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Методическое пособие

"ТЕКСТЫ ПРОФЕССИОНАЛЬНОЙ НАПРАВЛЕННОСТИ"

для студентов 3.4-х курсов
по специальности среднего профессионального образования
21.02.01 РАЗРАБОТКА И ЭКСПЛУАТАЦИЯ НЕФТЯНЫХ И ГАЗОВЫХ МЕСТОРОЖДЕНИЙ

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Аннотация

Методическое пособие «Тексты профессиональной направленности» по специальности среднего профессионального образования 21.02.01 Разработка и эксплуатация нефтяных и газовых месторождений (далее – Пособие) разработано на основе Федерального государственного образовательного стандарта (далее – ФГОС) по специальности среднего профессионального образования (далее – СПО): 21.02.01 Разработка и эксплуатация нефтяных и газовых месторождений. Пособие представлено на 33 листах.

Целью методического пособия является формирования знаний, умений и приобретения практического опыта в переводах текстов профессиональной направленности, а также работе с ними.

Задачи:

- развитие интереса у обучающихся к решению задач нестандартного вида;
- развитие активной творческой деятельности студента;
- формирование навыков самостоятельной работы, работа с литературой.

Актуальность разработки.

На протяжении курса английского языка студенты учатся решать различные профессиональные задачи в нестандартных ситуациях. Для работы с оборудованием и инструкциями зачастую необходимо знание терминологии на английском языке.

Методическое пособие можно рекомендовать преподавателям СПО как в аудиторной, так и во внеаудиторной работе с обучающимися по специальности среднего профессионального образования 21.02.01 Разработка и эксплуатация нефтяных и газовых месторождений. В конце представлен список основных терминов, употребляемых в текстах.

Содержание

Содержание 4
Введение 5
INTRODUCTION 6
TEXT 1. Oil and gas today 6
PART 1. ENHANCED RECOVERY AND WORKOVER OPERATIONS 7
TEXT 2. Oil and gas recovery methods 7
PART 2. THE EXPLORATION AND PRODUCTION LIFE CYCLE OF 8
OIL AND GAS 8
TEXT 3. Site life cycle 8
PART 3 MAIN FIELDS OF OIL AND GAS EXPLORATION AND PROBLEMS 10
TEXT 4. Drilling Mud 10
TEXT 5. Preventing Incidents in Drilling 11
PART 4. DRILLING PROCESS 13
TEXT 7. Straight Hole Drilling 18
PART 5. DRILLING TECHNIQUES 19
TEXT 8. Cable-Tool versus Rotary Drilling 19
TEXT 9. Rotating Systems 22
TEXT 10. OIL GAS AND ENVIRONMENT 23
PART 6. PRACTICING IN TRANSLATION 25
VOCABULARY (СЛОВАРЬ) 27
Список используемой литературы 33

Введение

Методическое пособие составлено в соответствии с рабочими программами социально-гуманитарной дисциплины «Иностранный язык» по специальности 21.02.01 Разработка и эксплуатация нефтяных и газовых месторождений и утвержденных в ОГБПОУ «Томский политехнический техникум».

В Пособии даны примеры текстов профессиональной направленности, составлены словари лексических единиц к каждому тексту и даны упражнения для отработки полученных знаний.

В результате изучения Пособия у выпускника должны быть сформированы общие компетенции:

- *ОК 2* организовывать собственную деятельность, выбирать типовые способы выполнения профессиональных задач;
- *ОК 4* осуществлять поиск и использование информации, необходимой для эффективного выполнения профессиональных задач, профессионального и личностного развития;
- *ОК 5* использовать ИКТ в профессиональной деятельности;
- *ОК 8* самостоятельно определять задачи профессионального и личностного развития, заниматься самообразованием, осознанно планировать повышение квалификации;
- *ОК 9* ориентироваться в условиях частой смены технологий в профессиональной деятельности

Также будет приобретен практический опыт перевода и понимания профессиональной терминологии. В связи с этими требованиями к выпускнику Пособие дает понятие и практический опыт работы с текстами профессиональной направленности и с терминологией в соответствии с получаемой профессией.

INTRODUCTION

TEXT 1. Oil and gas today

The oil and gas industry employs hundreds of thousands of people worldwide. Many teams have a mixture of nationalities so that English is often the language used, and is often specified for formal communications. Although most of the world has adopted an international measuring system and measures volume in litres, the oil industry often uses the US barrel as a measure even though most oil today is never contained in a barrel. The sector of the oil and gas industry from discovery and drilling to production and refining is known as the upstream sector. Initially, producing countries allowed trading countries (USA, Britain, and Holland) to exploit their oil as a raw material. But they needed to control their own resources commercially and they realized the advantages of processing their crude oil locally to increase the value of the product. They built their own refineries where the crude oil is separated into different forms and converted into different products.

The production of oil and gas has become a major element in international relations and politics. A large part of the industry has developed, transporting oil and gas from the producing countries to consumers and this is sometimes referred to as the midstream sector. The processing of oil into different products is known as the downstream sector. The products include the different fuels required for cars, trucks, and airplanes, fuel for power stations and heating, the basic material or feedstock for plastics, fertilizers, pharmaceutical, and the asphalt that covers our roads. Oil and gas are finite resources and because of the increasing scarcity of oil and gas, concern for the environment, and concerns over security of supply, a huge effort is being made to develop alternative sustainable sources of energy, but the skills of the people working in the oil and gas industry across the world will ensure that oil and gas will be available to us for many years to come.

EXERCISE 1. Answer the questions (write or speak)

1. What measuring system is used in the oil and gas industry?
2. What do “upstream sector”, “midstream sector” and “downstream sector” mean?
3. Is the oil and gas industry environment friendly?

EXERCISE 2. Give English equivalents to the Russian words and word combinations: Нефтегазовая промышленность; очистительные сооружения для нефти; безопасность поставки нефти и газа; международная измерительная система; сырая нефть; переработка; топливо для электростанций и отопительных систем.

EXERCISE 3. Match the words with the appropriate definition

A supply	a.	a type of substance like air and usually cannot be seen
B stream	b.	to break or divide up into the parts
C to separate	c.	to make pure
D to refine	d.	something flowing or moving forwards continuously
E gas	e.	to provide something that is needed

PART 1. ENHANCED RECOVERY AND WORKOVER OPERATIONS

TEXT 2. Oil and gas recovery methods

Extracting oil and natural gas from deposits deep underground is not as simple as just drilling and completing a well. Any number of factors in the underground environment – including the porosity of the rock and the viscosity of the deposit – can impede the free flow of product into the well. In the past, it was common to recover as little as 10 percent of the available oil in a reservoir, leaving the rest underground because the technology did not exist to bring the rest to the surface. Today, advanced technology allows production of about 60 percent of the available resources from a formation. Primary recovery refers to the recovery of oil and/or gas that is recovered by either natural flow or artificial lift through a single wellbore, i.e., when the pressure falls, artificial lift technologies, such as pumps, are used help bring more fluids to the surface. In some situations, natural gas is pumped back down the well underneath the oil. The gas expands, pushing the oil to the surface. Gas lift technology is often used in offshore facilities. Thus, primary recovery occurs as a result of the energy initially present in the reservoir at the time of discovery.

Primary recovery often taps only 10 percent of the oil in a deposit. When the initial energy has been depleted and the rate of oil recovery declines, oil production can be increased by the injection of secondary energy into the reservoir.

Secondary recovery is the recovery of oil and/or gas that involves the introduction of artificial energy into the reservoir via one wellbore and production of oil and/or gas from another wellbore. Conventional means of secondary recovery include the immiscible processes of water flooding and gas injection. Currently in the United States, waterflooding is the dominant secondary recovery method in that about half of the oil production is recovered from waterflood projects. This can bring an additional 20 percent of the oil in place to the surface.

After secondary recovery, a significant amount of oil may remain, and attempts to recover oil beyond primary and secondary recovery are referred to as **tertiary recovery**. Any method that

recovers oil more effectively than plain waterflooding or gas injection is defined as **enhanced recovery** (EOR). The more sophisticated enhanced methods may be initiated as a tertiary 14 process if they follow water flooding or gas injection, or they may be a secondary process if they follow primary recovery directly. Many of the enhanced recovery projects are implemented after waterflooding.

So, enhanced recovery techniques are used to mobilize the remaining oil. There are three common approaches: thermal recovery, gas injection or chemical flooding. Enhanced recovery techniques are employed to bring as much as 60 percent of the reserve? to the surface.

Chemical flooding, or chemical oil recovery, involves mixing dense, water-soluble polymers with water and injecting the mixture into the field. The water pushes the oil out of the formation and into the well bore.

Gas injection uses either miscible or immiscible gases. Miscible gasses dissolve CO2, propane, methane or other gasses in the oil to lower its viscosity and increase flow. Immiscible gasses do not mix with the oil, but increase pressure in the "gas cap" in a reservoir to drive additional oil to the well bore.

Thermal recovery is related to injecting steam into the formation. The heat from the steam makes the oil flow more easily, and the increased pressure forces it to the surface.

EXERCISE 1. Which recovery method:

uses polymers? _____

relies on natural flow? _____

uses gases? _____

uses steam injection? _____

is the least effective? _____

employs artificial lift technologies? _____

is dominant in the US?_____

PART 2. THE EXPLORATION AND PRODUCTION LIFE CYCLE OF OIL AND GAS

TEXT 3. Site life cycle

The preparatory phase

During the **exploration phase**, oil and gas companies locate and appraise the contained in a field. Before production can begin, they must devise a development plan. This involves:

- calculating the field's profitability to determine whether or not the future sales of oil and gas will be enough to cover the cost of production over the field's entire lifespan;
- determining the number of wells need to be drilled and selecting the most suitable installations for each stage of production;
- studies at this point focus on which extraction methods should be used and how products brought to the surface will be processed, temporarily stored and shipped;
- defining the field's production profile in order to forecast annual production volumes from the start of production to abandonment.

15 to 30 years: the average lifespan of an **onshore** oil field Next, the company needs to prepare the site for production by leveling the land, clearing trees, developing roads to transport equipment and building technical facilities and accommodation for the site's future workers. In offshore locations, the platform will need to be built or transported to the site.

The different stages of a field's life cycle

The life cycle of oil and gas fields can be broken down into three stages:

Start-up (two to three years). During this period, production increases gradually as more and more **wells** are drilled.

Plateau production, when output stabilizes. This stage also lasts two to three years, or sometimes longer in the case of larger fields.

Decline, during which production falls at a rate of 1% to 10% a year. When production ends, large quantities of oil and gas remain underground. Oil and gas companies are therefore constantly seeking to improve recovery rates using enhanced recovery techniques. Oil field recovery rates range from 5% to 50%. The rate is higher (60% to 80%) for fields that produce only natural gas, as its lower density and greater flow rate make production more efficient. Gas has a higher recovery rate (60% to 80%) than oil (5% to 50%).

The ups and downs of production

Things don't always go according to plan in oil and gas production. Some **reservoirs** will produce up to 10% to 20% more oil or gas than expected, while others may produce a great deal less than initially estimated. There are many reasons for this unpredictability. Oil and gas fields contain **residual water**, which is driven up the well with the hydrocarbons. After time, there may be more water and less oil or gas. The cost of extracting and separating the water out can result in a loss-making operation. In addition, at some sites the natural gas extracted is not intended for sale. Yet, gas production at these fields can sometimes spike, which means that less oil is produced. The global economic climate can also impact the life cycle of oil and gas fields. For example, if oil prices drop over a long period of time, companies may decide to abandon an oil field earlier than planned.

Conversely, if oil prices rise, production may continue longer. All of these factors impact profitability, and in some cases force companies to abandon production early at the risk of losing almost all of their considerable initial investment. To reduce this risk, engineers carry out regular appraisals throughout a field's life cycle.

Abandonment

When oil and gas companies abandon a field, they may sell it to a smaller private company with lower production costs that require lower returns. In other cases, the field may be bought by a state-owned company in the host country.

EXERCISE 1. Make the vocabulary of the words in bold and explain their meaning in English.

EXERCISE 2. Translate into English:

нефтегазовые компании, месторождение, бурить, рентабельность, метод улучшенной добычи, природный газ, остаточная вода, отказываться от месторождения (закрывать).

PART 3 MAIN FIELDS OF OIL AND GAS EXPLORATION AND PROBLEMS

TEXT 4. Drilling Mud

Drilling mud, also known as spud mud (when beginning the drilling process), is a drilling fluid used to drill boreholes into the earth. Often used while drilling oil and natural gas wells and on exploration drilling rigs but can also be used for much simpler boreholes, such as water wells.

The main classification scheme used broadly separates the mud into 3 categories based on the main component that makes up the mud: 1) Water Based Mud' (WBM); 2) 'Non Aqueous' or more commonly 'Oil Based Mud' (OBM) this also includes synthetic oils (SBM); 3) Gaseous or Pneumatic mud.

On a drilling rig, mud is pumped from the mud pits through the drill string where it sprays out on the drill bit, cleaning and cooling the drill bit in the process. The mud then carries the crushed rock ("cuttings") up the annular space ("annulus") between the drill string and the sides of the hole being drilled, up through the surface casing, and emerges back at the surface. Cuttings are then filtered out at the shale shakers and the mud returns to the mud pits. The returning mud can contain natural gases or other flammable materials. These can collect in and around the shale shakers area or in other work areas. There is a potential risk of a flare, an explosion or a detonation occurring if they ignite. In order to prevent this safety measures have to be taken. Safety procedures, special monitoring sensors and explosion-proof certified equipment has to be installed, e.g. explosion-proof certified electrical wiring

or control panels. The mud is then pumped back down and is continuously recirculated. After testing, the mud is treated periodically in the mud pits to give it properties that optimize and improve drilling efficiency. Drilling fluid carries the rock excavated by the drill bit up to the surface. Its ability to do so depends on cutting size, shape, and density, and speed of fluid traveling up the well. These considerations are analogous to the ability of a stream to carry sediment; large sand grains in a slow-moving stream settle to the stream bed, while small sand grains in a fast-moving stream are carried along with the water. The mud viscosity is another important property, as cuttings will settle to the bottom of the well if the viscosity is too low.

Notes:

Mud pit – приемная емкость для бурового раствора

Drill string – бурильная колонна

Annular space – кольцевое пространство

Surface casing – кондуктор (первая колонна обсадных труб)

Shale shaker – вибрационное сито (для очистки бурового раствора)

TEXT 5. Preventing Incidents in Drilling

Incidents in the process of drilling include oil and gas blowouts, breakage and leaving in the well of drill pipe and casing parts, drilling bits, downhole engines, loss of mobility (sticking) of pipe string run in the hole, falling of steel objects in the well, pipe string twist-off as a result of excessive load when pulling the pipe string out of the hole with drags. Well blowout can be described as an uncontrolled inflow of formation fluid under pressure, which may result in damage of drilling equipment, an explosion, fire or injuries of maintenance personnel. A blowout can occur in any well when pressure of drilling mud is lower than pressure of formation fluid or when formations with abnormally high pressure are encountered, pore pressure of which is higher than hydrostatic pressure of drilling mud. For this reason special equipment must be installed on each well being drilled in order to prevent blowouts. Such equipment is called a blowout preventer.

Blowout preventers are devices installed on the casing head to provide protection against potential well blowouts.

Preventers can be annular and ram types.

Annular or bag preventer is designed in such a way that it can seal placed in the wellbore equipment of any size and shape, that is close around drill pipe, drill collar, casing and also completely cover the well-bore when there is no pipe in it.

Ram-type preventers can be equipped with rams of four types: pipe rams, adjustable rams,

blind rams and shear rams. Blowout preventers are controlled with BOP stand driven by hydraulic pressure in common system.

Sticking is a situation when drilling tools or pipe string are stuck in the wellbore. There are several methods to remove sticking during drilling. Special geophysical instrument called a free point tool run in the hole on a wireline is used to determine the stuck point.

Small sticking is normally removed by tool reciprocating, that is repeatedly alternating lifting and lowering of drill pipe string while rotating it. If sticking occurred as a result of pressure differential, it can be removed by means of fluid patch (oil, water, acid or alkali).

Sometimes oil patch may result in an oil and gas blowout, therefore water or acid are used more frequently. Chemical cutter is a downhole tool, which uses acid under pressure to cut off pipe stuck in the hole. Cumulative cutter is similar in design but uses cumulative gas charge instead of acid.

Another method to save a drilled well is side-tracking applied when it is not feasible to retrieve or drill out tools fallen on the well bottom. In case all these methods are inefficient, then left in the hole pipes should be drilled out if practicable, otherwise the well must be suspended.

Word Combinations:

oil and gas blowout – выброс нефти и газа

pipe string twist-off – обрыв колонны труб

formation with abnormally high pressure – пласт с аномально высоким давлением

blowout preventer (BOP) – противовыбросовый превентор

annular (bag) preventer – универсальный превентор

ram-type preventers – плашечный превентор

sticking – прихват (ситуация, когда буровой инструмент или колонна труб застревают в скважине)

chemical pipe cutter – химическая труборезка

cumulative pipe – кумулятивная труборезка

free point tool – прихватоопределитель

EXERCISE 1. Give Russian equivalents of the following terms.

excessive load; pore pressure; the casing head; wellbore equipment; pipe rams; adjustable rams; blind rams; shear rams; oil patch; wireline; to retrieve or drill out tools

EXERCISE 2. Give English equivalents.

превышение нагрузки при подъеме труб; неконтролируемый приток пластовой жидкости под давлением; повреждение бурового оборудования; травмы обслуживающего персонала; герметизировать оборудование, помещенное в ствол скважины; гидравлическое давление в общей системе; методы ликвидации прихвата в процессе бурения; ликвидировать прихваты при помощи «расхаживания»; заряд кумулятивного газа; уход в сторону боковым стволом; консервировать скважину

EXERCISE 3. Answer the questions.

What incidents can take place in the process of well drilling ?

What is a well blowout?

When do well blowouts occur?

What equipment is used to prevent well blowouts?

Which types of blowout preventers do you know?

What is the principle of annular preventer operation?

What is sticking?

What geophysical instrument is used to determine the stuck point?

What methods to release tools stuck in the hole do you know?

What happens to the well when tools stuck in it cannot be released?

PART 4. DRILLING PROCESS

TEXT 6. What is drilling process?

Drilling is a process of well construction by means of rock crushing. A well or a hole is a cylindrical mining cavity constructed without access of people and having diameter many times less than its length. By level of development oil and gas fields can be classified into green fields and brown fields. Key types of wells in terms of their purpose include: wildcats, exploration wells, production wells, injection wells and observation wells.

Wildcats are drilled in order to discover new commercial deposits of oil and gas.

Exploration wells are drilled in areas with established commercial oil and gas production potential in order to survey the deposit size and structure, obtain required initial data in order to calculate oil and gas reserves, and also design its development.

Production wells are spudded in compliance with deposit development well spacing. They are used to recover oil and gas from subsurface reservoirs.

Injection wells are used to inject water (sometimes air or gas) into producing horizons

in order to maintain formation pressure and prolong flowing period of field development.Observation wells are drilled to control development of commercial deposits. Depth of drilled wells may change from 800 to 8000 meters depending upon location of oil-bearing formation. Briey it can be said that well drilling requires a bit rotating on the well bottom and crashing the rock, and making up of new drill pipes as the well deepens. Drilling is performed with a drilling rig.

Drilling unit is a set of drilling machines, mechanisms and equipment mounted in the drilling location and providing for process operations associated with well construction using drilling tools.

By method of impact on rocks drilling can be divided into mechanical and non-mechanical. In mechanical drilling tools directly impact the rock and crush it, and in non-mechanical drilling rock crushing is performed without direct contact between the rock crushing source and the rock.

By wellbore direction drilling can be divided into vertical, directional and horizontal.

Vertical drilling is a type of drilling, in which the well is drilled vertically in relation to stratification. Directional drilling is a type of drilling, in which the well is deviated in relation to stratification.

Horizontal drilling is a type of drilling, in which deviated well gradually becomes horizontal, for example, when two oil-bearing formations should be connected. Drilling with an angle to vertical line to reach the drilling target is called extended reach drilling. Any well penetrating formation along stratification can be called horizontal; meanwhile vertical wells are drilled obliquely to stratification. Thus the wells, penetrating vertically located formations with vertical wellbores are considered to be horizontal wells.

EXERCISE 1. Give Russian equivalents:

level of development oil and gas fields, green field, brown field, wildcat, exploration well, injection well, observation well, directional drilling, oil-bearing formation, to reach the drilling target, extended reach drilling, stratification.

EXERCISE 2. Scan the text and the English equivalents of the following expressions. Consult a dictionary if necessary.

1) разрушение горных пород

2) цилиндрическая горная выработка

3) сооружать скважину без доступа людей

4) участки с установленным промышленным потенциалом добычи нефти и газа

5) исследования размеров и структуры залежи

6) закачки воды в продуктивные горизонты

7) поддержание пластового давления

8) продление фонтанного периода эксплуатации месторождения

9) контроль разработки промышленных залежей

10) способ воздействия на горные породы

11) бурить скважину вертикально по отношению к напластованию

12) искривлять ствол скважины по отношению к напластованию

13) вскрывать пласт вдоль напластования

EXERCISE 3. Complete the following sentences:

1. Drilling is a process of…
2. By level of development oil and gas fields can be classified…
3. Wildcats are drilled in order to…
4. Exploration wells are drilled in order to…
5. Production wells used to…
6. Injection wells are used to inject water into producing horizons in order to…
7. Observation wells are drilled to…
8. Drilling unit is…
9. Vertical drilling is a type of drilling, in which…
10. Directional drilling is a type of drilling, in which…
11. Horizontal drilling is a type of drilling, in which…

EXERCISE 4. Translate the following definitions in written form.

Appraisal well – a well drilled in a relatively explored area to survey its geological structure and oil and gas bearing prospects.

Bottom hole – bottom of a well, the point to which a well is drilled.

Bottom hole assembly – combination of tools run in the hole. These tools are screwed together and thus can be used for a few operations without pulling out of the hole (for example, casing scraper can be combined with a mill, etc.).

Bottom hole engine drilling – a method of rotation drilling in which drilling string is not rotated and rock is destructed by rotating shaft with a bit on its end.

Complete a well – perform a series of operations in order to turn a well into production including perforating jobs, formation stimulation and initialization of Row.

Core well – a well drilled to identify prospect areas and prepare them for exploration drilling.

Crown block – a device on the top of the derrick that provides a means of taking drill line

from the hoisting drum to the traveling block.

Derrick – a structure above the well used for drilling string tripping, location of stands and protection of drilling crew against wind and precipitation.

Deviated well – a well drilled at an angle to stratification.

Directional drilling – controlled drilling at an angle to stratification.

Double – two lengths (joints) of pipe joined together.

Drilling – a process of well construction by means of rock destruction with a bit.**Drill line** – a wire rope made up of a number of strands wound around a steel core, used to lift or lower drill pipe.

Elevators – a device that is attached to the bails of the traveling block and used to grip joints. Elevators manually are latched on a pipe body under its collar after which the pipe can be lifted or lowered.

Exploratory well – a pilot well drilled in an area with identified commercial oil and gas bearing capacity to survey size and structure of formations, obtain required initial data to calculate oil and gas reserves and design its development.

Injection well – a well drilled to inject into pay zones water (air, steam, gas) in order to maintain formation pressure and prolong flowing period of field development, increase rate of production wells equipped with pumps.

Inclinometer – a device that tells the driller the angle of the hole and the direction in which the hole is heading.

Kelly bushing – the part of the drive assembly which transmits motion to the kelly and permits the kelly to move vertically while it is rotating or still. All vertical measurements on the rig are taken from the RKB (rotary kelly bushing).

Key well – a well drilled in an unexplored with drilling area to survey composition and age of rocks.

Kick-off point – the point at which a directional well is started.

Liner – lower narrow part of production casing. Liner diameter is smaller than that of production casing because during drilling a well bore diameter is made smaller with depth to increase efficiency of drilling progress.

Make up a connection – to screw the next drill pipe into the drilling string to continue drilling.

Mechanical drilling – a type of drilling when drilling tools directly impact the rock.

Mousehole – a shallow cased hole close to the rotary table. When making up a string, each single is stood here so that it can be connected quickly and easily to the kelly.

Non-mechanical drilling – a type of drilling when rock destruction occurs without direct

impact of drilling tools on the rock.

Observation well – a well drilled to control development of commercial value formations.

Production well – a well drilled in compliance with the plan of formation development to produce oil and gas.

Roller-cutter bit – a drilling bit with working elements in the form of disc rollers with sharp pins often made of diamonds. Three roller-cutters on the bit can simultaneously rotate thus increasing adhesion of the bit with the drilled rock.

Rotary drilling – a method of rotation drilling in which rock is destructed by rotated by rotor drilling string with a bit on its end.

Rotary table – a piece of equipment used to transfer rotary motion through a master bushing to the kelly, to drill pipe and, eventually, to the drill bit.

Rotation drilling – a method of drilling in which rock destruction occurs as a result of simultaneous impact of load and torque on the bit.

Spinner – a device used for screwing in and screwing out pipes during pipe tripping. The lower part of the spinner holds the lower pipe and is called a back-up, while the upper part grips and rotates the upper pipe. The spinner has two gears and is operated by power supplied from the rig engine.

Spud – to drill the ◌ɹrst few feet of a new hole.

Stabilizer – a centralizing element of the drill string used to maintain central position of the drill string in the most important intervals of the wellbore.

Stand – a double or a triple, two or three joints connected together. When tripping pipe stands are put vertically in the derrick. Use of stands instead of joints saves time on making up connections.

Swivel – a piece of equipment used to prevent the rotary motion of the kelly (or drill string) from being transferred to the drilling line.

Traveling block – a device that has several independently mounted sheaves or pulleys and used to lift and lower elevators.

Turbodrill – a multistage turbine downhole engine used for rotary drilling, each stage of which consists of a stator rigidly connected to the body and a rotor fixed on the turbodrill shaft.

Well deviation – change of drilling direction in order to reach target.

Wildcat – a single well drilled to find new commercial depositions of oil and gas.

TEXT 7. Straight Hole Drilling

Frequently it is necessary to drill a straighter hole than was originally planned when the job was started with a certain string of drill collars. Also, it may happen that it is desired to put more weight on the bit without increasing the deviation. The best single proven way to do either of these things with the same string of drill collars is to add stabilizers. For deviation control a single stabilizer is sufficient if it is properly located in the drill string.

The proper location is the first bend in the drill string above the bit.

Since the bending point depends on the hole size, drill size and weight on the bit, it may occur at different points. To some extent the placement is also dependable on the formation characteristics.

It has been considered good practice in some cases to space additional stabilizers about one stand apart through a portion or all of the rest of the drill collar string. The additional stabilizers do not help to keep the hole straight. They do help in preventing wall sticking and other problems associated with hole conditions.

With the use of stabilizers, it is important to remember that stabilizers are usually the weakest point in the drill string and, therefore, subject not only to wear but failure. Some of the more modern stabilizers have been designed so that the wings do not create a serious hazard in the hole. For example, some of these are made of drillable material and some may be removed with washover pipe.

By reducing the weight on the bit, the bending characteristics of the drill string are changed and the hole will tend to be straighter. One of the oldest techniques for straightening a hole was to reduce the weight on the bit and speed up the rotary table. In recent years it has been found that this is not always the best procedure because reducing the bit weight sacrifices considerable penetration rate.

The straightening of a hole by reducing bit weight should be done very gradually so that the hole will tend to return to vertical without sharp bends and will therefore be much more safer for future drilling.

***Notes*:**

Bending point – точка перегиба

Penetration rate – скорость проникновения

Space – помещать, размещать

Washover pipe – обурочная труба

PART 5. DRILLING TECHNIQUES

TEXT 8. Cable-Tool versus Rotary Drilling

There have been two drilling techniques available since people first began making holes in the ground: cable-tool drilling and rotary drilling.

Both methods originated a very long time ago. Over 2,000 years ago, for instance, the Chinese drilled wells with primitive yet efficient cable-tool rigs. (They were still using similar rigs as late as the 1940s.)

To quarry rocks for the pyramids, the ancient Egyptians drilled holes using hand-powered rotating bits. They drilled several holes in a line and stuck dry wooden pegs in the holes. They then saturated the pegs with water. The swelling wood split the stone along the line made by the holes.

Cable-Tool Drilling

A cable-tool rig works much like a seesaw. Cable-tool rigs have more parts and, instead of a seesaw, a cable-tool has a powered walking beam mounted in a derrick. At Drake's rig, a 6-horsepower steamboat engine powers the walking beam. The walking beam is a wooden bar that rocks up and down on a central pivot, much like a seesaw.

The derrick provides a space to raise the cable and pull the long drilling tools out of the hole. As the beam rocks up it raises the cable and attaches chisel, or bit. Then, when the walking beam rocks down, heavy weights, sinker bars, above the bit provide weight to ram it into the ground. The bit punches its way into the rock.

Repeated lifting and dropping makes the bit drill (fig. 2).

Special equipment plays out the cable as the hole deepens.

Cable-tool drilling works very well in the hard-rock formations such as those in eastern U.S., the Midwest, and California. A few cable-tool rigs are probably drilling wells somewhere in the world even now, although their use peaked in the 1920s and faded thereafter.

In spite of cable-tool drilling's widespread use in the early days; the system has a couple of drawbacks. One is that cable-tool drillers have to stop periodically drilling and pull the bit from the hole. They then have to run a special basket, a bailer, into the hole to retrieve and remove the pieces of rock, or cuttings, the bit makes.

After bailing the cuttings, they then run the bit back to bottom to resume drilling. If the crew fails to bail out the cuttings, the cuttings obstruct the bit's progress.

Bailing cuttings is not a big hindrance, because the cable-tool system allows the crew to do it quickly. Since the cable is wound onto a winch, or windlass, called the "bull wheel", the crew simply reels cable on and off the bullwheel to raise and lower the bit and bailer.

Reeling cable is a fast operation. A far bigger problem than bailing, and the one that leads to cable-tool drilling's demise, is that the cable-tool technique doesn't work in soft formations like clay

or loose sand.

Clay and sand close around the bit and wedge it in the hole. This limitation leads to the increased use of rotary rigs because more wells are being drilled in places like Spindle top where cable-tool bits get stuck.

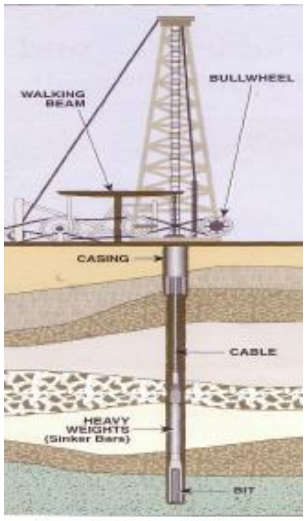

Figure 2. Cable-tool drilling rig

Figure 2. Cable-tool drilling rig

The wall cake created by circulating drilling fluid prevents formations from collapsing.

Rotary Drilling

Rotary drilling is quite different from cable-tool drilling. A rotary rig uses a bit that isn't anything like a cable-tool's chisel bit. Instead of a chisel, a rotary bit has rows of teeth or other types of cutting devices that penetrate the formation and then scrape or gouge out pieces of it as the rig system rotates the bit.

Further, a rotary rig doesn't use cable to suspend the bit in the hole. Rotary crew members attach the bit to the end of a long string of hollow pipe. By screwing together several joints of pipe, they put the bit on the bottom of the hole. As the hole deepens, they add joints of pipe.

EXERCISE 1. Give Russian equivalents of the following words and word combinations from the text:

cable-tool drilling, rotary drilling, rotating bits, wooden pegs, to saturate pegs with water, swelling wood, a seesaw, walking beam mounted in a derrick, a pivot, chisel, drawback, a bailer, to retrieve and remove the pieces of rock, bailing the cuttings, to resume drilling, to obstruct the bit's progress, a winch, a windlass, bull wheel, to reel cable on and off the bullwheel, to lead to cable-tool drilling's demise, to wedge a bit in the hole, the wall cake, to prevent formations from collapsing, to scrape or gouge out pieces of formation, joints of pipe.

EXERCISE 2. Complete the sentences:

1. A cable-tool rig works…
2. The walking beam is a wooden bar that…
3. As the beam rocks up…
4. Special equipment plays out the cable… The use of cable-tool rigs peaked in the 1920s…
5. Cable-tool drillers have to stop…
6. After bailing the cuttings, drillers run the bit back to…
7. A far bigger problem than bailing is that…
8. The wall cake created by circulating drilling Ruid prevents…
9. A rotary rig uses a bit that…
10. Rotary crew members attach…

EXERCISE 3. Say whether the following statements true or false:

1. A cable-tool has a powered seesaw mounted in a derrick.
2. The derrick provides a space to raise the cable.
3. Cable-tool drilling works very well in the soft formations.
4. The system of cable-tool drilling has a couple of advantages.
5. Cable-tool drillers have to retrieve and remove the pieces of rock, or cuttings.
6. Reeling cable is a slow operation.
7. The wall cake created by circulating drilling Ruid doesn't prevent formations from collapsing.
8. Rotary drilling is quite different from cable-tool drilling.
9. Instead of a cable, a rotary bit has rows of teeth or other types of cutting devices.
10. Rotary crew members attach the bit to the end of a long string of hollow pipe.

EXERCISE 4. Answer the questions:

1. What does the walking beam present itself?
2. What does the derrick provide to raise the cable?
3. What makes the bit drill?
4. When did the use of cable-tool rigs peak?
5. What do drillers have to run in order to retrieve and remove the cuttings?
6. What happens if the crew fails to bail out cuttings?
7. What problem must cable-tool drillers solve?

8. Why is the use of rotary rigs increasing?
9. What does the wall cake prevent formations from?
10. What does a rotary bit have instead of a chisel?
11. Where do rotary crew members attach the bit?
12. When do rotary drillers add joints of pipe to the bit?

TEXT 9. Rotating Systems

With the bit on bottom, the rig can rotate it in one of three ways. Many rigs use a machine called a "rotary table", a sort of heavy-duty turntable. Others rotate the bit with a top drive, a device with a powerful built-in electric motor that turns the pipe and bit.

In special cases, a slim downhole motor, usually powered by drilling fluid but in some cases by electricity, rotates the bit. A long metal housing with a diameter a little less than the hole's holds the motor. The bit screws onto the end of it. The latest rotary rigs use a top drive to rotate the pipe and bit.

Many drilling companies still own and use rotary tables, which are simple, rugged, and easy to maintain. Rotary rig owners often use downhole motors where they have to rotate the bit without rotating the entire string of pipe. Such situations occur when the rig is drilling a slant, or directional hole, a hole that is intentionally diverted from vertical to exploit a reservoir.

The driller, the person operating the rig, allows some of the weight of the pipe to press down on the bit. The weight causes the bit's cutters to bite into the formation rock. Then, as the bit rotates, the cutters roll over the rock and scrape or gouge it out.

Fluid Circulation

By itself, rotating a bit on pipe does not get the job done. The cuttings the bit makes must be moved out of the way. Otherwise, they collect under the bit cutters and impede drilling. Recall that the crew on a cable-tool rig has to stop drilling and bail the cuttings.

A rotary rig crew does not have to bail cuttings, because the rig circulates fluid while the bit drills, and the fluid carries the cuttings up to the surface (fig. 3).

Crew members attach a rotary bit to hollow pipe, instead of to braided cable. The pipe is a conduit: a powerful pump on the surface moves fluid down the pipe to the bit and back to the surface. This fluid picks up the cuttings as the bit makes them and carries them to the surface where they are disposed of. The pump then moves the clean mud back down the hole.

The fluid is usually a special liquid called "drilling mud". Don't be misled by the name. Although the earliest drilling muds were not much more than a plain, watery mud, drilling mud can be a complex blend of materials. Sometimes it isn't a liquid, which is why a better name

for drilling mud is “drilling fluid”. A fluid can be a liquid, a gas, or a combination of the two.

One advantage of a rotary rig is that workers do not have to worry about soft formations caving in on the bit and sticking it. Just as the Hamils prepared the mud to stabilize the hole at Spindletop, today’s drillers also prepare the drilling mud to control formations.

Although companies may use a cable tool rig in a few special cases, more often they use rotary rigs. Several kinds of rotary rigs are available for drilling on land and offshore.

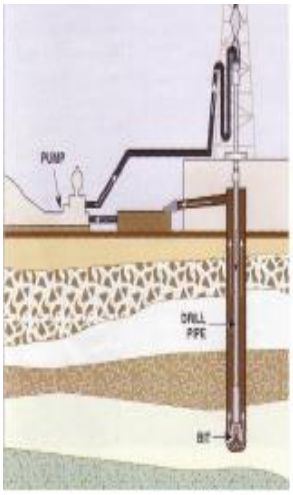

Figure 3. Drilling mud circulation

Figure 3. Drilling mud circulation

EXERCISE 1. Give English equivalents:

встроенный электрический двигатель, буровой раствор, эксплуатировать резервуар, оказывать давление на буй, врезаться в скалистое образование, препятствовать бурению, циркуляция жидкости, трубопровод, выносить на поверхность, сложная смесь материалов, преимущество.

EXERCISE 2. Express the same in Russian:

to screw onto something, string of pipe, fluid circulation, to be diverted, to press down on the bit, to roll over the rock, to move out of the way, to impede drilling, to bail cuttings, to be misled by the name, soft formation, to stabilize the hole, to be available

TEXT 10. OIL GAS AND ENVIRONMENT

The picture many people have of the oil industry is a negative one of disasters reported in

the media oil slicks from tankers, birds covered in oil, oil gushing from the ground, or pillars of smoke rising from a fire. The truth is very different. The world's daily consumption of oil is around 90 million barrels , and the overall impact of its production is very low . The industry puts

environmental protection high on its list of priorities. From planning the recovery of new resources , through design and construction and operation and eventual decommissioning and disposal of assets, all aspects of the environment are considered in order to minimize the industry's impact. Before licences are granted by governments for exploration or production of reserves on their territory, oil companies must demonstrate how the particular environment will be protected .The companies also have an obligation to consider the impact of their operations on the global environment.

Many desert and arctic areas are home to fragile, unique plant and animal species. Oil companies have their own specialists and work with other local and international experts to study the particular environment and how it should be protected. Soil protection, breeding and nesting sites, and migration routes have to be preserved from the disruption caused by exploration and production. When permanent installations are constructed , they are usually planned to operate for periods of around twenty years. Often large amounts of cooling water are used that may change the environment. More favourable conditions may be created for invasive plants or different species that can overwhelm native species. Waste materials have to be disposed of safely. Another perception of the industry is symbolized by the flaring of gas. There are international agreements to minimize flaring to decrease pollution and conserve resources, but flaring will always be required for emergencies to dispose of unwanted gas safely.

Companies also have to allow for unplanned events and emergencies. Designers must provide controls and instruments to allow for equipment failures. Plant must be designed to allow for unlikely but possible severe conditions that might only occur every twenty years, for example, extreme wave heights, extreme temperatures, or earthquakes. Technical and management systems have to be in place to ensure that the harmful effects of human error in operating procedures are minimized.

Many installations are close to residential areas, and apart from the safety implications, companies must minimize traffic, noise, and odours and generally develop good neighbourly relations. Most companies are keen to sponsor local events, educational initiatives, and opportunities to listen to local opinion and advice. Major oil companies realize that their long-term future is in more sustainable forms of energy. Far-Sighted companies have the financial motivation, resources ,and the expertise to make a major contribution to the global environment.

EXERCISE 1. Answer the questions:

1. What disasters are facing the world of today?
2. What ways are there for environmental protection in the companies?
3. Who is responsible for minimizing harmful effects of human error in operating procedures?

EXERCISE 2. Give English equivalents to the Russian words and word combinations:

Нефтяные пятна; клубы дыма; ежедневное потребление нефти; благоприятные условия; отходы должны быть надежно утилизированы; сжигание газа; чрезвычайная ситуация; вредные воздействия; устойчивые источники энергии.

EXERCISE 3. Translate the following sentences into English:

1. Защита почвы, размножения и мест гнездования и путей миграции должны быть сохранены от разрушения, вызванного разведкой и добычей.
2. Компании обязаны учитывать воздействие их деятельности на окружающую среду.

PART 6. PRACTICING IN TRANSLATION

EXERCISE 1. Translate into Russian:

Pipeline networks, pipeline system, equipment, maintenance, move products, location, main elements, storage facilities, pumps, compressors, inject into the pipeline, operational conditions, facilities, allow, protection, block valve, depend on, distribute, consumer, inject, rupture, leak.

EXERCISE 2.Translate into English:

Газопроводы, нефтепроводы, оборудование, запорнаязадвижка, находиться, местонахождения, работать, закачивать, нефтеилигазохранилище, разрешать, текущийремонт, разрыв, утечка, защита, насос, насоснаястанция, компрессорнаястанция, распределять, потребитель.

EXERCISE 3. Answer the questions:

1.What are the main elements of a pipeline system?

2.Where is the product injected into the pipeline?

3.What facilities are located at an Initial Injection Station?

4.What is the function of Compressor or Pump Stations?

5.What are block valves used for?

EXERCISE 4. Give English equivalents to the Russian words and word combinations:

Трубопровод; экономичное средство; очищенная нефть; природный газ; многофункциональный трубопровод; использовать; последовательность; распределение; смешивания продуктов; проникновение; оборудование на этапе получения продукта; предварительные расчеты; нормы абсорбции.

EXERCISE 5. Translate the following sentences into English:

1. Большинство трубопроводов строятся на глубине от 0,91 до 1,8 метров.

2. Нефть движется по трубопроводу с помощью насосных станций.

3. Горизонтальное бурение – это вид бурения, при котором направленная скважина постепенно становится горизонтальной, например, когда необходимо соединить два нефтенесущих пласта.

4. Бурение под углом к вертикали в целях достижения цели бурения называется бурением с отклонением от вертикали.

5. Скважины, вскрывающие вертикально расположенные пласты вертикальными стволами, считаются горизонтальными скважинами.

6. Если скважина неглубокая, промежуточную колонну, как правило, не используют.

7. Эксплуатационная колонна устанавливается от поверхности, проходит внутри направляющей колонны, кондуктора и промежуточной колонны до продуктивной зоны пласта или ниже нее.

8. Происшествия в процессе бурения включают выбросы нефти и газа, поломки бурильных труб, прихваты колонн бурильных труб, спущенных в скважину, падение металлических предметов в скважину и обрыв колонны труб.

9. Выброс из скважины может быть определен как неконтролируемый приток пластовой жидкости под давлением.

10. Выброс может произойти в любой скважине, когда давление бурового раствора меньше давления пластовой жидкости, или когда встречаются пласты с аномально высоким давлением.

VOCABULARY (СЛОВАРЬ)

Aa

abandon – ликвидировать;
abandonment – ликвидация;
accident rate – высокий уровень опасности;
acid – кислота;
add – наращивать;
adjust –регулировать,корректировать;
adopt – принимать;
affect – влиять;
air – воздух;
aircraft – самолёт, воздушное судно, летательный аппарат;
allow – позволять, разрешать;
ancient – древний;
anticline – антиклиналь;
application – метод;
aromatics - ароматический углеводород;
artificial lift – механизированная добыча, насосно-компрессорная добыча;
asphaltics - битумы;
asset – ресурс, достояние;
attach – присоединять.

Bb

barge – баржа;
be able – быть способным, мочь;
be located – находиться, быть расположенным;
beach – морской берег, взморье; отмель;
bedding – напластование; наслоение, слоистость;
behavior – поведение, режим работы;
benchmark – стандарт, эталон;
benzene - бензол;
biotite – биотит (чёрная слюда);
block valve – запорная задвижка;
Block Valve Station – узел задвижек;
bond – связывать, соединять, скреплять;
bond – связь;
boom – бум, резкий подъём деловой активности;
boulder – осадочный валун, диаметром не более 256 мм;
bounce – отскакивать;
brackish water – солоноватая вода;
breakdown – разрушение;
bridge – соединять;
brine water – грунтовая вода;
bubble – пузыриться; подниматься пузырьками;
bubble tray – колпачковая тарелка;
buildup – отложение;
bury - закапывать, зарывать, прокладывать;
bury – погружаться;
butane – бутан.

Cc

carbon dioxide – углекислый газ;
carbon steel – углеродистая сталь.
cargo – груз;
casing - обсадные трубы, обсадная колонна;
casing head gasoline – газовый бензин (получаемый в промысловом сепараторе или абсорбционной установке из нефтяного газа);
caterpillar machines – гусеничная техника;
cause – вызывать;
caustic – едкий;
cementation - цементирование;
chips, cuttings – буровой шлам;
classify – классифицировать;
clean – очищать;
clogging – забивание загрязнение; засорение;
coat – покрывать слоем чего-либо;
cobble –крупная галька (размером 64-256 мм);
compaction – уплотнение;
compare – сравнивать;
complete – заканчивать (скважину бурением)
comply – исполнять;
comprise – содержать, включать в себя;
condense – конденсировать;
consolidated sediments – уплотненные осадочные породы;
consolidation – сообщество;
constraint – ограничение.
constraint - ограничение;
consume – потреблять;
consumer – потребитель;
consumption waste – отходы потребления;
contain – содержать;

content – доля, процент, содержание (чего-л. в чём-л.);
contract – уплотняться, сжиматься;
contractor – подрядчик;
convert – преобразовывать; превращать;
copper – медь;
corrosion – коррозия, ржавчина;
counter part- аналог;
cracking stock – исходное крекинг- сырьё;
crop out – обнажаться, выходить на поверхность;
crude oil – неочищенная нефть;
current – текущий;
customer – клиент;
cycle – цикл; (хронологический) период;
cycloparaffins – циклопарафины.

Dd

decay – разлагаться;
decline curve – кривая падения;
define – устанавливать, определять;
Deliver – доставлять, распределять;
Delivery Station - распределительная станция
depend on – зависеть от;
deplete – истощать; исчерпывать;
depot – склад, хранилище;
depth – глубина;
detect – обнаруживать;
detector – сейсмоприёмник;
determine – определять, устанавливать;
development – развитие, освоение;
deviated well –наклонная скважина;
device — устройство;
disability –нетрудоспособность;
discharge – разгрузка, опорожнение;
displace – вытеснять, заменять, замещать;
distill – очищать;
distinguish – находить отличия; различать, распознавать;
distribution pipeline - распределительный трубопровоммуникации;
dome – купол;
downhole pump – забойный насос;
downstream - переработка нефти и сбыт нефтепродуктов
drilling – бурение;
drillpipe – бурильная колонна;
drinking water – питьевая вода;
drive – запускать; приводить в действие;
dry hole – непродуктивная скважина;
dune –дюна.

Ee

employee – рабочий;
encounter –встречать;
enhanced oil recovery (EOR) –добыча нефти вторичным методом;
ensure – гарантировать;
ensure – обеспечивать;
environment – окружение;
environment – окружающая среда;
equipment – оборудование;
equire – требовать;
estimate – оценивать.
ethane – этан;
evaluate – оценивать;
examine – исследовать; изучать;
exert – оказывать;
exist – существовать;
expose – обнажать;
extraction – извлечение.

Ff

facilities – оборудование;
facility – оборудование;
feeder line – подводящая линия;
feldspar – полевой шпат;
fertilizer – удобрение;
field pipelines – промысловые трубопроводы;
fill – наполнить;
fire cock – пожарный кран;
fire hazard – пожарная опасность;
fire hose – пожарный шланг;
fire safety – пожарная безопасность;
fit – подходить;
fittings – арматура;
flank – бок; край, сторона;
flare – факел сжигания (попутного газа);
flow – течь, поток;
flow mark – знак течения;
fluid - флюид;
foul – вонючий, омерзительный, отталкивающий;
frac job – гидравлический разрыв;
freeze – замерзать, обледеневать;
fresh – свежий;
furnace – печь.

Gg

gain – извлекать пользу, выгоду; улучшаться;
gas storage – газохранилище;

gasoline – бензин;
gathering pipeline - сборный нефтепровод;
giant – огромный;
glacier – ледник;
go-devil - скребок для очистки труб;
gold – золото;
good – товар;
grain – зерно;
granite – гранит;
granule – гранула; мелкая частица (2-4 мм);
greenhouse effect – парниковый эффект.

Hh

helium – гелий;
hidden – скрытый, спрятанный;
high-shrinkage oil – нефть с высокой усадкой;
hinder – затруднять, задерживать;
hold – сохранять, удерживать;
hornblende – роговая обманка, роговик;
hydrocarbon – углеводород;
hydrogen sulfide –сероводород.

Ii

identify – опознавать, распознавать;
ignite – возгораться, воспламеняться;
implement – внедрять, применять;
incident – случай;
include – включать в себя;
industrial facility - промышленный объект;
inject – закачивать;
injection well – нагнетательная скважина;
inlet – вход, подвод;
inspect – осматривать;
insurance – страхование;
interconnect – взаимодействовать;
interconnected – связанный, взаимосвязанный; соединённый;
Intermediate Station – промежуточная станция;
interrupt – прерывать;
investment – инвестирование;
iron – железо;
issue –исход, результат, плод.

Jj

jet – бить струёй.

Ll

launch – спускать, бросать;
layering – наслаивание;
lead – свинец;
leak – утечка;
leaky – имеющий течь; протекающий;
lethal – смертельный; летальный;
light - легкий;
liquid – жидкость;
LNG (Liquified Natural Gas) – сжиженный природный газ;
local – местный;
locate – определять место;
location – место, местонахождение;
logging truck –передвижная каротажная станция;
low-shrinkage oil– нефть с низкой усадкой;
lubricating oil - смазочное масло.

Mm

main pipe (lines) – магистральный трубопровод;
maintenance – текущий ремонт;
malfunctioning equipment – производственное оборудование.
mandatory - обязательно;
manifold pipelines – трубопровод с ответвлениями;
manufacturing plant - производственное предприятие;
mapping – нанесение на карту;
match – спичка;
measurement –снятие мерок, измерение;
meet - удовлетворять, соответствовать;
melt – таять, расплавлять;
meteoric water – подземные воды, образовавшиеся при просачивании
microbiological processes – микробиологические процессы.
mine – разрабатывать рудник; добывать;
mixture - смесь;
molten – расплавленный;
move – передвигать, перемещать;
mud – ил, тина;
mud crack – трещина усыхания.

Nn

naphthenes – нафтены, нафтеновые углеводороды;
natural gas liquids – газовый бензин;
nearby – близкий, соседний;
network – сеть;
nozzle – промывочная насадка.

Oo

occasional – случайный;
occur – встречаться, проявляться;
occur – происходить;
oil depot – нефтехранилище, нефтебаза;
oil field – нефтепромысел;
oil refinery - нефтеперерабатывающий завод;
oil refining - переработка нефти;
oil terminal - перевалочный склад для нефти и нефтепродуктов;
oil- нефть;
operate – работать;
order – порядок; последовательность;
ore – руда;
overlie – перекрывать (залегать выше);
overproduction –перепроизводство;
overthrust belt – надвиговая зона.

Pp

paraffin – парафин;
peak load – максимальная нагрузка;
peat – торф;
pebble –гравий;
percolate – просачиваться;
perforation – перфорация;
personnel – персонал;
petrochemicals – нефтепродукты;
petrol station - бензозаправочная станция;
petroleum – нефть;
pig - скребок для очистки труб;
pig - скребок для очистки труб;
pig-launcher station - площадка запуска диагностиройств;
pile – накапливаться;
pipe rolling – трубопрокатное производство;
pipe- труба;
pipeline – трубопровод;
pipeline inspection gauge - скребок для очис
plug – ставить пробку;
plummet = plummet down – быстро и отвесно падать;
poisonous – ядовитый;
pool – резервуар; бассейн;
pore space – поровое пространство;
precautions – меры предосторожности;
precipitate – осаждаться;
preexisting – существующие ранее;
preserve – сохраняться;
pressurize - поддерживать давление;
prevent – предотвращать;
processing facility - установка по подготовке нефти
producer – эксплуатационная скважина;
production platform - эксплуатационная морская платформа
propane – пропан;
protect – защищать;
protection – защита;
pump – насос;
pump station – насосная станция;
pungent – резкий, едкий;
pure – чистый, беспримесный;
purpose – цель.

Rr

range – колебаться, варьироваться;
rate of reliability – уровень надежности;
reclaiming – восстановление, рекультивация;
reduce – понижать, сокращать, уменьшать;
reef – риф;
refine – очищать;
refinery – переработка;
reflect – свидетельствовать;
regulatory agencies – органы государственного регулирования;
related – связанный;
release – освобождать, ослаблять;
relieve – ослаблять, уменьшать;
remaining – оставшиеся;
remedial – ремонтный;
remove – удалять;
replace – заменять, замещать;
replenish – пополнять, заполнять;
require – требовать;
requirement – требование;
requirements – требования;
reservoir – резервуар;
reservoir drive – пластовый режим;
resistance - сопротивление;
responsibility – ответственность;
restoring the site – восстановление
terexploration – исследование;
ripple marks –рябь;
road tanker – автоцистерна;
rock formation – горная порода;
route – путь, дорога;
routine repair – текущий ремонт;
rupture - прорыв, разрыв.

Ss

safety – безопасность;
Safety Department – отдел техники безопасности;
salvage – нереализованная продукция, отходы производства;
sample – образец, экземпляр;
satellite – спутник;
schedule – расписание;
scraper - скребок для очистки труб;
scraper - скребок для очистки труб;
seal – изолирующий слой;
seawater – морская вода;
seep – выход, проявление;
seepage – поверхностные признаки нефтепроявления;
seismic method –сейсмический метод;
send – посылать, отправлять;
sense – зондировать, измерять;
settling-pit – амбар – отстойник;
sewage – сточные воды
sewage – сточные воды;
shallow – мелкий, мелководный;
shield – щит;
side branch – боковое ответ;
side draw – боковой погон;
silt – мелкозем, частицы почвы 0,05-0,002 мм в диаметре);
silver – серебро;
site - территория объекта;
soil – почва;
solidify – затвердеть;
solution gas – природный газ, растворённый в нефти коллектора;
sonde – 1) зонд 2)каротажный заряд(спускаемый в скважину);
sorting – сортировка, классификация;
sour – высокосернистый;
source – взрывной источник;
source – источник, ключ;
split – разбивать, раскалывать;
split – расщеплять;
staff – сотрудники;
steam – пар;
steel - сталь;
storage – хранение;
storage facilities – нефте или газохранилище;
storage facilities – хранилище;
stream — поток;
stream — поток;
strict – точный;
sub-sea pipeline – подводный трубопровод.
sucker-rod pump – шланговый скважинный насос;
suggest – предлагать.
sulfur - сера;
supplies – сырье (здесь: продукция);
supply – снабжать, подводить;
surround – окружать; обступать;
surveillance - наблюдение;
suspend – подвешивать.

Tt

tank farm - резервуарное хозяйство;
tank terminal – тупиковая нефтебаза.
tank, tankage – резервуар;
tanker – танкер;
technical draft – технический проект;
technical standards – технические нормы;
terminal - конечная станция на трубопроводе;
termination – завершение, окончание;
terrain - территория, район, местность;
theft - воровство;
thick - плотный; густой, мощный (о слое, пласте);
tiny – крошечный;
to set up – устанавливать;
tower – вышка, башня;
transparent - прозрачный;
treatment plant - очистная станция;
tube- труба.

Uu

unauthorized – несанкционированный, неразрешенный;
unfavorable – неблагоприятный;
unit – единица;
unproductive – непродуктивный;
use – использовать.

Vv

valuable - ценный;
valve – клапан; вентиль; задвижка;
vehicles - транспортные средства;
viable – жизнеспособный;
volcanic – вулканический;
water- flood – заводнение.

Ww

wax – воск;
waxy crude oil – парафинистая нефть;
weld – сваривать;

welding – сварка;
well – скважина.
well log – каротажная диаграмма;
wildcat – разведочная скважина;
wireline – талевый канат;
workover – ремонт, ремонтные работы.

Yy

yield – давать; выдавать; производить.

Zz

zinc – цинк.

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