Analysis Of Liquid Accumulations At The Bottom Hole Of Gas And Gas Condensate Wells

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ABSTRACT

This article provides brief information on the origin of technological and geological factors that negatively affect production rates due to well flooding at the final stage of operation of gas and gas condensate fields.

Keywords: Gas, Pressure, Liquid, Aquifer, Condensate, Wells, Reservoir, Pressure, Gas-Liquid.

Introduction

Currently, a large number of wells in gas and gas condensate fields are subject to the process of liquid accumulation at the well bottom with subsequent self-crushing . This leads to the cessation of gas supply from the well, which entails large losses of recoverable gas and, as a consequence, failure to achieve the final gas recovery factor.[1]

Main part

Currently, the operation of gas wells is complicated by many factors, the main ones being the decrease in reservoir pressure at the field and the accumulation of liquid at the well bottom. These two complications are inextricably linked. In world practice, the development of the complications in question is divided into 4 stages, as each of them occurs, the gas flow rate decreases, while the amount of water in the wellbore increases, which leads to the cessation of the inflow into the well [1].

By the end of the well's service life, the fluid level may be above the perforations, and gas in the form of bubbles will rise through the liquid column to the surface. In this case, gas production will be carried out with a low but stable flow rate and the liquid will not reach the wellhead. If we analyze the operation of such a well without taking into account its history, we can assume that there is no accumulation of liquid in such a well, and the low flow rate is a consequence of a decrease in reservoir pressure.

Many wells produce not only gas, but also condensate and water. If the reservoir pressure drops below the dew point, the condensate enters the well together with the gas in liquid form, but if the reservoir pressure is above the dew point, the condensate enters the well in the form of a vapor phase together with the gas and can become liquid in the lift column or in the separator.

There are several mechanisms for water entering a gas well:

1. Water can come from an aquifer located above or below the gas-saturated formation.
2. In a water-driven mode, water moving along the formation will reach the bottom of the well.
3. Unbound formation water can be removed from the formation along with gas.
4. Water or hydrocarbons can enter the wellbore along with the gas in the form of a vapor phase and condense in the lift column.

Let's look at these sources in more detail.

A flood cone occurs when the gas flow rate is high enough to entrain water from the underlying aquifer, which may be located outside the perforated wells. interlayers . It is worth noting that in horizontal wells, significantly smaller pressure gradients are observed between gas and underlying aquifer zones, however, at very high flow rates we can observe a similar picture, which in turn is called not the formation of a flood cone, but the pulling of the GWC to the horizontal well.

When a well operates in a water-driven mode, that is, when the reservoir pressure is maintained due to the energy of the aquifer, water is ultimately drawn to the gas producing well, which will ultimately lead to this water entering the wellbore, which entails the above-mentioned problems associated with the accumulation of liquid at the bottomhole.

In the case where the well is completed with an open hole, or several intervals of the formation are perforated in the well, water inflow from other intervals is possible. This situation can be used to our advantage if the aquifer is located below the productive gas formation. Using various technical means and technological methods, as well as upon reaching the required injectivity, water can be pumped into the aquifer intervals, which will allow the gas to rise to the surface.

Due to poor quality cementing of the annular space or destruction of the cement stone, behind-the-annular cracks occur . overflows that allow water to flow from aquifers interlayers into gas layers, and then into the wellbore.[2]

Do not forget about water, which may be in an unbound state in the gas-bearing layer. It will also enter the well along with the gas.

Since the gas flow rate decreases with a decrease in reservoir pressure, this will also be accompanied by an increase in the amount of liquid in the wellbore. [3.4.5.]

Conclusion

Taking into account the potential increase in the number of wells subject to flooding in gas and gas condensate fields, it becomes obvious that there is a need to find a solution to this problem. For this purpose, existing methods of combating flooding of gas wells used in Uzbekistan and abroad were analyzed.

Literatures:

1. Дж. Ли, Г. Никкенс, М. Уэллс Эксплуатация обводняющихся газовых скважин. Технологические решения по удалению жидкости из скважин. Москва: Премиум Инжиниринг, 2008. 384 с.
2. Геологические отчеты ООО «Газпром добыча Ямбург», 2008–2011.
3. Unloading Technologies Selection Tool for Dewatering Solution / Imbò P., Gorini S., Passucci C., Marfella F. // Offshore Mediterranean Conference and Exhibi-tion. 2017.
4. Joseph A., Sand C.M., Ajienka J.A. Classification and Management of Liquid Loading in Gas Wells // SPE Nigeria Annual International Conference and Exhibition. 2013.
5. Radwan M.F. Feasibility Evaluation of Using Downhole Gas-Water Separation Technology in Gas Reservoirs with Bottom Water // SPE Middle East Oil & Gas Show and Conference. 2017.
6. Ibrahimovich, A. A., & Alanazarovich, M. Z. (2024). Selecting a process for oil and gas development reserve deposits hydrocarbons. *Web of Discoveries: Journal of Analysis and Inventions*, *2*(9), 24-25.
7. Muhammadiyev, H., & Oripova, L. (2023). Critical analysis of technological efficiency assessment methods of geological and technical measures in

wells. *Modern Science and Research*, *2*(10), 664-667.