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Research Article

THE RAW MATERIAL BASE OF THE VODIL BROWN COAL DEPOSIT AND THE FACTORS OF ITS FORMATION

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ABSTRACT
Currently, the republic's demand for brown coal energy fuel stands at 100%, of which only 30-35% has been supplied. The remaining 70-65% of the energy fuel needs are fulfilled through the purchase of coal on a contractual basis from neighboring countries, specifically Kazakhstan and Kyrgyzstan. This reliance on external sources is due to coal being a primary fuel for power plants (GRES) and thermal power plants (TPP). To address these challenges, the geological exploration of brown coal deposits, which have not been comprehensively studied as potential reserves, involves a thorough reevaluation of exploration efforts and economic assessments. The goal is to ascertain their conformity with industry requirements and standards, thereby mitigating the current energy supply issues.

Keywords: *Brown Coal, Oil Raw Material Base, Ash and Coal Content*

INTRODUCTION
One of the deposits that needs to be studied is the manifestation of brown coal Vodil. The manifestation of brown coal was found in the southern part of the Fergana Valley, which includes the Fergana, Namangan and Andijan regions of the Republic of Uzbekistan. Along the southern border of the Fergana Valley, it begins in the west from the Sulukta deposit and is limited in the east by the Kizilqiya deposit, located on the territory of the Republic of Kirgizistsn, with a length of more than 225 km, the coal region of Southern Fergana is allocated. Seven coal mines have been identified in the coal-bearing area. Many of them are located on the territory of Kyrgyzstan - Sulyukta, Otukchi, Shuran, Chontash and Kizilqiya. In the border region of Tajikistan and the Republic of Uzbekistan there are deposits of Shuran and Sox (Gaznau). The vodil brown coal mine is located on the territory of Uzbekistan.

MATERIALS AND METHODS
The study employs geological exploration and stratigraphic analysis to investigate the Vodil brown coal deposit in the Fergana Valley, considering the Paleozoic, Mesozoic, and Cenozoic deposits in the region.

RESULTS AND DISCUSSION
Stratigraphy. The geological structure of the area includes deposits of the Paleozoic, Mesozoic and Cenozoic Eras..
The Paleozoic group consists of conglomerates, sandstones, shales and limestones of the Upper Carboniferous (c3g1), composed of the underlying layers of the Gzhel tier. Paleozoic discoveries were observed in the southern part of the district.
The Mesozoic group consists of Jurassic and Cretaceous systems consisting of sediments formed in lagoon-marine, lake-continental and continental conditions.

The Jurassic system. In the Jurassic sediments, there are fused structures of the lower and middle divisions (Khojakelyan formation) and the middle and upper (Balabansoy formation) divisions. The boundary between them was roughly drawn. The opening of Jurassic deposits on the earth's surface was not observed.

The Khojakelyan formation (J1-2 hk) is divided into under coal and coal layers. At the base of the section there is a small layer and lens of sandstones lying with a discrepancy in upper carboniferous terrigenous deposits, gray clays belonging to the under coal layer, with the participation of flora remains. The thickness of the clays ranges from 2 m to 50 m. Above the cut is a coal seam consisting mainly of clays and sandstones. In clays there are first microlayers of coal (up to 2 cm), then a coal seam 9 m thick, simple and complex in structure. In total, 4-5 layers are allocated. The total thickness of the suite ranges from 2 m to 270 m . Deposits have been discovered in the interfluve of the Shamotol-Dargansai and Shuran-Ak-Kapchigan rivers (on the territory of Kyrgyzstan).

The Balabonsoy formation (J2-3 BL) refers to the upper layer of charcoal, consists of polymictic sandstones, limestones and, in some cases, brick-red and green clays in which coal seams occur. In some cases, conglomerates up to 5 m thick are found above the suite. The total capacity of the suite is 40-120 m. *The chalk system*. Cretaceous sediments are common in an area with a sharp discrepancy, in some cases they lie over Paleozoic and Jurassic sediments exposed on the surface of the Earth. In the system, the lower and upper parts are distinguished, containing all the formations indicated in the updated symbols of the geological map. The sub-department of the suite consists of three sections: Muyan (K1 mu), Lyakansky (K1 LC) and kyzylpilalsky (k1-2 KP), with a total capacity of up to 240 m. The upper section consists of four sections: kalachin (K2 KL), oyster (K2 us), yalovach (K2 Jal) and polvontosh (K2 pt) with a total thickness of 180-200m.

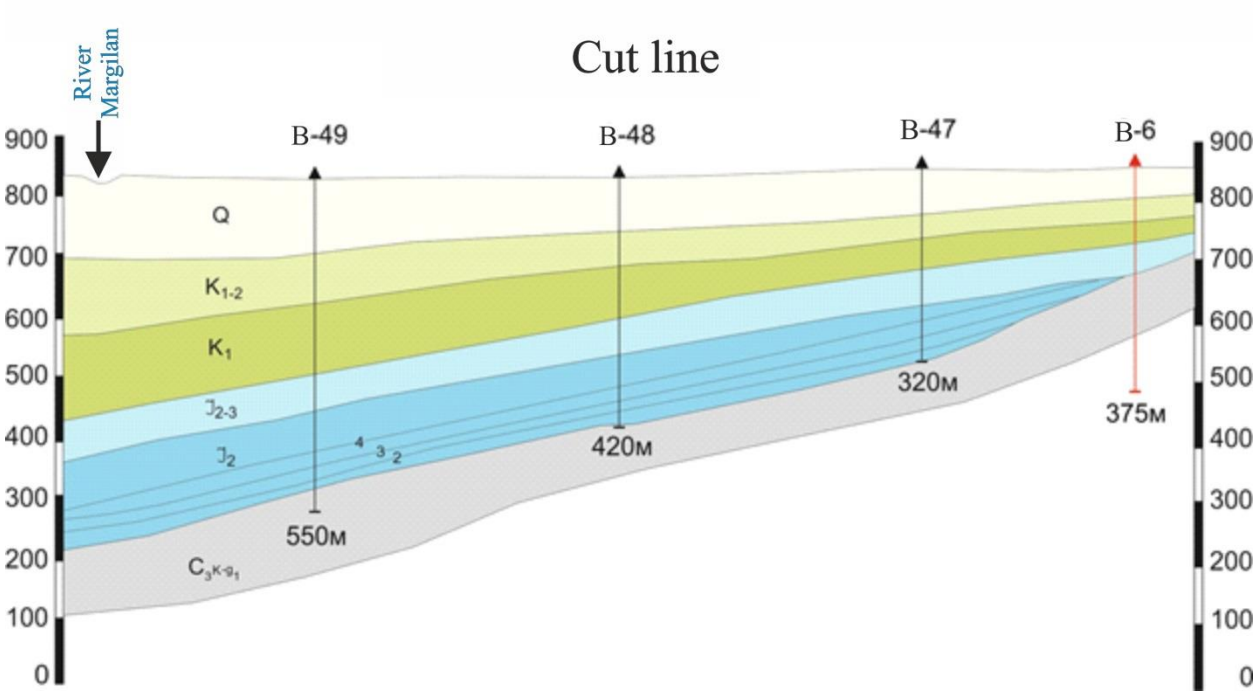

Figure 1: Geological map of the Vodil brown coal site, geological section on line 4-4.

Most of the cross-section of the Cretaceous sediments are clays, in which lenses and layers of sandstones and conglomerates occur. The Lacan and Oyster formations consist mainly of small layers of limestone and clay.
Tectonics. The structural and tectonic position of the area is determined by the fact that it belongs to the zone of the Karatag-Karachatyr Late Paleozoic trough, located on the southern wing of the Fergana Alpine synclinal structure. The Southern Ferghana coal district was formed on the foundation of the marginal section of the Karatag-Karachatyr trough in the Permian-Triassic period.
Coal content. The reservoir is the eastern part of the Sokh-Shakhimardan coal deposit. To the south of the Sokh-Shakhimardan coal deposit, the Chontosh brown coal deposit located on the territory of the Kyrgyz

Republic has been identified. Accordingly, coal-bearing strata in the Vodil manifestation are associated with coal-bearing strata in the Chontosh deposit.

The carboniferous appearance of Vodil is associated with the lower layer of the Khojakelian formation of the Middle Jurassic (J1-2 HK).

In total, 3 conditioned layers (bundles) have been allocated in the Vodil horizon - "CH-2", "CH-3", "CH-4" (from bottom to top), 5 layers have been allocated in total, the average thickness of the coal seam (1,80,83,2,4,7 for 6 wells) is 49.4 m.

As the main layer, the "CH-2" layer was adopted, located at the base of the coal bed, opened in all wells, the remaining layers were correlated (linked) on the basis of this layer.

The "CH-2" overlap pack consists of a layer with a thickness of 5.25 m to 8.9 m (wells No. 1 and 80) in the west wing and a layer with a thickness of 1.3 M (No. 7) in the east wing. In well No. 1, 2 layers of clay coal with a thickness of 2.0 m and 1.6 m were opened in the formation. The ash content of coal ranges from 12.1% to 29.45%. The ash content of clay coal seams ranges from 48% to 51.3%. Accordingly, the ash content of the rock mass at well No. 1 is 33.81%.

In the eastern direction, the degree of ash content increases along with a decrease in thickness. The composition of the Chontosh deposit includes only those reserves of this formation that are considered the most powerful and homogeneous in composition. The "CH-3" package also has the same composition as the "CH-2" package and is unchanged in the representation space. This makes it possible to attribute it to areas of industrial importance. The thickness of the bundle ranges from 1.2 m in the west to 3.5 m in the center to 9 m and decreases to 0.9 m in the east. unlike the "CH-2" pack, its ash content is slightly higher and ranges from 32.25% to 35.4%. Only in one case (well no. 2) ash content is reduced to 8.7%. In well No. 2, in the depth range of 266.8 m-273.2 m, coals and coal clays ("CH-31") were uncovered. The thickness of the carbon lens layer is 2.5 m, the ash content is 16.6%. The lens will probably be small in size, because it has not opened in other wells. Accordingly, the formation is considered to have no industrial significance. But due to the extreme shortage of exploration wells as a result of further exploration work and technical and economic calculations, there is a possibility of transition to the category of industrially significant. The "CH-4" bundle forms the upper part of the coal seam.

Unlike earlier bundles, this bundle does not have a uniform structure, it consists of a sequence of layers of coal, clay coal and coal gill beds. The thickness of the bundle ranges from 1m in the West, 7m in the center (well No. 4) and up to 5m in the east (well No. 7). The pack includes 1-2 coal layers and small layers of coal gills and clay coals. The ash content of coal is high and amounts to 34.34-36.8%, only at well No. 7 the ash content is reduced to 22.63%. When calculating reserves, the introduced layers have an ash content limit of 35%. Thus, this package can be attributed to the number of those that are of industrial importance.

In well No 4, a coal seam with a thickness of 2 m was opened above the CH-4 formation. in well No. 2, directed to the west, this layer alternates with sequentially arranged thin layers of coal, clay coal and coal clays. Coal seams are high-ash with an ash content of up to 39.98%. According to such properties, this part of the coal formation has no industrial significance.

Based on the above information, we can conclude:

- each insulated bundle of coal is characterized by its own individual features that allow them to be isolated and isolated from each other in structures; such characteristics include the composition of the bundle, its thickness and ash content of coal;
- the thickness of the pack "CH-2" decreases in the east direction, the thickness of the packs "CH-3" and "CH-4" increases towards the center, and then decreases;
- in the upper part of the packages "CH-3" and "CH-4", their structure becomes more complicated and the ash content increases;
- the "CH-2" packaging is considered the most unchangeable in terms of quality and composition;

- in general, the coal content of Jurassic sediments decreases in the eastern direction. As mentioned above, for technical reasons, the previous work was not carried out in full. Therefore, in the future planned exploration work, it will be necessary to clarify the geological structure of the coal seam.

As a result of technical and economic calculations carried out according to the data of exploration work carried out at the Gaznau field in 1990-1992, it was established that the industrial development of the field will be profitable only if it is accompanied by the development of the Atukchi mine.

In order to develop the energy coal raw material base of the Eastern Uzbekistan (Ferghana) economic region, the leadership of the Republic of Uzbekistan provides for prospecting operations at the promising Vodil deposit in the southern part of the Ferghana valley of brown coal.

In total, 7 wells were drilled in the period from 1993 to 1998, 4 of which opened a coal seam, and 3 of them a Paleozoic layer, and the work was stopped. None of the works provided for by the project have been completed:

-engineering-geological and hydrogeological studies of wells;
- Baikal sampling;
- petrographic definitions;
- study of the gas content of coal and rocks;

To export the extracted coal, it was planned to build a railway with a length of 24 km from the Ferghana station to the Vodil station.

Earlier (1993-1998), the following letters of recommendation were compiled on the basis of geological exploration work:

-Study of hydrogeological and engineering-geological conditions of water-coal manifestation;
- This project provides for prospecting and detailed evaluation work on the territory of the water-coal deposit;
- GOST 25543-88"Storm coals, stones and anthracites" «Coal brown, stone and anthracites»

Figure 2: Vodil brown coal

CONCLUSION

Our main goal is to ensure the growth of consumer demand for coal, to reduce the volume of coal imports from abroad. The study of useful elements in the composition of coal, conducting geochemical studies, identifying promising territories, providing the domestic market with high-quality coal.

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