Quadrant II – Transcript and Related Materials

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Notes

Coal Deposits of India

Coal is one of the principal mineral fuels and is primary source of energy and power. Coal was first discovered by Greeks and then by China in the 9th century. It was used as domestic fuel. In the coal production India stands next to UK.

Coal cannot be defined as mineral because it is not having definite chemical composition and is not of organic origin. It is regarded as a rock. It is originated by the accumulation of vegetal matter which has been subjected to various geological processes bringing about marked changes in the physical and chemical composition. These changes are gradual and revealed by the darkening of colour, increase in compactness, hardness and carbon content and decrease in moisture and volatiles.

The principal physical characters of coal are as follows:

Colour: The colour of low grade of coal is yellowish black to jet black in high grade coal.

Lustre: The lustre of coal is brilliant or glossy.

Fracture: Fracture is blocky or cubical in high grade coals and splintery to irregular in low grade coals.

Cleavage: Coal breaks with more or less smooth surface along certain directions.

Hardness: Hardness varies with ranks. Lignite =0.5, bituminous = 2, anthracite = 3.

Coking properties: The hard residue produced due to the heating of coal to a temperature of 925^0C up to complete carbonisation in the total absence of air, is called coke. A good coke has a dark grey to silver grey in colour, dull to metallic lustre and a porous to vesicular structure.

Chemical composition of coal: Coal is chiefly composed of carbon, oxygen, hydrogen with small amount of nitrogen and sulphur. Moisture content in coal is due to absorption of water through the surface in the pores of coal.

Origin of Coal: Vegetal matter is the prime source material for the formation of coal. It is usually formed from land plants, mainly lycopods, fern, flowering plants, etc. Coal were formed by the decay of plants due to long burial under the thick cover of sediments. Coal deposits have been formed both in fresh water and in brackish water. The climatic conditions that favoured the plant debris to form coal were tropical to sub-tropical with moderate to heavy rainfall throughout the year.

The change from plant debris to coal is brought about in two stages. In early stage, due to biochemical action of peat forming process or

Humification process and in the later stage by dynamo chemical processes or coalification process.

Coal is mixture of various kind of hydrocarbons. During the decomposition of plant materials, the hydrogen goes in the form of water and methane gas and oxygen in the form of carbon dioxide and water. All these changes are due to organic origin and in the process of change from plant materials to coal, there is increase in the concentration of carbon content and decrease in amount of nitrogen and oxygen.

Humification: It involves an early stage of biochemical action of bacteria and microorganisms producing partial decay and decomposition of some substances like resins, proteins, cellulose, etc. present in plants. These bacteria and microorganisms thrives well in swampy conditions. The final result is the formation of humic substances. The vegetal material are thus changed into porous, friable, fibrous material which is called peat.

Coalification: Conversion of peat into higher rank of coal this process is called Coalification.

Classification of Coal or Types of Coal

Coals are divided into four varieties based on the nature and composition of the organic matter of coal, its volatile matter and moisture content. The four main types of coal are Anthracite, Bituminous, Lignite and Peat.

Peat: It is the first stage in the formation of coal. It result from the accumulation of partly decomposed vegetable matter. Its colour varies from light brown to dark brown. It is light, porous and fibrous coal. The

moisture content is about 85%. Occurs in Ganges and alluvium of Kashmir valleys.

Lignite: It is the next stage of formation of coal after peat. It is brown in colour and contains impressions and remains of woody matter and leaves. It is banded and jointed. It contains high moisture which is reduced when exposed to air. The total carbon content in it about 65% to 75%. It is used for distillation, combustion and gasification. It occurs in cretaceous and tertiary formations of Assam, Kashmir, Rajasthan, Tamil Nadu and Kerala.

Semi-bituminous: It is black coloured, waxy and banded coal. It splits parallel to bedding plane. It is the intermediate stage between the Lignite and Bituminous coal. It is a good fuel. Found in Lower Gondwana formations of India.

Bituminous Coal: It is brittle, dense, dark in colour, banded and well jointed coals. They usually breaks into prismatic and cubical blocks. They burn with yellow smoky flame. Total carbon content is about 85% to 96%. They are used in the manufacture of metallurgical coke. In India it occur in Lower Gondwana formations.

Anthracite: It is black and hard coal. It does not soil fingers. It has brilliant lustre and breaks with conchoidal fracture. It is difficult to ignite. Burns with short faint blue flame without smoke.

Distribution of coal in India:

Raniganj, Damodar valley and Darjeeling in West Bengal.

Jharia, Bokaro, Ramgarh, Devgarh and Rajmahal in Bihar.

Mahanadi valley in Orissa

Satpura region in Jabalpur in Madhya Pradesh.

Neyveli Lignite Deposits: Situated at Neyveli, South Arcot District of Tamil Nadu. Deposits are associated with Cuddalore Series of Miocene age

Palana in Rajasthan most important Lignite field situated in Bikaner district Of Rajasthan. Associated with Eocene rocks.

Gondwana Coals: The lower Gondwana coals account for more than 98% of the annual production of coal, which are generally of bituminous rank. The Gondwana coals are largely confined to river valleys like Damodar, Mahanadi, Godavari, etc. In Damodar Valley the lower Gondwana coals are Barakar measures (lower Permian) and Raniganj measures (upper Permian).