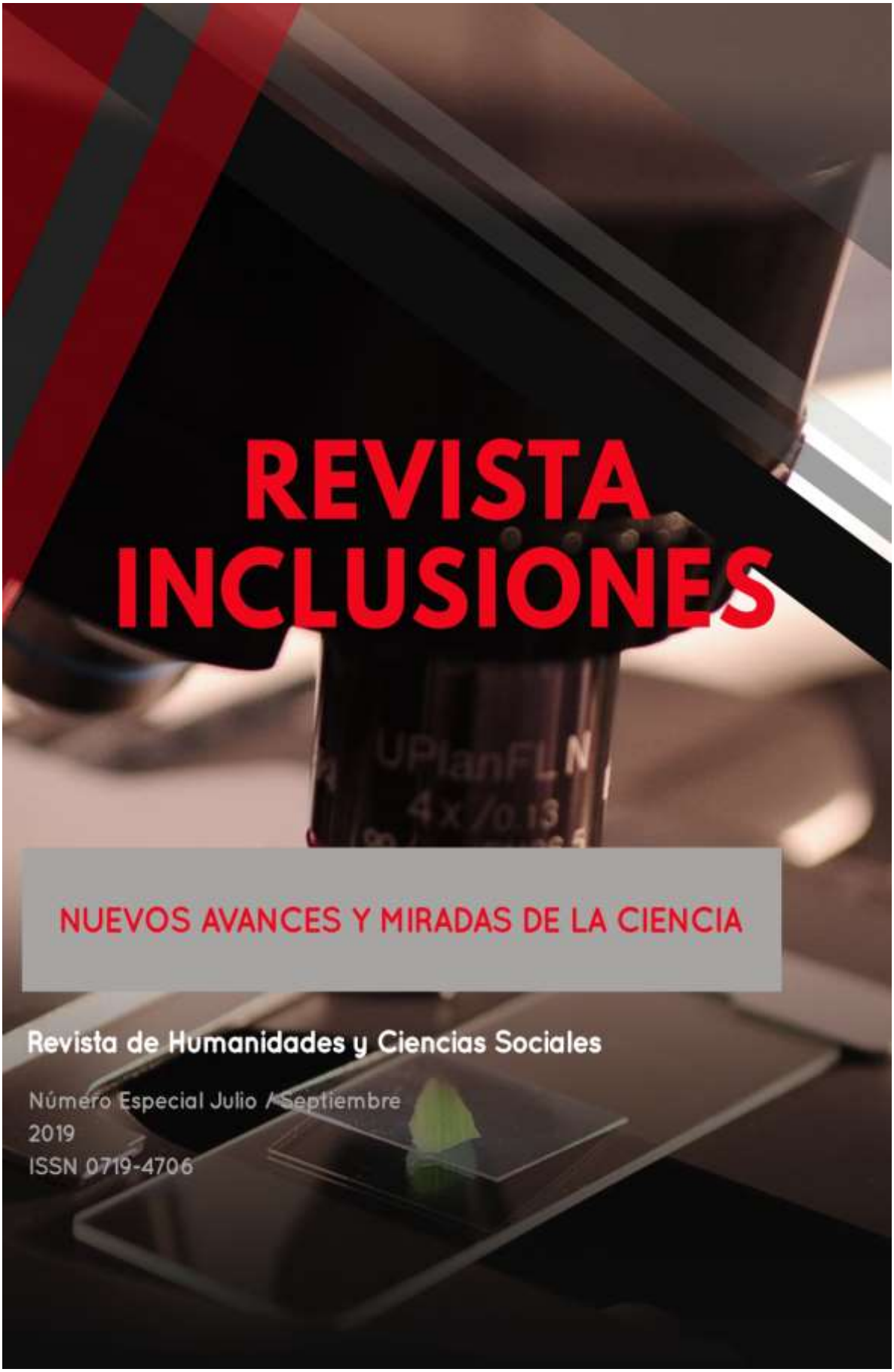

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ASPHALTEN-RESISTANCE AND PARAFFIN SEDIMENTS

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Abstract

His article discusses the implementation of a comprehensive program of technical re-equipment of oil and gas production. Methods of combating the formation of ASPO in wells, the intensive introduction into the production of new equipment and technology, automation and automated production management systems are analyzed and reviewed. Based on the analysis performed, the use of acceptable methods to reduce the formation of ARPD was justified.

Keywords

ARPD – Well – Automation – Reservoir – Production – Oill – Gas

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Introduction

As a result of the discovery and development of oil and gas fields in Tatarstan, Siberia and other regions, very complex tasks have been assigned to scientists and practitioners in our country. Scientists in the process of field development made a fundamental contribution to the theory and practice of fundamentally new development and development methods using intensive methods of water flooding, the use of injection wells. Intensive methods have been applied not only in large fields but also in small deposits, characterized by poor filtration conductivity of reservoirs. A significant contribution by Soviet scientists has been made to the theory and practice of the development and exploitation of oil and gas fields in permafrost conditions. Large-scale works are being carried out in our country to develop methods for intensifying the flow of oil and gas to wells, and to increase oil and gas output from reservoirs. At the same time, the workers of the oil and gas industry still face many unresolved problems in increasing the efficiency of exploitation of oil and gas deposits. The most difficult task is to increase oil and gas recovery.

Currently, recoverable oil reserves do not exceed 45-50% of the absolute. Substantial amounts of gas and condensate remain unbroken in the depths. Much remains to be done on the disposal of all gas produced along with oil, on the automation of oil and gas production facilities and the introduction of an automated control system (ACS) for the oil and gas industry. It is necessary to take measures to increase the residual reserves of numerous old oil deposits.

Oil production is accompanied by the inevitable change in thermodynamic conditions and the transition of oil from the reservoir to surface conditions. This decreases the temperature and pressure. The phase equilibrium of individual hydrocarbons in the mixture is disturbed and they are released in the form of hydrocarbon gases and solid, or greasy, heavy fractions in the form of paraffin, resins, asphaltenes[1].

Fine paraffin particles can remain in suspension and be carried away by the fluid flow. Under certain conditions, they stick together with asphaltenes and resins, forming small lumps of hydrocarbons, which stick to the rough walls of the pipes, reducing their cross-section. The beginning of sediment deposits is noted at depths of 900-300 meters from the wellhead. Paraffin deposition is facilitated by low flow rates and periodic exposure of the pipe surface as a result of pulsation[2].

The formation of ARPD occurs mainly in wells operating in a periodic mode or accumulation mode, as well as in wells with a small flow rate.

[1] A. Sorokin and A. Khavkin, “Features of the physicochemical mechanism of formation of aspop wells”, Burenieineft num 10 (2007): 30-31.

[2] N. Krishtiana and L. Kimatova, “Antibacterial Study and Green Preparation of Silver Nanoparticles through Some Plants”, Medbiotech Journal Vol: 2 num 2 (2018): 54-58; T. Tasnim and A. Farasat, “The Bioproduction of Ethanol through Isolation of Some Local Bacteria”. Medbiotech Journal Vol: 2 num 3 (2018): 132-135 y S. Heidary; M. Imani and S. M. Mostafavi, “A Validated and Rapid HPLC Method for Quantification of Human Serum Albumin in Interferon beta-1a Biopharmaceutical Formulation”, Medbiotech Journal Vol: 1 num 1 (2017): 29-33.

Rinsing with hot oil to remove ARPD is ineffective or ineffective, since the oil when pumped into pipes to the required interval has time to cool down, and undifferentiated paraffin crystals create crystallization initiation centers around which ARPD forms very quickly again.

Results

The most effective removal of paraffin is the injection of paraffin deposition inhibitors. Protection of wells using ARPA inhibitors, taking into account the presence of low dynamic levels, periodic operation of wells with pumping production and work with the accumulation of wells, as well as low flow rates of most wells complicated by ARPD, should be carried out by all methods of protection, choosing specifically for each well.

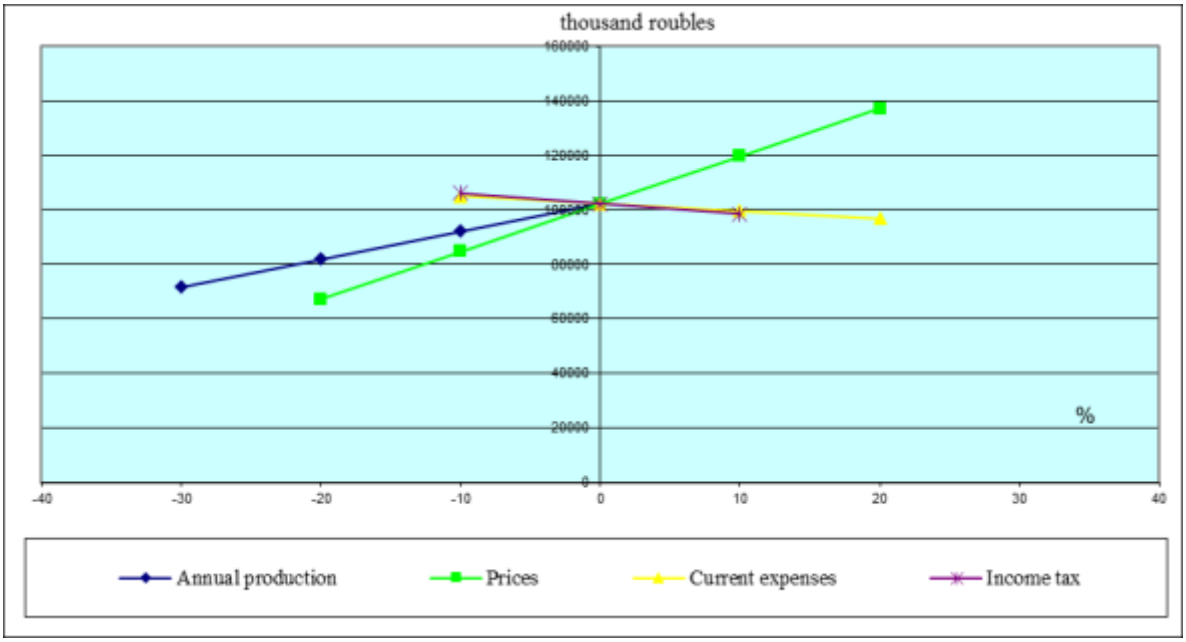

Fig.1
Diagram "Spider"

From the graphs in Fig. 1 of accumulated cash and net present value, the dynamics of cash flow to the account of the enterprise are visible. The implementation of this event is cost-effective because at low cost brings significant income to the enterprise. The location of the "spider" chart in the positive area indicates that, for any variety of factors, the company will only bring profit.

Findings

Wells equipped with a low dynamic level ESP are not recommended to be protected by the method of periodic injection of the inhibitor into the annular cavity, as the reagent is quickly removed from the product flow[3].

[3] J. K. Kerver and I. K. Heiheiker, “Scale inhibition by the squeeze technique”, J. Canada Petrol. Technol. Vol: 8 num 1 (1969): 15-23.

Considering the lower dynamic levels and low permeability, it is recommended to protect most of the wells working with the reservoirs by using an inhibitor using the technology of continuous reagent supply with the help of deep dosing units equipped at the wellhead. The use of inhibitors to protect oilfield equipment from ARPD increases the turnaround time of the wells several times. Prospective development of ARPD inhibitors tends to create complex action inhibitors using biodegradable surfactants, which makes it possible to increase not only the inter-treatment period by 5 or more times, but also create conditions for the initial, downhole oil demulsification, which in turn will reduce the consumption of the demulsifies and improve the quality of oil preparation for processing.

It should be noted that the use of traditional methods of removal of paraffin seemed to be ineffective due to their use in wells that do not meet the boundary parameters of their use.

The basis of the action of acids, reagents, and inhibitors of paraffin deposits is adsorption processes. When using chemical methods based on dosing in the produced chemical compounds, which reduce and sometimes completely remove or prevent the formation of asphalt-resinous and paraffin deposits.

The basis of the electric heaters, it should be noted that the heating will occur over the entire interval from bottom to bottom of the well, thus there will be no temperature difference during production, transportation of paraffin oil products will not be delayed in the oilfield equipment.

While maintaining a constant pressure in the wall, the ASPO will not be deposited in the oilfield equipment.

Insufficient time of each of the above methods does not allow to make an exhaustive analysis and to offer the most effective way to remove the problem of deposits of paraffin in the oil field equipment at wells and oil-gathering reservoirs. Except for maybe the latest positive developments, namely, biological removal of paraffin in wells. In the process of working with the existing stock of wells, it is necessary to use as many different methods of struggle against ARPD as possible. For each well has its characteristics of work, the methods of removal during the production process should be different. In the course of the current work, the well stock should be determined in which the application of certain methods of ARPD is most effective.

Conclusion

When considering all the methods and methods of dealing with ARPD, the following conclusion can be drawn. The use of chemical methods to protect equipment from sediment deposits and their removal is not widely used, due to the high cost of the reagent and the high cost of technology for their use. The cost of the reagent for the elimination of ASPO (SNPH 7880) at the rate of 6-7m3 for one injection cycle at 15 thousand rubles per ton will require significant costs during the year. It is necessary to pay attention to the fact that the need for reagents is shown without taking into account the inter-treatment period of good operation - that is, one effect on the elimination of ARPD.

The use of a two-row elevator did not bring the expected effect on the estimated scale, although wells were identified where hot-oil flushing through a two-row elevator is quite effective. The inexpediency of further work was due to two main reasons:

1. The MCI-considered well category has not changed, and in some cases has even decreased.
2. MOS practically has not changed, and the cost of pipes and wellhead equipment is a rather expensive “pleasure”, which does not pay off in the process of operation.

Theoretically substantiated as the most effective and recommended method for removing AFS by heating projectiles and in practice proved to be an effective and inexpensive method for removing deaf plugs and wells where non-revenue was obtained. Such work is underway to the present. The work involved three links for cleaning the tubing with a scraper tubing (on an automatic winch) and one Melter. Most of the wells have an ARP formation interval of up to 300 meters. This fund makes up to 70% of all wells with the intensive formation of ARPD, and 30% of them have ARPO formation depth up to 100 meters.

Wells with a depth of formation up to 500-700 meters make up to 28% of all, and the depth of formation of more than 500 meters is about 1.5%.

The formation of ARPD in the tubing at a depth of up to 100 meters is often observed in idle or stopped wells for some reason, regardless of the flow rate and production watering.

In wells with an interval of up to 300 meters, the average statistical flow rate is 52 m^3 / day with a water cut of up to 15%.

In wells with an interval of up to 500 meters, the average flow rate is 45m^3 / day with a water cut of up to 25%.

Thus, we can conclude that the depth of formation of ARPD is inversely proportional to the flow rates.

Acknowledgments

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References

Heidary, S.; Imani, M. and Mostafavi, S. M. “A Validated and Rapid HPLC Method for Quantification of Human Serum Albumin in Interferon beta-1a Biopharmaceutical Formulation”. Medbiotech Journal Vol: 1 num 1 (2017): 29-33.

Kerver, J. K. and Heiheiker, I. K. “Scale inhibition by the squeeze technique”. J. Canada Petrol. Technol. Vol: 8 num 1 (1969): 15-23.

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Sorokin, A. and Khavkin, A. “Features of the physicochemical mechanism of formation of aspop wells”. Burenieineft num 10 (2007): 30-31.

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