



Sarykum Deposit (coal and anthracite)

Location

The Sarykum deposit is located in the North-western Balkhash region in the Priozerny district of Karaganda Region. The town of Balkhash and railway stations Balkhash 1, 2 are located 70 km to the east of the deposit. Aktogay-Mointy railway line runs in the northern part of the deposit. The nearest railway station, Sarykum, is 12 km to the northwest of the centre of the deposit.



Valuable Components

Humus coal is ashy (10-48%), highly metamorphosed to anthracite, 91- 92% carbon content. The average ash content of the upper layer is 23.9%, and that of the lower layer is 44.2% (according to geophysical data, the ash content is expected to decrease by 2-3 times). The high quantity of alumina in ash (36.8%).

The coals are mostly low sulphur up to 1.8% and sulphurous up to 2.6% in some places. Coals are low-phosphorous, and some of the layers are easily beneficiated.

Associated minerals: germanium - 3 g/t, scandium - 40 g/t, gallium up to 20 g/t.

Subsoil Use Contract

The current Subsoil Use Contract for Geological Prospecting is concluded for 6 years.

The allotment's area is 302.72 km².

Intended Purpose of Investments

Searching for a potential buyer of the presented target or joint venture partner for the development of project at the Sarykum deposit.

Deposit's Coal Characteristics

Coal grade A as per GOST 9276-72. Anthracite as per GOST 25543-82 A. Group 1A to 3A. Ash content in the upper layer is up to 26%, and in the lower layer up to 50%. According to 2017 geophysics and drilling data, ash content is expected to decrease by 1.2-1.5 times. The combustion heat of ash-free coal is 7887-8365 kcal/kg. The moisture of the analysis sample is 1.0%.



Coal beneficiation achieved ash content reduction up to 8%-20% in different samples.

The product yield of Sarykum coal beneficiation using the anthracite scheme

Layer designation	A ^d of initial coal, %	Concentrate less than 1.8 g/cm ³		Middlings less than 2 g/cm ³		Waste		Indicative price, USD
		layer yield, %	A ^d	layer yield, %	A ^d	layer yield, %	A ^d	
Promising with high added value (can be used in the production of carbonaceous filler for electrode products, calcium carbide in the chemical industry, metallurgy)								
K9*	27.2	87.5	8.3	3.8	31.6	8.7	80.1	Anthracite lump prices are about 250 USD
K8*	33.7	64.4	18.9	-	-	35.6	56.1	
K2*	34.6	72.5	18.0	-	-	27.5	77.6	
For use in the electric power industry, metallurgy, and public utilities sector								
K3*	52.6	35.4	28.5	23.4	49.9	41.1	71.0	90-150 USD
K1*	50.9	1.4	23.6	23.5	29.7	75.0	57.1	
K4*	47.9	37.2	24.7	25.7	42.3	36.5	74.1	
K5*	44.1	53.7	26.5	16.6	48.6	29.6	71.2	
K6*	37.4	0.9	20.0	40.4	27.5	58.3	50.2	
K7*	46.7	0.1	20.0	2.6	22.3	97.2	47.0	

*Calculation was made for the bulk of coal

*Based on geophysics and exploration drilling carried out in 2017, the ash content in the K1-K8 layers is expected to decrease by 1.2-1.8 times.

Grades of Sarykum coal washability

1. Easily beneficiated layers:
 - K2 with an average thickness of 2.19 m
 - K8 with an average thickness of 1.6 m
 - K9 with an average thickness of 1.79 m.
2. Difficult to beneficiate layers:
 - K3 with an average thickness of 2.84 m.
3. Very difficult to beneficiate layers:
 - K1 with an average thickness of 1.43m
 - K4 with an average thickness of 3.08m
 - K5 with an average thickness of 0.5m
 - K6 with an average thickness of 1.6m
 - K7 with an average thickness of 1.38 m

According to geophysics data, the thickness of the layers is expected to increase by 0.2-6.8 m.

The application scope of the Sarykum deposit coal: chemistry, electrical engineering, metallurgy, power engineering, coal chemistry, and public utilities.



Analysis of Previous Works Performed

Drilling carried out at the deposit does not meet accepted standards, with core yields in coal intervals reaching 15-30% in places.

Comparison of the borehole logs with the log strip allows predicting with a high degree of confidence a significant increase in layer thickness and a reduction in ash content, as during single column drilling the high-grade coal was abraded in the first place due to its lower hardness.

The average thickness increase across the 15 available intersections is 1.31m, varying from +0.2m to 6.80m. Recalculating the reserves within the sections where the comparison was made, a 27.8% increase is obtained. Having distributed it over all reserves, approved for open-pit mining, a growth of 37,850.0 thousand tonnes is obtained with the stripping ratio of 5.03 t/m³.

Reserves and Resources

Summary table of reserves and resources:

Indicator	Reserves of rock mass, thou. tonnes		Ash content, %	Stripping ratio, m ³ /t
	C ₂	P ₁		
In an open pit up to a depth of 150 metres	136,153,560	15,910,232	10,1 - 43,3	6-7, *Geophysical data suggests a reduction to 5
Outside the open pit	280,838,967	140,965,411	15 - 46,8	the remaining reserves are planned to be mined from the pit wall by inclined adits
total	416,992,527	156,875,643		

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