rules, namely:

– Prevention of open gushing, absorption of flushing fluid, collapses of the well wall, collapses of interplastic fluid flows at the time of wiring, development of the well with its further operation;

– Strong insulation in the wells of oil, gas-bearing, as well as water-bearing formations, throughout the entire opened section;

– Reliable tightness of the process column, casing string, tightness of pipes that are lowered into the well itself, as well as their high-quality cementing;

Forecast and instantaneous prevention of reservoir properties of reservoirs, taking into account the preservation of their natural integrity at the time of opening, fastening, as well as development.

The exploration process itself, at the time of preparing the field for its further development, it is necessary to test all layers, oil and gas content, which, of course, will differ from the results of the analysis of sludge, rock samples, as well as from geophysical tests. As a rule, the process of testing water layers is accompanied by a number of studies aimed at clarifying the source of water intake.

Also, the process of opening layers with increased pressure, which may be accompanied by emissions, open fountains should be carried out when located at the wellhead with anti-blowout equipment using flushing fluid in compliance with the requirements of the technical design for drilling wells.

It is worth noting that the field object must be drilled taking into account compliance with certain requirements that will prevent damage to other operational facilities. At the time of priority drilling of the lower layers, it is necessary to observe a number of technical measures that guarantee favorable wiring of wells through the upper productive layers.

It should also be noted that in wells conducted on the underlying layers, it is necessary to observe a number of rules to prevent the flushing liquid from leaving the upper layers. At the moment when the liquid leaves the upper layers being developed, the operation of the well itself, as well as those located nearby, should be suspended until the drilling is complete, as well as the descent of the intermediate column.

It is known that in order to prevent a decrease in the permeability of the bottom-hole zone of wells due to the long-term influence of water or clay solution on them at the end of drilling the well, as well as the perforation of the column, it is necessary to take appropriate measures to develop the well in the shortest possible time [1].

It is also worth noting that the step-by-step testing of more than two oil-bearing formations in an exploration well is carried out separately from the bottom up. At the end of the process of testing the oil reservoir, it is isolated by installing a cement bridge with further verification of its location, as well as the presence of its tightness and lowering the level, by crimping.

In addition to the above, in wells that have not been completed by the drilling process for certain reasons, for example, as a result of accidents or poor wiring quality, insulation measures should be carried out to prevent interplastic fluid flows.

Of course, when drilling, as well as the development of exploration, production, injection wells, it is necessary to carry out a number of studies, namely geophysical and hydrodynamic.

A set of measures to protect the environment at the time of drilling of oil fields, it is necessary to observe and take into account measures aimed at preventing contamination of subsurface; both

surface and underground waters due to drilling mud; chemical reagents; petroleum products, as well as mineralized water [2].

In conclusion, I would like to note that in order to prevent the above pollution, it is necessary to take into account:

– Plan, drilling site deboning;

– Tightness of containers (tanks) intended for storage of petroleum products, chemical reagents;

– Safe storage of drilling mud, sludge tanks, earthen barns;

– Continuous use of drilling mud, neutralization, discharge, removal of it, as well as sludge in designated areas;

– Rational use, as well as land reclamation work at the end of the drilling process in compliance with laws, regulations, and state programs.

In conclusion, I would like to note that operational control over the state of environmental pollution with petroleum products is determined by the content of the quantitative composition of petroleum products, as well as polycyclic aromatic hydrocarbons, since these substances have toxicity, resistance to destruction, high solubility, increased migration activity in different environments.

Directly from the location of the region, as well as the tasks of the regime network, the oil pollution monitoring system can be defined as regional or local.

The regional forecast implies a forecast for large areas, taking into account the quality level, which reflect the most general environmental issues. The report is compiled at the end of a comparative analysis of the actual material with a sequence of both spatial and temporal.

The local forecast is carried out directly for a specific object, for example, wells, deposits, etc. The characteristic of the obtained results of stationary observations of the dynamics of all components of the environment is carried out using mathematical models using certain methods, for example, analytical, analog, numerical.

The regime network itself includes observations of changes in meteorological conditions and hydrogeological characteristics of surface watercourses at existing wells or special drilled wells.

Stationary studies at the sites of particular interest to us, the main indicators of pollution in the air, soil, water, and soils are monitored by monitoring the composition and forms of pollutants.

It is known that quantitative assessment in oil pollution is carried out taking into account the monitoring of the mass and volume content of indicator components, depending on background values and maximum permissible concentrations of substances.

Consequently, a comprehensive assessment of oil pollution, taking into account the physico-chemical changes in petroleum hydrocarbons of all environmental components, allows us to identify the source of pollution, with further forecasting of development in the territory, by section with a further proposal of measures to eliminate [1].n methods for their development.

In conclusion, I would like to note that it is the interaction of World Skills with the educational process that allows students to demonstrate the skills, knowledge, and skills acquired during the study of the program for the development and operation of oil and gas fields, the use of technologies such as multi-hole drilling technology, technology of autonomous flow control devices in the well serve as optimal methods to eliminate gas breakthrough. Of course, the use of the above technologies will reduce depression directly in the operated wells themselves, as well as reduce the gas factor and, of course, increase the flow rate of oil.

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