UDC 622.276.8 https://doi.org/10.33619/2414-2948/56/23

NON-TRADITIONAL OILS: ANALYSIS OF REGIONAL DISTRIBUTION AND RESERVES OF HEAVY OIL AND NATURAL BITUMEN

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НЕТРАДИЦИОННЫЕ НЕФТИ: АНАЛИЗ РЕГИОНАЛЬНОГО РАСПРЕДЕЛЕНИЯ И ЗАПАСОВ ТЯЖЕЛОЙ НЕФТИ И ПРИРОДНОГО БИТУМА

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Abstract. The spatial distribution of heavy oils and natural bitumen's depending on their reserves is analyzed. It is shown that due to the deterioration of the structure of the reserve in the direction of increasing the share of hard-to-recover oils, the role of heavy oils and natural bitumen's in the overall hydrocarbon balance increases. Analysis of reserves showed that most of their world reserves are concentrated in Canada, Venezuela, and Russia. The results of studies of the distribution patterns of heavy oils and natural bitumen's can be used in improving methods of field search and in solving other problems of the oil industry.

Аннотация. Проведен анализ пространственного распределения тяжелых нефтей и природных битумов в зависимости от их запасов. Показано, что в связи с ухудшением структуры запасов в сторону увеличения доли трудноизвлекаемых нефтей, роль тяжелых нефтей и природных битумов в общем балансе углеводородов возрастает. Анализ запасов показал, что большая часть их мировых запасов сосредоточена в Канаде, Венесуэле и России. Результаты исследований закономерностей распределения тяжелых нефтей и природных битумов могут быть использованы в совершенствовании методов поиска месторождений и при решении других задач нефтяной отрасли.

Keywords: heavy oil, natural bitumen, high-viscosity oil, reserves, resources, oil and gas basin, region.

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https://doi.org/10.33619/2414-2948/56

Ключевые слова: тяжелые нефти, природные битумы, высоковязкие нефти, запасы, ресурсы, нефтегазоносный бассейн, регион.

Oil has been the most important, necessary, and in-demand mineral in the world for more than a hundred years. Oil is a source of the country's mineral resources, and as a product, it is unimaginable for the chemical, fuel and energy, food, textile, and other industries.

The current situation with the limited and depleted supply of a number of minerals, primarily fuel and energy resources, has become widespread. It is based on the dynamics of the exploitation of large oil and gas fields and their dynamics in the next decades. The life cycle of each deposit involves the following periods: the start of the operation, the rapid growth of production, then the "peak" and the rapid decline in production due to the completion of production [1]. Based on the slowdown in production growth in the largest oil and gas fields, which are not replaced by the growth of newly discovered reserves, it can be concluded that the hydrocarbon era will begin in the next decades, 2030-2050 [2]. The final stages of hydrocarbon development vary from continent to continent and country to country, but there are a global oil and gas shortage at current production levels.

In the depths of the earth, the amount of conventional hydrocarbon raw materials is limited and located very uneven. The world's proven oil reserves (as of 2018) are 483 trillion barrels, natural gas — 199.444 trillion m^3 [3; 4]. With the modern use of energy resources, the oil will last for more than 40 years, and natural gas for 60-65 years.

The structure of the energy balance of consumption changes rapidly depending on the development of world culture and the use of these resources. Figure 1 shows the changes in the structure of global energy consumption over the next 60 years and the forecast for the next 10 years [5]. It is clear that by the thirties of this century, the world's demand for oil and gas will increase by almost one and a half times compared to the 2000s. Conventional light oil production is expected to peak in 10 to 15 years, after which it will decline.

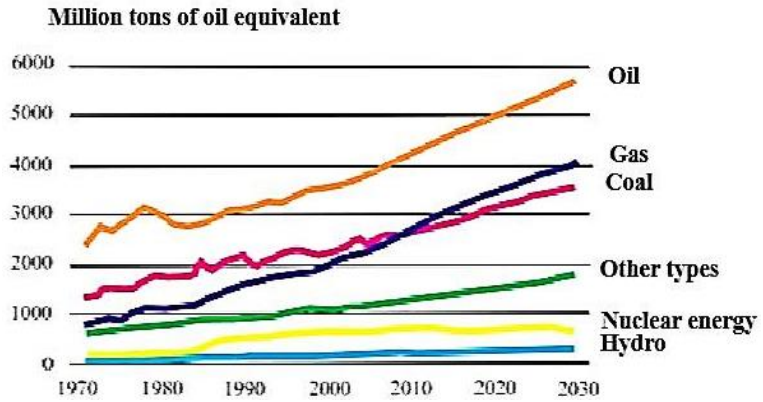

Figure 1. Global energy demand forecast for 2030

In 2016-2017, a historic event took place that was virtually unnoticeable to the general public — the world recorded the highest rate of conventional oil production. The U.S. Department of Energy estimates that oil production in 2015 reached 3,405 million. tons and in 2017 declined to 3340 million tons [6].

Current trends suggest that in the future the world will become more energy-dependent, urbanized and mobile. It can already be said that the next consumer revolution is expected in 2030-

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2035. As a result, energy consumption and consumption of the main types of mineral raw materials will increase.

An important source of raw materials to meet the growing demand for fuel and petrochemical products with the depletion of reserves of light and medium oils remains heavy high-viscosity oils, natural bitumens, flammable shales and other unconventional oil and gas resources.

Reserves of non-conventional oil are geographically more unevenly distributed than reserves of conventional oil. According to the US Geological Survey (USGS) [8] and the Energy Information Administration (EIA) [9], the world's technically recoverable reserves of unconventional oil are estimated at more than 200 billion. tons. This is similar to the reserves of conventional oils. Two-thirds of non-traditional sources are located in North and South America [7].

The assessment and classification of reserves depends on a number of factors, the most important of which are the geological data and experience gained during the direct development of the field. In particular, taking into account the relatively active development of non-conventional resources in North and South America, they are highly valued for their highly explored and recoverable reserves. It is likely that the transfer of geological search operations and technology to other regions of the world will increase the potential reserves of non-conventional oil. Globally, in 2017, 424 million tons of non-conventional oil were mined, which accounts for 9% of the world's liquid hydrocarbon production. It should be noted that a large part of this production, 350 million tons is in North America. Regionally, the second 60 million tons accounts for South America.

The positive picture of the future of oil in the world after 2040 is assessed only on the basis of the resources of the Gulf countries. Arctic waters remain unexplored, but their cost can be very high under permafrost conditions. Production of non-conventional sources of liquid hydrocarbons is projected to increase 3.8 times from 2007 to 2035 [10; 11] (Figure 2).

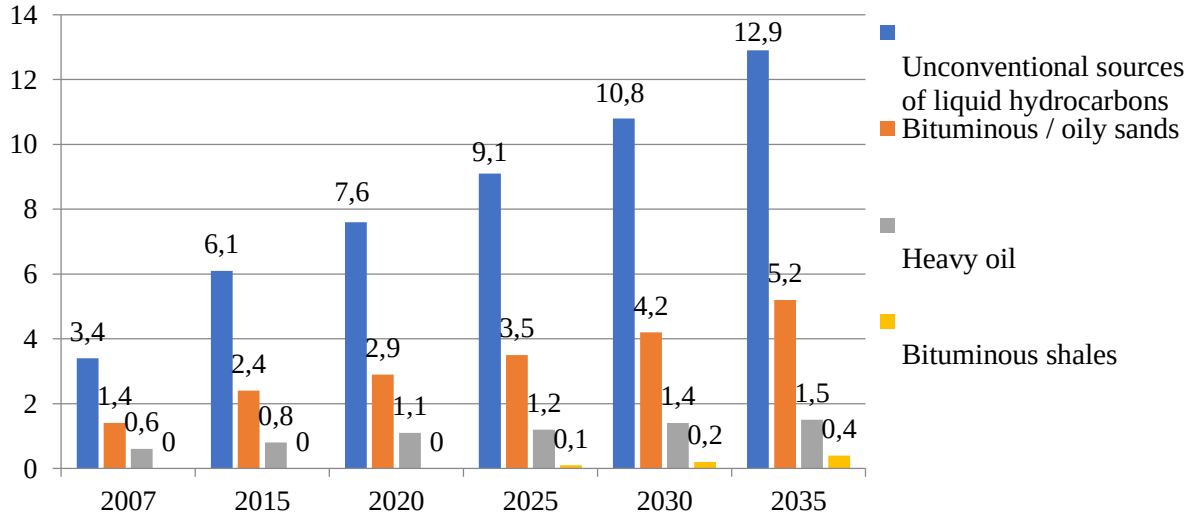

Figure 2. Growth forecast for non-conventional sources of liquid hydrocarbons

As stated by most experts, the reserves of high-viscosity oils and natural bitumen are made up 790 billion tons. to 1 trillion tons. which is 5-6 times more than the residual reserves of low and medium viscosity oil that is composed of 162 billion tons. This figure is significantly higher than light and low viscosity oil reserves. Therefore, one of the potential ways to stabilize oil production and increase recoverable reserves is to develop hard-to-recover reserves. In a number of developed countries, high-viscosity oils are not considered as a reserve of oil production, but as a main basis for its development in the coming years [12; 13].

The world's recoverable reserves of natural bitumen are distributed as follows: Canada — 75%, Russia — 22%, the rest of the world — 3%. The world's reserves of heavy oil and natural

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bitumen are located in 63 geological provinces and amount to 1 trillion tons. m3, of which about half are proven reserves, and the rest are estimated [14]. The technology has been used for several years in Russia, Uzbekistan and other countries in the field of high-viscosity oils and natural bitumen. And it is possible that in the near future the use of heavy oil will become a major part of the entire production.

The world's reserves of heavy oil are estimated at 350 billion. m^3 and mainly located in Venezuela (Orinoco stem), Canada, China, India. About one-third of these reserves are considered approved.

Heavy oil fields have been discovered in 155 different geological provinces. One-third of heavy oil reserves are concentrated in large oil fields, mainly in Canada, the United States, the Middle East and South America. Large reserves of heavy oil have been discovered in Kazakhstan, Azerbaijan, Russia, Romania, the Caribbean, Southeast Asia, including Uzbekistan.

Canada, Venezuela and Russia have the world's largest reserves of heavy oil and natural bitumen. In the future, with the depletion of the world's ordinary oil reserves and the effective use of heavy oil and natural bitumen, countries with significant reserves may play a greater role in the development of the energy market.

The largest reserves of heavy oil are concentrated in the Orinoco oil field (Venezuela), which accounts for more than 60% of the country's oil reserves. It is followed by Italy, Mexico, the United States and others.

The following table lists the world's giant (large) and supergiant (rare) heavy oil and bituminous (oil) sand deposits, their geological reserves, years of discovery, and oil and gas basins [17].

Table 1

THE WORLD'S GIANT AND SUPERGIANT HEAVY OIL AND BITUMINOUS (OIL) SAND DEPOSITS

№	*Country*	*Minefield*	*Year of discovering*	*Reserves, billion tons.*	*Oil and gas basin*
1	Canada	Athabasca	1967	20,6	Alberta
2	Venezuela	Carabobo-3	2010	10,4	Orinoco
3	Venezuela	Carabobo-1	2006	7,9	Orinoco
4	Venezuela	Carabobo-2	2010	6,4	Orinoco
5	Venezuela	Junín -7	2009	6,4	Orinoco
6	Canada	Cold Lake		6,2	Alberta
7	Venezuela	Junín -8	2009	5,6	Orinoco
8	Venezuela	Ayacucho -7		5,2	Orinoco
9	Venezuela	Junín -5	2010	4,8	Orinoco
10	Venezuela	Ayacucho -6		3,5	Orinoco
11	Venezuela	Ayacucho -3		3,0	Orinoco
12	Madagascar	Bemolanga		2,6	Madagascar
13	Venezuela	Junín -10	2009	1,5	Orinoco
14	Venezuela	Junín -4	2010	1,3	Orinoco
15	USA	Elm Coulee	2000	1,2	Montana
16	Venezuela	Junín -2	2010	1,0	Orinoco
17	Venezuela	Junín -1	2009	1,0	Orinoco

The largest reserves of natural bitumen are found in Canada. The United States, Russia and others are next. The largest bitumen deposits in Canada are: Athabasca, Carbonate-Trend, Could

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Lake, Peace River, Wabasca; in Venezuela — Oficina-Temblador; in the U.S. — Asphalt Ridge, Sunnyside, Whiterock, Edna; In Madagascar — Bemolanga.

Russia is the third largest producer of heavy hydrocarbons after Canada and Venezuela. Schlumberger oilfield company estimates that Russia has 13.4 billion tons. barrels of heavy oil reserves, and natural bitumen — 33.4 billion tons. Heavy oil reserves are mainly concentrated in Western Siberia, the Volga-Urals and the Timan-Pechora region [15; 16].

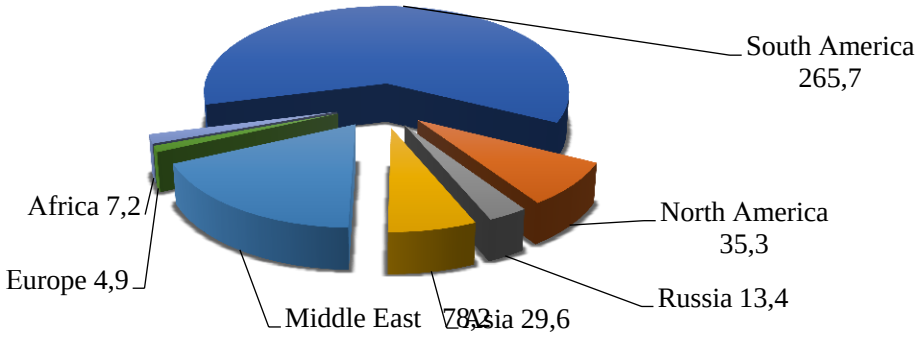

Figure 3. Regional distribution of heavy oil reserves

The regional distribution of heavy oil and natural bitumen reserves is shown in Figures 3 and 4. The distribution of heavy oil by regions of the world indicates that more than 80% of the world's heavy oil reserves are located in Eastern Europe, Central and North Asia [18; 19]. Significant collections of high-viscosity oil and natural bitumen have been accumulated in a number of countries.

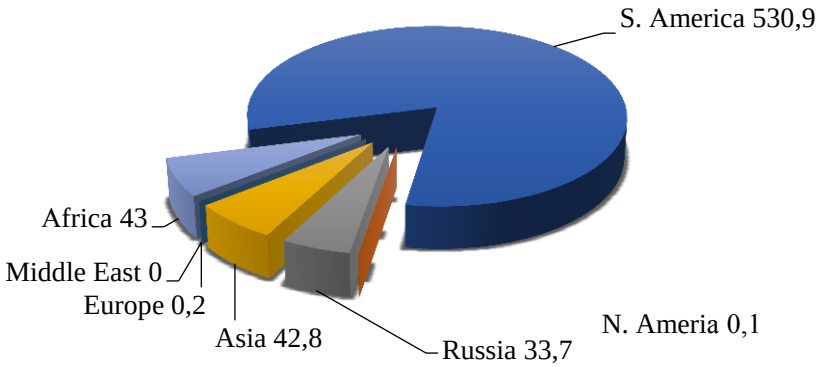

Figure 4. Regional location of natural bitumen reserves

Canada has the largest reserves of heavy oil and bituminous oil at 522.5 billion. tons. and mainly in the following provinces: Alberta — 374.5 billion. tons; Athabasca — 131.1 billion. tons; Wabasca — 16.9 billion. tons. Venezuela has the second largest reserves of this type of oil at 177.9 billion. tons. and Orinoco bituminous stems. Mexico, the United States, Russia, Kuwait and China also have significant reserves. In Norway, high-viscosity oils are mined using a number of large fields, such as the Grain in the North Sea shelf, with recoverable oil reserves of 105 million tons, is one of the largest oil fields in the Norwegian sector [19; 20; 21].

There are 184 heavy and bituminous oil fields, all or part of which are offshore, and 15 of them are giant. Most of them are located in Venezuela and Mexico. The 71 giant heavy and bituminous oil fields hold about 82% of the world's oil reserves. The largest are three deposits: Athabasca (Canada) — 20.6 billion. tons; Carabobo-3 (Venezuela) — 10.4 billion. tons; Argan (Kuwait) — 13 billion tons.

High-viscosity oil basins are common in the Eurasian region and North Africa — a total of 25 oil and gas basins, accounting for about 1/6 of the total number of basins in the world (Figure 5).

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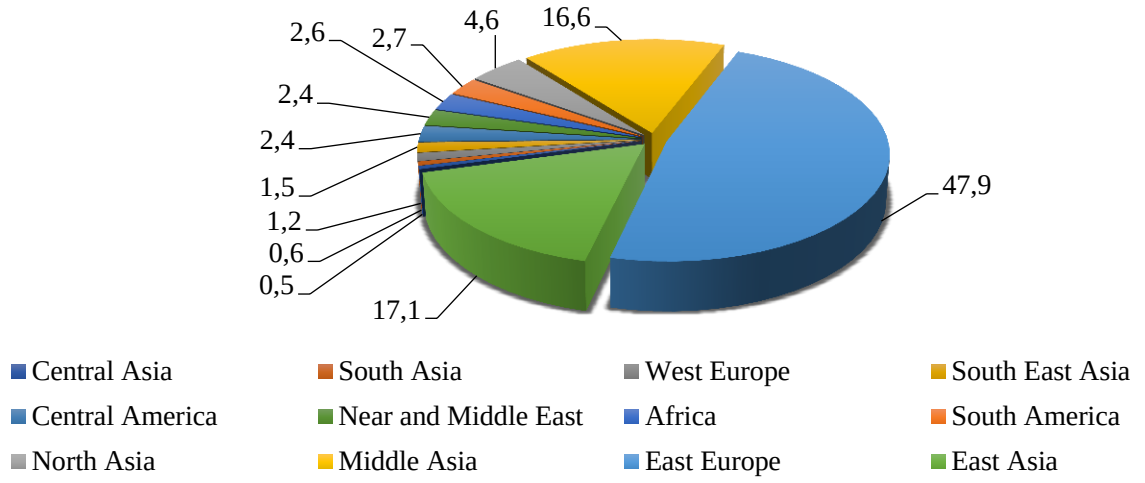

Figure 5. Distribution of heavy oil by regions of the world

Figure 6 shows the distribution of high-viscosity oils in Africa and Eurasia. As can be seen from the figure, more than 90% of high-viscosity oil in the region is located in the Commonwealth of Independent States (CIS) and is concentrated in three countries: Russia (6.2 billion tons or 84.4% of CIS reserves), Kazakhstan (726 million tons or 9.8%), Azerbaijan (389 million tons or 5.3%). In these countries, a total of 7.4 billion. tons. high-viscosity oil reserves in industrial categories or 99.5% of all CIS reserves are located [13; 18; 19].

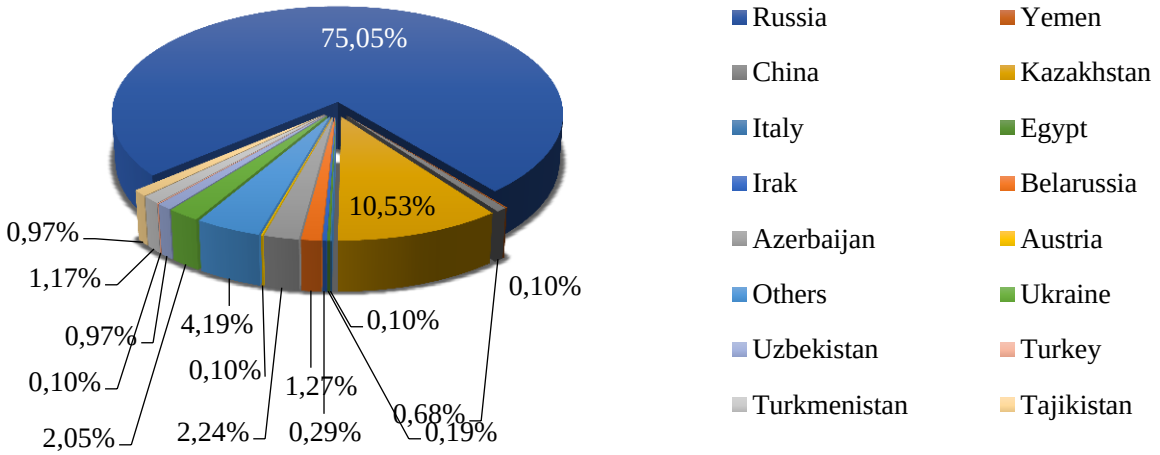

Figure 6. Country representation of high viscosity oils in Africa and Eurasia

The largest high-viscosity oil fields in the CIS are in Kazakhstan: Karajanbas — 230 mln. tons; North Buzachi — 195 mln. tons; Kenkiyak — 72 mln. tons; in Azerbaijan: Balakhany-Sabunchi-Romany — 114 mln. tons. The Russian Federation has significant high-viscosity oil reserves, which account for about 55% of Russia's total oil reserves.

Heavy oil deposits in the Republic of Uzbekistan are mainly located in the Surkhandarya oil and gas region. The estimated heap of heavy oil is located along the western wing of the Dasmanaga anticline. Estimated reserves of heavy oil, dirt and bitumen are estimated at 230 million. tons.

The United Nations estimates that the world's geological resources of natural bitumen are estimated at 260 billion tons, their recoverable resources are 70 billion. tons, about 70% of them are located in Canada. Bitumen sets are also available in Russia, Venezuela, the United States, Colombia, Argentina, Nigeria, Madagascar, Kazakhstan, Uzbekistan, and other countries [22; 13].

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In addition to the high content of asphalt-resin components (25-75%), high density, anomalous viscosity, natural bitumen's differ from low-viscosity oils by significant amounts of sulfur and metals, especially vanadium pentoxide (V_2O_5) and nickel (Ni) with a concentration of significant ore deposits comparable to the amount of metals in some countries of the world [22; 23].

Therefore, natural bitumen deposits should be viewed not only as a mono-mineral raw material for the production of oil and oil products, but also as a multi-component raw material.

The problem of substituting non-traditional types of hydrocarbons is very relevant, especially for oil-producing regions with high industrial potential, developed infrastructure and highly qualified specialists, which have been operating for many years.

Under modern conditions, it is time to undoubtedly include the oils of long-term deposits in non-traditional sources of hydrocarbon raw materials. For some reason, this is rarely mentioned, but the amount of these resources worldwide is on average more than twice the amount of conventional oil that has been extracted and will be extracted in the future. These are the usual oils, but the conditions under which they are extracted and the methods by which they can be extracted require an unconventional approach and, of course, large sums of money to extract them.

On that account, the future stability of the world oil industry, including the oil industry of Uzbekistan, and the future development of the country's economy depends to some extent on the resources of heavy oil, natural bitumen and shale. In this context, the study of the resources of heavy oil, natural bitumen and flammable shales in the earth's crust, the identification of specific features of their exploration and development, the study of the experience of developed countries in this area, as well as the development of efficient methods, the choice of cost-effective ways of extracting and processing them, attracting investment is one of the most pressing issues today.

References:

1. World Energy Outlook 2015. International Energy Agency. 2015.

2. Yakutseni, V. P., Petrova, Yu. E., & Sukhanov, A. A. (2009). Unconventional hydrocarbon resources are the reserve for renewal of the Russia oil and gas resource base. *Petroleum Geology. Theoretical and Applied Studies, 4*(1). 1-20. (in Russian).

3. Leading countries in oil and gas reserves - infographics https://clck.ru/Pd2wS

4. World oil reserves https://clck.ru/Pd2xy

5. Geology of the future https://clck.ru/Pd2z9

6. Yarboboev, T. N., Zhuraev, F. O., & Murodillaev, I. M. U. (2018). Perspektivy respubliki uzbekistan na slantsevoi nefti i gaza. *Internauka,* (12 (46)). 28-29. (in Russian).

7. Grushevenko, D. A., & Kulagina, V. A. (2019). Unconventional oil: technology, economics, prospects. Moscow. (in Russian).

8. USGS. Heavy Oil and Natural Bitumen-Strategic Petroleum Resources. https://pubs.usgs.gov/fs/fs070-03/fs070-03.pdf

9. U.S. Energy Information Administration. "World Shale Resource Assessments." Electronic resource. Official site of the U.S. Energy Information Administration, https://clck.ru/NNJXF

10. Yakutseni, V. P., Petrova, Yu. E., & Sukhanov, A. A. (2009). Netraditsionnye resursy uglevodorodov-rezerv dlya vospolneniya syr'evoi bazy nefti i gaza Rossii. *Neftegazovaya geologiya. Teoriya i praktika, 4*(1). 1-14. (in Russian).

11. Mamakhatov, T. M. (2013). Osobennosti osvoeniya netraditsionnykh istochnikov uglevodorodov v Rossii i mire. *Interekspo Geo-Sibir, 3*(1). 109-113. (in Russian).

12. Pat. 2248591 Russian Federation, O01U 1/157. Downhole source of elastic vibrations. E. P. Bolshakov, D. N. Dmitriev, B. A. Ivanov, A. A. Molchanov, O. P. Pechersky, V. V. Sidora, B. P. Yatsenko. 2003100022/28; declared 01/04/2003; publ. 03/20. 05, Bull. N.8. (in Russian).

13. Yarboboev, T. N. (2017). Perspektivy respubliki po zapasam tyazheloi nefti i prirodnykh bitumov i problemy ikh osvoeniya. *Gornoe delo,* (2). 69. (in Russian).

14. Shakurova, A. V. (2018). Obzor metodov razrabotok vysokovyazkoi nefti i prirodnykh bitumov. *Problemy razrabotki mestorozhdenii uglevodorodnykh i rudnykh poleznykh iskopaemykh,* (1), 81-84. (in Russian).

15. Lipaev, A. A., & Yangurazova, Z. A. (2007). Razrabotka mestorozhdenii prirodnykh bitumov. Almetievsk. (in Russian).

16. Lipaev, A. A. (2013). Razrabotka mestorozhdenii tyazhelykh neftei i prirodnykh bitumov. Izhevsk. (in Russian).

17. Campbell, C. J., & Laherrère, J. H. (1998). The end of cheap oil. *Scientific American*, *278*(3), 78-83. https://www.jstor.org/stable/26057708

18. Baikov, N. M. (2003). Perspektivy dobychi nefti v Norvegii. *Neftyanoe khozyaistvo,* (4), 124-125. (in Russian).

19. Bashkirtseva, N. Yu. (2014). Vysokovyazkie nefti i prirodnye nefti. *Vestnik Kazanskogo tekhnologicheskogo universiteta, 17*(19). 296-299. (in Russian).

20. Stainar, N. (2006). Upravlenie neftegazovymi resursami Norvegii. *Nedropol'zovanie XXI vek,* (1), 78-84. (in Russian).

21. Polishchuk, Yu. M., & Yashchenko, I. G. (2005). Vysokovyazkie nefti: analiz prostranstvennykh i vremennykh izmenenii fiziko-khimicheskikh svoistv. *Setevoe izdanie "Neftegazovoe delo",* (1). 31. (in Russian).

22. Yartiev, A. F. (2012). Prirodnye bitumy-unikal'noe energeticheskoe syr'e. *Vestnik Kazanskogo tekhnologicheskogo universiteta, 15*(12). 293-297. (in Russian).

23. Yarboboev, T. N., & Khazratova, G. Sh. (2017). Tyazhelye nefti i prirodnye bitumy kompleksnoe syr'e XXI veka. *Uchenyi XXI veka,* (4-2(29)). 19. (in Russian).

Список литературы:

World Energy Outlook 2015 // Международное энергетическое агентство 2015. URL: http://www.worldenergyoutlook.org/weo2015 (дата обращения 25.09.2019).

2. Якуцени В. П., Петрова Ю. Э., Суханов А. А. Нетрадиционные ресурсы углеводородов – резерв для восполнения сырьевой базы нефти и газа России // Нефтегазовая геология. Теория и практика: эл. науч. изд. 2009. Т. 4. №1. С. 1-20.

3. Страны-лидеры по запасам нефти и газа – инфографика https://clck.ru/Pd2wS

4. Мировые запасы нефти https://clck.ru/Pd2xy

5. Геология будущего https://clck.ru/Pd2z9

6. Ярбобоев Т. Н., Жураев Ф. О., Муродиллаев И. М. У. Перспективы республики узбекистан на сланцевой нефти и газа // Интернаука. 2018. №12 (46). С. 28-29.

7. Нетрадиционная нефть: технологии, экономика, перспективы / под ред. Д. А. Грушевенко, В. А. Кулагина. М.: ИНЭИ РАН, 2019.

8. USGS. Heavy Oil and Natural Bitumen-Strategic Petroleum Resources. https://pubs.usgs.gov/fs/fs070-03/fs070-03.pdf

9. U.S. Energy Information Administration. "World Shale Resource Assessments." Electronic resource. Official site of the U.S. Energy Information Administration, https://clck.ru/NNJXF

10. Якуцени В. П., Петрова Ю. Э., Суханов А. А. Нетрадиционные ресурсы углеводородов-резерв для восполнения сырьевой базы нефти и газа России // Нефтегазовая геология. Теория и практика. 2009. Т. 4. №1. С. 1-14.

11. Мамахатов Т. М. Особенности освоения нетрадиционных источников углеводородов в России и мире // Интерэкспо Гео-Сибирь. 2013. Т. 3. №1. С. 109-113.

12. Пат. 2248591 Российская Федерация, О01У 1/157. Скважинный источник упругих колебаний / Е.П. Большаков, Д.Н. Дмитриев, Б.А. Иванов, А.А. Молчанов, О.П. Печерский, В.В. Сидора, Б.П. Яценко. 2003100022/28; заявл. 04.01.2003; опубл. 20.03. 05, Бюл. №8.

13. Ярбобоев Т. Н. Перспективы республики по запасам тяжелой нефти и природных битумов и проблемы их освоения // Горное дело. 2017. №2. С. 69.

14. Шакурова А. В. Обзор методов разработок высоковязкой нефти и природных битумов // Проблемы разработки месторождений углеводородных и рудных полезных ископаемых. 2018. №1. С. 81-84.

15. Липаев А. А., Янгуразова З. А. Разработка месторождений природных битумов. Альметьевск. 2007.

16. Липаев А. А. Разработка месторождений тяжелых нефтей и природных битумов. Ижевск. 2013.

17. Campbell C. J., Laherrère J. H. The end of cheap oil // Scientific American. 1998. V. 278. №3. P. 78-83. https://www.jstor.org/stable/26057708

18. Байков Н. М. Перспективы добычи нефти в Норвегии // Нефтяное хозяйство. 2003. №4. С. 124-125.

19. Башкирцева Н. Ю. Высоковязкие нефти и природные нефти // Вестник Казанского технологического университета. 2014. V. 17. №19. P. 296-299.

20. Стайнар Н. Управление нефтегазовыми ресурсами Норвегии // Недропользование XXI век. 2006. №1. С. 78-84.

21. Полищук Ю. М., Ященко И. Г. Высоковязкие нефти: анализ пространственных и временных изменений физико-химических свойств // Сетевое издание «Нефтегазовое дело». 2005. №1. С. 31.

22. Яртиев А. Ф. Природные битумы-уникальное энергетическое сырье // Вестник Казанского технологического университета. 2012. Т. 15. №12. С. 293-297.

23. Ярбобоев Т. Н., Хазратова Г. Ш. Тяжелые нефти и природные битумы комплексное сырье XXI века // Ученый XXI века. 2017. №4-2(29). С. 19.

Работа поступила
в редакцию 10.06.2020 г.

Принята к публикации
15.06.2020 г.

Ссылка для цитирования:

Yarboboev T., Sultanov Sh., Aminov F., Navotova D. Non-traditional Oils: Analysis of Regional Distribution and Reserves of Heavy Oil and Natural Bitumen // Бюллетень науки и практики. 2020. Т. 6. №7. С. 226-234. https://doi.org/10.33619/2414-2948/56/23

Cite as (APA):

Yarboboev, T., Sultanov, Sh., Aminov, F., & Navotova, D. (2020). Non-traditional Oils: Analysis of Regional Distribution and Reserves of Heavy Oil and Natural Bitumen. *Bulletin of Science and Practice, 6*(7), 226-234. https://doi.org/10.33619/2414-2948/56/23