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Current State And Ways To Improve The Efficiency Of Field Development In The South-Eastern Part Of The Bukhara-Khiva Region

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ABSTRACT

The increase in hydrocarbon production in the Republic as a whole and in the South-Eastern part of the Bukhara-Khiva region is largely determined by the degree of discovery of new fields and the increment of hydrocarbon reserves. The main volume of production and growth of hydrocarbon reserves here is associated with the Jurassic carbonate formation, which for more than 40 years has been the main target object of prospecting, exploration and development of deposits. Due to the relatively high degree of study of the carbonate formation, the probability of discovery of large and medium-sized hydrocarbon deposits in the South-Eastern REGION is low. At the same time, hydrocarbon is increasing the share of small deposits being discovered. To improve the efficiency of development of these deposits and the degree of recovery of hydrocarbon reserves, it is necessary to justify new modern technologies. Since fields with oil deposits have specific features, we will consider this problem separately for oil and gas and gas condensate fields.

KEYWORDS

Hydrocarbon, oil, gas, deposit, deposits, development efficiency, stage.

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IMPACT FACTOR
2020: 5. 276

INTRODUCTION

Analysis of the current state of development of hydrocarbon deposits. Currently, there are several stages in the development of hydrocarbon deposits. At the same time, there are three stages for fields with gas deposits, and 4 stages for oil deposits. Each selected stage of development of hydrocarbon deposits is characterized by certain patterns of changes in technical and economic indicators.

The first stage is the field development stage with drilling of the main well stock and implementation of the reservoir pressure maintenance system. It is characterized by an annual increase in oil production, with a slight water cut of the output of wells. The stage ends when the maximum annual oil or gas production is reached.The secon d is the stage of high extraction rates, varying within ± 5% of the maximum annual oil and gas production. At the end of this stage, there is usually an increase in the water cut of the produced products and the transfer of the well to a mechanized method of operation.

The third stage is a decrease in oil and gas production and a rapid increase in the water content of produced wells. At this stage, annual oil production is 2% or more of the initial recoverable reserves. The fourth stage is the stage of low rates of oil and gas extraction, high water content of wells produced. At this stage, the rate of oil extraction is usually less than 2% per year. In practice, the term "late stage" is also widely used, which includes the third and fourth stages of development. As can be seen from table 1, the hydrocarbon fields discovered on 01.01.2020 are at the spill stages of development.

MATERIAL AND METHODS

This makes it possible to evaluate the effectiveness of implemented development systems at long-term fields and develop recommendations for improving the efficiency of extracting hydrocarbons from objects at the initial stages of development. From table. 2. it can be seen that there are hydrocarbon deposits in the South-Eastern REGION with both normal hydrostatic pressures and avpd. The current rates of extraction from the initial geological ones are: gas -1.00%; condensate - 0.35% and oil-0.21%.

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IMPACT FACTOR
2020: 5. 276

Table 1 Initial geological and recoverable hydrocarbon reserves of the YWCHBHR fields

№№ P. p.	Field	Productive horizon	Date		Initial geological reserves			Stage of development
			openings	Introduction to development	Gaza	Condensate's	Oils	
1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
1	Khanabad-N	XV-HP	2002	2018	-	-	40	In the concentration camp
2	Sulliger-N	XV-HP		2016	-	-	55	The first
3	Germiston -N	XV	1986	1992	-	-	1980	Third
4	Feruza-N	XV+XVa	2002	2005	-	-	6897	First
5	Maisonminutes, NGC	XV-HP	2000	2010	-	-	2362	First
6	Karatepa-NGK	XV-P+HP	2011	2013	2012	176	4809	Fourth
7	Yangi Karatepa-NGC	XV+XV-PR+XVa	2003	2005	13182	2518	29118	Second
8	Shakarbulak NGK	XVa, XV-HP+P	1987	1991	9071	1129	32940	Fourth
9	Turtsari-NGK	XV-HP+P+PR	2009	2010	5142	533	1545	Second
10	Kumchuk-NGK	XV+XVa	2000	2009	151	-	5902	In the concentration of
11	SEV. Shurtan NGK	XV-HP+P	1987	2005	3357	319	1268	Fourth
12	Ilim-NGK	XV+XV_a	2007	2007	3067	224	-	Fourth
13	Darakhtli-NGK	XV	2011	2018	1792	-	133	In development
14	Kamashi-NGC	XV+XVa	1970	2008	2408	170	785	Third
15	Beshkent-NGK	XV+XVa	1974	2007	11588	2422	876	Third
16	Sherkent-NGK	XV+XV-PR+XVa	2011	2011	345	90	2881	Third
17	Rubaii-NGK	XV+XV-PR+XVa	2011	2011	2134	436	0	The first
18	Aknazar -NGK	XV-XVa	2004	2012	6382	479	-	The First
19	PWM. Aknazar-NGK	XV	2002	2012	1085	-	4010	First

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IMPACT FACTOR
2020: 5. 276

Notes-the table was compiled by the applicant for geological and field materials of the Shurtan and Mubarek oil and gas production departments listed in the annual geological reports for 2017-2018.

continuation of table1

1	2	3	4	5	6	7	8	9
20	Mirmiran-NGK	XV-HP+P	2007	2017	639	-	422	In conservation
21	Namesby-GK	XV-XVa	2011	2014	4346	of 227.2	-	Second
22	Oydin-GC	XV-XVa	2005	2011	10209	393	-	The first
23	Chungar-GK	XV-XVa		2007	13647	1138	-	Second
24	Shurtan-GC	XV-PP +XV-HP+P	1974	1980	641383	37200	-	Fourth
25	Ahirbulak-GC	XV-HP+XV-P			9471			
26	Buzakhur-GC	XV - XVa+XVI	1987	2005	6845	419	-	Third
27	East Buzakhur-GC	XV - XVa+XVI	1987	2006	4113	838	-	Third
28	Tarnasky-GK	XV-XVa	?????	2012	4817	299	-	First page
29	Tavakkal-GC	XV-P+ HP	2010	2010	6200	235	-	In the exploration
30	Alachagikuduk-GC	XV-P+ HP			375			In the exploration
31	Zafar-GC	XV+XVa	???	1994	3059	877	-	Second
32	SEV.NIshan-GC	XV+XVa+ XVI	1970	2007	30366	1761	-	Third
33	Nishan-GC	XV-XVa	2008	2011	2098	????	-	Third
34	Sept.Guzar GC	XV-HP+P	1992	2007	8471	1735	-	Third
35	Hotel marvarid - GK	XV			894			
36	Topicxal - GK				1072			
37	Giran GK	XV+XVa+ XVI	1979	1989	10604	625	-	The Third

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IMPACT FACTOR
2020: 5. 276

38	PWM.Girsan GC	XV+XVa+ XVI	2009	2010	12643	715	-	The first
39	of Divana GK	XV+XVa+ XVI	2009	2010	1891	109,550	-	First
40	Ernazar-GC	XV -XVa	2009	2010	8209	299	-	First
41	Chigil-GC	XV-XVa+	2008	2010	17889	898	-	First
42	Talimarjon - GK	XV-XVa+	2009	2019	16854	618	-	The first
43	Nazarchuk - GK	XV-XVa+	2009	2012	11127	563	-	First
44	Kapali-G	XV-XVa			386			

Table 2.

State of hydrocarbon production in the South CAUCASUS Federal district

№ № Item no	**Field**	**Reservoir pressure, kg/cm^2**		**Fund of drilled wells**		**Annual production**		
		Initial	**Current state**	**Total**	**Current**	**Gas consumption, mln. m^3**	**Condensate, thousand tons of**	**Oil thousand tons**
1	2	3	4	5	6	7	8	9
1	Khanabad-N	350	281	3	-	-	-	-
2	Soligor-N	310	300	5	-	-	-	2,685
3	Hermiston -N	352	240	17	6	6,537	-	35,626
4	Feruza-N	486	292	9	4	-	-	0,733
5	Meson, NGC	317	270	4	-	-	-	0,008
6	Karatepa-NGK	503	124	14	11	89,226	-	17,110
7	Yangi Karatepa NGK	504,5	124	17	2	27,515	0,44	1,238
8	of Shakarbulak NGK	395	296,8	32	9	71,099	0,751	18,872
9	Curtsey-NGK	355	218	7	5	58,160	-	10,874
10	Kumchuk-NGK	381	208	5	-	-	-	-
11	SEV. Shurtan NGK	387	140	25	9	2,577	77,6	86,871
12	Ilim-NGK	383,5	49,6	7	5	93,013	3,6	1,012
13	Darakhtli-	-	-	-	-	-	-	

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IMPACT FACTOR
2020: 5. 276

	NGK							
14	Kamashi-NGC	571,5	318	8	5	11,767	0.191	3,972
15	Beshkent-NGK	573,4	301	12	4	5,492	0.125	6,261
16	Sherkent-NGK	469	352	6	1	0.293		0.908
17	Ruboi-NGK	486	361	8	6	29,205	0,424	6,626
18	Aknazar-NGK	623	182	6	1	4,906	-	0,153
19	PWM. Aknazar-NGK	621	331	4	1	-	-	0,19
20	Mirmiran-NGK							
21	Namazbay-group	of companies 321	143	8	6	39	1,121	-
22	Oydin-group	of companies 271,6	181,7	3	1	7,315	0,20	-
23	Chunagar-group	of companies 344	91,2	17	2	42,860	1,4	-
24	Shurtan-group	of companies 349	44,2	239	151	6634,416	189	-
25	Ahirbulak-GC							
26	Buzakhur-GC	365	45,02	19	7	123,660	-	-
27	East Buzakhur-group of companies	Buzakhur-group of companies 346	76	12	2	28	1,3	-
28	Tarnasoy-group	of companies 368	87	2	1	28	0,398	-
29	Tavakkal-	group of companies 306,8	310	6	-	-	-	-
30	Alachagikuduk-GC							
31	Zafar-GC	431	50,9	12	2	25,200	0,7	-
32	SEV.NIshan-	group of companie	118	50	32	323,264	7,095	-

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IMPACT FACTOR
2020: 5. 276

		s 550						
33	Nishan-GC					8,099	-	
34	SEV.Guzar group	of companies 317	105	13	5	38,384	0,544	-
35	Marvarid-GC							-
36	Topicxal - GK							
37	GK Giran	621	190	12	8	281,9	15,2	-
38	PWM.Girsan group	of companies 598	306	7	4	39,2	0,179	-
39	Divkhana group	of companies 548	210,6	6	4	27,2	0,788	-
40	Ernazar-	group of companies 629	304,8	16	13	513,7	17,47	-
41	Chigil-GC	615	308	7	4	24,5	0,735	
42	Talimarjon-GC	457	352	13	9	203,6	6,116	
43	Nazarchuk - GK	630	256,8	4	2	153,4	5,432	
44	Kapali-G							

RESULTS

Potential amounts of gas, condensate and oil extraction indicate a low intensity of development systems implemented at the fields.

The magnitude of the rate of gas and condensate without regard to the unique field of Shurtan is 0.93, and 0.70 percent respectively.

As you know, the generally accepted indicator for evaluating the efficiency of hydrocarbon field development is the recovery coefficients of gas, condensate and oil from productive formations.

The values ofуглеводородовthese indicators vary within very large limits depending on the stage of their development at the Yakh hydrocarbon fields of the South Siberian oil and gas industry (table 3), averaging: gas recovery factor (GRI) - 0.626; condensate recovery factor (CIC) – 0.429; oil recovery factor (OC) – 0.037. Current (as of 01.01.2020), KIG and KIC values excluding the Shurtan field are 0.224 and 0.168, respectively. The obtained values of KIG, KIC and KIN indicate that the development systems implemented in the YVCHBKHR hydrocarbon fields were generally ineffective.

In this regard, we will consider the reasons for the low efficiency of field development and

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IMPACT FACTOR
2020: 5. 276

possible ways to improve them. Analysis of the current state and ways to increase the efficiency of oil and gas fields development in the South-Eastern part of the Bukhara-Khiva region.

Oil and gas fields account for the majority of oil reserves on the territory of the South Caucasus Federal DISTRICT. In which oil deposits are located under a gas cap relatively with a more powerful effective thickness.

Table 3
The state proficiencies of depletion of hydrocarbonreserves in the South West of the RUSSIAN Federation

№№ Item no.	Field	Accumulated production			The current recovery factor, fractions of one.		
		Gas, million m3[3]	Condensate, thousand tons	of Oil, thousand tons of gas.	Gas	Condensate's.	Oil
1	2	3	4	5	6	7	8
1	Khanabad-N	-	-	1,524	-	-	0,044
2	Sovligar-N	-	-	3,951	-	-	0,072
3	Garmiston -N	-	-	524,615	-	-	0,265
4	Feruza-N	-	-	81,142	-	-	0,011
5	Meson, NGC	-	-	4,322	-	-	0,090
6	Karatepa-NGK	2713,103	340,6275	130,711	0,534	0,331	0,080
7	Yangi Karatepa-NGK	2 741	341,070	130,712	0.2122	0.1990	0.3610
8	Shakarbulok NGK	1632	33	697	0.180	0.029	0.021
9	Turtsari-NGK	850	25.164	117,984	0.1790	0.0629	0.1071
10	Kumchuk-NGK	-	-	8,671	-	-	0,001
11	SEV. Shurtan NGK	766	31,004	1210,012	0.6978	0.6420	0.1574
12	Ilim-NGK	2098	114,563	-	0,6833	0,6160	-
13	Darakhtli-NGK	-	-	-	-	-	-
14	Kamashi-NGC	641	37,154	132	0.266	0.219	0.169
15	Beshkent-NGK	6190	466,062	181,101	0.534	0.192	0.206
16	Sherkent-NGK	169	5.649	178.823	0.4899	0.0926	0.2436
17	Ruboyi-NGK	48	0,727	27,650	0,022	0,002	-

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IMPACT FACTOR
2020: 5. 276

18	Aknazar-NGK	56,593	-	1,776	0,010	0,004	-
19	PWM. Aknazar-NGK	-	-	3,924	-	-	0,003

Continuation of table 3

1	2	3	4	5	6	7	8
20	Mirmiran-NGK	-	-	-	-	-	-
21	Namazbay-	group of companies 448	19718	-	0,1050	0,1084	-
22	Oydin-group	of companies 105	5,024	-	0,0141	0,0244	-
23	Chunagar-group	of companies 1367	60,543	-	0,1021	0,063	-
24	Shurtan-group	of companies 501061	21242,212	-	0,7901	7165	-
25	Akhirbulak-	group of companies -	-	-	-	-	-
26	Buzakhur-GC	6739	331,646	-	0,9963	0,9476	-
27	East Buzakhur-	group of companies 1143	164,722	-	0,2906	0,3050	-
28	Tarnasoy-group	of companies 228	3,544	-	0,0479	0,0142	-
29	Tavakkal-group	of	companies 77,1842,527	-	0,012	0,010	-
30	Alachagikudu k-group	of companies -	-	-	-	-	-
31	Zafar-group	of companies 772	111,888	-	0,2678	0,1955	-
32	SEV.NIshan-	group of companies 14931	619	-	0,4917	0,3515	-
33	Nishan-GC	8,099	-	-			

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IMPACT FACTOR
2020: 5. 276

34	SEV.Guzar group	of companies 2987	382,4	-	0,352	0,220	-
35	Hotel marvarid – GK						
36	Topichaksoy-GC						
37	Girsan GC	5835,4	192,9	-	0,551	0,310	-
38	PWM.Girsan group	of companies 135	7,539	-	0,0289	0,0134	-
39	Divkhana group	of companies 316	16,552	-	0,1707	0,1602	-
40	Ernazar-group	of companies 1704	73,754	-	0,3816	0,1715	-
41	Chigil-group	of companies 31,4	0,9	-	0,002	0,001	-
42	Talimarjon-group	of	companies 271,182 11,381	-	0,016	0,018	-
43	Nazarkuduk-group	of	companies 304,945 11,7897	-	0,0303	0,072	-
44	Kapali-G						

Due to the high complexity of the wells due to the breakthrough of gas in the oil of these objects wells due to the breakthrough of gas from a gas cap and bottom water to downhole stocks of these objects belong to the category of hard-to-recover [3; p. 46-50, 4; p. 267, 5; p. 34-36, etc.].

Sub-gas oil deposits are usually developed with the prevailing water-pressure, gas¬-pressure or simultaneous manifestation of both modes. As¬is well known, when developing a field using the technology of oil displacement by various agents, the oil recovery factor (EIR) is calculated using the modified formula of A. N. Krylov [6; p. 15-17].

КИН = Квыт • Кохв = Квыт • Кохв.п • Кохв. т , (1)

where Toinyt. - coefficient of displacement of oil by the working agent; KKSHV. p, Kinyt. t-коэффи¬coefficients of displacement coverage in the area and thickness of the formation, respectively.

In the development of fields with heterogeneous reservoirs, the value OfCW. p is mainly influenced by the density of the grid of wells and the scheme of their placement. In this regard, in a number of studies, this coefficient is called ¬the grid coefficient [7; p.15-18, 8; p. 34-37], the value of which

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IMPACT FACTOR
2020: 5. 276

depends on the density of the adopted grid of wells placement (S - the area of oil content per well), on the zonal heterogeneity and discontinuity of oil reservoirs.

Due to the great practical importance of this issue, many scientists and research centers have conducted studies to determine the dependence oil recovery on the density of the well grid (PSS). Dependencies were obtained both for specific fields and for oil-producing regions. The disadvantages of these dependencies are the complexity of defining their parameters,¬ which is why they are not widely used.

DISCUSSIONS

It should be noted that there are also such methods for estimating the-coefficient of coverage of wells with a grid - the "kh-ratio method" and " method Stiles,¬ which are used to justify and analyze the potential of compacting drilling. The main disadvantage of these methods is also the complexity in determining ¬parameters, in particular the uncertainty in constructing the connectivity - distance relationship between wells, which is caused by a large spread of points obtained using the proposed algorithms [9; p. 40-45].
The determination of a more reasonable value of KC is not a big problem if there is a hydrodynamic model of the Deposit ¬that correctly reproduces the features of the structure of the Deposit. In this ¬regard, the development and approval of a guidance document on the creation of a permanent geological and technological model of a hydrocarbon field in the design of the development of oil and gas fields in Uzbekistan is timely [10; 80c.]. ¬The use of this guidance document (RH 39.0-105:2012) will speed up the implementation of advanced computer technologies in the design¬and management of oil and gas¬and oil field development, and allow for the operation of geologic and technological information in its entirety (3D), taking into account changes over time (4D).

However, the uncertainty and lack of input data required for¬a permanent geological and technological model and for their ¬initialization may limit the use of 3Dsimulators for predicting both the oil recovery coefficient and the well grid coefficient, especially at the stage of field development and the calculation of hydrocarbon reserves. In this regard, it is necessary to focus attention on another problem¬that is characteristic of the initial stage of field development. As you know, the first document on the new field is the calculation of hydrocarbon reserves.

CONCLUSIONS

Naturally, in the initial stage, special emphasis is placed on the types of research¬ aimed at determining and justifying the estimated parameters¬ of carbon dioxide reserves. This leads to the fact that in the preparation of project documents for development of oil fields with application of hydrodynamic calculation methods, based on mathematical description of mechanism of process oil recovery and requires the use of a wide range of settings, acute lacked ¬the ka of data on reservoir permeability, the change in the value of oil properties and gas pressure, phase and relative permeability, of the geological heterogeneity parameters of layers etc. Under these conditions, the use empirical formulas becomes not only unavoidable, but also significant for making management decisions in the initial stage of development.

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IMPACT FACTOR
2020: 5. 276

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