

МИНИСТЕРСТВО ОБРАЗОВАНИЯ РОССИЙСКОЙ ФЕДЕРАЦИИ

РОССИЙСКИЙ ГОСУДАРСТВЕННЫЙ УНИВЕРСИТЕТ

НЕФТИ И ГАЗА

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**УЧЕБНО-МЕТОДИЧЕСКОЕ ПОСОБИЕ ПО АНГЛИЙСКОМУ
ЯЗЫКУ ДЛЯ СТУДЕНТОВ III ЭТАПА ОБУЧЕНИЯ
ФАКУЛЬТЕТА РАЗРАБОТКИ НЕФТЯНЫХ И ГАЗОВЫХ
МЕСТОРОЖДЕНИЙ**

Москва 2004

УДК 802. О ()

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Учебно-методическое пособие по английскому языку для студентов III
этапа обучения факультета разработки нефтяных и газовых
месторождений - М.: РГУ нефти и газа, 2004, - 54 с.

Настоящее методическое пособие предназначено для студентов ФРН и
ГМ и ИЭФ II и III этапов обучения. Они могут быть также
использованы для работы с аспирантами.

Цель методического пособия – развитие всех видов чтения на основе
профессиональных текстов.

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Издание второе дополненное и переработанное.

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Supplementary material: Origin and Accumulation of Oil and Gas.

Unit II.

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Text: Casing.

UNIT 1

I. Learn to pronounce the following words properly:

responsible []	considerably []
secondary []	saturation []
percentage []	importance []
hydration []	void []
heterogeneity []	destroy []
accumulate []	provide []

II. Read the following international words and give their Russian equivalents:

economic []	basis []
specific []	absolute []
accumulation []	status []

III. Translate the following sentences into Russian. Pay attention to the Passive construction:

1. Oil and gas are greatly needed for both industry and everyday use.
2. It is to be noted that oil and gas are of great importance for industry.
3. The problem can't be solved without the cooperation of scientists in different branches of science.
4. This problem will have to be carefully examined as it is of great importance for the development of industry.
5. It has been established that oil and gas can be found in sands.
6. Mention is to be made of the theory put forward by Soviet scientists.
7. The theory put forward by him at the conference is to be taken into consideration.
8. The data which are referred to can't be relied upon.
9. These data couldn't help us to solve the problem which must be carefully discussed.
10. The data which we have can't be relied on.

IV. Translate the following of-phrases into Russian:

- e.g.* an article of great importance - статья, представляющая большой интерес
rocks of high porosity - порода с высокой пористостью
rock property of great importance;
reservoir rocks of great permeability;
grains of large size;
text of great interest;
mineral grains of large size;
experiments of great value;
pore space of large volume.

V. Translate the following sentences into Russian. Pay attention to the of-
phrases:

1. There are many things of great importance.
2. This is a text of great interest to those who study rock properties.
3. Soviet engineers invented a new effective equipment of great value for oilmen.
4. They have carried out an experiment of great interest for us.
5. These rocks consist of grains of different size.
6. Sedimentary rocks of great permeability serve as reservoirs for oil and gas.

VI. Read the text and give the main idea of it.

OIL AND GAS

Petroleum is the name of the mineral that comes from the ground and from which various fuels are obtained. It is the crude oil that comes from the wells.

Oil usually lies thousands of feet below the earth's surface. There are many ways of discovering this underground oil, but the only way to be certain that it exists is to make a deep hole, called a bore-hole, or a well, through the rock, earth and sand. The steel framework over the well is called a derrick. From the derrick the machinery that drills the hole is hoisted and lowered.

Bore-holes are often very deep. Some of them go to a depth of two miles, or even farther. The diameter may be 24 inches at the top (mouth), and as little as 3 or 4 inches at the bottom.

The economic value of oil fields is known to be determined to a considerable extent by the physical properties of reservoir rocks, the reservoir fluids and also by the type and amount of reservoir energy. The three engineering characteristics of a reservoir rock are porosity, oil, gas and water saturation and permeability.

Porosity is known to be the best physical characteristic of an oil reservoir. It determines the volume of oil and gas present. In oil reservoirs the porosity represents the percentage of the total space that is available to be occupied by either liquids or gases. It also determines the storage capacity of the sand.

One may distinguish two types of porosity, namely, absolute and effective. Absolute porosity is the percentage of total void space with respect to the bulk volume regardless of the interconnection of the pore voids. A rock may have considerable absolute porosity and yet have no conductivity to fluid for lack of pore interconnection.

Effective porosity is the percentage of interconnected void space with respect to the bulk volume. It is an indication of conductivity to fluid but not necessarily a measure of it. Effective porosity is a function of a great many lithological factors. Some of the most important of these are heterogeneity of grain size, packing, cementation, weathering, clay content, clay types, and clay hydration status.

sandstone [*'sændstəʊn*] - песчаник
derrick [] - буровая вышка
to hoist [] - поднимать
to lower [] - спускать; опускать
top (mouth) - устье скважины
value [] - ценность, стоимость
reservoir [] - пласт, коллектор
recovery [] - добыча, отдача пласта
water saturation [] - водонасыщенность
permeability [] - проницаемость
storage capacity [] - ёмкость резервуара
void space [] - поровый объём
bulk volume [] - общий объём
grain [] - зерно, отдельная частица (минерала)
packing [] - уплотнение, прокладка
weathering [] - выветривание, эрозия
thickness [] - мощность (пласта)
fracturing [] - гидравлический разрыв пласта
to result from - происходить, следовать
to result in - приводить к

VIII. Form nouns from the following adjectives by means of the suffix - "ity" and translate them into Russian.

e.g. porous - porosity - пористость

heterogeneous, special, responsible, respectable, necessary, . .
conductive, electrical, reliable, available, dense, permeable.

IX. Remember the singular and plural forms of the following nouns:

stratum - strata; datum - data; phenomenon - phenomena;
analysis – analyses; crisis - crises, basis - bases.

X. Find the Russian equivalents to the following word combinations:

1. reservoir rocks	1. гидроразрыв
2. reservoir fluids	2. объем коллектора
3. reservoir characteristics	3. водонасыщенность
4. reservoir energy	4. пластовая жидкость
5. reservoir volume	5. пластовые характеристики
6. reservoir fracturing	6. значительно
7. reservoir recovery	7. общий объем
8. total void space	8. нефтенасыщенность
9. oil saturation	9. нефтеотдача
10. water saturation	10. пластовая энергия
11. bulk volume	11. общий поровый объем
12. to a great extent	12. коллектор

XI. Give the English equivalents of the following word combinations:

физические свойства пород пласта-коллектора, пластовые флюиды; тип пластовой энергии, пористые и проницаемые породы; пористость и проницаемость пород; общий объем; суммарный объем; объем связанных между собой пор; однородность размера зерен; в значительной степени; первичная и вторичная пористость; пласт (коллектор), имеющий большое значение; емкость резервуара(хранилища); нефте-, водо-, и газонасыщенность пласта; достаточная мощность породы.

XII. Translate the sentences into Russian. Pay attention to the meaning of the word "that» (то; тот; то, что; который; что)

1. That oil is found associated with gas is a very important factor for oil production.
2. The history of oil industry in Russia was to a large extent connected with that of Baku oil region.
3. So wonder that in a few years kerosine became well known throughout the country and the demand for petroleum greatly increased.
4. That the paper is of great interest is quite evident to us.
5. This article is much more difficult than that translated by you.
6. The cost of that product is very high.
7. He said that very important information had been obtained by the scientists working at this problem.
8. It is well known that oil is of great importance for the wealth and strength of any country.
9. The experiment that you made last year is much more interesting than that conducted now.

XIII. Translate the following sentences into Russian. Pay attention to the "Nominative + Infinitive" construction.

e.g. The economic value of oil fields is known to be determined to a considerable extent by the physical properties of reservoir rocks.

- a) Известно, что физические свойства коллекторских пород определяют в значительной степени экономическое значение нефтяных месторождений.
 - б) Экономическое значение нефтяных месторождений в значительной степени, как известно, определяется физическими свойствами коллекторских пород.
1. Porosity is considered to be the best-known physical characteristic of an oil reservoir.
 2. The bore hole is reported to go down to a great depth.
 3. Many various fuels are known to be obtained from the crude oil.
 4. Pipeline oil transportation is thought to be the most economical.
 5. A new field is expected to be discovered in this part of Siberia.
 6. Natural geologic processes are known to create and destroy porosity.
 7. Two types of porosity are known to be distinguished.
 8. This process is known to be of great importance.

XIV. Translate the following sentences into English.

1. Считают, что решение этой проблемы имеет большое значение для нефтяной промышленности.
2. Сообщают, что в этом районе добывают много нефти.
3. Нефть транспортируют с месторождений на большие расстояния.
4. Физические свойства пород определяют значение нефтяных месторождений.
5. Пористость может создаваться и разрушаться под действием геологических процессов.
6. Различают, как известно, два вида пористости.
7. Считают, что пористые и проницаемые породы заняты либо газами, либо жидкостями.
8. Полагают, что поры связаны между собой.
9. Объем, занимаемый газом и нефтью, можно определить с помощью пористости.
10. Из всех технических параметров нефтяного пласта пористость выделяют как самую важную характеристику.

XV. Answer the following questions.

1. What is an oil?
2. What is a derrick and what is it used for?
3. What does this text deal with?
4. Of what importance are the physical properties of reservoir rocks?
5. What can be determined by means of the physical properties of reservoir rocks and some engineering characteristics?
6. Which of the physical characteristics is considered to be the most important?
7. What is porosity?
8. What types of porosity may be distinguished?
9. Give the definition of these types.
10. Which of the two types of porosity is of great interest for oilmen?
11. In what way is porosity created and destroyed?
12. What processes are responsible for primary and secondary porosity?

XVI. Look through, the extracts given below and say what each of them is about. Does any of them deal with the science you study? Read extract 1 and :

a) say what deposits were discovered on the Tazov Peninsula;

b) describe the climatic conditions in this area.

Read extract 2 and say what information concerning gas production you could get from it.

Read extract 3 and say whether the information deals with the field of engineering you study.

1. The Yamburg settlement on the Tazov Peninsula (North-Western Siberia) is mentioned both in the Guidelines for the Economic and Social Development of the USSR for 1986 - 1990 and for the Period ending in the year 2000 and in the list of new joint projects approved at the 39th CMEA Session in Havana.

Several years ago deposits of gas condensate on the site stretching 170 km long and 45 km wide were discovered in the permafrost area of the Tazov Peninsula tundra. Several gas pipelines will begin here, including one for exporting gas to the CMEA member-countries. The latter, 4,605 km long, will even be longer than a similar one built from Urengoi, already developed deposit south of Yamburg to Western Europe (4,451 km).

Construction work is in full swing on Yamburg's oil field. Pile foundations for a complex gas preparation installation are being built in harsh climatic conditions. Winter frosts reach 50°C below, and even in summer it is not easy to drive piles into permafrost. A way out was found: wells are first drilled and filled with hot solution, then eight-metre-long piles are sunk.

It has been decided not to build a permanent city in this harsh area. Instead use is made of the expedition-shift method.

Notes:

1. pile - свая

2. expedition-shift method - вахтовый метод

2. Daily gas production at Tyumen fields in Western Siberia is one billion cubic metres. It has taken less than 20 years to reach the mark. Despite difficult accessibility, the Tyumen gas fields have been developed faster than any other deposits in the world. With the climate being rigorous and industrial centres far away it took basically new methods to open the gas fields up. The deposits were developed turn by turn in line with accumulated experience.

Compared with the comprehensive gas treatment units used at the fields some years ago, the ones now being installed are twice as efficient. They are also lighter and occupy twice less space. Such improvements have been very important to gas pool development in the tundra.

Long-distance pipeline building has also been picking up speed. While previously it took two years to lay a gas main, now this is done in less than 12 months.

3. Accumulations of hydrocarbons in commercial quantities can be found at depths of 10 km. This is the conclusion of specialists in Azerbaijan (Transcaucasia).

When studying the interior of the South Caspian Depression, they created a theory, methods and techniques for predicting the properties of deep-seated rocks and their ability to form natural reservoirs in which hydrocarbons could accumulate.

At great depths, usually notable for high pressures and temperatures, rocks are heavily compressed and there are no hollows in which hydrocarbons could embed.

In the South Caspian Depression, deep-seated rocks are recent (10-12 million years old) and did not have time to get compressed. Whole deep-seated reservoirs, covered with clayrocks barriers which are impermeable to water and which reliably protect the contents of the natural hollows, have been found there.

The conclusions which are substantiated theoretically and experimentally, are corroborated by 250 mud volcanoes which during eruptions eject rocks from great depths with signs of oil. The same is evidenced by seismic survey data indicative of the presence of structures favourable for the accumulation of hydrocarbons at depths down to ten kilometres.

Deep-seated oil deposits have also been found in a number of other areas of Russia. To begin developing them commercially is one of the main tasks of the Russian oil production workers.

Moscow News, 1986.

XVII. Do you know that ...

The word «petroleum» comes from two Latin words: PETRA, meaning rock, and OLEUM, meaning oil. Petroleum in its natural state is generally known as crude oil. Most of the compounds found in petroleum are composed of hydrogen and carbon. Such compounds are called hydrocarbons. In addition to hydrocarbons, other compounds containing small amounts of sulfur, oxygen and nitrogen are also present in petroleum.

Colour, odour, specific gravity, and viscosity are the main physical properties of petroleum. Another important determination made in connection with petroleum products is that of the flash and burning points.

Crude oils differ markedly in their boiling points and in the amount of distillate which is obtainable at definite temperatures. The boiling point of the crude oil will depend largely on the hydrocarbons.

Crude oil as it comes from the earth is of little value. To find practical application, it must be separated into fractions or groups of compounds possessing approximately the same physical properties.

(Handbook of Petroleum, 1976).

XVIII. Answer the following questions:

1. What does the word "petroleum" mean?
2. What is petroleum composed of?
3. What are the main physical properties of petroleum?
4. Why is it necessary to separate crude oil into fractions or groups?

XIX. Read the text and answer the questions that follow.

ORIGIN AND ACCUMULATION OF OIL AND GAS.

Progress in solving the secrets of the origin and accumulation of petroleum took a giant step forward in the year 1859 with the drilling of the first oil well. This initial oil discovery was drilled to a depth of 69 feet.

Today we have widely accepted geologic theories. Once formed in the sedimentary source beds, the oil and gas then migrated to other sedimentary rocks where we find them today.

During the development of our planet, early life on earth possibly began in vast seas and inland lakes. This is one of the concepts in developing the current geologic organic theory of petroleum. The hydrogen and carbon material which makes up the composition of petroleum is considered to come from the decomposed plants and animals that were living on land and in the sea.

The vast seas that at several times in the geologic past covered large portions of the present continents and near offshore areas supported abundant populations of marine plant and animal life. As these organisms died, their remains buried and preserved in the sedimentary rocks. This evidence of ancient seas is found in the rocks on and underlying much of the present land area.

Throughout millions of years, rivers flowed down to these seas and carried with them great volumes of mud and sand to be spread out by currents and tides over the sea bottoms near the constantly changing shore lines.

Under the increasing weight of the accumulating sediments, the ocean floors slowly sank, so that thick sequences of mud, sand and carbonates were formed and preserved. They were squeezed by the weight of thousands of feet of overlying organic and inorganic materials and eventually became what are called sedimentary rocks.

Through geologic times, the deeper sediments were compressed and eventually hardened into rock. As time passed, the weight of the overlying sediments caused tremendous pressure to be exerted on the deeper sedimentary layers. Then this pressure, along with high temperature, bacterial action and chemical reactions, produced the changes that caused the formation of oil and natural gas

(Oil and Gas Production, Amer. Petroleum Institute, 1986).

XX.

1. What is the main idea of the whole text?
2. How many parts are there in the text ?
3. What parts include the information on geologic theories of oil and gas origin ?
4. In what way were sedimentary rocks formed ?

