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IMPROVING THE PERFORMANCE OF PUMPS IN OIL FIELDS

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Abstract

In this article, the main task of the work is to increase the amount of oil recovery from wells by studying the factors affecting the performance of deep well pumps due to changes in the composition of the raw materials of oil wells and methods for eliminating them. The increased level of hydration of the productive layers in oil fields creates difficulties in the process of mechanical extraction, collection and preparation of commercial oil. The opposite of such difficulties is the formation of viscous water-oil emulsions, which have a large value. Many scientists have conducted scientific work on the problems of improving the effectiveness of the operation of rod deep well pumps and their impact on the performance of pumps. Stable emulsions lead to breakage of rods when using a submersible pump (submersible pumps), breakage of electrical components in a centrifugal electric pump (CEP), and premature repair of SEM (submersible

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electric motors). Due to the incomplete filling of the chamber of the submersible pump with liquid and the increase in hydraulic resistance in the working parts of the centrifugal electric pump under the influence of the tensile stress applied to the rod, the daily transmission rate decreases by 2 times. The factors that negatively affect the performance of the use of submersible pumps in oil production, namely the release of dissolved gases in the oil, sand particles, heavy hydrocarbons in the wellbore and the working parts of the pump, and their consequences are presented.

Keywords: Oil, pump, deep, well, sand, dissolved gas, paraffin, curvature, water, rod.

Introduction

Currently used in the extraction of oil from oil fields is determined by the long-term reliable operation of their constituent elements, the ability to extract the required amount of oil in a timely manner, the distribution of various mechanical impurities and resinous paraffins in the raw material , etc. Therefore , increasing the efficiency of oil extraction from wells while ensuring the long-term operability of deep well pumps is one of the important issues of the present day .

Purpose and objectives of the work

The main purpose of the work is to study the factors affecting the performance of technological equipment operating in interaction with the environment as a result of increased water content in wells during oil extraction using deep well pumps, the presence of aggressive environments in the composition of the oil raw material, and the formation of layers with low adhesion with the metal surface , reducing the amount of solid particles in the composition of the raw oil and increasing the wear resistance of pump elements, eliminating negative factors affecting the operating modes of pumps, such as temperature-dependent settling of heavy hydrocarbons in the composition of the oil , and the release of free gases at the bottom of the well .

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Analysis of literature on the topic

The rod well pump device is widely used in the operation of wells, including those with a large amount of free gas, mechanical impurities, water, and paraffin and mineral salt deposits in the well product during the operation of the well. Difficulties arise when using pumps to operate curved sections of the well. Each of these factors reduces the efficiency of the rod well pump device, and when the above complex factors occur together, they can cause serious dangers.

Many types of complications arise when using wells with rod pump installations, and they include the following.

1. The amount of free gases entering the well along with oil.
2. Sand particles entering the well along with oil.
3. Formation of paraffin deposits in the pump, pump-compressor pipes and rods.
4. Bending of the wellbore.

Research Methodology

As a result of the harmful effect of gas on the pump in the operation of the lever device, the pump filling coefficient decreases and complications arise.

As the idle phase decreases, the intake volume increases and the pump fill factor becomes higher. In order to reduce the idle phase in the pump, an additional drive valve is installed at the lower end of the plunger, and it is carried out by inserting the plunger into the pump cylinder.

By increasing the length of the plunger stroke and simultaneously reducing the diameter of the submersible pump, the proportion of the volume of the waste phase decreases. In mining conditions, the pump is immersed deeper below the dynamic surface.

In rod pump installations, sand that comes out with the working oil creates difficulties. Sand entering the pump disrupts the plunger's movement, resulting in increased fluid leakage through the valves, often causing the plunger to stick to the pump, the rod to break, stopping fluid flow from the well, and requiring well repair. The repair interval for such wells is very short.

The annular space between the pump pipes and the tubular rods is filled with water or oil, eliminating the imbalance when the plunger moves downward. When extracting paraffinic oils, complications arise due to the deposition of paraffins on the walls of the liquid pumps, on the walls of the pump-compressor pipes, on the

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rods and in the deep well pump. The remaining paraffin also settles on the walls of the oil wells, leading to a reduction in the cross-sectional area, while at the same time, paraffin deposits settle on the walls of the oil wells, on the walls of the rods, preventing the movement of the rod assembly and the movement of the liquid.

When working with rod-type deep wells, they can damage the pump rod and pipes and cause cracks. To combat this negative phenomenon, centering devices are installed on the rod string. All types of centering devices are divided into two groups: sliding centering devices and vibrating centering devices (roller centering devices). Centering devices are made of metal and plastic materials. Centering devices installed on the rod string also perform the function of a scraper.

Conclusions and Suggestions

Measures are being developed to eliminate the impact of negative factors and to assess the efficiency of pumps in ensuring the long-term reliable operation of technological equipment used to increase the quantity and quality of oil field production using deep well pumps .

Performance indicators of pumps in mining conditions , the composition of mined products are studied and recommendations are made to eliminate negative effects .

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