



Министерство образования Республики Беларусь
БЕЛОРУССКИЙ НАЦИОНАЛЬНЫЙ ТЕХНИЧЕСКИЙ
УНИВЕРСИТЕТ

Кафедра английского языка № 1

Е.И. Яловиц
А.С. Милейко
А.М. Силицкая

**ГОРНЫЕ МАШИНЫ И ОБОРУДОВАНИЕ.
РАЗРАБОТКА МЕСТОРОЖДЕНИЙ
ПОЛЕЗНЫХ ИСКОПАЕМЫХ**

Пособие по практическому курсу
научно-технического перевода для студентов факультета
природных ресурсов и экологии

Минск 2007

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Пособие предназначено для обучения переводу научно-технической литературы с английского языка на русский студентов факультета природных ресурсов и экологии, по специальностям «Горные машины и оборудование», «Разработка месторождений полезных ископаемых».

Пособие построено на оригинальных текстах и служит развитию и закреплению навыков, необходимых для более глубокого понимания содержания оригинального научно-технического текста и правильного его перевода.

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Предисловие

Данное пособие является практическим пособием по обучению переводу научно-технической литературы с английского языка на русский студентов факультета природных ресурсов и экологии по специальностям «Горные машины и оборудование», «Разработка месторождений полезных ископаемых». Пособие рассчитано на 36 часов.

В основу учебника положен принцип профессиональной направленности.

Цель пособия – развить умение анализировать различные элементы текста и правильно переводить американскую и английскую научно-техническую литературу по специальности, а также привить навыки аннотирования и реферирования текстов.

Учебное пособие состоит из 2 частей и поурочного словаря. Часть 1 состоит из 10 уроков (Units 1-10). Каждый урок включает задания на отработку лексических и грамматических трудностей текста и текст для перевода. Часть 2 состоит из текстов для дополнительного чтения.

В основном тексты учебника взяты из современной оригинальной англо-американской научно-технической литературы и подобраны так, что они знакомят студентов с тематикой их будущей специальности.

Упражнения, включенные в уроки, отражают лексические и грамматические особенности перевода. В систему лексических упражнений входят упражнения на перевод терминологической лексики, многозначных слов, многофункциональных слов.

В систему грамматических упражнений входят упражнения на перевод страдательного залога, инфинитива и инфинитивных конструкций, причастия и причастных оборотов, герундия и герундиальных конструкций, эмфатических конструкций и др.

К части 1 дан поурочный словарь, составленный из наиболее трудной лексики текстового материала.

PART I

Unit I

Лексические особенности перевода

- Перевод интернациональных слов.
- Перевод однокоренных слов.
- Перевод слов с приставкой *non-*.
- Перевод слов с приставкой *re-*.
- Перевод словосочетаний *сущ. + сущ.*
- Перевод псевдоинтернациональных слов.
- Перевод предложений с интернациональными и псевдоинтернациональными словами.

Грамматические особенности перевода

- Перевод независимого причастного оборота.
- Перевод предложений с *- ing* формами.

Практика перевода

Текст *Principal Ways of Protecting Mineral Deposits*

Лексические особенности перевода

I. Прочитайте и переведите интернациональные слова.

Asphalt; naphthalene; kerosene; masut; vaseline; plastics; geochemist.

II. Определите части речи и переведите следующие слова, имеющие общий корень.

Refining - to refine – refinery – unrefined; lubricant – lubricate – lubrication – lubricator; replacement – to replace – replaceable; non-productive – productive – productivity – product – to produce – producer; to extract – extractive – extraction; incline – inclined – inclination; deliver – delivering – delivery – deliverer.

III. Переведите следующие слова с приставкой *non-*, которая обозначает отрицание или отсутствие, например: non-essential – несущественный, essential – существенный.

Non- productive; non-renewable; non-ferrous metal; non-freezing; non-effective; non-metal; non-standard; non-rigid; non-payment.

IV. Переведите следующие глаголы с приставкой *re-*, которая имеет значение: снова, заново, ещё раз, обратно.

Replace; recycle; reconstruct; reorganize; reproduce; recover; recreate; recollect.

V. Переведите следующие словосочетания на русский язык.

Underground fires; raw materials; oil fields; separation process; fossil fuels; energy sources; nitrogen fertilizers; iron ore; mine – cars; cutter – loader; country rock; liquid fuel.

VI. Переведите следующие псевдоинтернациональные слова, выбирая правильный ответ из ряда значений справа.

Clay - глина, клей
data - данные, дата
accurate - точный, аккуратный
actual - действительный, актуальный
familiar - известный, фамильярный
list - список, лист

magazine - журнал, магазин
principal- основной, принципиальный
production- производство, продукция
resin- смола, резина

VII. Переведите следующие предложения, содержащие интернациональные и псевдоинтернациональные слова, на русский язык.

1. The usual cementing substances are sand, clay, calcium, carbonate and others.
2. The process of sedimentation is called weathering.
3. When minerals occur so that they can be worked at a profit they are called deposits.
4. Many different factors are taken into account in choosing a prospecting method.
5. Aerial photography with geological interpretation of the data to be obtained is highly effective from aircraft or helicopter.
6. Last century prospectors looked for visible evidence of mineral deposits. This fact is familiar to me.

Грамматические особенности перевода

VIII. Переведите следующие предложения, обращая внимание на перевод независимого причастного оборота.

1. Weather permitting, the expedition will start tomorrow.
2. At this mine the method of working is long-wall, the faces being rather long.
3. Coal being widely used as a raw material we use it in chemical industry.
4. The work done, we were paid right away
5. The most widely used hydraulic method of mining involves the use of water jets, the method being increasingly used both underground and in quarries.

IX. Переведите предложения, обращая внимание на перевод *-ing* форм. Как называются эти формы.

1. Processes leading to the formation of sedimentary rocks are known.
2. By-products requiring additional separation processes are also dumped.
3. Designing new machines, engineers pay attention to geological conditions.
4. The mine cars are emptied without being stopped.
5. Cutting coal is performed by cutting chains.
6. Natural gas is the raw material for obtaining plastics and nitrogen fertilizers.
7. Geochemists in many countries are working on the technical and physico-chemical aspects of exploitation at greater depths of the earth.

Практика перевода

X. Переведите текст, обращая внимание на лексические и грамматические особенности перевода.

Principal Ways of Protecting Mineral Deposits

Mineral resources should be protected primarily from non-productive use. For example, much coal is lost in underground fires, large amounts of gas are lost when it is burned at the oil fields, and so on.

The economical and comprehensive use of mineral raw materials is aimed at exploiting the existing (already developed) mineral deposits in such a way as to make them last longer. In nature, ores do not contain only iron or only copper, zinc, or lead. The

overwhelming majority of ores are complex with one main component and a number of additional ones. For example, in addition to their main element, iron ores often contain titanium, vanadium, cobalt, copper, zinc, phosphorus, and sulfur; polymetallic ores contain tin, copper, nickel, cobalt, tungsten, molybdenum, gold, silver, and a whole range of rare metals (in different amounts);

Mining enterprises sometimes extract only the main mineral and only from the richest layers. Adjacent poorer layers are not exploited but left in the ground or extracted and dumped. By-products requiring additional separation processes are also dumped. This method of mining mineral raw materials is now outdated.

Certain success has been achieved in comprehensive use of mineral raw materials. Non-ferrous metallurgical plants make as by-products nearly all the silver, bismuth and platinum, about 30 per cent of the sulfur, and up to 10 per cent of the zinc, lead and copper. Indium, gallium, selenium, tellurium, cobalt, and other valuable elements are extracted from polymetallic ores. It should be noted that fuller use of mineral raw materials raises efficiency of production.

The need for economical and comprehensive use of mineral resources also applies to fossil fuels.

Coal is used not only as a source of energy but also in metallurgy (coke) and as a raw material for the chemical industry. Coal when processed yields about 300 kinds of products: asphalt, household gas, engine lubricant, carbolic acid, xylene, naphthalene and others.

Like coal, oil and gas are not only energy sources but also valuable chemical raw materials. Oil refining yields petrol, kerosene, lubricants, masut, tar, vaseline, and paraffin. Synthetic rubber is made of gases which are the by-products of oil extraction. Natural gas is the raw material for obtaining plastics and nitrogen fertilizers.

The replacement of mineral raw materials in short supply by other resources becomes necessary as mineral deposits are depleted. In many cases metal may be replaced by plastics, oil by coal, thermal power produced in burning coal by atomic power and so on.

Metal recycling is very important in saving mineral raw materials. In Britain, for example, more than half the steel produced is made of scrap-metal. In the future, metal recycling will probably grow in all countries which will increase the length of service of mineral deposits.

As we deplete existing deposits, we are compelled to switch to the use of deeper deposits. Geochemists in many countries are working on the technical and physico-chemical aspects of exploitation at greater depths of the earth.

Mineral resources are non-renewable, and their conservation means economical and rational use of them.

Continuous exploration, the economical and total use of mineral resources, and the replacement of mineral raw materials in short demand by other resources are carried out with the aim of rational use of mineral resources. The repeated use of scrap-metal is very important to save mineral raw materials. In addition, measures must be envisaged to prevent and eliminate the harmful impact of mining operations on the environment.

Unit II

Лексические особенности перевода

- **Перевод интернациональных слов.**
- **Перевод однокоренных слов.**
- **Перевод словосочетаний.**

Грамматические особенности перевода

- **Перевод предложений с глаголом to be в различных функциях.**
- **Перевод предложений с пассивными конструкциями.**
- **Перевод предложений с группой «подлежащее-сказуемое».**

Практика перевода

Текст *The Mineral Resources of the Continent*

Лексические особенности перевода

I. Обратите внимание на значения следующих «ложных друзей» переводчика:

Position - положение, состояние

Data- данные, факты, сведения

Apparatus - прибор, инструмент, аппаратура, машина

Reserve - запас, резерв.

II. Переведите следующие интернациональные слова.

Import, v; manganese, n; titanium, n; molybdenum, n; chromium, n; absorb, v;
register, v; geological, adj; gaseous, adj;

III. Переведите следующие слова, имеющие общий корень.

Distribute – by distributing – while distributing – distribution; frequency – frequent – frequent – frequently; to contradict – contradiction – contradictory; to define – definite – definitely – indefinite – definition; precise – precisely – precision; deplete – depletion ; understand – understanding – understandable.

IV. Проверьте по терминологическому словарю, правильно ли Вы понимаете значения следующих слов.

Prediction; conserve; observation; probe; rational; enormous; to process;

V. Переведите следующие словосочетания на русский язык.

1. Field observation, daily observations
2. Harvest prediction, earthquake prediction, water quality prediction
3. Conserve forests, conserve water resources, conserve groundwater
4. Precise analysis, precise apparatus, precise prediction, precise observations

Грамматические особенности перевода

VI. Переведите предложения на русский язык. Обратите внимание на перевод глагола *to be* в различных функциях.

1. Mineral deposits are distributed unevenly on the continents.
2. Russia is in a better position than many other countries in terms of its mineral resources.
3. The world mineral reserves are enormous.
4. As coal will remain an important fuel for a long time to come, it is understandable that power engineers should turn their attention to Siberia.
5. The aim was to reduce the volume of development work by using the long-wall method.
6. The pump is to be installed at the surface.

VII. Переведите предложения на русский язык, обращая внимание на перевод пассивных конструкций.

1. Mineral deposits are distributed unevenly on the continents, and for that reason many countries are forced to import oil and various metal ores.
2. The research was done a few years ago.
3. It is believed that iron resources will last for 250 years.
4. How is this phenomenon accounted for?
5. The world mineral reserves become depleted when they are intensively exploited by people.
6. Their conclusions can be relied on.

IX. Переведите предложения. Найдите в каждом предложении группу «подлежащее-сказуемое».

1. Mechanization and automation of underground mines and opencast have advanced greatly.
2. Metamorphic rocks make up a large part of the Earth's crust and are classified by texture and by chemical and mineral assembly.
3. The process of metamorphism may have destroyed the original features that could have revealed the rock's previous history.
4. The work carried out at this peat field gave excellent results.
5. Petroleum is believed to have been formed from decaying vegetable and animal remains.
6. They felt the earth move.

Практика перевода

X. Переведите текст, обращая внимание на лексические и грамматические особенности перевода.

The Mineral Resources of the Continent

Mineral deposits are distributed unevenly on the continents, and for that reason many countries are forced to import oil, various metal ores and the like.

Russia is in a better position than many other countries in terms of its mineral and raw material deposits. It occupies first place in the world in estimated deposits of iron and manganese ores, titanium, nickel, lead and molybdenum.

The world mineral reserves are enormous and run into millions, billions and even trillions of tons. However, they are not infinite and deposits become depleted when they are intensively exploited.

Various and often contradictory estimates exist as to how long the different raw materials will last. According to some, iron resources will last for 250 years, chromium resources for 95 years, copper for 30 years, coal for 500 years, and oil and gas for 70 years. Other predictions exist, but one thing is clear: mineral deposits will last only for a limited, not very lengthy period. We must conserve and make rational use of mineral resources.

Prospecting for new deposits occurs in all countries and new reserves of minerals are discovered every year.

Precise and highly sensitive apparatus is used to study mineral resources, observations are made, and various kinds of photographs taken from outer space. Distant probes from outer space function on the basis that all natural formations reflect, absorb or radiate electromagnetic waves of a definite frequency and intensity. These waves can be registered by the appropriate receptors on spacecraft. Together with the data obtained by conventional geological methods, the information from outer space provides the material vital for understanding the pattern of ores, oil and coal distribution on the earth and enables us to discover promising new areas of mineral deposits.

Coal reserves are unevenly distributed among the countries: most of them are in Asia, North America, Russia, the Ukraine and Europe.

About 60 per cent of the coal mined is now used in the production of electrical and thermal energy (and compressed air); only 19 per cent is used for heating. In future the requirements for coal will probably increase only in thermal and electric power production; more coal will be processed into the liquid and gaseous fuel.

As coal will remain an important fuel for a long time to come, it is understandable that power engineers should turn their attention to Siberia where 90 per cent of the coal reserves is concentrated.

So the coal industry will continue to be a key “power supply sector” of the country for many decades.

Unit III

Лексические особенности перевода

- Перевод интернациональных слов.
- Перевод слов имеющих общий корень.
- Перевод «ложных друзей» переводчика.
- Перевод атрибутивных словосочетаний.
- Перевод слова *plate* в различном контексте.

Грамматические особенности перевода

- Перевод слова *that* в различных функциях.
- Перевод предложений с сослагательным наклонением.
- Перевод предложений с различными способами выражения отрицания.

Практика перевода

Текст *How Earthquakes Work*

Лексические особенности перевода

I. Переведите следующие интернациональные слова.

Phenomena, stable, vibration, technically, seismology, theory, volcanic, planet, continents, tsunamy, magma.

II. Переведите следующие слова, имеющие общий корень. Определите, какой частью речи они являются.

erupt – eruption – eruptive

meteor – meteoric – meteorite – meteorology – meteorological – meteorologist

explode – explosion – explosive

instigate – instigation – instigator

science – scientific – scientist

destroy – destruction – destructive – destructor

III. Переведите следующие слова «ложные друзья» переводчика.

solid

actually

natural

activity

IV. Переведите следующие атрибутивные словосочетания.

Terrifying phenomena, large truck, volcanic eruptions, natural disaster, biggest, scientific, breakthrough, peculiar phenomenon, the clustering of volcanic activity, huge ridges, apparent movement, divergent plate boundary, extreme violence, the theory of plate tectonics, fairly large area.

V. Переведите следующие предложения. Обратите внимание на перевод слова *plate* в различном контексте.

1. The majority of naturally – occurring earthquakes are caused by movements of the earth's plates.

2. The basic theory is that the surface layer of the earth – the lithosphere is comprised of many plates that slide over the lubricating asthenosphere layer.

3. A holographic plate is a piece of glass coated with a substance, the latter being sensitive to light.
4. He has enough porridge on his plate.
5. This device is made of two metal plates.
6. When the plates are finally moved, this built-up energy becomes kinetic.

Грамматические особенности перевода

VI. Переведите следующие предложения, обращая внимание на перевод слова *that* в различных функциях.

1. An earthquake can shatter that perception instantly.
2. An earthquake is a vibration that travels through the earth's crust.
3. The basic theory is that the surface layer of the earth the lithosphere is comprised of many plates that slide over the lubricating asthenosphere layer.
4. More than three million earthquakes occur every year. That's about 8,000 a day, or one every 11 seconds.
5. It is the big quakes that occur in highly populated areas that get our attention.

VII. Переведите следующие предложения, обращая внимание на сослагательное наклонение.

1. If two plates are moving apart from each other hot molten rock flows up from the layers of mantle below the lithosphere.
2. It is understandable that power engineers should turn their attention to Siberia where 90% of coal reserves is concentrated.
3. If seedlings are in demand they can be cropped annually.
4. There would be no life without water.
5. It is necessary that mineral resources should be protected primarily from non-productive use.
6. Two plates are moving toward each other as if one plate typically pushes under the other one?

VIII. Переведите предложения, обращая внимание на разные способы выражения отрицания.

1. In these layers there is little or no oxygen.
2. No fissures were found.
3. We do not use the room and pillar method on a wide scale because it is characterized by high losses of coal.
4. It is not the shaking ground itself that claims lives-it is the associated destruction of manmade structures.
5. A level is a horizontal road with no direct access to the surface.
6. Neither plate is in a position to subduct under the other.

Практика перевода

IX. Переведите текст, обращая внимание на лексические и грамматические особенности перевода.

How Earthquakes Work

An earthquake is one of the most terrifying phenomena that nature can dish up. We generally think of the ground we stand on as "rock-solid" and completely stable. An earthquake can shatter that perception instantly, and often with extreme violence.

An earthquake is a vibration that travels through the earth's crust. Technically, a large truck that rumbles down the street is causing a mini-earthquake, if you feel your house shaking as it goes by, but we tend to think of earthquakes as events that affect a fairly large area, such as an entire city. All kinds of things can cause earthquakes: volcanic eruptions, meteor impacts, underground explosions (an underground nuclear test, for example), collapsing structures (such as a collapsing mine)

But the majority of naturally-occurring earthquakes are caused by movements of the earth's plates, according to the United States Geological Survey, more than three million earthquakes occur every year. That's about 8,000 a day, or one every 11 seconds!

Earthquakes have caused a great deal of property damage over the years, and they have claimed many lives. In the last hundred years alone, there have been more than 1.5 million earthquake-related fatalities. Usually, it's not the shaking ground itself that claims lives - it's the associated destruction of manmade structures and the instigation of other natural disasters, such as tsunamis, avalanches and landslides.

Sliding Plates

The biggest scientific breakthrough in the history of seismology - the study of earthquakes - came in the middle of the 20th century, with the development of the theory of plate tectonics. Scientists proposed the idea of plate tectonics to explain a number of peculiar phenomenon on earth, such as the apparent movement of continents over time, the clustering of volcanic activity in certain areas and the presence of huge ridges at the bottom of the ocean.

The basic theory is that the surface layer of the earth - the lithosphere - is comprised of many plates that slide over the lubricating asthenosphere layer. At the boundaries between these huge plates of soil and rock, three different things can happen:

- Plates can move apart - If two plates are moving apart from each other, hot, molten rock flows up from the layers of mantle below the lithosphere. This magma comes out on the surface (mostly at the bottom of the ocean), where it is called lava. As the lava cools, it hardens to form new lithosphere material, filling in the gap. This is called a divergent plate boundary.

- Plates can push together - If the two plates are moving toward each other, one plate typically pushes under the other one. This subducting plate sinks into the lower mantle layers, where it melts. At some boundaries where two plates meet, neither plate is in a position to subduct under the other, so they both push against each other to form mountains. The lines where plates push toward each other are called convergent plate boundaries.

- Plates slide against each other - At other boundaries, plates simply slide by each other --one moves north and one moves south, for example. While the plates don't drift directly into each other at these transform boundaries, they are pushed tightly together. A great deal of tension builds at the boundary.

Where these plates meet, you'll find faults -- breaks in the earth's crust where the blocks of rock on each side are moving in different directions. Earthquakes are much more common along fault lines than they are anywhere else on the planet.

Лексические особенности перевода

- Перевод прилагательных с суффиксами *-ful, -less*.
- Перевод многозначных слов в узком контексте.
- Перевод словосочетаний со словом *very*.
- Перевод слов с префиксом *-un*.
- Перевод словосочетаний.

Грамматические особенности перевода

- Перевод предложений с местоимением *both* и союзом *both...and*.
- Перевод предложений со словами *only, the only*.
- Перевод предложений с местоимением *it*.

Практика перевода

Текст *How Earthquakes Work*

Лексические особенности перевода

I. Проанализируйте и переведите на русский язык следующие прилагательные, образованные с помощью суффиксов *-ful* и *-less*.

- a) – ful useful, successful, powerful, harmful, fruitful.
b) – less useless, powerless, harmless, sleepless.

II. a) **Переведите слова с префиксом *un-*:**

unconsolidated, uncemented, unusual, unsatisfactory, unnecessary, unlike, undeformed.

b) **Переведите следующие предложения:**

1. The results of the experiment were unsatisfactory.
2. Gravel, sand and clay are unconsolidated mechanical sediments.
3. They are called so because they are composed of loose uncemented particles.
4. The geologists found the old structures which were unusual and undeformed.
5. Mechanical sediments can be unconsolidated and consolidated.

III. **Переведите предложения, обращая внимание на разное значение выделенных слов в зависимости от контекста.**

1. The girl had a beautiful face. Plastic faces are widely used nowadays. What do the dimension of production faces depend on? Peat production faces many problems.
2. The progress of the national science was remarkable during last decades. The scientists progress slowly in their work.
3. This is an electric field. What a fine field of wheat! The scientists carried out research in the field of geology and mining. Terpigorev visited many coal-fields and collected materials for his graduation paper.
4. There is a large hole in the roof of this house. The surface above the workings is the roof in coal mining.
5. There is a fault in the electrical system. Whose fault is it that we are late? These faults occur where the crust is being pulled apart.

IV. **Переведите следующие словосочетания на русский язык, выбирая правильное значение многозначных слов при помощи узкого контекста.**

1. the floor of a seam, the floor of the room, on the third floor
2. to go to bed, a flower-bed, the bed of honour, a thick bed of clay.
3. hard work, hard rocks, a hard blow, hard radiation.
4. rate of exchange, to live at a high rate, rate of increase, at the rate of 40 miles an hour, an equal rate.

5. a work-bench, to sit on the bench, coal bench.
6. to drive a car, to drive into a corner, to drive a nail, to drive a trade, to drive a tunnel.

Грамматические особенности перевода

V. Переведите следующие сочетания слов, обращая внимание на разные значения слова *very*.

Very good; very much; very difficult; at the very beginning; at that very moment; at the very end; the very book; this very colliery; that very scientist; the very first; the very best.

VI. Переведите предложения, обращая внимание на значение местоимения *both* и союза *both...and*.

1. Both methods of prospecting are in use.
2. A new institute will train both geologists and mining engineers.
3. The loader is attached in the front and the backhoe is attached in the back. Both components serve very different functions.
4. About 60 per cent of coal mined is now used both in the production of electrical and thermal energy.
5. Peat and coal are the organic sediments. Both of them are of great practical value.

VII. Переведите следующие предложения обращая внимание на перевод слов *only* и *the only*.

1. The Mining Engineering Department is the only one in the University of Wales.
2. The only solution is for CO₂ to be removed and deposited.
3. Certain deposits are found only in a particular type of ground.
4. At present great consideration is given not only to surface method of prospecting but also mineralogical method of prospecting.
5. The shield method of mining is the only method which is used where short faces are worked. It is used in all the coal-fields of Russia.

VIII. Переведите предложения. Обратите внимание на перевод местоимения *it*.

1. The backhoe is the main tool of the backhoe loader. It is used to dig up hard, compact material.
2. It is possible to explore very gently sloping seams by boreholes.
3. It should be noted that there exist ground and aerial prospecting methods.
4. It is obvious what a dump truck does just by looking at it.
5. Oil occurred at great depths and it was difficult to search for it.

Практика перевода

IX. Переведите текст, обращая внимание на лексические и грамматические особенности перевода.

Faults

Scientists identify four types of faults, characterized by the position of the fault plane, the break in the rock and the movement of the two rock blocks.

In a normal fault the fault plane is nearly vertical. The hanging wall, the block of rock positioned above the plane, pushes down across the footwall, which is the block of rock below the plane. The footwall, in turn, pushes up against the hanging wall.

These faults occur where the crust is being pulled apart, due to the pull of a divergent plate boundary.

The fault plane in a reverse fault is also nearly vertical, but the hanging wall pushes up and the footwall pushes down. This sort of fault forms where a plate is being compressed.

A thrust fault moves the same way as a reverse fault, but the fault line is nearly horizontal. In these faults, which are also caused by compression, the rock of the hanging wall is actually pushed up on top of the footwall. This is the sort of fault that occurs in a converging plate boundary.

In a strike-slip fault, the blocks of rock move in opposite horizontal directions. These faults form when the crust pieces are sliding against each other, as in a transform plate boundary.

In all of these types of faults, the different blocks of rock push very tightly together creating a good deal of friction as they move. If this friction level is high enough, the two blocks become locked - the friction keeps them from sliding against each other. When this happens, the forces in the plates continue to push the rock, increasing the pressure applied at the fault.

If the pressure increases to a high enough level, then it will overcome the force of the friction, and the blocks will suddenly snap forward. To put it another way, as the tectonic forces push on the "locked" blocks, potential energy builds. When the plates are finally moved, this built-up energy becomes kinetic. Some fault shifts create visible changes at the earth's surface, but other shifts occur in rock well under the surface, and so don't create a surface rupture.

The initial break that creates a fault, along with these sudden, intense shifts along already formed faults, are the main sources of earthquakes. Most earthquakes occur around plate boundaries, because this is where the strain from the plate movements is felt most intensely, creating fault zones, groups of interconnected faults. In a fault zone, the release of kinetic energy at one fault may increase the stress -- the potential energy -- in a nearby fault, leading to other earthquakes. This is one of the reasons that several earthquakes may occur in an area in a short period of time.

Every now and then, earthquakes do occur in the middle of plates. In fact, one of the most powerful series of earthquakes ever recorded in the United States occurred in the middle of the North American continental plate. These earthquakes, which shook several states in 1811 and 1812, originated in Missouri. In the 1970s, scientists found the likely source of this earthquake: a 600-million-year-old fault zone buried under many layers of rock.

The vibrations of one earthquake in this series were so powerful that they actually rang church bells as far away as Boston!

Unit V

Лексические особенности перевода.

- **Перевод однокоренных слов.**
- **Словообразование. Суффиксы прилагательных.**
- **Перевод словосочетаний.**
- **Перевод слов "like", "likely".**
- **Перевод многофункциональных слов "one", "ones".**

Грамматические особенности перевода.

- **Перевод модальных глаголов.**
- **Перевод причастия.**

Практика перевода

Текст Fossil Fuels.

Лексические особенности перевода.

I. Переведите следующие слова, определите какой частью речи они являются.

To inhabit – inhabitant, inhabitable, uninhabitable; suit, suitable, unsuitable; to mine, mining, miners; acid – acidification; environment – environmental; to pollute, pollutant, pollution, polluting; to emit – emission; sulphur – sulphuric – desulphurization.

II. Переведите на русский язык следующие прилагательные.

Numerous, gigantic, pure, huge, hazardous, calorific, substantial, conspicuous, significant, uninhabitable, environmental.

III. Переведите следующие словосочетания со словарем.

numerous underground corridors
gigantic underground anthill
pure hard coal
huge waste deposits
hazardous gases in the mines
calorific value
a substantial amount of the emissions
the most conspicuous of the these pollutants
significant environmental effects
open-cast mines

IV. Переведите следующие словосочетания на русский язык, обратите внимание на перевод цепочки существительных.

Underground corridors, energy use, environmental, impact studies, health risks, coal combustion, forest damage, ground-water level, district-heating plants, hard coal combustion, lignite burning power plants, ground waters.

V. Переведите на русский язык следующие атрибутивные словосочетания.

Carbon monoxide (CO₂)
nitrogen oxides (NOX)
sulphuric dioxide
sulphuric acid acidification of many lakes
desulphurization lack
greenhouse gas
acidification of many lakes
SO₂ emissions per tonne of lignite
uninhabitable areas

VI. Найдите эквиваленты для части А в части В:

А
solid fossil fuels;
contaminate
to excavate;
substance;
methane;

В
добывать открытым способом;
сгорание;
твёрдое ископаемое топливо;
метан;
вещество;

to emit;	атмосфера;
combustion	загрязнять;
atmosphere;	излучать;
quality of coal;	содержание углерода;
carbon content.	качество угля.

VII. Переведите следующие предложения, обращая внимание на: перевод выделенных слов.

1. Today the term **“fossil”** generally means any direct evidence of past life.
2. Most fuels are carbon-containing substances that are burnt in air.
3. Fuels may be solid, liquid and gaseous.
4. Liquid fuels the most important are derived almost from petroleum.
5. Of gaseous fuels the most important are those derived from natural gas.
6. Gas is the most economical and convenient type of fuels.
7. Using gaseous fuels makes it possible to obtain high thermal efficiency, ease of distribution and control.
8. Mineral fuels such as oil, shale, gas and coal are commonly called fossil fuels.
9. These fossils are organic materials accumulated into the geological past.
10. Liquid is once of the states of matter.

VIII. Переведите следующие предложения. Определите значение слов “like” и “likely”.

1. *Подобно, как.*
2. *Похожий, одинаковый.*
3. *Любить, нравиться.*
4. *“it is likely” – вероятно, возможно.*
5. *Unlikely – маловероятно, вряд ли.*

1. Like sands, sand stones can be divided into fine-grained, medium-grained and coarse-grained.
2. Like other sedimentary rocks coal beds may be structurally disturbed by folding and faulting.
3. As is known, unlike granite metamorphic rocks have a schistose structure.
4. Like his father he is going to become a miner.
5. He looks like his dad.
6. We like our future speciality.
7. Some liquids have like properties.
8. You may take any device you like.
9. The reaction is likely to take place.

Грамматические особенности перевода.

IX. Переведите следующие предложения, обратите внимание на перевод причастия.

1. Depending on the quality of the coal, it is broken into small pieces or pulverized.
2. Having finished the experiment the students left the laboratory.
3. The resulting product is then shipped to the end users.
4. Many polluting gases and particles are emitted when coal is burning.

5. The material extracted from the coal mines consists not only of pure hard coal but also of other substances unsuitable for energy use.
6. Various polluting gases are emitted into the atmosphere.

X. Переведите следующие предложения на русский язык, обратите внимание на перевод модальных глаголов.

1. For this reason the Earth's surface can become unstable which often makes the mining areas uninhabitable.
2. Part of it can be used for energy production.
3. In the atmosphere SO₂ is converted into sulphuric acid which can be transported for long distances before it falls to the Earth as raindrops.
4. As a result of lignite extraction, thousands of hectares in eastern Germany have been spoiled and have to be reclaimed and recultivated.
5. To mine the coal below the Earth's surface numerous underground corridors have to be excavated.

XI. Проанализируйте и переведите следующие предложения, обращая внимание на перевод многофункциональных слов "one, ones".

one – числительное – один, одна, одно,

one – формальное подлежащее (перед личной формой глагола), не переводится,

one (ones) – слово-заменитель либо переводится словом, которое заменяет, либо совсем не переводится,

one's – местоимение – свой, своя, своё.

1. One can divide all sediments into consolidated and unconsolidated rocks.
2. This process is one to be associated with reaction in alkaline solution (щелочной).
3. One can reduce heat losses in a transmission line.
4. One has to be careful while testing the new machine.
5. One hundred years ago there were neither electric lamps nor electric motors.
6. The results of this experiment are much better than the previous ones.
7. The atoms of different elements differ from one another.
8. This substance reacts one tens as fast as the other one.

Практика перевода

XII. Переведите текст, обращая внимание на лексические и грамматические особенности перевода.

Fossil fuels

In the Baltic region three types of solid fossil fuel are extracted: hard coal (in Poland), lignite (in eastern Germany and Poland) and oil-shale (in Estonia and western Russia).

Hard-coal mining has significant environmental effects. To mine the coal below the Earth's surface, numerous underground corridors have to be excavated which make the mining area look like a gigantic underground anthill. For this reason the Earth's surface can become unstable which often makes the mining areas uninhabitable. The material extracted from the coal mines consists not only of pure hard coal but also of other substances unsuitable for energy use. The separation of coal from these substances results in huge waste deposits which inhibit other activities in the coal-mining areas. During the mining process, methane is emitted. Part of it can be used for energy production, but certain amounts are emitted into the

atmosphere. Since methane is a so-called greenhouse gas, it contributes to global climate change. Apart from the environmental damage, there are also health risks to miners from hazardous gases in the mines, or mining accidents, and anthracosis (so-called 'coal miner's lung').

Depending on the quality of the coal (for example its carbon content or calorific value), it is broken into small pieces or pulverized. The resulting product is then shipped to the end-users.

Further environmental problems from hard coal result from its conversion into electricity or heat. During the combustion of hard coal, dust and various polluting gases are emitted into the atmosphere. Since the plants have high smoke-stacks, a substantial amount of the emissions is carried far away. Sulphur, in the form of sulphur dioxide, is the most conspicuous of these pollutants. In 1993, about 7.5 million tonnes of SO₂ were emitted in the Baltic region (excluding northwestern Russia). Most of these emissions came from coal combustion. In Poland, coal combustion for electricity and heat production accounts for more than 70 per cent of all SO₂ emissions.

In the atmosphere, SO₂ is converted into sulphuric acid which can be transported for long distances before it falls to the Earth as raindrops and leads to the acidification of water and soil. This so-called 'acid rain' is a major contributor to forest damage and the acidification of many lakes in the Baltic region.

Beside SO₂, many other polluting gases and particles, for example, nitrogen oxides (NO_x), dust and carbon monoxide (CO), are emitted when burning coal.

Lignite is typically extracted in open-cast mines. As a result of lignite extraction, thousands of hectares in eastern Germany have been spoiled and have to be reclaimed and recultivated. Mining also lowers the ground-water level in the mining regions and leads to methane emissions. Lignite is used by power plants and district-heating plants. Before transportation to the power plants, it is pulverized at the mining site. The waste material from the lignite mines is mostly used for landfills but sometimes it is just stored close to the mines in high heaps which are washed out by rain. Heavy metals and other pollutants leaking from these deposits contaminate surface and ground waters.

Like hard coal, lignite emits SO₂ when combusted. Due to the lower calorific value of the lignite, the SO₂ emissions per tonne of lignite are approximately three times higher than those for hard coal. As regards other pollutants, the situation is rather similar to the emissions from hard coal use. Because of the lack of desulphurization equipment at some lignite-burning power plants in eastern Germany and Poland, those plants have the highest emissions of SO₂ in the Baltic region. Dust emissions are also high compared to similar plants in western Europe.

Unit VI

Лексические особенности:

- **Перевод интернациональных и псевдоинтернациональных слов.**
- **Перевод словосочетаний.**
- **Перевод предлога “as”.**
- **Перевод слова “once”.**
- **Перевод существительных с суффиксами – tion, sion, ance, ence, ment и прилагательных с суффиксами al, ant, able, ous.**

Грамматические особенности.

- **Перевод модального глагола.**
- **Перевод инфинитива.**
- **Перевод субъектного инфинитивного оборота.**
- **Перевод объектного инфинитивного оборота.**

Практика перевода.

Текст Oil Exploration.

Лексические особенности перевода.

I. Переведите следующие интернациональные слова.

Geologist, organism, microorganism, seismology, magnetometer, seismometer, seismologist.

II. Переведите следующие словосочетания на русский язык, обращая внимание на перевод цепочки существительных.

Oil company, oil trap, surface features, soil types, core samples, surface rock, satellite images, shock waves, rock layers, vibration detectors, drill site, work space, access roads, water well, sedimentary layers, carbon-rich components, fine-grained shale, crude oil, natural gas, shallow drilling, to measure tiny changes, the smell of hydrocarbons, environmental impact studies, lease agreements, titles and right-of way accesses, off-shore sites, legal jurisdiction, drilling accessories, a large-diameter conductor pipe.

III. Переведите следующие имена существительные и подберите соответствующие глаголы.

Pressure, entrapment, finding, variety, travelling, settlement, equipment, location, drilling, evaluation, agreement.

IV. Переведите предложения, уделяя внимание переводу модальных глаголов.

1. They can use sensitive gravity meters to measure tiny changes in the Earth's gravitational field.
2. They can detect the smell of hydrocarbons.
3. It must be surveyed to determine its boundaries.
4. Environmental impact studies may be done.
5. There must be a source of water nearby.
6. Mud must be disposed outside.
7. Equipment may be transported to the site by truck.

Грамматические особенности перевода.

V. Выберите правильный вариант группы сказуемого.

1. There was little or no oxygen present.
 - Был маленький, или не был кислород.
 - Было мало или совсем не было кислорода.
 - Кислорода было мало или он совсем не присутствовал.
2. The task is to find the right conditions.
 - Задача состоит в том, найти необходимые условия.
 - Задание находит верные условия.
 - Была задача найти необходимые условия.
3. The readings are interpreted for signs of oil.
 - Показания обрабатываются, чтобы найти признаки нефти.
 - Показания были обработаны на признаки нефти.
 - Чтения были проведены по нефти.

VI. Переведите следующие предложения на русский язык, обращая внимание на перевод слова “once”.

Once: после того как; раньше; однажды; в своё время; в том случае, если.

Once again: снова, опять.

Once for all: раз и навсегда.

Once more: ещё раз.

At once: немедленно, тотчас.

1. Once the legal issues have been settled, the crew goes about preparing the land.
2. Once the land has been prepared, several holes must be dug.
3. Once the equipment is at the site, the rig is set up.
4. Once again they started drilling.
5. She agreed with pleasure to help me in the laboratory once a week for an hour.
6. Once he left school he worked in a mine.
7. Nokia is a once-popular brand of mobile phones.
8. Once I asked if I could take part in the experiment.

VII. Переведите следующие предложения обращая внимание на перевод слова «as»:

- союз – так как, поскольку;
- союз – по мере того, как;
- наречие – как;
- *as to (as for)* – чтобы, что касается.

1. As there was no mining machinery, the miners' work was very hard.
2. As for the origin of fossil fuels they are usually found in sedimentary rocks.
3. As a rule granite may occur in dykes.
4. As early as 1602 Galileo invented the Centigrade scale.
5. The gas cools as it flows through the generator.
6. In our experiments we took account of the main variables such as heat, pressure and specific weight.
7. As is known the chief sources of energy are oil, gas, coal, water power and atomic power.
8. He began to work as a mining engineer.
9. As to be sure of good results it is necessary to be attentive and exact.
10. As to the advantages of this method they leave no doubt.
11. This formula is not so simple as you think.

VIII. Переведите следующие предложения, определите функцию инфинитива.

To complete this work will not take much time.

Чтобы завершить эту работу не понадобится много времени.

1. To determine properties of a metal special machines are used.
2. To weld metals is possible by means of heat produced by current.
3. To produce angular acceleration, a torque must be applied to the body.
4. To prove this law experimentally is very difficult.
5. To find the state of a mass of a gas, we must know three things about it, namely, its volume, its pressure and its temperature.
6. The task is to find the right conditions for an oil trap.
7. It is necessary for an engineer to know the properties of engineering materials.

IX. Переведите следующие предложения на русский язык, обращая внимание на субъектный инфинитивный оборот.

1. Heat is known to be a form of energy.
2. Real water vapor and steam are known to be completely invisible.
3. The number of protons was assumed to be sufficient to account for the atomic weight.
4. The laser beam seems to have almost unlimited industrial possibilities.
5. These chemical changes prove to have been caused by heat.
6. The weather appears to be improving.
7. These two scientists happened to work at the same problem.

X. Переведите следующие предложения на русский язык, обращая внимание на объектный инфинитивный оборот.

1. Formerly one thought heat to be an invisible weightless fluid called “caloric”.
2. They consider the pressure to decrease as altitude increases.
3. We know gravity to act on every particle of a body.
4. Modern discoveries allow science and engineering to be developed rapidly.
5. These scientists believe to have discovered a new compound.
6. Attractive forces make molecules collide.
7. When the state of a body is such that it can do work, we know the body to possess energy.
8. We believe cybernetics to be an important branch of modern technology.

Практика перевода

XI. Переведите текст, обращая внимание на лексические и грамматические особенности перевода.

Oil Exploration

Oil is a fossil fuel that can be found in many countries around the world. In this section, we will discuss how oil is formed and how geologists find it.

Oil is formed from the remains of tiny plants and animals (plankton) that died in ancient seas between 10 million and 600 million years ago. After the organisms died, they sank into the sand and mud at the bottom of the sea.

Over the years, the organisms decayed in the sedimentary layers. In these layers, there was little or no oxygen present. So microorganisms broke the remains into carbon-rich compounds that formed organic layers. The organic material mixed with the sediments, forming fine-grained shale, or source rock. As new sedimentary layers were deposited, they exerted intense pressure and heat on the source rock. The heat and pressure distilled the organic material into crude oil and natural gas. The oil flowed from the source rock and accumulated in thicker, more porous limestone or sandstone, called reservoir rock. Movements in the Earth trapped the oil and natural gas in the reservoir rocks between layers of impermeable rock, or cap rock, such as granite or marble.

The task of finding oil is assigned to geologists, whether employed directly by an oil company or under contract from a private firm. Their task is to find the right conditions for an oil trap - the right source rock, reservoir rock and entrapment. Many years ago, geologists interpreted surface features, surface rock and soil types, and perhaps some small core samples obtained by shallow drilling. Modern oil geologists also examine surface rocks and terrain, with the additional help of satellite images. However, they also use a variety of other methods to find oil. They can use sensitive gravity meters to measure tiny changes in the Earth's

gravitational field that could indicate flowing oil, as well as sensitive magnetometers to measure tiny changes in the Earth's magnetic field caused by flowing oil. They can detect the smell of hydrocarbons using sensitive electronic noses called sniffers. Finally, and most commonly, they use seismology, creating shock waves that pass through hidden rock layers and interpreting the waves that are reflected back to the surface.

The shock waves travel beneath the surface of the Earth and are reflected back by the various rock layers. The reflections travel at different speeds depending upon the type or density of rock layers through which they must pass. The reflections of the shock waves are detected by sensitive microphones or vibration detectors -- hydrophones over water, seismometers over land. The readings are interpreted by seismologists for signs of oil and gas traps.

Once the site has been selected, it must be surveyed to determine its boundaries, and environmental impact studies may be done. Lease agreements, titles and right-of way accesses for the land must be obtained and evaluated legally. For off-shore sites, legal jurisdiction must be determined.

Once the legal issues have been settled, the crew goes about preparing the land. The land is cleared and leveled, and access roads may be built. Because water is used in drilling, there must be a source of water nearby. If there is no natural source, they drill a water well. They dig a reserve pit, which is used to dispose of rock cuttings and drilling mud during the drilling process, and line it with plastic to protect the environment. If the site is an ecologically sensitive area, such as a marsh or wilderness, then the cuttings and mud must be disposed offsite – trucked away instead of placed in a pit.

Once the land has been prepared, several holes must be dug to make way for the rig and the main hole. A rectangular pit, called a cellar, is dug around the location of the actual drilling hole. The cellar provides a work space around the hole, for the workers and drilling accessories. The crew then begins drilling the main hole, often with a small drill truck rather than the main rig. The first part of the hole is larger and shallower than the main portion, and is lined with a large-diameter conductor pipe. Additional holes are dug off to the side to temporarily store equipment - when these holes are finished, the rig equipment can be brought in and set up.

Depending upon the remoteness of the drill site and its access, equipment may be transported to the site by truck, helicopter or barge. Some rigs are built on ships or barges for work on inland water where there is no foundation to support a rig (as in marshes or lakes). Once the equipment is at the site, the rig is set up.

Unit VII

Лексические особенности перевода

- **Перевод слов** *other, another, the other.*
- **Перевод значений слов** *affect и effect.*
- **Перевод местоимений** *either, neither* **и союзов** *either ... or, neither ... nor.*

Грамматические особенности перевода

- **Перевод артиклей** *a (an), the.*
- **Перевод глагола** *do.*
- **Перевод глагола** *have.*
- **Перевод предложений, содержащих инверсию и эмфатические конструкции.**

Практика перевода

Текст *Inexhaustible Resources.*

Лексические особенности перевода

I. Переведите следующие предложения, обращая внимание на различие в употреблении слов *other, another, the other*.

1. For example, scientists' warn that even a limited nuclear war would darken the sky with smoke and other particulate matter, causing a marked drop in surface temperatures known as nuclear winter.
2. Another method was tried to find out the best solution.
3. Water is not destroyed by human uses, although it may be held for a time in combination with other chemicals.
4. The same seems to be true for the other applications.
5. We used different materials, some were useful, others failed to afford good results.
6. From the ocean the water is evaporated by solar energy and returned to the atmosphere, from which it again falls as rain or some other form of precipitation.
7. Another object of this paper is to examine the integrity of the latter method.

II. Переведите следующие предложения, обращая внимание на различие значений слов *affect* и *effect*.

1. That energy supply, however, depends on the condition of the atmosphere, which can be affected by human activities.
2. This problem may cause the developments that are likely to affect the environment.
3. The reconstruction was effected immediately.
4. All of these factors are affected by human activity and by the effects of this activity on other forms of life.
5. This is effected by weathering.
6. This is affected by weathering.
7. Some new policies should be adopted to reduce emissions of gases which cause the greenhouse effect.

III. Переведите следующие предложения, обращая внимание на значения местоимений *either, neither* и союзов *either ... or, neither ... nor*.

1. Either method can be used.
2. Neither of these rocks are important because they are poor in mineral deposits.
3. It was neither heat nor cold that had lead to the decomposition of rocks.
4. Lignite either in the raw state or in briquetted form, is a source of industrial carbon and industrial gases.
5. You can use a backhoe either to dig up hard, compact material or to lift heavy loads.
6. Neither could they find valuable minerals there.

Грамматические особенности перевода

IV. Переведите следующие предложения, обращая внимание на артикли *a (an), the* и их отсутствие.

1. Water may also be considered an inexhaustible resource because the total supply of water in the biosphere is not affected by human activities.
2. From the ocean the water is evaporated by solar energy and returned to the atmosphere, from which it again falls as rain or some other form of precipitation.
3. The supply of solar energy represents an inexhaustible resource in relation to human time scales, and it is not affected by human activities.

4. A layer of the gas ozone, for example, must be maintained in the upper atmosphere to screen out damaging ultraviolet light from the Sun.
5. The accumulation of toxic materials in the air must be kept to a minimum, and the concentration of solid and liquid particles in the atmosphere must not be allowed to reach a level that interferes with the flux of solar radiation.
6. The difference between the two factors is due to different methods of estimating.

V. Переведите следующие предложения, обращая внимание на функции глагола do.

1. Every force does its own job no matter how many other forces are acting.
2. In the 1980s, for example, wood fuel provided more of the energy used in the United States than did nuclear power.
3. Some minerals do not undergo changes by taking water in their molecules.
4. It is obvious that plants and organisms do affect the destruction of rocks.
5. Does water facilitate the decomposition of rocks?
6. Higher temperature does not necessarily mean faster growth. In general, however, it probably does.
7. We do not possess any accurate understanding of cause and effect. Nor do we know how to explain the system operation.

VI. Переведите следующие предложения, обращая внимание на функции глагола have.

1. New plants have been built in this region for the processing of ferrous and non-ferrous metals.
2. In certain locations, however, water has a much longer cycling time.
3. We still cannot say to have solved the problem.
4. You have to study the origin of fossils to understand their nature.
5. Petroleum is believed to have been formed from decaying vegetables and animal remains.
6. They had to introduce a new mining method in thick seams two years ago.
7. Recent experiments have produced conflicting results.

VII. Переведите следующие предложения, содержащие инверсию и эмфатические конструкции.

1. Only recently have we appreciated the potentialities of inexhaustible energy sources.
2. It was N. Chinakal who worked out the shield method of mining.
3. Important for this method is temperature.
4. Never does it lead to considerable changes.
5. It was this technique that failed to meet the requirements.
6. It did cause some difficulties.
7. Working under hard conditions were all the early geologists and mineralogists.
8. Had the coal supply stopped for a moment, serious damage might have resulted.

Практика перевода

IX. Переведите текст, обращая внимание на лексические и грамматические особенности перевода.

Inexhaustible Resources

Solar energy

The supply of solar energy represents an inexhaustible resource in relation to human time scales, and it is not affected by human activities. The potential lifetime of the Sun is in

hundreds of millions of years, barring cosmic accidents, and throughout its lifetime the amount of energy reaching the Earth from the Sun could be capable of meeting all human needs. That energy supply, however, depends on the condition of the atmosphere, which can be affected by human activities. For example, scientists' warn that even a limited nuclear war would darken the sky with smoke and other particulate matter, causing a marked drop in surface temperatures known as nuclear winter.

Solar energy can be captured directly, as in the space heating of buildings, the heating of fluids in solar collectors, or the conversion of that energy to electricity using photovoltaic cells. It can also be captured indirectly by powering the hydrologic cycle, thereby making solar "energy available as water power, or by photosynthesis, thereby converting solar energy stored in plant tissues. Plants, in turn, contribute biomass, which can be converted to alcohol fuels or burned directly to provide heat. In the 1980s, for example, wood fuel provided more of the energy used in the United States than did nuclear power. In developing countries, wood is often the major supplier of energy. In whatever form it is used, solar energy can be expected to play a growing role in meeting human energy needs.

Water

Water may also be considered an inexhaustible resource because the total supply of water in the biosphere is not affected by human activities. Water is not destroyed by human uses, although it may be held for a time in combination with other chemicals. To be useful, however, water must be in a particular place and of a certain quality, and so it must be regarded as a renewable, and often scarce, resource, with recycling times that depend on its location and use.

Water that falls from the atmosphere as various types of precipitation and then runs off the land surface to form streams and rivers that eventually reach the ocean generally operates on a one-year-renewable cycle known as the hydrologic cycle. From the ocean the water is evaporated by solar energy and returned to the atmosphere, from which it again falls as rain or some other form of precipitation. In certain locations, however, water has a much longer cycling time; after entering the ground from rainfall, it may percolate slowly through underground channels until it reaches underground reservoirs. In certain arid regions the total water supply may be underground water that accumulated during past ages, when the climate of the region was more humid. Since that time there may have been little or no addition to this supply because of the existing climatic conditions. Because its cycling time may be extremely long and dependent upon the frequency with which wet and dry climates alternate in a particular region, such a water resource can be virtually non-renewable.

Air

Air is also an inexhaustible resource in the sense that the uses made of it have little effect on its total quantity. The quality of air, however, as measured by its chemical composition or physical state, is subject to human interference. For life to exist on Earth there must be a proper balance among the nitrogen, oxygen, carbon dioxide, water vapour, and other components of the atmosphere. A layer of the gas ozone, for example, must be maintained in the upper atmosphere to screen out damaging ultraviolet light from the Sun. The accumulation of toxic materials in the air must be kept to a minimum, and the concentration of solid and liquid particles in the atmosphere must not be allowed to reach a level that interferes with the flux of solar radiation. All of these factors are affected by human activity and by the effects of this activity on other forms of life.

X. Сравните свой перевод абзаца текста с предложенным ниже вариантом. Найдите ошибки, допущенные при переводе. Отредактируйте перевод.

Вода, которая падает из атмосферы как различные типы осадков, затем покидает землю поверхности, чтобы формировать потоки и реки, которые в конечном счете достигают океана, обычно действует в одногодичном цикле, знакомом как гидрологический цикл.

Из океана, вода испарена солнечной энергией и возвращена в атмосферу, из которой она снова падает как дождь или некоторая другая форма осадков. В определенных местах, тем не менее, вода имеет значительно более длинное повторяющее время; после проникновения в землю из количества осадков она может просачиваться медленно через подземные каналы, пока не достигнет подземных резервуаров. В определенных сухих регионах общая водная поставка может быть подземной водой, которая накапливалась в течение прошлого возраста, когда климат региона был более влажным.

Unit VIII

Лексические особенности перевода

- Перевод словосочетаний
- Перевод интернациональных и псевдоинтернациональных слов
- Перевод разных значений слова *like*

Грамматические особенности перевода

- Перевод предлогов *by* и *with*
- Перевод инфинитива с различными функциями в предложении
- Перевод причастия и герундия с различными функциями в предложении

Практика перевода

Текст *What Is a Backhoe Loader?*

Лексические особенности перевода

I. Переведите следующие словосочетания (существительное + существительное)

a construction site
the backhoe operator
the tractor component
stabilizer legs

a backhoe tractor
construction equipment
the grouser shoe
a Caterpillar backhoe

II. Переведите следующие интернациональные и псевдоинтернациональные слова. Определите случаи расхождения значения слов – ложных друзей переводчика.

component	tractor	material
unique	operator	compact
typical	function	segment
operation	farmer	design
position	application	combination
effect	bucket	control
asphalt	construction	actually
version	object	specific

III. Переведите следующие предложения, обращая внимание на перевод слова *like* в зависимости от контекста.

1. Just like the tractors that farmers use in their fields, the backhoe tractor is designed to move easily over all kinds of rough terrain.
2. During the exploratory workings the signs of shale-like deposits were found.
3. He said he would like to participate at the conference next year.
4. You may use the loader like a big, powerful dustpan or coffee scoop.

5. The first ores of iron to be mined were deposits of galena and the like.

Грамматические особенности перевода

IV. Переведите следующие предложения с предлогом *by*.

1. It is obvious what a dump truck does just by looking at it.
2. The backhoe segments are connected by three joints, comparable to your wrist, elbow and shoulder.
3. The stability of a working tractor is achieved by employing the stabilizer legs.
4. Scientists predict that by the end of the century there will be no fossil fuels left.
5. **The average year temperature has been raised by 1.5 °C.**
6. The process of rock disintegration by the direct influence of local atmospheric conditions on the Earth's surface is called weathering.
7. Certain marine organisms accelerate the destruction of rocks by making holes in them to live in.

V. Переведите следующие предложения с предлогом *with*.

1. Soft rocks are easily penetrated with a tool and do not greatly resist the separation of a part from the mass.
2. The biosphere appears an arena of complex interactions among the essential natural cycles of its major constituents, with continuous fluxes of these constituents entering the biosphere, or being released by it.
3. With the succession of day and night the change in temperature takes place, which causes physical weathering.
4. This design also provides extra space for the bucket when the operator curls it in with a full load.
5. With the participation of oxygen and carbon dioxide up to 90 per cent of rocks is transformed into soluble minerals, which are carried away by the waters.
6. With all factors considered, we believe that the mechanism is the most suitable.

VI. Переведите следующие предложения, обращая внимание на инфинитив в функции а) обстоятельства цели, б) части сказуемого.

1. To use the backhoe, the operator has to park the tractor and turn the seat around.
2. **The stabilizer legs have two types of "shoes" so that they can be planted securely on both dirt and pavement.**
3. The loader is used to pick up and carry large amounts of loose material.
4. The loader can also smooth things over and push dirt like a plow.
5. Sometimes backhoe cabs have an open canopy structure to give the operator protection.

VII. Переведите следующие предложения, обращая внимание на перевод причастий и герундия.

1. The tractor has a powerful turbocharged diesel engine, large rugged tires and a cab with basic steering control.
2. The tractor component is for moving the loader and backhoe from place to place.
3. The stabilizers keep the tractor steady, minimizing the jostling effect of digging with a backhoe.
4. The operator controls the loader while driving the tractor.
5. When using a loader, the operator also maneuvers the tractor component.
6. Each piece of equipment is suiting to a particular sort of work.

7. A backhoe loader is three pieces of construction equipment combined into one unit.
8. The most common application for a backhoe loader is digging a trench with the backhoe and then back-filling it with the loader.

Практика перевода

VIII. Переведите текст, обращая внимание на лексические и грамматические особенности перевода.

What Is a Backhoe Loader?

Backhoe loaders have a very unique appearance -- they have components sticking out every which way. It's obvious what a dump truck does just by looking at it; but what are the different appendages of a backhoe used for?

A backhoe loader is an interesting invention because it is actually three pieces of construction equipment combined into one unit. A backhoe loader are a tractor, a loader and a backhoe.

Each piece of equipment is suited to a particular sort of work. On a typical construction site, the backhoe operator usually uses all three components to get the job done.

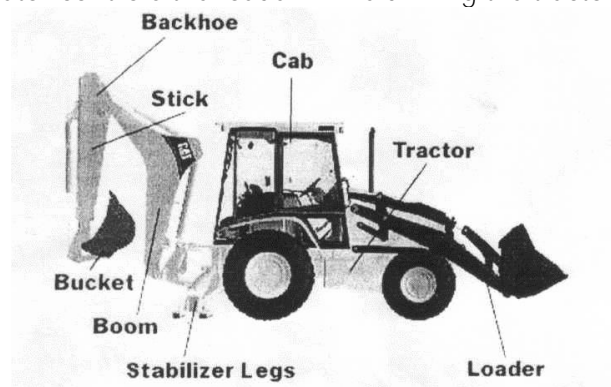
The core structure of a backhoe loader is the tractor. Just like the tractors that farmers use in their fields, the backhoe tractor is designed to move easily over all kinds of rough terrain. It has a powerful, turbocharged diesel engine, large, rugged tires and a cab with basic steering controls (a steering wheel, brakes, etc.). Backhoe cabs are either completely enclosed or have an open canopy structure to give the operator protection.

The loader is attached in the front and the backhoe is attached in the back. These two components serve very different functions.

The loader can do several different things. In many applications, you use it like a big, powerful dustpan or coffee scoop. You usually don't dig with it; you mostly use it to pick up and carry large amounts of loose material. It's also used to smooth things over like a butter knife, or to push dirt like a plow. The operator controls the loader while driving the tractor.

The backhoe is the main tool of the backhoe loader. It's used to dig up hard, compact material usually earth, or to lift heavy loads such as a sewer box. It can lift the material and drop it in a pile to the side of the hole.

Basically, the backhoe is a big, extremely powerful version of your arm or finger. It has three segments: the boom, the stick, the bucket.



This arrangement is very similar to your arm. Your arm has three segments -- your upper arm, forearm and hand.

The backhoe segments are connected by three joints, comparable to your wrist, elbow and shoulder. The backhoe moves in pretty much the same way as your arm. In a **Caterpillar® backhoe, the boom is bent upward to make it easier to dig with obstacles in the way.** This design also provides extra space for the bucket when the operator curls it in with a full load.

The backhoe can dig all sorts of holes, but is especially suited for digging ditches. To use the backhoe, the operator has to park the tractor and turn the seat around.

So what do the tractor, loader and backhoe have to do with each other? The tractor

component is for moving the other two components from place to place, and the operator also maneuvers it when using the loader. The loader and backhoe components are a natural combination for all sorts of jobs. When you dig up a lot of dirt to make a ditch or any other sort of hole, you generally need a loader to either move the dirt out of the area or to fill the dirt back in once you've got the pipes, power lines, etc. in position. The most common application for a backhoe loader is this basic job -- digging a trench with the backhoe and then back-filling it with the loader.

The other appendages you'll typically notice on a backhoe loader are the two stabilizer legs just behind the rear wheels. These legs are crucial to backhoe operation because they take the brunt of the weight when a backhoe is digging. Without the stabilizer legs, the weight of a heavy load or the downward force of digging into the ground would strain the wheels and tires, and the whole tractor would bounce constantly. The stabilizers keep the tractor steady, minimizing the jostling effect of digging with the backhoe. They also secure the tractor so that it won't slip into the ditch or hole. The stabilizer legs have two types of "shoes," so that they can be planted securely on both dirt and pavement. The grouser shoe side digs into the dirt for a better grip, but would tear up the pavement if you were to use it on a road. For a good grip on asphalt, the operator simply flips the rubber-padded shoe into position.

X. Сравните свой перевод абзаца текста с предложенным ниже вариантом. Найдите ошибки, допущенные при переводе. Отредактируйте перевод.

Так что же трактор, погрузчик и канавокопатель делают друг с другом? Трактор служит для движения других двух компонентов с места на место, и оператор также маневрирует им, когда использует погрузчик. Погрузчик и канавокопатель—это натуральная комбинация для всех сортов работ. Когда вы выкапываете много земли, чтобы сделать канаву или другую яму, вам нужен погрузчик, чтобы убрать землю с этого места или засыпать землю обратно после того, как вы уложили трубы или кабель. Самое обычное применение экскаватора -- вот такая основная работа—копать окоп ковшем и засыпать погрузчиком.

Unit IX

- **Реферативный и аннотационный перевод.**
- **Пример реферативного перевода.**
- **Пример аннотационного перевода.**
- **Упражнения.**

Реферативный перевод

Реферативный перевод является сокращенным вариантом полного письменного перевода. Суть этого способа перевода состоит в выборе ключевых частей исходного текста и их полном переводе, все остальные компоненты исходного текста отбрасываются как второстепенные и не подлежат переводу вообще. Как правило, реферативный перевод короче оригинала в несколько раз.

Выполнение реферативного перевода состоит из следующих этапов:

1. Предварительное знакомство с исходным текстом, определение данной области и ее терминологией. Внимательное чтение всего текста.
2. Определение ключевых частей текста и исключение его второстепенных частей.
3. Чтение исходного текста без исключенных частей.

4. Полный письменный перевод выбранных частей, которые должны представлять собой связный текст.

Если в исходном тексте есть рисунки, чертежи, таблицы, то необходимо выбрать наиболее важные и объяснить их в переводе.

Аннотационный перевод

Аннотационный перевод—это вид технического перевода, заключающийся в составлении аннотации оригинала на другом языке. Аннотация—это короткая, сжатая характеристика содержания и перечень основных вопросов книги, статьи. Для того чтобы сделать аннотационный перевод, необходимо прочитать книгу или статью, составить план, затем сформулировать основные положения, перечислить основные вопросы. Стиль аннотационного перевода книги или статьи отличается свободным переводом, т.е. дается главная характеристика оригинала. Для структуры аннотации характерны следующие составные части:

1. Вводная часть, обязательно включающая название работы (оригинала) на языке перевода и название статьи на языке оригинала (можно в скобках), фамилию и имя автора.
2. Описательная часть, называющая тему и содержащая перечень основных положений оригинала или предельно сжатую характеристику материала.
3. Заключительная часть, подытоживающая изложение автора первоисточника.

Пример реферативного перевода.

<p style="text-align: center;">Making waves</p> <p>When a sudden break or shift occurs in the earth's crust, the energy radiates out as seismic waves, just as the energy from a disturbance in a body of water radiates out in wave form. In every earthquake, there are several different types of seismic waves.</p> <p>Body waves move through the inner part of the earth, while surface waves travel over the surface of the earth. Surface waves -- sometimes called long waves, or simply L waves - are responsible for most of the damage associated with earthquakes, because they cause the most intense vibrations. Surface waves stem from body waves that reach the surface.</p> <p>There are two main types of body waves.</p> <ul style="list-style-type: none"> • Primary waves, also called P waves or compressional waves, travel about 1 to 5 miles per second (1.6 to 8 kps), depending on the material they're moving through. This speed is greater than the speed of other waves so P waves arrive first at any surface location. They can travel through solid, liquid and gas, and so will pass completely through the body of the earth. As they travel through rock, the waves move tiny rock particles back and forth -- pushing them apart and then back together -- in line with the direction the wave is traveling. These waves typically arrive at the surface as an 	<p style="text-align: center;">Сейсмические волны</p> <p>Когда в земной коре происходит разлом или сдвиг, то образованная энергия распространяется в виде сейсмических волн. В любом землетрясении присутствуют разные виды этих волн.</p> <p>Объемные волны проходят через внутреннюю часть земли, тогда как поверхностные волны – по ее поверхности.</p> <p>Существует два вида объемных волн.</p> <p>Первичные волны двигаются со скоростью 1-5 миль в секунду (1,6-8 км/с), в зависимости от материала, через который они проходят. Волны этого вида способны перемещаться через твердое тело, жидкость и газ и поэтому могут пройти через всю землю. Вторичные волны двигаются с меньшей скоростью. Они могут проходить только через твердое тело, поэтому останавливаются в жидких слоях ядра земли.</p>
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abrupt thud.

- Secondary waves, also called S waves or shear waves, lag a little behind the P waves. As these waves move, they displace rock particles outward, pushing them perpendicular to the path of the waves. This results in the first period of rolling associated with earthquakes. Unlike P waves, S waves don't move straight through the earth. They only travel through solid material, and so are stopped at the liquid layer in the earth's core.

Both sorts of body waves do travel around the earth, however, and can be detected on the opposite side of the planet from the point where the earthquake began. At any given moment, there are a number of very faint seismic waves moving all around the planet.

Surface waves are something like the waves in a body of water -- they move the surface of the earth up and down. This generally causes the worst damage because the wave motion rocks the foundations of manmade structures. L waves are the slowest moving of all waves, so the most intense shaking usually comes at the end of an earthquake.

Оба вида объемных волн перемещаются по всей земле, и их можно определить с противоположной стороны от места начала землетрясения.

Поверхностные волны двигают поверхность земли вверх-вниз, что и вызывает самые большие разрушения, так как движение волн раскачивает фундаменты зданий и сооружений. Эти волны самые медленные, поэтому самые интенсивные колебания обычно возникают в конце землетрясения.

Пример аннотационного перевода описательной части.

Аннотация

В данной статье (Making Waves) рассматриваются виды сейсмических волн при землетрясении. Изложены их свойства и характеристики, места возникновения и способы перемещения.

Статья рассчитана на широкий круг читателей, которые интересуются сейсмическими волнами.

1. Выполните реферативный и аннотационный перевод следующего текста, соблюдая требования, предъявляемые к данному виду перевода.

Types of natural resources

In classifying natural resources it has been traditional to distinguish between those that are renewable and those that are non-renewable. The former were once considered to be the living resources—e.g., forests, wildlife and the like — because of their ability to regenerate through reproduction. The latter were considered to be nonliving mineral or fuel resources, which, once used, did not replace themselves.

The most clearly recognizable renewable resources are those consisting of, or produced by, living things. Agricultural crops, animal forage, forest crops, wild and domestic animals—all can continue to reproduce and regenerate their populations as long as environmental conditions remain favourable and an adequate seed source, or breeding stock is maintained.

Renewable resources include resources with widely different cycling times, some so long as to make the resources essentially non-renewable. Fossil and nuclear fuels and

minerals also exhibit a wide range of properties that affect their management. Fossil fuels, such as coal and petroleum, are the least renewable of such resources because they are effectively exhausted by use and because their rate of formation is exceedingly slow. Most minerals, on the other hand, are not destroyed by use; thus, in a sense, they are renewable and inexhaustible because they can be recycled for further use. But useful supplies of these minerals in accessible locations are exhaustible, and thus they are non-renewable for human purposes.

Unit X

Лексические особенности.

- **Перевод однокоренных слов.**
- **Перевод слова “for”.**
- **Перевод предлога “since”.**
- **Перевод значений слов *affect* и *effect*.**
- **Перевод значений слов *charge* и *change*.**
- **Перевод слова “but”**

Грамматические особенности перевода.

- **Перевод причастия II.**
- **Перевод герундия.**
- **Перевод глаголов в страдательном залоге.**

Практика перевода

Текст Drilling.

Лексические особенности перевода.

I. Переведите следующие однокоренные слова и определите какой частью речи они являются. Обратите внимание на случаи изменения корневой гласной.

1. Able – to enable – unable – ability.
2. Accuracy – accurate – inaccurate.
3. To connect – connection – to disconnect.
4. To alter – alternative – alternation – alternating.
5. To impress – impressive – impression – unimpressive.
6. To apply – application – applicable – inapplicable.
7. Certain – certainly – certainty – uncertain.
8. Simple – simplicity – simplify – simplification.
9. Frequent – frequency – frequently.
10. Deep – depth – deepen.
11. Long – length – lengthen.
12. Strong – strength – strengthen.
13. Wide – width – widen.
14. Hard – hardness – harden.

II. Переведите следующие предложения. Обратите внимание на перевод двух глаголов: to change – to charge.

1. Under the action of pressure and high temperature rocks change their composition and structure.
2. Many minerals undergo changes.
3. It was proved that lightning is a discharge of electricity.
4. Static charges are known to be at rest.
5. Alternating current changes its direction many times a second.

6. We know the electric charges to be positive and negative.

7. One can charge dissimilar objects by rubbing them.

III. Переведите следующие предложения. Обратите внимание на перевод двух глаголов:

to affect **и** to effect.

1. It had no effect on the hardness of steel.

2. The use of metals is affected by the available ore resources.

3. The question now arises as how the behaviour of metals is affected by the changes in temperature.

4. The charge of an atom is not affected by the number of neutrons present, but depends on the balance between electrons and protons.

5. The concentration of the reactants appeared to have little effect on the amount of sulfate.

6. It is not now known whether the impurities have affected the mechanical properties of the alloys.

7. The effect is highly dependent on frequency with the lower frequencies showing less noise.

IV. Переведите следующие предложения обращая внимание на слово «since»:

Since: так как; с тех пор; со времени, после того.

Since then: с этого времени.

Ever since: с этих пор, с тех пор как.

1. Since the conversion to electricity the main aim of railways was to widen the railway network.

2. The weight of an atom depends almost entirely on the number of protons and neutrons it contains, since the electrons are so light that contribute but little to atomic weight.

3. Since heat and work are convertible, the most important thing to know about any device for this purpose is its efficiency.

4. The physical properties of plasma have been a problem since the discovery of that state of matter.

5. Since the steam gives up its heat energy to drive the turbine its temperature and pressure fall.

6. I worked at the power plant last year and I have not been there since.

7. Automatic control in the simplest form has been known since the beginning of the steam age.

8. Silver is the best known conductor since it offers the least resistance to the current flow.

9. Since the release of the potential energy of the atomic nucleus, we have entered the atomic age.

10. There is no flow of electrons since the electric circuit was broken.

V. Переведите следующие предложения на русский язык, обращая внимание на перевод слова “but”.

But – но, лишь, только, кроме, за исключением.

1. There is but little information about this new element.

2. The air is known to be warmed by the sun but not directly by **the sun’s rays**.

3. Nothing but a double row of ball bearings can improve the machine.

4. All the students but one worked independently.

5. But for the atmosphere, life on the Earth would be impossible.
6. An electron seems to be nothing but electricity.

Грамматические особенности перевода.

VI. Переведите предложения, обратите внимание на функции причастия II.

1. A device, called a packer is run down the outside of the tubing.
2. It is expanded to form a seal around the outside of the tubing.
3. Once they have reached the final depth, the crew completed the well, to allow oil to flow into the casing in a controlled manner.
4. **Things done can't be undone.**
5. Once the well is completed, they must start the flow of oil into the well.
6. When burnt, coal produces heat.
7. Metals do not melt until heated to a definite temperature.
8. The product obtained is used in industry.
9. Exposed igneous rocks are numerous in mountain zones.

VII. Переведите следующие предложения, обратите внимание на перевод герундия.

1. Drilling continues in stages.
2. Core samples means taking samples of rock to look for characteristics of reservoir rock.
3. The first stage in writing is producing ideas.
4. **There's no crying over spilt milk.** I remember your having objected to the use of this gas.
5. He insisted on the modern mining equipment being used.
6. Is there any possibility of their finding other sources of energy?
7. The problem of extracting geothermal energy is under consideration.
8. On re-utilizing the wastes it will be possible to make the extractive industries more efficient.
9. Brown coal and lignite are used for producing coke and chemical products.
10. Geologists have got good results in prospecting for mineral resources in the sea.
11. Charcoal is used for producing high grades of cast iron.
12. Coke is formed in the process of heating certain grades coal in the absence of air.

VIII. Переведите на русский язык следующие предложения со сказуемым в страдательном залоге.

1. Oil is formed from the remains of tiny plants and animals.
2. The readings are interpreted by seismologists.
3. Additional holes are dug.
4. The waves are reflected back to the surface.
5. The land is cleared and leveled.
6. Some rigs are built on ships or barges.
7. The rig is set up.
8. Because water is used in drilling they drill a water well.
9. Heat was transformed into work.
10. A new device is being designed now.

IX. Переведите следующие предложения, обращая внимание на глагол в страдательном залоге с послелогом.

1. The lecturer was listened to with great attention.
2. The equipment was sent for.
3. Care should be taken of this device.
4. Students are provided with hostels, well-equipped laboratories and libraries.
5. **What has been and is being done in environment protection can't be measured by yesterday's standards.**
6. We hoped to be sent with that expedition.
7. Your invention was much spoken about.
8. The body may be acted on by any number of external forces.
9. The resistance of a given conductor depends on the material it is made of.
10. The theory is based on these experiments.
11. New data were obtained by him.
12. All natural phenomena are governed by the law of conservation of energy.
13. Power stations are equipped with new machines.
14. He was particularly interested in theoretical geology.
15. Much attention is paid to mineral economics for evaluation of mineral deposits.
16. His works are devoted to localization, liquidation and prevention of underground fires.

X. Переведите следующие предложения, обращая внимание на слово "for".

for – союз "либо", "так как",

for – предлог

1. "из-за", "по причине",
2. "для", "за", "в качестве",
3. "в случае", "в течении".

1. Two hours are sufficient for the reaction to occur.
2. A mechanical method was substituted for an electric one.
3. It is usual for any device to be preceded by other related devices.
4. For the sake of clarity the reactions have been separated as steps.
5. For the best accuracy the carriage should be as light as possible.
6. The device has been designed for two months already.
7. It takes longer for the reaction to complete at low temperatures.
8. For the reason discussed above that metal had no effect on the hardness of steel.

Практика перевода

XI. Переведите текст, обращая внимание на лексические и грамматические особенности перевода.

Drilling.

The crew sets up the rig and starts the drilling operations. First, from the starter hole, they drill a surface hole down to a pre-set depth, which is somewhere above where they think the oil trap is located. There are five basic steps to drilling the surface hole:

- 1 Place the drill bit, collar and drill pipe in the hole
- 2 Attach the kelly and turntable and begin drilling.
3. As drilling progresses, circulate mud through the pipe and out of the bit to float the rock cuttings out of the hole
- 4 Add new sections (joints) of drill pipes as the hole gets deeper.

5 Remove (trip out) the drill pipe, collar and bit when the pre-set depth (anywhere from a few hundred to a couple-thousand feet) is reached.

Once they reach the pre-set depth, they must run and cement the casing -- place casing-pipe sections into the hole to prevent it from collapsing in on itself. The casing pipe has spacers around the outside to keep it centered in the hole.

The casing crew puts the casing pipe in the hole. The cement crew pumps cement down the casing pipe using a bottom plug, a cement slurry, a top plug and drill mud. The pressure from the drill mud causes the cement slurry to move through the casing and fill the space between the outside of the casing and the hole. Finally, the cement is allowed to harden and then tested for such properties as hardness, alignment and a proper seal.

Drilling continues in stages. They drill, then run and cement new casings, then drill again. When the rock cuttings from the mud reveal the oil sand from the reservoir rock, they may have reached the final depth. At this point, they remove the drilling apparatus from the hole and perform several tests to confirm this finding:

- Well logging - lowering electrical and gas sensors into the hole to take measurements of the rock formations there.
- Drill-stem testing - lowering a device into the hole to measure the pressures, which will reveal whether reservoir rock has been reached.
- Core samples - taking samples of rock to look for characteristics of reservoir rock.

Once they have reached the final depth, the crew completes the well to allow oil to flow into the casing in a controlled manner. First, they lower a perforating gun into the well to the production depth. The gun has explosive charges to create holes in the casing through which oil can flow. After the casing has been perforated, they run a small-diameter pipe (tubing) into the hole as a conduit for oil and gas to flow up the well. A device called a packer is run down the outside of the tubing. When the packer is set at the production level, it is expanded to form a seal around the outside of the tubing. Finally, they connect a multi-valved structure called a Christmas tree to the top of the tubing and cement it to the top of the casing. The Christmas tree allows them to control the flow of oil from the well.

Once the well is completed, they must start the flow of oil into the well. For limestone reservoir rock, acid is pumped down the well and out the perforations. The acid dissolves channels in the limestone that lead oil into the well. For sandstone reservoir rock, a specially blended fluid containing proppants (sand, walnut shells, aluminum pellets) is pumped down the well and out the perforations. The pressure from this fluid makes small fractures in the sandstone that allow oil to flow into the well, while the proppants hold these fractures open. Once the oil is flowing, the oil rig is removed from the site and production equipment is set up to extract the oil from the well.

After the rig is removed, a pump is placed on the well head.

In the pump system an electric motor drives a gear box that moves a lever. The lever pushes and pulls a polishing rod up and down. The polishing rod is attached to a sucker rod, which is attached to a pump. This system forces the pump up and down, creating a suction that draws oil up through the well.

In some cases the oil may be too heavy to flow. A second hole is then drilled into the reservoir and steam is injected under pressure. The heat from the steam thins the oil in the reservoir, and the pressure helps push it up the well. This process is called enhanced oil recovery.

With all of this oil-drilling technology in use, and new methods in development, the question remains: Will we have enough oil to meet our needs? Current estimates suggest that we have enough oil for about 63 to 95 years to come, based on current and future finds and present demands.

PART II

Text 1

Surface mining

Surface mining is a type of mining used to extract deposits of mineral resources that are close to the surface. In most forms of surface mining, heavy equipment, such as earthmovers, first remove the overburden (the soil and rock above the deposit). Next, huge machines such as dragline excavators extract the mineral. Surface mining generally leaves large devastated areas called spoil banks (unless the land is recovered). Since surface mining by its nature removes overlying landscapes, it has a heavy negative effect on local ecosystems and the environment. There are four main forms of surface mining.

Types of surface mining. Strip mining is the practice of mining a seam of mineral ore by first removing all of the soil and rock that lies on top of it (the overburden). It is similar to open-pit mining in many regards. Strip mining is also used to extract the oil-impregnated sand in the Athabasca Tar Sands.

Strip mining is only practical when the ore body to be excavated is relatively near the surface. Since colossal quantities of material often need to be removed, the excavating machinery used in strip mining is often among the largest such equipment ever constructed; drag line excavators and bucket-wheel excavators are common examples. There are two forms of strip mining; area strip mining, which is used on fairly flat terrain, to extract deposits over a large area. Contour strip mining, usually used in hilly terrain, involves cutting terraces in mountainsides following the contour of the land.

Open-pit mining refers to a method of extracting rock or minerals from the earth by their removal from an open pit or borrow. The term is used to differentiate this form of mining from extractive methods that require tunneling into the earth. Open-pit mines are used when deposits of commercially useful minerals or rock are found near the surface; that is, where the overburden (surface material covering the valuable deposit) is relatively thin or the material of interest is structurally unsuitable for tunneling (as would be the case for sand, cinder, and gravel). Where minerals occur deep below the surface—where the overburden is thick or the mineral occurs as veins in hard rock—underground mining methods are used to extract the valued material. Open-pit mines are typically enlarged until the mineral reserve is exhausted.

Mountaintop removal (MTR) is a relatively new form of coal mining that involves the mass restructuring of earth in order to reach sediment as deep as 1,000 feet below the surface. Mountaintop removal requires that the targeted land be first clear-cut and then leveled by explosives.

Dredging is a method often used to bring up underwater mineral deposits. Although dredging is usually employed to clear or enlarge waterways for boats, it can also recover significant amounts of underwater minerals relatively efficiently and cheaply.

Text 2

Coal mining

Coal mining is the extraction of coal from the Earth for use as fuel.

Methods of extraction. The most economical of methods of coal extraction from coal seams depends on the depth and quality of the seams, and also the geology and environmental factors of the area being mined.

If the coal seams are near the surface, the coal is extracted by strip mining. Strip mining exposes the coal by the advancement of an open pit or strip. As the coal is exposed

and extracted, the overburden from the still covered coal fills the former pit, and the strip progresses. Most open cast mines in the USA extract bituminous coal. In South Wales open casting for steam coal and anthracite is practised.

Most coal seams are too deep underground for open cast mining. In deep mining, the room and pillar method progresses along the *Mammoth coal vein* seam, while pillars and timber are left standing to support the coal mine roof. A most dangerous method of operation in deep mining and is known as *robbing the pillars*. This is where miners attempt to remove and/or retreat between the timbers in order to get coal out of the main coal seam, allowing the roof to cave in. This method of mining is used principally in the United States and has contributed to many fatalities in the early history of coal mining.

Longwall mining is conducted along the seam with the use of self-advancing hydraulic roof supports known as "chocks" or "shields". These supports are placed in a line (up to 400 metres long), known as a "longwall" and as coal is removed from in front of the longwall, the supports are advanced. As the longwall advances, the cavity created behind the longwall known as the goaf caves in. Longwall mining is the principle method of underground mining in Australia.

Highwall mining is a form of coal mining in which a continuous miner is controlled remotely from outside the mine, and is guided along the seam straight back drilling holes in excess of 500 feet. A highwall is the unexcavated face of exposed overburden and coal in a surface mine. As the coal is sheared off the face of the seam, it falls below to a conveyor belt that transports the coal to the surface. A large amount of capital is required to purchase a highwall mining unit, but the labor costs are low because an operation does not require a full crew

Highwall auger mining is generally applied in an open cast mine, once open cut mining becomes uneconomic. Mountaintop removal levels the land with explosives. Then the overburden (the mountain) is pushed into a nearby valley or hollow. The coal is transported to a processing plant where it is washed. The waste from this process is stored in earthen dams containing millions of gallons of slurry.

Text 3

The history of technology

The history of technology is at least as old as humanity. Some primitive forms of tools have been discovered with almost every find of ancient human remains. Nevertheless, other animals have been found to use tools—and to learn to use and refine tools—so it is incorrect to distinguish humans as the only tool-using or tool-making animal. The history of technology follows a progression from simple tools and simple (mostly human) energy sources to complex high-technology tools and energy sources.

The earliest technologies converted readily occurring natural resources (such as rock, wood and other vegetation, bone and other animal byproducts) into simple tools. The use, and then mastery, of fire was a turning point in the technological evolution of humankind, affording a simple energy source with many profound uses. Perhaps the first use of fire beyond providing heat was the preparation of food. This enabled a significant increase in the vegetable and animal sources of food. The use of fire extended the capability for the treatment of natural resources and allowed the use of natural resources that require heat to be useful. Wood and charcoal were among the first materials used as a fuel. Wood, clay, and rock (such as limestone), were among the earliest materials shaped or treated by fire, for making artifacts such as weapons, pottery, bricks, and cement. Continuing improvements led to the furnace and bellows and provided the ability to smelt and forge native metals (naturally occurring in relatively pure form). Gold, copper, silver, and lead, were such early metals. The advantages

of copper tools over stone, bone, and wooden tools were quickly apparent to early humans. Eventually, the working of metals led to the discovery of alloys such as bronze and brass.

Meanwhile, humans were learning to harness other forms of energy. The earliest known use of wind power is the sailboat.

From prehistoric times, Egyptians probably used "the power of the Nile" annual floods to irrigate their lands, gradually learning to regulate much of it through purposely built irrigation channels. Similarly, the early peoples of Mesopotamia, the Sumerians, learned to use the Tigris and Euphrates rivers for much the same purposes. But more extensive use of wind and water (and even human) power required another invention.

It is still a mystery as to who invented the wheel and when and why it was invented. According to some archaeologists, it was probably originally invented about 8000 B.C. The wheel was almost certainly independently invented in Mesopotamia — present-day Iraq. It didn't take long to discover that wheeled wagons could be used to carry heavy loads. But it was the use of the wheel as a transformer of energy (through water wheels and windmills and even treadmills) that revolutionized the application of nonhuman power sources.

As tools increase in complexity, so does the type of knowledge needed to support them. Complex modern machines require libraries of written technical manuals of collected information that has continually increased and improved — their designers, builders, maintainers, and users often require the mastery of decades of sophisticated general and specific training.

Text 4

Ecology

Ecology, or ecological science, is the scientific study of the distribution and abundance of living organisms and how these properties are affected by interactions between the organisms and their environment. The environment of an organism includes both the physical properties, which can be described as the sum of local factors like solar insolation, climate and geology, as well as the other organisms that share its habitat. The term oekologie was coined in 1866 by the German biologist Ernst Haeckel; the word is derived from the Greek oikos - "household" and logos - "study"; therefore "ecology" means the "study of the household [of nature]".

Ecology is usually considered a branch of biology, the general science that studies living organisms. Organisms can be studied at many different levels, from proteins and nucleic acids (in biochemistry and molecular biology), to cells (in cellular biology), to individuals (in botany, zoology, and other similar disciplines), and finally at the level of populations, communities, and ecosystems, to the biosphere as a whole. Ecology is a multi-disciplinary science. Because of its focus on the higher levels of the organization of life on earth and on the interrelations between organisms and their environment, ecology draws heavily on many other branches of science, especially geology and geography, meteorology, chemistry, and physics.

As a scientific discipline, ecology does not dictate what is "right" or "wrong". However, ecological knowledge such as population dynamics have provided a scientific basis for expressing the goals of environmentalism and evaluating its goals and policies. Additionally, a holistic view of nature is stressed in both ecology and environmentalism.

Text 5

Ecological crisis

Generally, an ecological crisis occurs when the environment of a species or a population evolves in a way unfavourable to that species survival.

It may be after a change in an ecological factor (for example, an increase of temperature, less significant rainfalls). It may be due to an increased pressure of predation (for example overfishing). Lastly, it may be that the situation becomes unfavourable to the quality of life of the species (or the population) due to a rise in the number of individuals (overpopulation).

Ecological crises may be more or less brutal (occurring within a few months or taking as long as a few million years). Lastly, an ecological crisis may be local or global (a rise in the sea level due to global warming).

A local crisis will have more or less significant consequences, from the death of many individuals to the total extinction of a species. Whatever its origin, disappearance of one or several species often will involve changes in the food chain, further impacting the survival of other species.

In the case of a global crisis, the consequences can be much more significant; some extinction events showed the disappearance of more than 90% of existing species at that time. However, it should be noted that the disappearance of certain species, such as the dinosaurs, allowed the development of the mammals.

During the past decades, the increasing responsibility of humanity in some ecological crises has been clearly observed. Due to the increases in technology and a rapidly increasing population, humans have more influence on their own environment than any other ecosystem engineer.

Text 6

Mining engineering

Mining Engineering is a field that involves many of the other engineering disciplines as applied to extracting and processing minerals from a naturally occurring environment.

The need for mineral extraction and production is an essential activity of any technically proficient society. As minerals are produced from within a naturally occurring environment, there is some disturbance of the environment as a result of mineral production. Modern mining engineers must therefore be concerned not only with the production and processing of minerals, but also with the decrease of damage or changes to an environment as a result of that production and processing.

The two primary types of mine are underground mines and open-pit mines. Minerals that exist mostly underground (eg. coal, gold etc.) are generally recovered using the underground mining process. Minerals like iron ore, limestone, etc. are mostly recovered from the surface downwards in opencast mining.

Mineral prospecting. Mining operations start only after geophysical survey. A geological survey will develop a projection of the size and purity of an ore deposit. Based on these projections, more detailed studies may be ordered. This is known as detailed prospecting. Prospecting is the act of searching for mineral, ore, or fuel deposits, typically oil, coal, iron, uranium, and other materials used extensively in modern industry. Prospecting can be undertaken by individuals (prospectors) or corporations. Prospecting includes geological mapping, rock assay analysis, and sometimes the intuition of the prospector.

Instruments play a large role in gathering geological data. Instruments can check for variations in gravity, magnetism, electromagnetism and a number of different other variables in a certain area.

Text 7

Petroleum

Petroleum (from Greek *petra* – rock and *elaion* – oil or Latin *oleum* – oil) sometimes colloquially called black gold, is a thick, dark brown liquid. Petroleum exists in the upper strata of some areas of the Earth's crust. It consists of a complex mixture of various hydrocarbons, largely of the alkane series, but may differ greatly in appearance and composition. Petroleum is used mostly for producing fuel oil and gasoline (petrol), both important "primary energy" sources. Petroleum is also the raw material for many chemical products, including solvents and plastics. 88% of all petroleum extracted is processed as fuel; the other 12% is converted into other materials such as plastic. Since petroleum is a non-renewable resource, many people are worried about the consequences of its depletion

The first oil wells were drilled in China in the 4th century or earlier. They had depths of up to 243 meters and were drilled using bits attached to bamboo poles.

In the 8th century, the streets of the newly constructed Baghdad were paved with tar (**смазаны дегтем**), derived from easily accessible petroleum from natural fields in the region. The modern history of petroleum began in 1846, with the discovery of the process of refining kerosene from coal. At that time Baku produced about 90% of the world's oil. The first modern oil well was drilled in 1848 by Russian engineer F.N. Semyonov, on the Aspheron Peninsula north-east of Baku. The first commercial oil well drilled in North America was in Oil Springs, Ontario, Canada in 1858, dug by James Miller Williams. The American petroleum industry began with Edwin Drake's discovery of oil in 1859, near Titusville, Pennsylvania. By 1910, significant oil fields had been discovered in Canada, Persia, Peru, Venezuela, and Mexico, and were being developed at an industrial level.

Today, about 90% of fuel needs are met by oil. Access to it was a major factor in several military conflicts, including World War II and the Persian Gulf War.

Text 8

Rock

Rock is a naturally occurring group of minerals. Rocks are classified by mineral and chemical composition; the texture of the constituent particles; and also by the processes that formed them. These indicators separate rocks into igneous, sedimentary, and metamorphic.

Igneous rocks are formed from magma and are divided into two main categories: plutonic rock and volcanic. Plutonic or intrusive rocks result when magma cools and crystallises slowly within the Earth's crust, while volcanic or extrusive rocks result from magma reaching the surface as lava. Intrusive igneous rocks usually take a few thousand years to cool whereas extrusive igneous rocks take only a few days or weeks to cool and solidify.

Sedimentary rocks are formed by deposition of organic or chemical matter, followed by cementation. This can occur at or near the Earth's surface, especially in the case of carbonate-rich sediments.

Metamorphic rocks are formed by subjecting any rock type (including previously-formed metamorphic rock) to different temperature and pressure conditions. These temperatures and pressures are always higher than those at the Earth's surface, and must be sufficiently high so as to change the original minerals into other mineral types or else into other forms of the same minerals.

The Earth's crust is formed of rock.

A field of geology which focuses on the study of rocks and the conditions by which they form is petrology. There are three branches of petrology, corresponding to the three types of rocks: igneous, metamorphic, and sedimentary. The word petrology itself comes from the Greek word "petros", meaning rock. Petrology utilizes the classical fields of mineralogy, microscopic petrography, and chemical analyses to describe the composition and texture of rocks.

Text 9

Volcanic ash

Volcanic ash consists of very fine rock and mineral particles less than 2 mm in diameter that are ejected from a volcanic vent. Ash is created when solid rock shatters and magma separates into minute particles during explosive volcanic activity. The usually violent nature of an eruption involving steam (phreatic eruption) results in the magma and perhaps solid rock surrounding the vent, being torn into particles of clay to sand size.

The plume that is often seen above an erupting volcano is composed primarily of ash and steam. The very fine particles may be carried for many miles, settling out as a dust-like layer across the landscape. This is known as an "ash fall." The term for any material explosively thrown out from a vent is tephra or pyroclastic debris. If liquid magma is ejected as a spray, the particles will solidify in the air to small fragments of volcanic glass. Tephra particles of gravel size are termed cinders.

The ejection of large quantities of ash will produce an ash cone. A layer of volcanic ash tends to become cemented together to form a solid rock called "tuff."

Unlike the ash that forms from burning wood or other combustible materials, volcanic ash is hard and abrasive, rather than soft and fluffy. It does not dissolve in water, and it conducts electricity, especially when it is wet. During a severe ash fall, the sky may seem hazy or yellow, and light may fade altogether. The approaching ash cloud may appear to be a weather cloud: lightning and thunder are often present. The air often smells of sulfur.

Volcanic ash is not poisonous, but inhaling it may cause problems for people whose respiratory system is already compromised by disorders such as asthma or emphysema. The abrasive texture can cause irritation and scratching of the surface of the eyes. People who wear contact lenses should wear glasses if they are experiencing an ash event. Furthermore, the combination of volcanic ash with the moisture in the lungs may create a substance akin to liquid cement. People should also take caution to filter the air they breathe with a damp cloth or a face mask when facing an ash event.

The most devastating effect of volcanic ash comes from pyroclastic flows. These occur when a volcanic eruption creates an "avalanche" of hot ash, gases, and rocks that flow at high speed down the flanks of the volcano. These flows can be impossible to outrun. In 1902, the city of St. Pierre in Martinique was destroyed by a pyroclastic flow which killed over 29,000 people.

Ash and aviation

Volcanic ash jams machinery. This poses a great danger to aircraft flying near ash clouds. There are many instances of damage to jet aircraft as a result of an ash encounter. Engines may quit, and fuel and water systems may become fouled, requiring repair. After the Galunggung, Indonesia volcanic event in 1982, a British Airways Boeing 747 flew through an ash cloud that fouled all 4 engines, stopping them. The plane descended from 36,000 feet to only 12,000 feet before the crew could manage to restart the engines.

Increasing numbers of events like that prompted the aviation industry to meet in 1991 to decide how to best distribute information about ash events. One solution was the creation of Volcanic Ash Advisory Centers. There is one VAAC for each of 9 regions of the world.

VAACs can issue advisories and serve as liaisons between meteorologists, volcanologists, and the aviation industry.

Atmospheric effects

Very fine ash particles may remain high in the atmosphere for years, spread around the world by high-altitude winds. This suspended material contributes to often spectacular sunsets, as well as an optical phenomenon known as "Bishop's Ring." This refers to a corona or halo effect around the sun.

Text 10

Clay

Clay is a term used to describe a group of hydrous aluminium phyllosilicates minerals that are typically less than 2 micrometres in diameter. Clay consists of a variety of phyllosilicate minerals rich in silicon and aluminium oxides and hydroxides which include variable amounts of structural water. Clays are generally formed by the chemical weathering of silicate-bearing rocks by carbonic acid but some are formed by hydrothermal activity. Clays are distinguished from other small particles present in soils such as silt by their small size, flake or layered shape, affinity for water and high plasticity index.

Depending upon academic source, there are three or four main groups of clays: kaolinite, montmorillonite-smectite, illite, and chlorite (the latter group is not always considered a part of the clays and is sometimes classified as a separate group, within the phyllosilicates). There are about thirty different types of 'pure' clays in these categories but most 'natural' clays are mixtures of these different types, along with other weathered minerals.

Clays are heavy in texture yet soft to the touch. Clay is a malleable substance when wet, which means it can be shaped easily with the hands. When dry, it becomes firm and when "fired," or hardened by intense heat, clay becomes permanently solid. A fireplace or oven specifically designed for hardening clay is called a kiln. These properties make clay an ideal substance for making durable pottery items, both practical and decorative, with different types of clay and firing conditions giving earthenware, stoneware and porcelain. Early humans discovered the useful properties of clay in prehistoric times, and one of the earliest artifacts ever uncovered is a drinking vessel made of sun-dried clay. Depending on the content of the soil, clay can appear in various colors, from a dull gray to a deep orange-red.

Clays sintered in fire were the first ceramic, and remain one of the cheapest to produce and most widely used materials even in the present day. Bricks, cooking pots, art objects, dishware, spark plug bodies, and even musical instruments such as the ocarina are all made with clay. Clay is also used in many industrial processes, such as paper making, cement production, pottery, and chemical filtering.

Vocabulary

Unit I

bismuth, n
by-products, n
carbolic acid
cobalt, n
compel, v
comprehensive use
copper, n
deplete, v
dump, v
gallium, n
household gas
indium, n
lead, n
length of service
lubricant, n
molybdenum, n
outdated, adj
phosphorus, n
platinum, n
refining, (oil)refining, n
replacement, n
overwhelming majority
scrap-metal
selenium, n
tar, n
tellurium, n
tin, n
titanium, n
tungsten, n
vanadium, n
yield, v
zinc, n

висмут
побочный продукт
карболовая кислота
кобальт
заставлять, принуждать
безотходное использование
медь
истощать, исчерпывать запас
сваливать, сбрасывать
галлий
бытовой газ
индий
свинец
срок службы, эксплуатации
смазка, смазочный материал
молибден
устарелый, устаревший
фосфор
платина
очистка, переработка (нефти)
замена
подавляющее большинство
металлический лом
селен
смола, гудрон
теллур
олово
титан
вольфрам
ванадий
производить, давать
цинк

Unit II

contradictory, adj
deplete, v
distribute, v
estimate, v
estimation, n
exploit, v
frequency, n
infinite, adj
last, v
liquid fuel
precise, adj
promising, adj

противоречащий
истощать, исчерпывать (запас, силы и т.п.)
распределять
оценивать
оценка
разрабатывать
частота
бесконечный, безграничный
хватать (на период времени)
жидкое топливо
точный
перспективный, многообещающий

prospecting, n	поиски, разведка
reflect, v	отражать
unevenly, adv	неравномерно

Unit III

apparent, adj	очевидный, несомненный, кажущийся
asthenosphere, n	астеносфера
avalanche, n	снежный обвал, лавина
breakthrough	прорыв
claim, v	требовать, претендовать, утверждать
cluster	собирать пучками, сосредотачиваться
collapse, n	разрушение
disaster, n	бедствие, внезапное большое несчастье
divergent, adj	расходящийся; отклоняющийся, отходящий
earthquake, n	землетрясение
entire city	целый город
explosion, n	взрыв
extreme violence	огромная сила
fairly large area	достаточно большие пространства (площадь)
instantly, adv	немедленно, мгновенно
instigation, n	подстрекательство
landslide, n	обвал, оползень
lithosphere, n	литосфера
mantle, n	мантия
meteor impact	подземный толчок
molten, adj	расплавленный, растопленный
perception, n	представление
plate tectonics	тектоника плит
ridge [rId]	гребень волны
shake, v	трясти, встряхивать, колебать
shatter, v	разбиваться вдребезги
subducting plate	пододвигающаяся (тектоническая) плита
terrifying phenomena	ужасающее явление
to melt, v	плавить, плавиться
to rumble, v	гроыхать, грохотать
volcanic eruptions	извержение вулкана

Unit IV

compression, n	сжатие, сдавливание
create, v	создавать
earthquake, n	землетрясение
fault, n	разлом, сдвиг, сброс
footwall, n	подошва пласта
friction, n	трение
lock, v	сжимать
occur, v	случаться, происходить
plate boundary	граница плиты (пласта)
pressure, n	давление

rupture, n	прорыв, пролом, разрыв
shake, v	трясти, сотрясаться
shift, n	косое смещение
slide, v	скользить

Unit V

acidification, n	подкисление
anthill, n	муравейник
coal, n	уголь
combustion, n	сгорание
conspicuous, adj	заметный, видный
contaminate, v	заражать, загрязнять
damage, n	вред, ущерб
dust, n	пыль
emit, v	выбрасывать, выделять
environment, n	окружающая среда
excavate, v	производить земляные работы
extract, v	извлекать, добывать
hard coal, n	каменный уголь
heap, n	куча
inhabit, v	населять
inhibit, v	препятствовать
leak, v	просачиваться
lignite, n	бурый уголь, лигнит
lower, v	понижаться
methane, n	метан
monoxide, n	окись
nitrogen, n	азот
oil shale, n	горючий сланец
oxide, n	оксид
significant, adj	значительный
surface, n	поверхность
pollutant, n	загрязняющий агент
pulverize, v	распылять
waste, n	отходы

Unit VI

access, n	доступ
accessory, n	приспособление, вспомогательный прибор
ancient, adj	древний
assign, v	назначать, поручать
barge, n	баржа
bottom, n	низ, дно
boundary, n	граница
carbon, n	углерод
cellar, n	подвал
crew, n	команда
decay, n	распад
deposit, n	месторождение, залежь

die, v
dig, v
dispose, v
drill, n
exert, v
evaluate, v
impermeable, adj
jurisdiction, n
layer, n
limestone, n
marsh, n
mud, n
oxygen, n
pit, n
reflect, v
remains, n
remove, v
rig, n
sample, n
sand, n
sandstone, n
sedimentary, adj
select, v
sink, v
site, n
surface, n
survey, n
trap, n
wild, adj

умирать
копать
вывозить, избавляться
бурение
проявлять
оценивать
непроницаемый
сфера полномочий
слой
известняк
болото
грязь
кислород
яма
отражать
остатки
удалять
буровая установка
образец
песок
песчаник
осадочный
выбирать
тонуть
строительная площадка
поверхность
обзор
ловушка
дикий

Unit VII

Vocabulary:

accumulate, v
accumulation, n
affect, v
alternate, v
amount, n
arid, adj
barring
be subject to, v
capture, v
conversion, n
convert, v
darken, v
directly, adv
drop, n
effect, n
enter, v
evaporate, v
flux, n

накапливать, накопить
накопление
воздействовать, влиять
чередовать(ся), сменять друг друга
количество, сумма
сухой, засушливый, безводный
за исключением
подчиняться чему-либо, подвергаться чему-либо
захватывать
превращение, переход, изменение
превращать, превратить
затемнять, сделать темным
прямо, непосредственно
падение, понижение, снижение
следствие, действие, воздействие, результат
проникать, проникнуть
испарять(ся), испарить(ся)
течение, поток

frequency, n	частотность, частота
hydrologic cycle	круговорот воды, влагооборот
indirectly, adv	косвенно, не прямо
inexhaustible, a	неистоощимый, неисчерпаемый
interfere with smth, v	вмешиваться, служить препятствием, мешать
interference, n	вмешательство, препятствие
lifetime, n	продолжительность жизни, срок существования
location, n	расположение, местоположение
marked, adj	заметный
meet one's needs	удовлетворять спрос (требования)
nuclear, adj	ядерный
particulate matter	твердые частицы (в воздухе)
percolate, v	просачиваться, проникать сквозь
photovoltaic cell	фотоэлемент
power, n	мощность, энергия
power, v	снабжать энергией, приводить в действие
precipitation, n	выпадение осадков, осадки
recycling, n	повторение цикла, повторное использование
renewable, adj	возобновляемый
resource, n	ресурс, мн. запасы
scarce, adj	недостаточный, скудный, редкий
screen out, v	отводить, не допускать
solar collector	солнечный коллектор
space heating	отопление помещений
supply, n	снабжение, поставка
surface, n	поверхность
tissue, n	ткань
underground, adj	подземный
vapour, n	пар, пары, испарения

Unit VIII

appendage, n	дополнительное приспособление
backfilling, n	обратная засыпка
backhoe, n	канавокопатель
boom, n	стрела
bounce, v	дрожать, подергиваться
brunt, n	удар, толчок
bucket, n	ковш
canopy, n	навес, тент
curl, v	закручивать(ся), скручивать(ся)
ditch, n	канава, траншея
downward, a	направленный вниз
dustpan, n	совок
engine, n	двигатель
turbocharged engine	двигатель с турбокомпрессором
flip, v	шелкать, ударить (слегка), подбросить
grip, n	захват, захватное устройство
joint, n	соединение, стык
jostle, v	толкать(ся), теснить(ся)
leg, n	опора, столб, подножка
stabilizer leg	опора-стабилизатор

loader, n
loose, a
plant, v
plow, n
rugged, a
scoop, n
sewer, n
shoe, n
grouser shoe
rubber-padded shoe
stick, n
strain, v
terrain, n
rough terrain
trench, n
upward, a
wheel, n
rear wheel

погрузчик, погрузочное устройство, погрузочная машина
рыхлый, сыпучий
устанавливать в грунте
плуг
прочный, жесткий
ковш, совок
канализационная труба
башмак, опорная подушка
грунтозацеп башмака
башмак с резиновой подушкой
рукоять (ковша экскаватора)
деформировать, натягивать, растягивать
почва, грунт
пересеченная местность
траншея, канава, котлован, шурф
направленный вверх
колесо
заднее колесо

Unit X

acid, n
add, v
alignment, n
attach, v
bit, n
casing, n
cement, n
collapse, v
collar, n
crew, n
demand, n
depth, n
dissolve, v
draw up, v
drill, v
estimate, n
fluid, n
gear, n
hole, n
lever, n
limestone, n
measure, v
mud, n
perforation, n
prevent, v
pump, n
remove, v
run, v
sample, n
sandstone, n
seal, n

кислота
добавлять
выравнивание
прикреплять
бур, бурав
корпус {обсадная труба}
цемент
разрушать
отверстие буровой скважины, устье шахты
команда
требование
глубина
растворять
составлять
бурить
оценка
жидкость
механизм передачи
яма
рычаг
известняк
измерять
грязь, шлам, буровой раствор
перфорация, отверстие
предотвращать
насос
удалять
управлять
образец
песчаник
уплотнение, заделка

slurry, n
spacer, n
steam, n
suction, n
tubing, n
well, n

жидкое цементное тесто, шлам, суспензия
распорная деталь
пар
всасывание
тюбинг, монтаж, установка трубопровода
колодец