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REAGENT TREATMENT OF THE SURFACE OF THE PETROLEUM LAYER, WITH THE USE OF A SURFACTANT COMPOSITE.(SAW)

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ABSTRACT
In the paper, the issues of oil production at the 15th petroleum well . of the supsa field and the factors affecting its productivity are discussed. in details: watering of the bottom hole zone, high viscosity of the extracting oil, residual oil, as well as the deposition of heavy oil components asphaltenes, resins and paraffins.

here, we recommend a reagent method for solving problems, namely: the introduction of a multifunctional composite solution of sas [alkan-202 + sulfanol] into an oil reservoir to improve the fluidity of the oil flow and the filtration of rock aggregates. the article presents the results of laboratory studies conducted to determine the effect of sas on the rate of filtration of rocks. the process of moving the water-oil contact in the reservoir layer depends on the surface properties of the rock, such as capillary wetting ability, oil and water permeability, hydrophilicity of the rock surface, filtration rate, etc. in this regard, the introduction of the sas solution into the formation allows us adjust, increase or decrease the rate of filtration. which provides the intensity of the flow of oil in the plast.

we investigated the dynamics of wetting of the surface of hydrophobic rocks on quartz. the effect of sas on the rate of filtration of collectors is shown. the filtration rate was determined from the average value, and it was found that by mixing the composite sas mixture, the flow velocity increases. the work was conducted on the basis of scientific contacts and cooperation, the oil academy of Azerbaijan.

Keywords: *Surfactant, Alkan 202; sulfonol; filtration rate, wetting dynamics.Supsa/*

1. INTRODUCTION

Most oil deposits located at a late stage are characterized by a decrease in the flow of oil, of the main reasons for the decrease in productivity is the inflow of water that causes the formation of a water block. One of the main reasons is watering the zone of the lower hole, which leads to clogging of water in the formation and prevents oil flow, which consequently reduces and restricts the flow of oil from the formation into the well. Deterioration in the characteristics of the formation can also be caused by the sedimentation of heavy oil components, namely asphalts, resins and paraffins, and the formation of asphalt-resinous paraffin deposits on the walls of the compressed pipe, which gradually reduces the diameter of the pipe and makes it difficult to move the oil flow [1]

The oil well with a low production rate of No. 15 of the Supsa oil field was chosen as the research object. It was discovered in 1889 by the Anglo-Belgian oil company and 54 wells were drilled. The well has a shallow depth, a maximum of 779 m. It runs periodically, using a pump, Rocking machine, the daily production is 300 liters. Reservoir pressure max. 20 atmospheres. Most of the oil fields that are in a later stage of operation have a decrease in productivity. [2];

The geological parameters of well No. 15 are given in Table 1.

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Table 1 The geological parameters of well # 15, the Supsa deposit [2]

Well №	The extraction method	Extraction T / month			Debit T / day		Water content %	The gas factor %	Reservoir Pressure atm
		oil	water	gas	oil	fluid			
14	Rocking machine	7,98	62,808	0,230	0,26	0,4	34	30	
15		**4,587**	**35,944**	**0,138**	**0,15**	**0,25**	**36**	**30**	**20**
34		1,323	16,912	0,04	0,04	0,12	60	30	

The Geological Administration of Georgia issued the Resolution for arrangement of the effective measures for intensification of oil inflow in Supsa oilfield,use of chemical reagents including SAS and polymeric solutions. As refagents, the solutions Alkan-D202 and Sulfanol- were chosen. [3];[4];[5];

In the laboratory, physical parameters were determined: reservoir oil and formation water of an oil well with a low production rate of No. 15, the Supsa deposit. as well as the quantitative content of asphalt-resinous paraffin compounds; It is found that the oil refers to the average viscosity and high density mass, which contains completely 16-18% of asphalt-resinous paraffin compounds. Physical and chemical parameters of the oil samples taken from Supsa oilfield well N 15 are shown in Tables 2 and 3.

Table 2. Physical parameters of the oil sample taken from Supsa oilfield well N 15;

	Parameters	Data
1	Density at 20^{0}C, g/sm^3	0.8788-0.8864
2	Cinematic viscosity at 20^{0}C, mm^2/sec.	11.874-15.85
3	Pour point, ^{0}C	Below 0
4	Water content % mass fraction	32-34
5	Content of mechanical impurities % mass fraction	0,016-0.021

Table 3 Stratum oil samples and results of their tests

q-ty of samples taken		Oil density g/sm^3		vis-cosity Pa sec. 10^3	Content %			
On surface	From depth	On surface	From depth	On surface	asphaltenes	tars	paraphines	sulphur
16	1	0.907	0.841	29.68	7.74	20.3	3.9	0.44

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2. EXPERIMENTAL PART

At first, we determined the surface tension of solutions of surfactants by the method of stallagmometry.**[6].** We prepared various concentration solutions with an interval of 0.125-1.0%. The test results are shown in Table 4. It has been found that the surface tension decreases with increasing SAS concentration.

model system-1. Surface-active solutions were then passed through a model system-1 with quartz sand and the effect of SAS concentration on interfacial tension.

The results of the experiments are shown in Table 5.

Table 4 The results of the surface tension value for different SAS classes

Concentration of SAS, %	Superficial tension 10^{-3} n/m^2.	
	Sulfanol	Alkan DE 202
1,0	0,93	3,74
0,5	1,83	5,26
0,25	2,40	7. 00
0,125	3,61	8,90
Oil free of SAS	44	

As it is shown in the drawing, superficial tension coefficient for Sulfanol is higher than for Alkan DE 202. Increase of SAS solution concentration causes reduction of superficial tension. For research of capillary forces, we have studied correlation of capillary impregnation process and concentration of SAS solution.

model system-2, The experiments of capillary percolation of oil stratum were performed on laboratory model system- 2, presented with pipe column of 80mm length and 20mm width. One end of the pipe is closed, the other one is filled with silica sand of fraction [0,01-0.025mm]. In Table 5. we show capillary impregnation rate research results for various SAS. Capillary impregnation rate was determined in the porous space of pipe for the samples given in Table 5. Time required for rising of liquid in the experiment pipe was different for different reagents. Correspondingly, capillary percolation rate was different as well. The experiments were performed at 24-25C. Concentration of SAS solution changed from 0.1% to 0.05%. Sulfanol and Alkan DE 202 were injected into the samples as additives.

Table 5. Capillary impregnation rate research results for concrete SAS-es

Oil rise level H, %	Capillary impregnation rate, mm/min		
	Oil free of additives (control)	Content of additives in oil, %	
		Sulfanol 0,1%	Alkan DE 202 0,1%
20	9,2	10	9,5
40	9,1	9,8	9,3
60	8,6	9,4	9,0

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80	4,2	4,5	4,3
100	2,4	3,3	3,1
Average capillary impregnation rate, mm/min	6,7	7,4	7,0

The results of the experiments prove that the effective impregnation rate in the case of sulfanol at all stages is greater than for oil and in the case of Alkan 202. The average arithmetic impregnation rate is calculated by summing the speeds given in the table and dividing by 5.

$$V = \frac{9{,}2 + 9{,}1 + 8{,}6 + 4{,}2 + 2{,}4}{5} = 6{,}7 \quad (1)$$

2. In case of Sulfanol (anionic SAS)

$$V = \frac{10 + 9{,}8 + 9{,}4 + 4{,}5 + 3{,}3}{5} = 7{,}4 \quad (2)$$

3.In case of Alkan 202 (nonanionic SAS)

$$V = \frac{9{,}5 + 9{,}3 + 9{,}0 + 4{,}3 + 3{,}1}{5} = 7{,}0 \quad (3)$$

The experiments proved that the composite solutions give the positive results and effectually rise capillary impregnation rate in porous space.

Proceeding from above mentioned, in our works we were interested in increase of SAS effectiveness by means of adding of the various reagents solutions. As it is known, according to classification of surface-active-substances, Sulfanol belongs to anionic, but Alkan DE 202 – noniogenic ones. On the basis of their mixture, we prepared SAS composite solution of correlation [1:1]; As a result of our experiments, we determined the average rates of capillary impregnation, which increases sharply in the case of composite solutions of SAS.

As a result of the conducted experiments, we determined the average rates of capillary impregnation, which is sharply increased in the case of composites SAS.

Table 6 Average capillary impregnation rate research for SAS composite solutions

Oil rise rate, H % mass fraction	impregnation rate in case of SAS addition		
	Sulfanol 0,05 % +Alkan DE 202 0,05 % mass fraction	Sulfanol 0,05 %	Alkan DE 202 0,05 %
20	10,8	9,4	9,1
40	10,0	9,2	8,8
60	9,5	8,8	8,1
80	4,8	4,6	4,2
100	3,5	2,9	2,7

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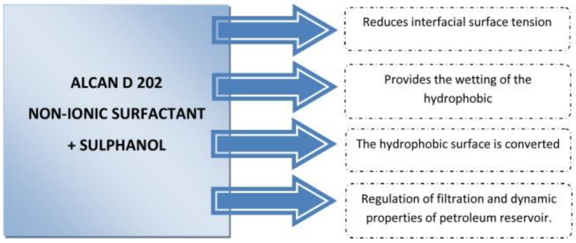
Average rate, mm/min	7,72	6.98	6,58

Based on the conducted experiments, we created a schematic diagram for the effect of composite solutions on the petroleum layer.



1. Schematic diagram for the effect of composite solutions on the petroleum layer

3. CONCLUSION

Based on the results of our experiments, it was found that the processes occurring in the oil reservoir can be regulated using composite SAS solutions. They effectively improve the reservoir and filtration properties of the formation, which causes an intensification of the oil flow in the formation phase.

- As a result of laboratory experiments it was established that various solutions of SAS, their composite solutions in the oil layer, cause the hydrophilicity of the hydrophobic surface.
- As a result of the experiments, it was found that SAS composite solutions have a high rate of impregnation into the layer, which accelerates the migration of water in the porous space and ensures the displacement of oil from the porous space of the formation.

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