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TECHNOLOGY OF MOVEMENT OF OIL STREAMS BY THERMAL METHODS

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A B S T R A C T	K E Y W O R D S
Steam oil compression is the most common method of increasing the oil yield of formations, and it has many advantages over all other methods in the compression of high-viscosity oils. In this process, steam is pumped into low-temperature and high-viscosity oil layers from the surface of the earth, within the boundaries of the oil field, through special steam-driving wells. Steam at 2300 C is 3-3.5 times more than hot water, has a large heat capacity (more than 5000 kDj/kg), brings a lot of heat energy to the layer. This input heat energy is spent on heating the formation, reducing the relative permeability and oil viscosity, saturating the formation and expanding oil, water, and gases.	

Introduction

The following three zones are formed in the layer, which differ in temperature, saturation and compression properties1. The temperature of the zone around the driver well varies from the temperature of the driven steam to the temperature of the start of condensation (400-200^{o}C). In this zone, the extraction of light fractions of oil and their migration (compression) along the layer with steam occurs, i.e., it is a zone with hot condensate whose temperature varies from the temperature of the beginning of condensation (200°C) to the temperature of the layer. In this zone, hot condensate (water) compresses the light fractions of oil under non-thermal conditions. It is a zone at the temperature of the initial layer, which is not affected by heat. In this zone, oil is displaced by formation water.

During the continuation of the process, the steam and hot condensate zones expand, and the third zone with the temperature of the initial layer shrinks. The end result is a hot, condensate zone and then a steam zone that can reach the receiving wells. It is observed that hot water and steam penetrate the wells and bring them to the surface together with oil.

After that, it is not practical to continue the process of steam driving.

During heating of the layer, distillation of oil, reduction of viscosity and volumetric expansion of all factors in the layers, changes in phase conductivities, wettability of the layer, mobility of oil and water and other indicators occur.

The main part of oil displacement efficiency is due to reduction of oil viscosity (40-50%), followed by oil distillation (18-20%), change in mobility (18-20%), oil expansion and formation wettability. is mounted. During the movement of steam and hot condensate in the formation, heat loss occurs due to heat transfer to the rocks surrounding the oil formation. Heat loss is proportional to the temperature at the boundary with the rocks surrounding these zones, the temperature at their contact surface, contact time and other indicators.

When the thickness of the oil layer is small, the temperature at the boundary with the rocks surrounding it is always high, the relative surface area (compared to the volume of the layer) of heat exchange is also very large, as a result, when the distance between the wells is large, steam In many cases it does not work. Therefore, the most rational technologies and systems of oil steam compression are characterized by low heat consumption, full and even heating of the pile volume.

Therefore, to apply this method, sufficiently thick layers (15 m and more) are selected, their middle part is opened in the driving wells, the well placement system is adopted at a density of 1-2 to 4-8 ha/well across the field. is made, the steam is provided by successively alternating steam and water at maximum speed, after the layers are sufficiently heated, water is pressed.

Steam extraction of oil from formations is used in many countries that use high-viscosity oil fields. The conditions of using the method of increasing the oil yield of the layers have been sufficiently studied and tested.

Currently, various forms of this method are used:

- oil extraction with steam;
- periodic exposure to layers with steam heat;
- transfer of steam injection into the layers to the bottom of receiving wells combined with steam-heat treatment, etc.

The technological efficiency of the method depends on uniform heating of the layer, the level of heat use for heating the layer and liquids. In high-permeability layers with a depth of no more than 500-800 m and an oil viscosity of no more than 200-1000 mPa*s, the use of steam can ensure that the final oil recovery is up to 50-55%.

However, it is impossible to significantly increase the final oil yield in inefficient process technologies or in unusable facilities (cracked, saturated with small oil), the amount of additional oil obtained may not cover the oil spent on steam production. 1 ton of oil can be burned in a steam generator to produce 13-15 tons of steam. 2.5-3.5 tons of steam are used to obtain 1 ton of additional oil under favorable conditions for steam extraction.

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