



ArcelorMittal

Baimuhametov Sergazy
Doctor of Engineering
Kazakhstan

**“ArcelorMittal Temirtau” JSC Coal Division issues in terms of coal
mine methane**

October 2014

“AMT” JSC CD employees have more than 50 years of experience in terms of methane extraction (coal seams degassing) and its utilization.

8 Coal Division mines produce approximately 11 million tones of the coking coal.

The main limiting factor for the production level increase is the high gas content (18-24m³/t) along with the coal seams low gas permeability. ($2-3 \cdot 10^{-2}$ milidarcy)

The maximum development speed in outburst hazardous seams is 100-120 meters/month due to the need in outbursts protection measures realization.

The average production faces capacity is lower than 3000-4000 tones/day only due to the gas factor. Furthermore, the absolute methane release in production faces comes up to 80-90 m³/min, and in the specific case is over 150m³/min. The next slide shows You the absolute methane release in Abayskaya mine K10 seam production faces.

Mine	Daily longwall production rate , t/day	Methane capturing by means of ventilation, m3/min	Methane capturing by means of degassing, m3/min		The absolute methane release in the section,m3/min	The complex degassing efficiency,%
			Goaf area	Seam		
“Abayskaya” mine K10 North wing	4 000	33,3	102,7	3,3	139,3	73,7
“Abayskaya” mine K10 South wing	3 500	15,2	128,1	8,2	151,5	90

The biggest issue for the Coal Division, up to date, is the prevention of the sudden coal and gas outbursts. There were 58 sudden coal and gas outbursts since 1959 in Karaganda coal field mines. 5 sudden outbursts happened in the last 5 years.

The coal development faces gas release is 8-10m³/min in case of development speed equal to 6-8 meters/day.

For this reason, the big amount of works is realized in terms of coal seams preliminary degassing in Coal Division mines.

Annually, more than 450km of the underground degassing boreholes and 70 surface vertical boreholes with depth of up to 600m are drilled.



The most efficient method of the seams degassing is undermining. At that, the natural seam gas content is reducing by 80-90% (as K12 seam was undermined by K10 seam). However the geological factor of the seams bedding does not allow to use this method all the times.

The acceptable development speed was achieved in high outburst hazardous D6 seam only after the development of the additional heading in rock 8-12 meters under the seam and degassing of D6 seam from this heading

This method is expensive, but there is no alternative method of safe development in high outburst hazardous D6 seam up to date.



There are approximately 300mln. m³ of methane being released during mining, approximately 100mln.m³ (>25%) of it is the commercial methane which can be utilized for the 40mW of the electric power generation for the local consumers.

The work is performed in terms of methane utilization at Coal Division mines. The boilers are equipped for heat generation from methane at “Kostenko”, “Abayskaya”, “Lenina” and “Shakhtinskaya” mines. The (“Jenbacher”) electric power generator is in work at “Lenina” mine since November 2011 with the capacity of 1,4 mW.

The pilot project experience showed the payback period of this installation equal to 2-2,5 years (moreover the methane cost is not accounted due to its production for mine safety). Last year this installation produced 5mln.kW/hour of the electric power.

Taking into account the positive experience of the pilot project “ArcelorMittal” has held the tender for the electric power generation with the total capacity of 20mW and chose the “Harworth Energy East” company (England) for this project realization. The company has to realize the projecting and to start the power generation by January 2015.

The DMT company laboratory has been purchased and successfully works for the physical-chemical coal parameters identification. The agreements were concluded with this company in terms of researching and measures development for the gas-dynamic phenomenas prevention in Coal Division mines.

The DMT company seismic-acoustic station was purchased for the geological faults identification.

The Republic of Kazakhstan Government has approved the strategy for the methane production from the not-mined seams of Karaganda coal field.

The private companies were invited for this.

The “KazTransGas” company has created the joint concern with the “Le MarCA” company and went to the expenses for the test boreholes drilling in low gas permeability seams and the development of the industrial methane production technology.

Recently, through the support of the corporate office the big work was performed in terms of coal seams degassing improvement and sudden outbursts prevention. We want to thank Mr. Van Zyl, Mr. David Vint and Mr. Maarten Velzeboer for their support. With their help the Karaganda coal seams features research was realized by means of “Sigra” Australian company , DMT (Germany) company and “Harworth Energy” (Great Britain) company.

Thanks for Your attention!