WEB OF SCIENTIST: INTERNATIONAL SCIENTIFIC RESEARCH JOURNAL
ISSN: 2776-0979, Volume 5, Issue 5, May - 2024

PROBLEMS OF FLUID LOSS IN WELLS AT OYDIN GAS CONDENSATE FIELD

Shukhrat Adxamovich Sultonov
Senior Lecturer at the Department of Economic Geology and Exploration of Minerals, Qarshi Engineering and Economics Institute,
sultonovshukhrat87@gmail.com

Ali Rustam ogli Sultonov
Student of Karshi Engineering Economics Institute
"Geology, Exploration and Exploration of Mineral Deposits"
sultonovali222@gmail.com

Asilbek Jononov
Student of Karshi Engineering Economics Institute
"Geology, Exploration and exploration of Mineral Deposits"
jononovasilbek717@gmail.com

Sultonov Nekruz Alikulzoda
Student of Karshi Engineering Economics Institute "Geology, Exploration and Exploration of Mineral Deposits"
sultanovnekruz6@gmail.com

Abstract
In this article, information on fluid loss problems in wells in the Aydin gas condensate field is briefly discussed. In particular, mining indicators are briefly analyzed, information on the production of currently working wells, and some comments and recommendations on improving production are given.

Keywords: mine, well, horizon, reserve, fluid, gas, gas condensate, aerodynamics, structure, fold, layer, anticlinal, artesian.

INTRODUCTION

Usually, over time, water begins to appear in the product of wells. Especially in gas wells, the liquid that is taken together with the gas gradually collects in the well body, creates an obstacle to the gas flow and even stops the well from working.
The reduction of well water control measures and elimination of accumulated fluid in the gas well body provides an opportunity to increase well productivity.

Most of the gas and gas condensate fields used in the Republic of Uzbekistan have the above-mentioned problem, and solving this problem is one of the urgent issues.

DISCUSSION

A liquid is a physical body that has two distinct properties: it can change its volume dramatically even under the influence of a sufficiently small force, and it is fluid and easily mobile. In other words, liquids are substances whose molecules are randomly arranged and periodically jump from one equilibrium state to another. The most important mechanical characteristics of a liquid are its density, specific gravity and viscosity.

Flow of gases and liquids - movement of gaseous substances and liquids under the influence of pressure. When a gas (or liquid) flows slowly, the layers are parallel to each other. Such flow is called laminar flow. If a gas (or liquid) flows quickly, the layers will mix. Such flow is called turbulent flow. When layers of gas and liquid move relative to each other, an internal friction force, i.e. viscosity, arises between them. The transfer of laminar flow to turbulent flow in the pipe is expressed by Reynolds number pzV. Here: r — gas or liquid density, 8 — flow rate, g — pipe radius, d — viscosity coefficient.

The viscosity coefficient of gases is several hundred times smaller than that of liquids. For gas or liquid to flow in a pipe, the pressure difference between the two ends of the pipe must be Ar=r,—r². For laminar flow, the volume of gas (or liquid) flowing through the tube in a given time is expressed by the Poiseuille formula: V = vro, 8l (where Ar is the pressure difference, / is the length of the tube). At very low pressure (vacuum), the flow of gases differs from normal conditions. If gas molecules do not collide with each other during gas flow, such flow is called molecular flow. In molecular flow, the amount of gas flowing through the tube does not depend on the speed of the molecules and the viscosity coefficient, which is directly proportional to the cube of the tube radius. Studying the flow of gases and liquids is one of the main issues of aerodynamics and gas dynamics.

At present, various methods are used to fight against water in the production of liquid from water wells, to protect the well from flowing water, and to use water water wells. Let's consider this problem on the example of Oydin mine.

The Aydin field is located in the Bukhara-Khiva gas-oil region (conditional region, so state borders should not be important in the region) and consists of gas and condensate fluids.

Oydin mine is located in Guzor district of Kashkadarya region. Guzor is located 17 km southeast of the district center. From the tectonic point of view, the mine is located in

the north-eastern part of the Amudarya fold, the Chardjou thrust, and the Beshkent fold.

The Oydin structure was discovered in 1995 as a result of seismic exploration. The Aydin mine exploration well No. 1 is located 3.05 km southwest of the Guzar field parametric well No. 1, 4.65 km southeast of the Chanak field well No. 1, and 5.15 km southwest of the Guzar field parametric well No. 2. . The main purpose of installing the exploratory well No. 1 of the Oydin field is to study the deep geological and tectonic structure of the field, to determine the oil and gas accumulations in the carbonate deposits of the Upper Jurassic period, and to organize the hydrogeological and hydrochemical properties of the formation waters. At the mine GSCH (GVK) minus 2158 m abs. otmetka. In the Oydin mine, the initial pressure of the productive layer was 271.6 kg/sm^2, the temperature of the initial layer was 84^{o}C, and the initial potential mixture of condensate and gas was 69.14 g/m^3.

The mine is in the form of an anticlinal T_5 - on the upper part of the return horizon (lower anhydrite) minus 2150 meters according to the isogyps, its size is 5.0 x 2.4 km, i.e. 10.2 km^2, the amplitude is 150 meters.

The estimated projected gas reserve of the C_3 category of the area bounded by the tectonic fault of the eastern wing of the dome-shaped projection is 6.538 billion. m^3, oil 621 thousand tons.

In order to extract gas products from the mine, NK pipes of Ø73 mm brand L 80 with a wall thickness of 5.51 mm were lowered to a depth of 2696.33 meters. The well was tested on October 3, 2011. a gas condensate mine was opened.

Chemical analysis (gas condensate studies) of the gas condensate coming out of the well was conducted by the researchers of UzLITIneftgaz OJSC.

Well foreman (Ustya well)			Separ- of the throttle discharge thousand m^3/day	Ressur e/atm	Tem ^{o}C	Of condensate unchanging output sm^3/m^3		Water lischarge sm^3/m^3	Comparison weight g/sm^3	
Rtr atm	Enjoy atm	Diameter washer (stutsera) mm				Inside of degree	II degree (mtsu)		does not change condensatio n	water quantity drug
160	170	10.00	206,672	40	12	43,66		32,05	0,786	1,060
-	-	-	-	60	17	54,81		27,40		
-	-	-	-	80	24	49,29		22,76		
135	158	12.00	292,688	40	26	36,41		21,97		
-	-	-	-	60	30	39,68		21,97	0,791	1,060
-	-	-	-	80	37	33,78		21,97		
150	155	14.00	326,108	40	28	33,56		22,96		
-	-	-	-	60	35	35,77		22,96	0,787	1,060
-	-	-	-	80	41	32,67		19,43	0,787	

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Wellbore Rest Pressure (VSD):

Rtr= 200 atm, Rztr= 195 atm, Rpl= 280 atm.

Prospective resources of gas and condensate in the Oydin field are as follows:

Gas reserves on the XV horizon (wet/dry)

Qg = 2,801/2,736 billion m^3

XVa horizon gas reserves (wet/dry)

Qg = 3,891/3,802 billion m^3

Total gas reserves (dry)

Qg = 6.538 billion m^3

Reserve of condensate

Qk = 693/621 thousand tn.

Hydrogeological description of the deposit. The Oydin mine is hydrogeologically considered a component of the Amudarya artesian basin of the first level, and is located on the border of the Beshkent hydrogeological region of the second-level Kashkadarya artesian basin.

Five regional water pressure complexes are distinguished in the section of the Meso-Cenozoic sedimentary crust of the Bukhara-Khiva oil and gas region: Jurassic, Neocomaptian, Albsenonian, Upper Turonian and Neogen-anthropogenic. They are distinguished by the complex of impermeable rocks of the Kimmeridgian lithic rocks and the clay pack, the lower clay layer, the clay pack of the Lower Turonian and the clay pack of the Eoceneoligocene, which are located below the Neocomian.

The following are water reservoirs in the separated pressure complexes: sandstones and siltstones of the XIX, XVIII, XVII horizons of terrigenous formations in the Jurassic period, volatile limestones of the XVI, XVro, XVr, XVa, XVru horizons of the

Middle Kellow Kimmeridgian carbonate deposits, XI, composed of sandstones and siltstones in the Albian Cenomanian. X, IX horizons, sandstones and siltstones of the VIII volatile horizon in the Turonian above the Turonian, sandstones and siltstones of the Senonian and Bukhara limestone layers of the Paleocene, sandstones and siltstones of the Neogenanthropogen.The Taminot region of the Amudarya artesian basin is located on the border of the Hisar and Zarafshan mountains. According to most researchers, the regional basin region is located in the Pitnyan uplift and the Sarikamish depression.

In the Lower Calloway terrigenous layers of the Middle Jurassic and Upper Jurassic, water-bearing rocks are sandstones and siltstones, and are very well organized in the Girsan, Shurtan, Dzhambulok deposits.

The waters of the terrigenous Jurassic are considered to be chlorcalcium-containing brines. In Dzhambulok, terrigenous Jurassic waters have mineralization of 175786-201391 mg/l, specific gravity at 20°C is equal to 1.126-1.130 g/sm^3. The amount of microcomponents is high, the waters are metamorphosed.They belong to class III types, hard according to Palmer, and belong to the chlorcalcium type of the chloride group according to Sulin.

In order to maintain the current number of the fund in motion, it is recommended to restore the inactive and completed well at the level of 1 well in the Aydin gas condensate field by drilling the side shaft and maintain the operational nature of the wells in motion with the methods of accelerating the shaft.

The analysis of the operational fund shows that the wells opened to the full thickness of the productive layer are characterized by good productivity, or the exploited facilities, which include XV-R+RU horizons, are characterized by good productivity. Therefore, it is recommended to open all the gas-saturated layers of the productive section of the Aydin mine in all wells drilled with a side shaft.

Prospective exploration work at the Oydin mine is carried out under abnormally low formation pressure conditions. In such conditions, various treatments are used to remove drilling fluid from the formation zones of the formation collectors:

hydrochloric acid (SKO);
volume foam (OPKO);
periodic foam acid treatment under crack opening pressure (SPKO);
penoemulsion acidic (PEKO).

In order to accelerate the flow of gas in the fields of Uzbekistan, methods based on restoring the filtration properties of the rocks to the bottom of the well by means of physico-chemical effects are widespread in order to clean the rocks (oily, oil-containing, gas-condensate, acid treatment, PAV treatment, etc.). Also, in order to

connect the relations of the wells with the uncontaminated zone of the formation (filling the filtration zone with light oil and shooting the productive formation, GRP), the way of creating new channels is widespread.

Long-term mining experience shows that oil, petroleum soda, gas condensate operations carried out in well-permeable, but contaminated reservoir rocks during drilling or well opening lead to a significant increase in well discharge. Such treatments are ineffective in small-thick, high-clay low-resilience rocks, and it is necessary to take drastic measures to increase the productivity of the well (filling the filter part of the productive horizon with light liquid hydrocarbons, hydrofracturing the formation), these measures allow connecting the well with the formation zone without affecting the filtrate.

In the fields of Western Uzbekistan, the work carried out on the acceleration of the gas production, shooting on an oil basis gives positive results in many cases.

There are 2 working wells in the Aydin gas field. According to the project, there should be 4 wells. 2 less than the project of working wells in the mine.

The total number of wells in the Aydin mine is 7

From this:

- used -2
- 2 gas dispensers
- oil supplier -0
- 3 in control (№№ 3, 11, 13)
- 0 pending completion
- completed wells -0

The coefficient of utilization of the well fund this year was 0.14. In 2022, this coefficient was 0.28.

So, this indicator has decreased, due to the fact that the fund of wells used in the mine has decreased, the drilling of wells has not been canceled, and the coefficient of utilization of the well fund has decreased because the capital repair work of the wells in the completed well fund has not been canceled.

RESULTS

During the operation of the Oydin gas field, the equilibrium pressure on the well is measured, and the reservoir pressure is determined by calculating this pressure. In addition, pressure measurement is also determined during gas-hydrodynamic testing. The current layer pressure was equal to 107.6 kgs/sm^2. Based on the established technological mode of gas wells, the gas flow rate is as follows:

Actual - 98.5 m/s

The pressure above the well is 66.4 kg/sm^2

The pressure difference in the layer is 24.4 kg/sm^3.

Currently, an average of 43.7 thousand cubic meters of gas and 1.1 tons of gas condensate are extracted from 2 wells.

There are 2 wells working in the Aydin gas field, 2 of which are gas, the amount of gas extracted from each well is 21.8 thousand m^3/day on average. The choice of the method of using a gas well depends on the dynamics of formation fluid flow into the well body and the type of this fluid.

To reduce and prevent the occurrence of gas extraction, it is possible to increase the stable operation period of flooded gas wells by applying effective methods of liquid release to the surface to increase the gas permeability coefficient of the field.

There are many methods of combating gas well waterlogging, but each of them is used in a narrow range. There is no universal way to deal with this situation, so when this situation arises, the choice of the way to deal with it should be chosen based on the technology of using the well.

CONCLUSION

In order to ensure the stable operation of gas and gas condensate wells, in our country and in international practice, there are various methods of forced extraction of liquid and limiting its flow to the well wall, which can be classified into three groups.

1. The method of removing liquid using a plunger lift and a pump,
2. Liquid removal methods using copic surfactants (SFM).
3. Separation of water-bearing layers.

In recent years, the use of coaming SFMs for fluid extraction has been greatly reduced and increased to the wellhead. As a result, the drag of the gas entering the elevator column is reduced compared to the liquid and coke, and it rises to the wellhead.

To implement the technology, it is necessary to select the composition of SFM, bring it to the bottom of the well, mix it with the extracted liquid, transfer gas from the mixture, and after raising it to the wellhead, separate the liquid from the gas and recycle it. The effectiveness of the retention of the copying SFM depends on the technology of its introduction into the well.

Currently, in order to implement this technology in the Oydin mine, it would be appropriate to cancel the experimental work on the selection of the composition of SFM, the technology of delivering it to the bottom of the well and introducing it into the well.

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