**Пояснительная записка**

Данные тексты разработаны Гавриловой Светланой Григорьевной и предназначены для студентов 3 курса, обучающихся по специальности 21.02.03 «Сооружение и эксплуатация газонефтепроводов и газонефтехранилищ» и подобраны согласно требованиям Федерального компонента государственного стандарта среднего (полного) общего образования базового уровня по указанной специальности.

Целью подбора данных текстов и использования их на занятии является обучение студентов работе с периодической литературой на английском языке с использованием профессиональной лексики, а так же призвано помочь студентам научиться читать литературу по специальности.

Разработанные тексты по специальностям нефтегазового профиля, отражают историю описания технического оборудования нефтегазовой промышленности, информацию о нефтяных газопроводах и ведущих нефтяных и газовых компаниях, а именно:

1. Типы бурильных скважин. Классификация и назначение скважин

2. Особенности монтажа нефтяной вышки

Предлагаемый материал может быть рекомендован как для студентов на аудиторном занятии под руководством преподавателя, так и для лиц, самостоятельно изучающих и желающих улучшить знания английского языка, расширить словарный запас, приобрести навыки устной и письменной речи, перевода с английского языка на русский и с русского языка на английский.

**Практическое занятие 3**

**Типы бурильных скважин. Классификация и назначение скважин**

**1. Прочитайте и переведите текст. Обратите внимание на перевод следующих слов и словосочетаний при работе над текстом.**

Cellar (mouth) – устье. Face (bottom) – забой.

Core – керн. Deposit – залежь.

Key well – опорная скважина.

Development test well – параметрическая скважина.

Cored well – структурная скважина.

Prospecting well – поисковая скважина.

Exploratory well – разведочная скважина.

Delineation – оконтуривание.

Producing well – эксплуатационная (добывающая) скважина.

Injection (input) well – нагнетательная скважина.

Observation well – наблюдательная скважина.

Industrial water – промысловые воды.

Oil and gas flowing – фонтан нефти и газа.

Pumping –закачка.

Service water – техническая вода.

Driving – проходка (горизонтальная).

Sinking – проходка (вертикальная).

**CLASSIFICATION AND PURPOSE OF WELLS**

The well is erected by consecutive destruction of rocks and their extraction to the surface. The beginning of the well is called cellar (mouth). The well bottom is called face (bottom). The well diameter is 59…1 000 mm. When ordinary drilling takes place, the whole rock mass is destroyed. At coring while drilling only hole annulus of well walls is destroyed, but core is extracted in undestroyed condition to study the field geological structure.

The purpose of well can be different. All the wells that are drilled for regional exploration, search, prospecting and development of oil and gas deposits or accumulation are divided to the following categories (classes).

Key wells are drilled for studying geological structure and hydro geological conditions of large regions favorable for oil and gas accumulation to choose the most long-term course of geological survey operation on oil and gas.

Development test wells are drilled to study deep geological structure and comparative estimation of oil and gas accumulation fields, and to obtain necessary information about geological and geophysical characteristics of the section to define more accurately the results of seismic and other perspective analysis.

Cored wells are drilled to make apparent and prepare for exploratory drilling of perspective fields. As a result engineers and explorers get information about deposits bedding (tectonics, stratigraphy and lithology) in different points and make up cross-sections (elevations) of this field.

Prospective (pioneer) wells are drilled in the fields that were prepared by geological and exploring works (geological survey, cored drilling, geophysical and geochemical analysis or by their method complex) to establish oil and gas accumulation.

Exploratory wells are drilled in the fields with established industrial oil and gas accumulation for deposit delineation, calculation of its reserves and preparation for their development (exploitation).

Producing wells are drilled for oil and gas deposits development and production. This group of wells includes test wells (to test collectors of productive horizons), injection (input) wells (to pump water, air or gas into productive horizons to support deposit pressure and to prolong the period of natural flowing) and observation wells (monitor and pressure observation wells). These wells are destined for thermal action on the deposit at development of the fields with heavy oil.

Special wells are drilled to drain industrial water, to liquidate open oil and gas flowing, to prepare structures for underground gas-stores and pumping of gas into them and to explore and extract service water.

Wells drilling is used not only for oil and gas industry. Wells are drilled to explore and produce other natural resources, water supply, underground fire fighting, coal gas supply, mines ventilation, freezing of formations at mines driving (sinking), soil investigation before the construction of industrial and housing structures.

**2. Ответьте на вопросы.**

1. How is the well erected? 2. What is well cellar (mouth)?

3. What is well face (bottom)? 4. When is the whole mass rock destroyed?

5. What are the purposes of well drilling? 6. What are the categories (classes) of wells?

7. Please, describe some wells? 8. Is well drilling used only for oil and gas industry?

9. What are the wells drilled for? 10. Are natural resources developed by well drilling?

**3. Найдите в тексте следующие выражения и высказывания на английском языке.**

1. Скважина создается последовательным разрушением горных пород.

2. Начало скважины называется устьем, дно скважины – забоем.

3. Керн извлекается в не разрушенном состоянии.

4. Разработка нефтяных и газовых месторождений.

5. Благоприятные отложения для нефтегазонакоплений.

6. Изучение глубинного геологического строения.

7. Уточнение результатов сейсмических и других геофизических исследований.

8. Составлять профили данной площади.

9. Установить нефтегазоносность.

10. Оконтуривание месторождения.

11. Разработка и эксплуатация залежей нефти и газа.

12. Термовоздействие на пласт.

13. Сброс промысловых вод.

14. Ликвидация открытых фонтанов нефти и газа.

15. Подземные газохранилища.

16. Разведка и добыча технических вод.

17. Водоснабжение населенных пунктов.

18. Тушение подземных пожаров.

19. Вентиляция шахт.

20. Замораживание грунта при проходке шахт.

**Практическое занятие 4.**

**Особенности монтажа нефтяной вышки**

**1. Прочтите и переведите текст. Следующие слова и выражения помогут вам при переводе и понимании текста:**

Exploration – разведка.

Oil and gas pools – залежи нефти и газа.

Test drilling – структурно-поисковое бурение.

Oil and gas saturation – нефтегазоносность.

Tectonic zone – тектоническая зона.

Gravity prospecting – гравиразведка.

Electrical prospecting – электроразведка.

Seismic prospecting – сейсморазведка.

**EXPLORATION STAGES**

The purpose of oil exploration is detection, economic-geological evaluation and preparation to development of industrial oil and gas pools.

Oil exploration is carried out with the help of geological, geophysical and drilling works in effective combination and succession. The process of geological exploration of oil and gas can be divided into two stages: searching and explorative stages. Test stage includes three steps: regional geological-geophysical works, preparation of the areas for deep test drilling and searching of deposits.

Explorative stage is not divided into steps and completed with preparation of deposit to development.

At the first stage of test step the regional works are carried out in the fields with undetermined oil and gas saturation or for studying of poorly explored tectonic zones or lower structural stories in the fields with determined oil and gas saturation.

At the second stage of searching more detail studying of oil and gas saturating zones is carried out by means of structural-geological survey, detail gravity prospecting, electrical prospecting, seismic prospecting and test drilling. The seismic prospecting is preferred because it permits to study structure and composition of deep entrails of the earth.

Forecast estimation of oil and gas saturation is defined more accurately at this stage.

At the third stage of searching test drilling is carried out to discover new oil or gas deposits.

**2. Ответьте на вопросы.**

1. What is the purpose of oil exploration?

2. What kinds of work are carried out at oil exploration?

3. What are the stages of geological exploration process?

4. How many steps are there at the test stage?

5. What can you say about the first stage?

6. What is carried out at the second stage?

7. What kind of prospecting is preferred and why?

8. What is defined more accurately at this stage?

9. When is test drilling carried out?

10. What is the purpose of test drilling?

**3. Переведите предложения на русский язык, обращая внимание на сказуемое в страдательном залоге.**

**e.g. Oil production is increased from year to year.**

 *Добычу нефти увеличивают с каждым годом.*

 *Добыча нефти увеличивается с каждым годом.*

1. Various fuels are obtained from petroleum.

2. Oil and gas are transported to different parts of our country.

3. A great number of engineers are needed for oil industry.

4. Wells are drilled to produce oil.

5. Great quantities of oil and gas are needed for our country.

6. A deep hole drilled through rock is called a well.

7. This equipment is used in the fields.

8. These methods are developed at this research institute.

9. Oil is discovered in different regions of our country.

**4. Найдите в тексте предложения, в которых глагол-сказуемое употребляется в страдательном залоге. Переведите текст.**

**KEY TO EXPLORING THE EARTH DEPTH**

The discussion of the plan for super deep drilling marked a new stage in the geological exploration in Russia. The drilling of the first super deep wells facilitated the development of new technological methods and drilling tools for rock destruction, i.e., drill bits, turbo drills, as well as light – alloy pipes. Only some decades ago super deep drilling was considered experimental, whereas today the term is used in much broader sense. Russian scientists have developed instruments and drilling equipment for drilling networks (or frameworks, as we call them) of super deep wells.

According to program, 22 super deep wells were to be drilled. Twelve of them were intended for prospecting for oil and gas, and the rest were either for prospecting for ores or for the study of regional tectonic patterns. An important part of the program is regional geographical and geological exploration, the final objective of which is the determination of typical patterns of techno sphere of the basic oil-, gas-, and ore-bearing areas with their various geodynamic characteristics.

The super deep well being drilled on the Kola Peninsula, has already helped to determine the structure of the ancient Baltic shield. The technological achievement and experience gained provided a good basis for increasing the effectiveness of drilling such wells. The best achievements of Russian engineering thought are employed to realize the program of super deep drilling.

**5. Подберите русские эквиваленты следующих слов и словосочетаний.**

1. super deep drilling a. трубы из легких сплавов

2. geological exploration b. полуостров

3. super deep wells c. сверхглубокое бурение

4. drill bits d. нефтеносные площади

5. turbo drills e. геологоразведка

6. light alloy pipes f. щит

7. ore-bearing areas g. достижения

8. peninsula h. сверхглубокая скважина

9. shield i. турбобур (сверло)

10. achievements j. буровая головка (коронка)

**Практическое занятие 5**

**Технологии промывки скважины**

**1. Переведите текст.**

Drilling methods can be classified according to action character on the rocks: mechanical, thermal, physical-chemical and electro-sparking methods. Wide application got only the methods deal with mechanical action on the rocks; the others are at the stage of experimental development.

Drilling of wells in the earth’s crust is the most effective means of prospecting for and exploration of mineral deposits of all types. This process implies a whole complex of operations, which are known to be carried out by means of special equipment (drilling rigs and tools).

Holes may be drilled from the earth surface, from underground mine openings, from the surface of water bodies (rivers, lakes, seas and oceans), from the surface of the Moon, and, in the future, from the surface of other planets.

Depending on their purpose, wells are classified into three main categories: exploratory holes, exploitation holes (producing or development holes) and technical holes.

In accordance with the classification of wells by their purpose, there are three types of drilling: a) exploratory drilling; b) exploitation (development) drilling; and c) technical drilling.

As regards the rock-breaking principle, holes may be drilled by one of the drilling methods fundamentally in their physical nature. It is known that mechanical methods of wells drilling may be classified into three main groups. They are called rotary drilling method, churn (cable) method and turbine drilling method; the churn (cable) drilling method being the oldest one and is not used in the Russian Federation.

The rotary method is widely used in our country while drilling of oil and gas wells. Lessnet, a French civil engineer, first introduced it in 1863. In this method the hole is drilled by rotating bit, which is attached to a length of steel pipe.

Russian scientist Kapelyushnikov invented turbine-drilling method in the twenties of the 20th century, but in 1934 a group of engineers headed by Shumilov invented new turbo-drill quite different from the previous one. In turbine drilling the bit is known to be rotated by the turbine placed on the borehole.

This process is performed without rotation of the pipes; breakdown of the drilling pipes occurring seldom. The power on the bit in this method is much greater than in rotary drilling.

**2. Обратите внимание на слова с окончанием “-ed”, предложения переведите.**

 e.g. The exploration of mineral deposits started many years ago.

 Исследование залежей минералов началось…

 The methods used are…

 Используемые методы это…

 The methods used in the field are…

 Методы, используемые на этом месторождении…

1. He improved the method of drilling.

2. The engineer answered that the exploration of the area had already started.

3. The paper translated by us at the last lesson deals with different problems in the field of oil and gas exploration.

4. The results obtained will be of great importance.

5. Due to the new methods used at present we have greatly minimized the cost of production.

6. Gas is often used as raw material.

7. The development of oil industry was greatly influenced by the increased demand for oil.

8. The problem discussed at the meeting is of great interest.

9. His experiment in this field has attracted the attention of scientists.

10. Rotary drilling method was first introduced in 1863.

**3. Дайте английские эквиваленты следующих русский слов и словосочетаний:**

способы бурения;

воздействие на горные породы;

стадия экспериментальной разработки;

земная кора;

залежи минералов;

ударно-канатный метод бурения;

средство;

бурить скважину;

в зависимости от …;

внедрить новый метод;

стальная труба вращается;

поломки трубы;

изобрести новый турбобур;

водоем.

**4. Переведите следующие предложения на русский язык.**

1. As the rig bores a hole lengths of pipe are added.

2. Recent developments of percussion drilling include a bit that removes the cuttings as they are formed.

3. In rotary method the hole is drilled by rotating bit.

4. The bit is raised and dropped; chipping it’s away into the formation.

5. The energy of the bit is expanded entirely on cutting rock.

6. The turning of the table causes the bit at the bottom of the hole to rotate.

7. The increase of the drilling depth causes lengths of pipe to be added.

8. The number of times the drilling bit is to be replaced depends on the depth of the well and the character of the formation penetrated.

9. The mud flushes out the cuttings created while drilling and brings them to the surface.

10. To get better results and to increase the productivity of drilling, it is necessary to use the modern methods and the latest equipment.