**Министерство образования и науки Республики Бурятия**

**Государственное бюджетное профессиональное образовательное учреждение**

**«Байкальский колледж недропользования»**

**Профессионально ориентированный английский язык.**

**Традиции и инновации в горной промышленности (тексты и упражнения)**

***21.02.17*** ***Подземная разработка месторождений полезных ископаемых***

***21.02.15*** ***Открытые горные работы***

**Улан-Удэ, 2017**

**Практическое занятие №1 (Lesson 1)**

**WHAT IS COAL?**

**1. Запомните следующие слова и сочетания слов:**

**value –**ценность

**fuel –**топливный

**heating quality of coal –**свойство угля выделять тепло

**hence –**отсюда, следовательно

**to smelt –**плавить

**to warm –**согревать

**heat –** нагревать, тепло

**essential part –**значительная часть

**to surround –**окружать

**to extract –** извлекать

**treatment –**обработка, обогащение

**coke** - кокс

**to subject –**подвергать воздействию, влиянию

**to distil –**перегонять, подвергать

**ammonical liquid –**аммиачная жидкость

**leaving behind –**за исключением

**volatile hydrocarbons –** летучие углеводороды

**carbon monoxide –**окись углерода

**to obtain –**получать, достигать

**to predict –** предугадать, спрогнозировать

**immense –**огромный

**consumption –**потребление, расход

**to yield –** добывать, вырабатывать, добыча

**tar –**смола

**May we consider this a very bold comparison? –**Можем мы считать, что это очень смелое сравнение?

**3. Прочитайте и переведите текст, обращая внимание на лексику занятия.**

What is coal? When did man learn about its value as a fuel?

If nowadays scientists can fully answer the first question, nobody can answer the second one. We cannot say at what stage of civilization man realized the heating quality of coal.

We do not know how many years coal serves man. We know, however, that coal forms the basis upon which the majority of human industries and hence human health, wealth and happiness.

Coal moves thousands of mighty vessels through the seas and oceans, and a hundred thousand locomotives over the iron ways of the world. Coal smelts the millions of tons of iron ore from which we make all our machinery. Coal provides the power for our factories, lights our streets and houses, warms us with its stored heat. But we need not extend the list. Coal becomes an essential part of our everyday life and surrounds us in the shape of thousands of different things.

Coal is one of the greatest sources of materials in the world, a wonderful reservoir of valuable chemicals. Which of them do we extract and in what form do we use them? This is rather a matter of choice. A ton of coal may yield large quantities of chemicals and materials, or it can give a little heat, some gas and a little tar. It depends upon the treatment to which we subject coal.

The usual treatment of coal is to distil it at a high temperature, which drives off gas, tar, and ammonical liquid, leaving behind coke. Coal-gas is a mixture of volatile hydrocarbons with some other gases such as carbon monoxide. It forms a good, convenient method of lighting and heating but it results in the wastes of the hydrocarbons. The chief use of coal-gas today is that of heating.

Today besides heating calories we obtain hundreds of the most precious products which have nothing in common with a little black piece of coal. What else can scientists obtain from this "black gold" in their laboratories?

Can we predict it? ’’Black gold"!

May we consider this a very bold comparison? People willingly pay gold for this stone in which, as we know, the energy of the sun accumulated millions of years and which is now a store of immense power in the service of man.

If we look at all the products which we obtain from coal, we realize that under no conditions can gold supply us with even a thousandth of what we get from coal.

That is why when people speak of coal as ’’black gold" they only belittle its importance. We may even put such questions as: Is there anything more precious for man than coal? Do we know enough about the wonderful properties of coal? Do we devote sufficient attention to its mining and consumption?

“The Sun Stone” so the Russian writers name coal. That is true. Sun is the source of life on our planet. The sun warms and feeds us. We must not be wasteful of our “store” of sun power – this greatest gift of nature.

**4. Переведите предложения письменно.**

1. This method has nothing in common with the other one. 2. Nobody can say when man learned about coal as a fuel. 3. Any method of work requires some test. 4. Now we have some new combines at our mine. 5. Coal is called “Black gold”.

**Практическое занятие №2 (Lesson 2)**

**THE ORIGIN OF COAL**

**1. Письменно переведите на английский язык:**

1. Уголь – один из основных источников энергии сегодня. 2. Ценность угля велика. 3. Много электростанций работают на угле. 4. Угольный газ – это смесь летучих углеводородов с другими газами. 5. Уголь – удивительное хранилище ценных химических веществ.

**2. Запомните следующие слова и сочетания слов:**

**sedimentary rock –**осадочная порода

**organic origin –**органического происхождения

**mummified plants –**остатки растительности

**fossil fuels –**органическое топливо

**lignite**[ˈlɪgnaɪt]**–**лигнит

**bituminous coal** [bɪˈtjuːmɪnəs kəʊl] – каменный уголь

**anthracite**[ˈænθrəsaɪt] - антрацит

**peat**[piːt] – торф

**banding**[ˈbændɪŋ] –полосатость, неоднородность

**substance**[ˈsʌbstəns]**–**вещество

**constituents**[kənˈstɪtjʊənts] – составляющие

**vitrain -**витрен

**clarain –**кларен

**durain –**дюрен

**fusain –**фюзен

**streaks -**полосы

**bark –**кора, береста

**cells –**клетки, камеры, элементы

**debris**[ˈdeɪbriː] – обломки, осколки, мусор

**sporecoats –**слой спор

**megaspores –**мегаспоры

**microspore**[maɪˈkrɒspərɪ] – микроспора

**levels –**уровни

**interbanded –**межполосчатый

**silting –**заиливание, засорение

**subsidence**[səbˈsaɪdəns] - оседание

**charcoal**[ˈʧɑːkəʊl] – древесный уголь

**banded coals** – полосчатый уголь

**3. Прочитайте и переведите текст, обращая внимание на лексику занятия.**

Coal is a sedimentary rock of organic origin and is usually described as a mass of mummified plants. Several fossil fuels are included under the word “coal”: brown coal, lignite, bituminous coal, anthracite. Peat, though the first stage in the formation of most coals, has never been included under that name.

Practically all black coals show banding of soft bright and hard coal (“brights” and “hards”).

The banded coals were divided into four constituents, vitrain, clarain, durain and fusain. The first two make up the “brights”, the durain is the “hards” and the fusain is the “mineral charcoal”. Examination with the microscope has shown that the bright vitrain streaks represent large pieces of wood or bark with their cells filled with a bright black substance originally introduced as a jelly; clarain is similar to vitrain, but made of plant debris such as leaves and twigs, and fusain is partly carbonized wood. Durain is composed of more highly carbonized material with a high proportion of sporecoats, both megaspores and microspores. The “hards” and “brights” are generally concentrated at more or less definite levels in a seam, though they are sometimes inter- banded.

The history of the development of a coal seam was something like this: if silting in a lake basin or river estuary exceeds the rate of subsidence, the water shallows till plants are able to take root and grow. The vegetation becomes thick, movement of water is stopped and it becomes stagnant. By the decay of the accumulating vegetation the oxygen is used up and further decay is retarded. So peat composed of stems, twigs and leaves is formed and eventually gives a bed of “bright”. If subsidence now exceeds the rate of deposition the plants are drowned and the region becomes open water. After the coal is buried by overlying sediments a further series of changes takes place resulting in the increase in “rank” of the coal.

***4. Выполните упражнения.***

*1. Answer the following questions:*

1. What is coal? 2. What coals are “brights”? 3. What fossil fuels are included under the word “coal'? 4. Into what constituents are banded coals divided? 5. What do the bright vitrain streaks represent?

*2. Answer the following question in written form:*

What is the history of the development of a coal seam?

*3. Translate into English paying attention to the tenses in the English sentences:*

1. В начале XIX века русские ученые считали, что миллион лет назад Донецкий бассейн был заливом громадного моря. 2. Большой вклад в изучение этого вопроса был сделан русским геологом Александром Карпинским. Этот неутомимый ученый изучал историю нашей планеты в течение многих лет. Он составил 12 палеографических карт, на которых была показана территория европейской части России 500, 300 и 200 миллионов лет назад. 3. Стволы деревьев и отпечатки листьев находят в угольных пластах.

*4. Read and translate the text:*

Coal is composed mostly of carbon, hydrogen and oxygen in complex groupings. The different bands of coal are called: fusain, durain, clarain and vitrain. There are four kinds of coal: brown coal, lignite, bituminous coal and anthracite.

Man realized the heating quality of coal long ago. It is the basis upon which most branches of human industry, rest. Coal is used to set in motion mighty vessels and locomotives. It is widely used in metallurgical industry. Coal yields a large quantity of chemicals. Coal gas is a mixture of volatile hydrocarbons with some other gases. It is a source of lighting and heating.

Large quantities of coal have been formed in nature by the slow decomposition of vegetable matter without much heating but in the presence of water and away from air. Nowadays people devote great attention to coal-mining and consumption.

*5. Read and translate the text:*

Alexander Karpinsky is an outstanding Russian scientist who described the geological past of the European part of our country including the Donetz Basin. This tireless scholar studied the past history of the earth in order to help people to explore its wealth. He founded the Russian school of geology, which has won the leading position in the world science. His “Essays on the Geological History of European Russia" was of great importance in the development of geology and coal-mining in the Donetz Basin.

Alexander Karpinsky followed M. V. Lomonosov’s idea that rocks and minerals undergo constant changes, and that there are continuous physico-chemical processes in the earth’s crust.

He personally drew up paleogeographical maps showing the distribution of land and sea at prehistoric times. These geographical maps afforded a graphic picture of European Russia 500, 300, 250 and 200 million years ago.

According to his theory an enormous sea covered nearly the entire territory from the Urals to the Caspian and the Black Sea.

The territory of the present Donbass was once a bay of this sea. Giant plants and trees grew on its shores. These plants and trees fell into the marsh of the bay and were covered by sand and silt. The compressed deposits of trees and other plants underwent decomposition, and deposits of coal were formed.

*6. Translate into English:*

**УГОЛЬ**

Каменные угли представляют собой плотные, в большинстве слоистые, породы черного цвета со смоляным блеском. Они обычно пачкают руки. Удельный вес—1,2— 1,5. Твердость — 2—3.

Антрациты являются плотными, черными с сильным металловидным блеском породами.

Бурые угли являются плотными деревянистыми породами бурого цвета. Удельный вес их колеблется от 0,8 до 1,8.

**Практическое занятие №3 (Lesson 3)**

**COAL AND ITS CLASSIFICATION**

**1. Запомните следующие слова и сочетания слов:**

**bench -** слой, пачка *(пласта)*

**blend -**смешивать(ея); ' вклинивать(ся)

**combustion -** горение, сгорание;

**spontaneous combustion**самовоспламенение,

самовозгорание

**continuity -**непрерывность, неразрывность

**domestic -**внутренний; отечественный

**estimate**['estimeit] оценивать; оценка;

**fault -**разлом, сдвиг *(породы),*сброс;

**faulting -**образование разрывов или сбросов

**fold -** изгиб, складка, флексура;

**folding -**складчатость, смещение *(пласта)*без

разрыва

**inflame -**воспламеняться; загорать(ся);

**inflammable -**воспламеняющийся, горючий,

огнеопасный;

**flame**[fleim] - пламя

**intermediate -**промежуточный; вспомогательный

**iable -****(to)**подверженный; подлежащий *(чему-л.)*

**lustre -**блеск *(угля,металла),*

**lustrous -**блестящий

**matter -** вещество; материя

**moisture -** влажность, сырость; влага

**parting -** прослоек; отдельность

**plane -** плоскость;

**bedding plane**плоскость напластования

**rank -** класс, тип;

**coal rank**группа угля, тип угля

**regular**['regjula] -правильный;

непрерывный;

**irregular -**неправильный; неравномерный;

**regularity -**непрерывность; правильность

**similar**['simila] *а*похожий,

сходный; подобный; *syn***alike, the same as**

**smelt**[smelt] -плавить *(руду)-,*

выплавлять *(металл)*

**store -**запасать, хранить на складе; вмещать

**strata -**пласты породы; свита *(плас-*

*тов),*формация, напластования породы;

*syn***measures**

**utilize –**использовать;*syn***use, apply, employ**

**volatile –**летучий, быстро испаряющийся

**uniform –**однородный, равномерный

**uniformity –**однородность, единообразие

**thickness –**мощность (пласта, жилы)

**2. Прочитайте следующие сочетания слов и переведите их:**

liable to spontaneous combustion; inflammable gas; the most abundant deposits; lustrous metal; ash and sulphur content; brilliant lustre; coking and non-coking qualities; iron ore smelting; high-rank or low-rank coal; intermediate substance; as many as 72 elements; coal beds; different bands or benches of various thickness; thin layers of clay and shale; folding and faulting; domestic fuel; low-volatile bituminous coals; to weather slightly; to be more difficult to store

**3. Определите значения выделенных слов по сходству их корней с корнями соответствующих слов в русском языке:**

coal **formation processes; parallel**planes; **structurally**disturbed beds of coal; coal**classification; lignite**and brown coals; **bituminous**coal; **anthracite**or "hard" coal;**gasification**and carbonification; domestic and **industrial**purposes of using coal; in**briquetted**form; to be used **intensively;**to produce a **mixture;**researches into new**technologies;**petrochemical **processes**

**4. а) Переведите следующие существительные, образованные с помощью суффикса "-ity" от прилагательных:**

irregularity, similarity, uniformity

**б) Заполните пропуски существительными, образованными от выделенных прилагательных:**

1. As a rule coal beds are **uniform.**They are characterized by the same ... and continuity as other strata of sedimentary origin. 2. Although coal is not a true mineral, its formation processes are **similar**to those of sedimentary rocks. In this case we can speak about their ... . 3. According to their shape mineral deposits can be classified as regular or **irregular.**Regular deposits include seams and veins while **irregular**deposits include stocks. Coal belongs to regular deposits but it is characterized by ... in thickness.

**5. Переведите слова с префиксом "sub-"***под-:*

subgroup, subdivision, subsection, subcommittee, power substation

**6. Прочитайте предложения и найдите в них причастие I. Переведите предложения:**

1. Coal beds may consist of different bands of varying thickness from thin to thick seams. 2. Laser is used in mining. This is a more recent development replacing theodolites in surveying. 3. Speaking about the future of coal, it is necessary to note the production of liquid fuels such as gas and oil from coal.

**7. а) Прочитайте вслух следующие слова:**

[e] — bed, blend, 'smelting, 'general, 'element, do'mestic, 'many

[ i:] — p e a t , heat, 'easy, steel, keep, 'medium

[] — 'lustre, 'sulphur, some, but, 'other, a'bundant

[æ] — ash, 'value, rank, 'matter, 'calorie, 'active

[ε: I — burn, 'surface, 'purpose, re'serves, world, 'furnace

[ С: l — store, ac'cording, pro'portion, source

[аi] — dry, pile, kind, pro'vide, 'either, slight, 'slightly

[ou] — low, coke, 'coking, most, though, al'though, smoke

[a: J — large, hard, 'carbon, blast, fast

**б) Прочитайте названия химических элементов и углей:**

carbon, chromium, cobalt, copper, nickel, tungsten, bituminous coal, anthracite, liquefaction

**в) Прочитайте следующие сочетания слов:**

according to the amount of carbon; a variable proportion of ash; a low-rank brown-to-black coal; easily inflammable lignite; liable to spontaneous combustion; medium-to-low volatile bituminous coals; the greatest quantities of peat; a mixture with improved coking qualities; to be of great importance for the development of modern industry; to be used for domestic and industrial purposes

**8. Прочитайте текст и скажите, какие угли имеют наиболее важное экономическое значение.**

**COAL AND ITS CLASSIFICATION**

Coal is the product of vegetable matter that has been formed by the action of decay, weathering, the effects of pressure, temperature and time millions of years ago. Although coal is not a true mineral, its formation processes are similar to those of sedimentary rocks. Structurally coal beds are geological strata characterized by the same irregularities in thickness, uniformity and continuity as other strata of sedimentary origin. Coal beds may consist of essentially uniform continuous strata or like other sedimentary deposits *may be*made up of different bands or benches of varying thickness. Thus, in Fig. 3 one can see a seam limited by two more or less parallel planes, a shape which is typical of sedimentary rocks. The benches may be separated by thin layers of clay, shale, pyrite or other mineral matter, commonly called partings (Fig. 4). Like other sedimentary rocks coal beds may be structurally disturbed by folding and faulting.

According to the amount of carbon coals are classified into: brown coals, bituminous coals and anthracite. Brown coals are in their turn subdivided into lignite and common brown coal. Although carbon is the most important element in coal, as many as 72 elements have been found in some coal deposits, including lithium, chromium, cobalt, copper, nickel, tungsten and others. *Lignite*is intermediate in properties between peat and bituminous coal, containing when dry about 60 to 75 per cent of carbon and a variable proportion of ash. Lignite is a low-rank brown-to-black coal containing 30 to 40 per cent of moisture. Developing heat it gives from 2,500 to 4,500 calories. It is easily inflammable but burns with a smoky flame. Lignite is liable to spontaneous combustion. It has been estimated that about 50 per cent of the world's total coal reserves are Iignitic. *Brown coal*is harder than lignite, containing from 60 to 65 per cent of carbon and developing greater heat than lignite (4,000-7,000 calories). It is very combustible and gives a brown powder. *Bituminous coal*is the most abundant variety, varying from medium to high rank. It is a soft, black, usually banded coal. It gives a black powder and contains 75 to 90 per cent of carbon. It weathers only slightly and may be kept in open piles with little danger of spontaneous combustion if properly stored. Medium-to-low volatile bituminous coals may be of coking quality. Coal is used intensively in blast furnaces for smelting iron ore. There are non-coking varieties of coal. As for the thickness, the beds of this kind of coal are not very thick (1-1.5 metres). The great quantities of bituminous coal are found in the former USSR. *Anthracite*or "hard" coal has a brilliant lustre containing more than 90 per cent of carbon and low percentage of volatile matter. It is used primarily as a domestic fuel, although it can sometimes be blended with bituminous grades of coal to produce a mixture with improved coking qualities. The largest beds of anthracite are found in the former USSR, the USA and Great Britain. Coal is still of great importance for the development of modern industry. It may be used for domestic and industrial purposes. Being the main source of coke, coal is widely used in the iron and steel industry. Lignite, for example either in the raw state or in briquetted form, is a source of industrial carbon and industrial gases. There is a strong tendency now for increased research into new technologies to utilize coal. No doubt, coal will be used as a raw material for the chemical industry and petrochemical processes. All these processes involve coal conversion which include gasification designed to produce synthesis gas from coal as the basis for hydrogen manufacture, liquefaction (разжижение) for making liquid fuel from coal and other processes.

**9. Укажите, какие предложения соответствуют содержанию текста. Подтвердите свои ответы фактами из текста.**

1. Anthracite coals may be divided into lignite and common brown coal. 2. Coals are ranked according to the percentage of carbon they contain. 3. Peat, with the least amount of carbon is the lowest rank, then comes lignite or brown coal. 4. Brown coal is hard and it is not liable to spontaneous combustion. 5. Bituminous coal weathers rapidly and one cannot keep it in open piles. 6. Being intensively used in the iron and steel industry bituminous coal varies from medium to high rank. 7. Anthracite or hard coal, the highest in percentage of carbon, can be blended with bituminous grades of coal.

**10. Ответьте на следующие вопросы:**

1. What is the classification of coal, based on? 2. Is carbon the only element in coal? (Prove it.) 3. Is lignite intermediate in properties between peat and bituminous coal? 4. What heat value does lignite develop when burnt? 5. What coals are liable to spontaneous combustion? 6. What is the difference between lignite and brown coal? 7. Is bituminous coal high- or low-volatile? 8. Does anthracite contain 90 per cent of carbon? 9. Where are the largest deposits of anthracite found?. And what can you say about bituminous coal? 10. What do you know about the utilization of coal?

**11. а) Найдите в правой колонке русские эквиваленты следующих слов и сочетаний слов.**

1. spontaneous combustion

2. moisture and ash content

3 . the most abundant variety of coal

4. in its turn

5. the amount of volatile matter

6. easily inflammable gas '

7. brilliant lustre

8. to smelt iron ore

9. high-rank coal

10. a smoky flame

1. легковоспламеняющийся газ

2. высокосортный уголь

3. плавить железную руду

4. самовозгорание

5. содержание влаги и золы

6. дымное пламя

7. самые широко распространенные угли

8. яркий блеск

9. в свою очередь

10. количество летучих веществ

**б) Найдите в правой колонке английские эквиваленты следующих слов и сочетаний слов.**

1. тип угля

2. некоксующийся уголь

3. доменная печь

4. содержание углерода

5. смешиваться с другими углями

6. улучшенного качества

7. складировать уголь

8. теплотворная способность

9. быстро выветриваться

1. heat value

2. amount of carbon

3. coal rank

4. to store coal

5. to weather rapidly

6. non-coking coal

7. blast furnace

8. of improved quality

9. to blend with other coals