Unit 4

I. Learn to pronounce the following words properly;

torque	frequently	strengthen
ensure	transmit	surface
debris	acidizing	permeability
viscosity	promote	collapsible

II. Translate the following sentences into Russian. Pay attention to the word "most":

e.g. 1. Most wells are drilled by rotary drilling. — БОЛЬШИНСТВО скважин бурят роторным методом.

2. Moat of the problems are very interesting. — Большинство проблем очень интересны.

3. This is the most interesting problem. — Это наиболее (самая) интересная проблема.

4. This is a most interesting subject. — Это чрезвычайно интересный предмет.

1. Most papers dealing with the problems you are interested in have been published in this journal.

2. A most Interesting theory was put forward as to the climatic conditions in the Far East.

3. Most of the problems under discussion are associated with the improvement of the equipment used in oil producing fields.

4. Drilling of holes in the earth is the most effective means of prospecting for mineral deposits.

5. The man who worked with us last year has published a most interesting paper as to the origin of oil.

6. He worked most of all at the problem of oil extraction.

7. This is the most interesting problem which should be solved at the next meeting.

III. Translate the sentences into Russian, Pay attention to modal verbs; "must, can, may, ought to, should".

1. A great many problems must be solved to answer these questions.
2. It should be noted that the problem is of great scientific interest.
3. One ought to be very careful when dealing with such materials.
4. According to the opinion of some scientists there may be still undiscovered oil deposits that will be very great.
5. Before drilling a well one should collect all the data available about the geologic structure of the region.

6. To solve this problem one should know many things.
7. It can be shown that the density of formation water depends on its salt content.
8. You must know that interest in development and exploitation of gas condensate fields is growing from year to .year.
9. Such rigs should be used when deeper drilling becomes necessary.
10. If the equipment had been repaired, we should have begun the work long ago.
11. It must be kept in mind that it's impossible to meet the requirements of our industry without highly developed technology.
12. It should be said that great progress has been made in all the branches of oil industry and still greater progress is to be made.
13. This problem can't be solved without the cooperation of scientists in different branches of science.
14. He must be helped as his work is of great importance and should be completed as soon as possible.

IV. Read the text and say what it is about:

OIL WELLS

The first stage in the construction of a well is the drill operation, which almost always involves rotary drilling. A derrick or a drilling mast is used to support the hoisting gear for raising and lowering the drilling equipment and to support the drilling string which consists of the rotating drill pipes, each some 30 ra long. Derricks are expensive structures and the modern trend is towards collapsible masts which can be used for holes up to 3,000 m in depth. The length of steel pipe transmitting torque and vertical pressure to the drilling bit are also known as "rods" and those convey the drilling fluid to the bit.

Drilling fluid or mud which is often a suspension of fine clay is used to cool the bit and to flush out cuttings (debris), to support the wall of the hole and to seal porous rock thus preventing leakage of gas, oil or water. Commonly, the first 100 m or so of the hole, which is 450-500 mm in diameter is cased with steel pipe and the hole proper may be 200-300 mm in diameter. The top of the hole is fitted with valves to control the flow of mud and later the petroleum gases. Oil wells range in depth from 2,000 to 10,000 m.

The passage of oil depends on the viscosity of the fluid and the permeability of the porous stratum but most importantly on driving pressure. This can be due either to gas, as in a gas-cap reservoir, or to water as in a water-drive reservoir. At the surface gas often comes out of solution in the oil and helps to lift the oil by expansion. This is often enhanced by passing gas down between the tubing and casing to promote the "air-lift" effect.

The production from each well passes to a central gathering station where gas is separated and solids are removed by either settling or centrifuging.

The gas separation is purely mechanical at this stage. The separated .crude oil and gas are now ready for further processing.

Wells often must be treated to improve the recovery from a reservoir, or to remove barriers within the producing formation which prevent easy passage of the fluid into the wellbore. Such processes are known as well-stimulation treatments. These include. fracturing, acidizing and other chemical treatment. Such processes are often used in combination since they frequently help each other. Programs for individual wells vary according to well characteristics, economics and end result desired.

(Production of Oil and Gas, 1985).

V. Read and remember the following words and expressions:

rod - штанга, свеча
torque - вращательный момент
to convey - передавать
to seal - запаивать, запечатывать
leakage - утечка, выброс
to fit - армировать, устанавливать
valve - клапан
wellhead valve - устьевое оборудование
to promote - обеспечивать
fracturing - гидравлический разрыв пласта
gas cap - газовая шапка
water drive reservoir - пласт с водонапорным режимом
drive - вытеснение нефти (газом, водой)
to enhance - увеличивать, повышать
air-lift - аэрлифт, воздушный подъёмник
acid - кислота
settle - отстаивать(ся)
processing - обработка
either ... or - или ... или, либо ... либо
well stimulation _ возбуждение скважины

VI. Find the proper English equivalents to the following Russian word combinations:

1. регулировать приток нефти
2. обсаживать стенки скважины
3. смазывать долото
4. укреплять стенки скважины
5. поднимать нефть на поверхность
6. состоять из
7. выносить шлам

1. to consist of
2. to strengthen the walls of the well
3. to case the walls of the well
4. to lubricate the bit
5. to control the flow
6. to remove this cuttings
7. to lift the oil to the surface

VII. Translate the following sentences into Russian:

1. The valves allow the fluid inside the drill to move from the bottom up and outside the unit downward.
2. Recent developments in percussion drilling include a bit that removes the cuttings as they are formed.
3. This method appears to be the first to have been used for industrial drilling oil wells.
4. A second and very important feature of the casing is its being used for isolating water held in strata near the surface from oil sands.
5. The number of wells drilled by the turbodrill today exceeds both cable tool and rotary methods of drilling.
6. If natural gas is used, care must be taken to avoid the formation of explosive mixture with air.
7. The drilling fluid is one of the factors on which the satisfactory completion of the job depends.
8. The mud flushes out the chippings creater while drilling and brings them to the surface.
9. The function of a derrick is to provide the vertical clearance necessary for raising and lowering of the dull string into and out of the hole during the drilling operations.
10. The preparation for deep drilling begins with the construction of the derrick over the site selected for the well.

VIII. Translate into English using the Nominative with Infinitive Construction, where possible

1. Вполне вероятно, что они поедут летом на север.
2. Вряд ли они переведут этот текст завтра.
3. По-видимому, он очень занят сейчас.
4. Он, по-видимому, ответит на все ваши вопросы.
5. Говорят, что он давно работает над этой проблемой.
6. Известно, что результаты его работы обсуждали на конференции.
7. Я знал, что они прибывают сегодня вечером.
8. Маловероятно, что они сейчас слушают лекцию по бурению скважин.
9. Они бесспорно работают сейчас в лаборатории.
10. Говорят, что он провел много опытов, прежде чем получил хорошие результаты.

IX. Answer the following questions on the text:

1. What parts include the main facts concerning the problem of the construction of a well?
2. What is the main idea of the text?
3. How many parts are there in the text?
4. What is the first stage in the construction of a well?
5. What is a rod?
6. What type of substance is drilling mud?
7. What is the drilling fluid used for?
8. What is the well cased with?
9. What does the passage of oil depends on?
10. What is the effect of centrifuging?

XIV. Read the text and do the exercises that follow:

DESCRIPTIOH OF AN OIL WELL

In general terms an oil-well, is similar to any other bore-hole drilled for the purpose of producing water or other fluids.

The well bore length exceeds many times its diameter. The opening of the well bore at the surface is called the well head, and its lower part the bottom hole. The depth of an oil-well is controlled by the depth at which oil is found.

The diameter of a well varies. A deep well has a diameter at the surface *of* about 16 - 18 inches, which diameter is reduced progressively to about 6 inches at the bottom. The diameter of the oil string depends in the main on the expected productivity of the well.

As drilling proceeds, subsurface waters or formations of a caving nature are often encountered. To exclude such water from the well and to hold back the caving formations, the well is lined with steel tubes known as casing.

The number of "strings" of casing and their diameter is controlled by local conditions and by the depth to which the well is to be drilled

Oil-well casing is usually made of solid drawn tubes with screwed and socketed joints. There may be within the well bore several strings of casing: the surface casing, the intermediate or protective string and the oil string.

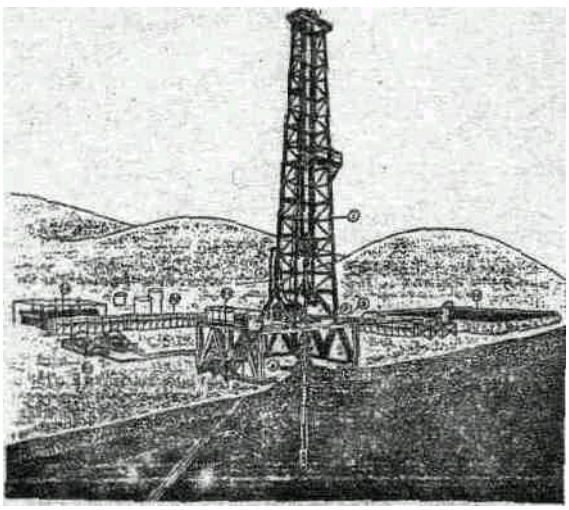
In cases where the oil is struck at high pressures or where it is essential that all upper water shows must be permanently sealed off or segregated from each other other, each string of casing is cemented in place. The section of a completed oil-well resembles a telescope, the eye-piece end being the bottom of the well and the large end the top of the well.

The necessary valves and fittings, known as the "Christmas Tree" for closing-in or controlling the production, are attached to the "oil string" of casing.

There are different kinds of oil wells depending on the purpose for which they are drilled, such as: key holes, exploratory wells, wild cats, producing wells or producers, seismic wells, prolific wells and etc.

An Oil Well

1. the derrick – вышка
2. turntable – ротор
3. working platform – полати буровой вышки
4. flexible and hose – гибкий шланг для бурового раствора
5. control valves, blow-out preventers – распределительные клапаны
6. well casing – обсадная труба
7. well shaft – ствол скважины
8. drill string/pipe – бурильная колонна .
9. drill bit – буровое долото
10. mud tanks – резервуары для запасного бурового раствора
11. 'doghouse' (containing operating controls) - будка на буровой
12. mud pumps - буровые насосы
13. power unit – силовая установка
14. reserve pits – запасные хранилища



XV. <u>Answer the questions;</u>

1. What is a well head?
2. What is the diameter of a well?
3. What is the number of "airings" of casing controlled by?
4. What strings of casing do you know?
5. What is the "Christmas Tree?"
6. What kinds of wells do you know?