

Prospects of progress of a mineral base of oil and gas in Republic Sakha (Yakutia)

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In article questions of the further progress of a mineral-raw-material base of oil and gas in Republic Sakha (Yakutia) are considered

Keywords: а минерально-raw-material base, oil, gas, processing, fuel..

Now in territory of Republic Saha (Yakutia) publicly 32 oil fields and gas, from them 11 are revealed in Viluskiy synklize and central part Priverhoynskiy of a deflection, and 21 – within the limits of Nepsko-Botuobiskiy unteklize and Predpatomskiy a deflection (tab. 1, fig. 1):

TABLE 1. OIL-AND-GAS DEPOSITS OF REPUBLIC SAHA (YAKUTIA) *

1. Alinskiy GO	12. Machobinskiy OG	23. Stanakhskiy OG
2. Andulakhskiy GC	13. Mirninskiy OG	24. Tas-Uryahskiy OGC
3. Badaranskiy G	14. Nelbinskiy G	25. Talakanskiy OGC
4. Besurskiy G	15. Nizhneviluiskiy G	26. Tolonskiy GC
5. Busukhtahskiy GC	16. Nizhnetunkyanskiy G	27. Tumpuchanskiy GO
6. Verhneviluchanskiy OG	17. Otradninskiy G	28. Ust-Viluiskiy G
7. Verhnepeleduiskiy GC	18. Severo-Nelbinskiy G	29. Hotogo-Murbaiskiy G
8. Viluisko-Dzherbinskiy G	19. Sobolokh-Nedzhelinskiy GC	30. Chayandinskiy OGC
9. Iktehskiy OGC	20. Srednebotuobinskiy OGC	31. Severo-Talakanskiy O
10. Ireliahskiy OGC	21. Sredneviluiskiy GC	32. Vostochno- Alinskiy O
11. Mastahskiy GC	22. Srednetungskiy GC	

*Type deposits: G – gas, O – oil, OG – oil and gas, GO – gas and oil , GC – gas condensate, OGC – oil and gas condensate.

According to the order of the Government of the Russian Federation from 28.11.07 №1707-p, five largest deposits of Republic Saha (Yakutia)¹ are carried to the deposits having strategic value for gas supply of the Russian Federation: Chayandinskiy, Tas-Uryahskiy, Verhneviluchanskiy, Srednetungskiy and Sobolokh-Nedzhelinskiy.

Stocks of perspective territories of the Western Yakutia make 24,0 billion t conditional hydrocarbons, including: - oil – 10,4 billion t (taken 2,6 billion); - free gas – 12,1 bln. m³; - the gas dissolved in oil – 0,8 bln. m³; - a condensate – 0,7 billion t.

Industrial stocks on categories A+B+C₁ oil and gas of already revealed largest deposits make on oil from above 400 million t, on gas about 2 bln. m³. More than 80 % of the reconnoitered stocks of oil and over 65 % of gas occur in three deposits Nepsko-Botuobinskiy oil and gas containing areas (OGA) – Verhnechonskiy, Talakanskiy and Chayandinskiy and Kovuktinskiy deposits of Angaro-Lenskiy OGA.

These two OGA are put forward as the main objects, capable to provide necessary growth stocks of oil and gas. Besides the certain volume of hydrocarbon resources is prepared in Baikitskiy OGA. For example, in Urubcheno-Tohomskiy deposit stocks on A+B+C₁ exceed 65,0 million t and C₂ – 265,8 million t.

¹ According to Temporary classification of deposits (pril.3 to order MNR of Russia №126 from 07.02.2001), to unique with taken stocks of oil more than 300 million t or gas more than 500 billion m³, to large accordingly – 60-300 million t and 75-500 billion m³, deposits are carried to averages – 10-60 million t and 40-75 billion m³, to fine – less than 10 million t and 40 billion m³.



Pic. 1. Oil and gas provinces and deposits of hydrocarbon raw material RS (Y) IAC «Mineral»

Proceeding from dynamics of actual and perspective consumption of oil and natural gas in Eastern Siberia and the Republic Sakha (Yakutia) stipulated «Power strategy of Russia for the period up to 2020», at factor of reproduction 1,2 (oil) and 1,6-2,0 (gas) should make volumes of a gain of stocks to 2020. Nearby 500 mln. t on oil and 1,3 bln. m³ on gas.

On three unique deposits – Kovuktinskiy, Chayandinskiy and Urubcheno-Tohomskiy

with a total stock of gas on category C₂, more than 2 bln. m³ supposed to 2015г. A gain not less than 450 billion m³. In Republic Sakha (Yakutia) the State balance of stocks considers 12 deposits (4 oil-gas, 2 gas-oil and 6 oil-gas-condensate) with total taken stocks of oil 218,1 million т on And In C₁. The basic oil recovery (81,6 %) is necessary on three large deposits: Chayandinskoe, Srednebotuobinskoe and Talakanskoe which contain 92,7 % of stocks.

Initial stocks of oil on these deposits made 203,69 mln. t, including taken on categories A+B+C₁ – 202,17 mln. t (tabl. 2). However these unique on stocks and quality of resources of a deposit to date are not involved in wide industrial development and remain practically not demanded.

Variation of stocks of oil in the distributed fund on deposits has occurred as a result of industrial extraction of Joint-Stock Company "Irelyahneft" on Irelyahskiy a deposit and trial operation of "Tas-Uryahneftegazdobucha" Ltd of central block Srednebotuobinskiy of a deposit.

TABLE 2. STOCKS OF OIL ON BASIC DEPOSITS RS (Y) *

Deposit	Initial stocks of oil	Taken stocks			The rest of the approved taken stocks on cat. A+B+C ₁	
		A+B+C ₁		C ₂	Всего	% от учтенных балансов
		Total	% from stocks of republic			
Talakanskiy OGC	106,286	105,449	48,36	18,132	100,702	95,50
Srednebotuobinskiy OGC	54,886	54,203	24,86	11,934	50,091	92,41
Chayandinskiy OGC	42,519	42,517	19,50	7,511	42,517	100
Total	203,691	202,169	92,71	37,577	193,310	95,62

*Таблица составлена по данным Государственного геологического фонда РС (Я) за 2007г.

In territory of the Western Yakutia 7 deposits are reconnoitered: in Viluiskiy area Sredneviluiskiy and Srednetungskiy GC, in Suntarskiy – Verhneviluchanskiy and Viluisko-Dzherbinskiy GCD, in Mirninskiy – Srednebotuobinskiy, Tas-Uryahskiy and Iktehskiy GCD; 4 deposits of natural gas are developed: Sredneviluiskiy, Mastahskiy, Srednebotuobinskiy, Severo- Nelbinskiy. Besides at a stage of trial operation are Talakanskiy, Irelyahskiy and oilfields Srednebotuobinskiy.

Reconnoitered hydrocarbon resources of the Far East of Russia as a whole it is insignificant. The reconnoitered taken stocks of oil and gas of the most perspective areas of a land of the Western Kamchatka and Chukotka do not exceed 30 mln. t. For maintenance stable oil-and-gas recovery here it is necessary to provide a gain 37 bln. m³ gas and 10 mln. t for oil. For progress of oil-and-gas branch by the most perspective deposits of Republic Saha (Yakutia) are considered, which are concentrated to the West of Yakutia and dated for two oil-and-gas provinces: Leno-Tungskiy, including Nepsko-Botuobinskiy, Predpatomskiy, Severo-Aldanskiy, Zapadno-Viluiskiy, Sugdjerskiy and Anabarskiy OGA, as well as Hatahgo- Viluiskiy, consisting from

Leno-Anabarskiy, PreVerkhoyansk, Viluiskiy OGA.

According to the State balance stocks of free gas in Republic Sakha (Yakutia) make A+B+C₁ – 1213,7 bln. m³ and cat. C₂ – 1063,7 bln/ m³.

Free gas of deposits of republic contains such passing products, as a condensate, ethane, propane, butane and helium.

Balance stocks of a condensate are considered on 14 deposits (8 gas condensate and 6 oil gas condensate) with stocks on C₁ - 30767 thousand t and on C₂ – 14940 thousand t. The content of a condensate in gas changes from 3 up to 139 g/m³, density – from 0,669 up to 0,85 g/sm³, factor of extraction – from 0,45 up to 0,95. On stocks of a condensate as the largest in republic are considered Chayandinskiy, Sredneviluiskiy and Srednetungskiy deposits. On their fraction 63,9% of stocks on category C₁ are necessary.

In the distributed fund it is considered five deposits, including northern and central blocks Srednebotuobinskiy of a deposit. OS "Yakutgazprom" develops two deposits containing a condensate, as a passing component: Mastahskiy and Sredneviluiskiy. In total on Mastahskiy GCD extraction has made 3000 thousand t. On Sredneviluiskiy GCD it is extracted 67 thousand t and losses

have made 2000 thousand t. A condensate from stocks cat. C₁. On Talakanskiy deposit for the period 1998-2005. Extraction of a condensate has made 1,5 thousand t.

Stocks of helium are reconnoitered on 13 deposits. Stocks of helium in free gas as of today make the order 3165,5 mln. m³ on categories C₁ and 5654,4 mln. m³ on C₂. The content of helium in the dissolved gas on C₁ is equaled 2934 mln. m³, on C₂ – 547 mln. m³. Stocks of helium in free gas on 3 developed deposits have made 623,2 mln. m³ on C₁ (19,7 %) and 45,1 mln. m³ on C₂, in the dissolved gas accordingly – 64,7 mln. m³ and 15,6 mln. m³.

In connection with absence of installations on extraction of helium from extracted gas all helium taken from bowels concerns to losses. On tentative estimations at extraction of free gas of OS "ALROSA-GAS" it is not involved in use more than 788 thousand m³. On Irelyahskiy to a deposit fulfilled by JSC "Irelyahneft", loss of helium have made 26 thousand m³. In total on republic on the average in a year than 835 thousand m³ helium from free and 5,0 thousand m³ from the dissolved gas is lost more. In group of 7 "inhibited" deposits of gas the considered stocks of helium on cat. C₁ make not less than 198,3 mln. m³, on kat. C₂ – 165,3 mln. m³.

Stocks of sulfur are considered only on one developed Srednebotuobinskiy deposit and make 445 thousand t on category C₁ and 215 thousand t on C₂ at an average content of sulfur in oil 0,89 g/m³.

As show results of geological researches, the majority of the reconnoitered gas deposits differ a high content not only a condensate, but also oil. As of today from all 19 deposits Nepsko-Botuobinskiy OGA Srednebotuobinskiy, Irelyahskiy and Talakanskiy deposits are in an initial stage of trial operation with selection of oil for use as boiler fuel.

On balance of stocks on Talakanskiy deposit taken stocks of oil on category C₁ 107,1 mln. t, C₂ – 39,3 and C₃ – 66,5 mln. t, free gas accordingly – 36,4 bln. m³, 31,5 and 165,1 bln. m³, a gas condensate on cat. were considered. C₁ – 375 thousand t and C₂ – 154 thousand t. On the central block of the given deposit taken stocks of oil on C₁ have made 101,4 mln. t and C₂ – 13,0 mln. t, free gas accordingly – 18,95

and 3,8 bln. m³, and a gas condensate on C₁ C₂ – 529 thousand t.

Irelyahskiy OGCD it is located in a southwest Peace. According to «Giprovostokneft» the average worker debit one chink is certain in 33,1 t/day. Recently drilling horizontal chinks that allows to increase efficiency of chinks in 2 times (50-60 t/day here takes root.). Stocks A+B+C₁ make 31 mln. t, including taken – 9,9 mln. t.

In immediate prospects these deposits will join Chayandinskiy. On balance of the given deposit on categories And In C₁ are included 165,4 million τ geological and 42,5 million τ taken stocks of oil, accordingly 1240,9 billion m³ and 379,7 billion m³ natural gas, including free – 115,7 and a gas cap – 264 billion m³, as well as 18,3 million τ. Taken stocks of a condensate. The deposit is located between Talakanskiy and Srednebotuobinskiy oil-and-gas deposits in 165 km to the west of Lensk.

Chayandinskiy the deposit is considered as export base for delivery of natural gas to the Far East and in the countries ATR. In the beginning 2008 the license for development of this of the largest in Russia gas condensate deposit on without competitive to a basis has been passed Gazprom. And it opens possibilities for the beginning realizations of the scale project on gasification the Far East.

Per 2003-2004 four licenses for the right of development of central block Talakanskiy of a deposit have been given out to OS "Surgutneftegaz" and three – for geological studying Peleduiskiy, Kedrovyy and Horonokhskiy the sites covering as a whole the area more 31,9 thousand km². Alongside with OS "Surgutneftegaz" which have gained the tender on Alinskiy to a site, the license have received OS "Kholmogorneftegaz", being branch of OS "Sibneft", on Tumpushikanskiy and Hotogo-Murbaiskiy deposits and OS "Sakhaneftegaz" on Otradninskiy and Srednetungskiy deposits.

Sredneviluiskiy GCD it has been entered into development in 1986. Also is base object of operation and alternatives to it in a zone of operating main gas mains does not exist. The basic areas of development on a deposit are productive horizons T₁-II and T₁-III with balance stocks on cat. C₁ 158,6 bln. m³. The productive horizon T₁-III containing 73,3 % of stocks of a deposit, is widespread on all area,

and productive horizon T₁-II (25,5 %) is located in a left-bank part of a deposit. In 1990 Novosibirsk branch VNIIPGazdobycha had been developed a version of the project of arrangement Sredneviluiskiy GCD with annual volume of extraction up to 4 bln. m³. On an operational grid in 43 chinks according to which works on arrangement of craft now are conducted. However in communication with significant divergences in fact the sold diagram of construction from operating projects of arrangement of a deposit the sharp indispensability of a corrective amendment of projects that will allow to finish volume of extraction of gas up to 11,6 mln. m³/day has ripened and to carry out a rational level of operation of craft.

On Srednebotuobinskiy OGCD 117 chinks are drilled, including: parametrical – 1, search – 2, prospecting – 102, operational – 12. From among prospecting chinks in operational fund 7 gas and 5 oil wells are accepted. Taken stocks of a deposit on oil are estimated in 74,9 mln. t, on gas – 171 bln. m³.

In 1996 OS "Yakutgazprom" within the limits of northern (gas containing) a segment conducted industrial development газоконденсатной deposits Botuobiskiy of horizon, which with 1985-1989. Was in trial operation, as well as trial operation of deposits Ulahanskiy and Talakhskiy productive horizons.

On central (petroliferous) block Srednebotuobinskiy of a deposit trial operation oil оторочки proceeded. On this block the annual volume of selection of gas has reached 1798 million m³, that makes 8,9 % from initial prognoses resources. Fund of operational chinks on the end 2006. Under the plan has reached 25 units.

Thus daily average дебит as a whole on a deposit has made 41 t/day., that above design. Because of backlog of arrangement of a deposit and seasonal prevalence of consumption of oil the actual volume of extraction lags behind a design level. For all period of operation of a deposit selection of oil

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was equaled 375,5 thousand t, that makes about 0,75 % from the stocks of oil approved in GKZ.

Northern block of a deposit is developed for extraction of gas. Extracted possibilities are estimated in 1,38 mln. m³/ day. At demand of region 2,0 million m³/day. According to OS "Yakutgazprom", in operation is 11 chinks with workers debit from 40 up to 2000 thousand m³ gas/ day.

In the mean time, complex mountain-geological operating conditions of the block limit possibilities of maintenance of stable volume of extraction. It became the reason for review of the project of development of a deposit and decrease in volume of extraction up to 260 mln. m³.

THE CONCLUSION

With a view of the further strengthening a mineral-raw-material base (MMB) hydrocarbon resources it is necessary:

1. Up to reconnoiter the deposits known and prepared for industrial development with a view of a gain of stocks of oil and gas.
2. To begin and strengthen prospecting works on the average deposits which are being unallotted fund with objective of their translation in a category demanded, that will allow increasing quantity of deposits in the distributed fund.
3. For support MMB of large strategic deposits of hydrocarbon resources of republic expediently to begin escalating prospecting works on investigation and up to reconnoiter nearby average and fine deposits, using existing in area prospecting base, as repeated return to them in the future will entail significant organizational, material and financial problems.
4. For strengthening MMB of republic NGK by experience of subjects of Russia where active and large-scale development of hydrocarbon raw material is conducted is necessary to create not integrated small enterprises (NIE) on development of fine and average deposits.

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BIOGRAPHIES

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