



# Deep Gassy Coal Mines of Karaganda Coal Basin

**U.S. Environmental Protection Agency**  
**December 2011**



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(Coal/methane production, incl. predictions)

Prepared for the U.S. EPA Coalbed Methane Outreach Program by the Methane Center, Kazakhstan, through an Interagency Agreement with Pacific Northwest National Laboratory

December 2011

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## Introduction

### Karaganda Coal Basin

The Karaganda Coal Basin (Fig. 1) is located in the area of Karaganda and in the center of the Karaganda oblast of Kazakhstan. The overall area of the basin is 3, 600 sq km, with a length (from west to east) of 120 km and a width of 30–50 km. The terrain of the basin is mainly steppes and bare hills. The carbon coal content portion of the basin is about 2000 km<sup>2</sup> and 4000m deep. Four synclines are notable in the basin: Tentek, Sherubainur, Karaganda, and Verkhnesokursk. The first three of these comprise the industrial part of the basin and are studied to a depth of 700-1300m. Productive sediments are represented by Ashlyarik (C1), Karaganda (C1), Dolinsk (C2), and Tentek (C2-3) series, which contain up to 30 coal seams with a total working thickness of 40m. Coal ash content varies from 10-35 %, with the smaller percentage typically found at the top of the section. The most widespread coals are hvBb to mvb types. The Karaganda basin has high gas content, and gas content layers range from 400-500m to 15-20 m<sup>3</sup>/t at the beginning of the methane zone and are more stabilized at a depth between 22-27 m<sup>3</sup>/t. The gas weathering zone depth varies within the limits of 60-250 m.

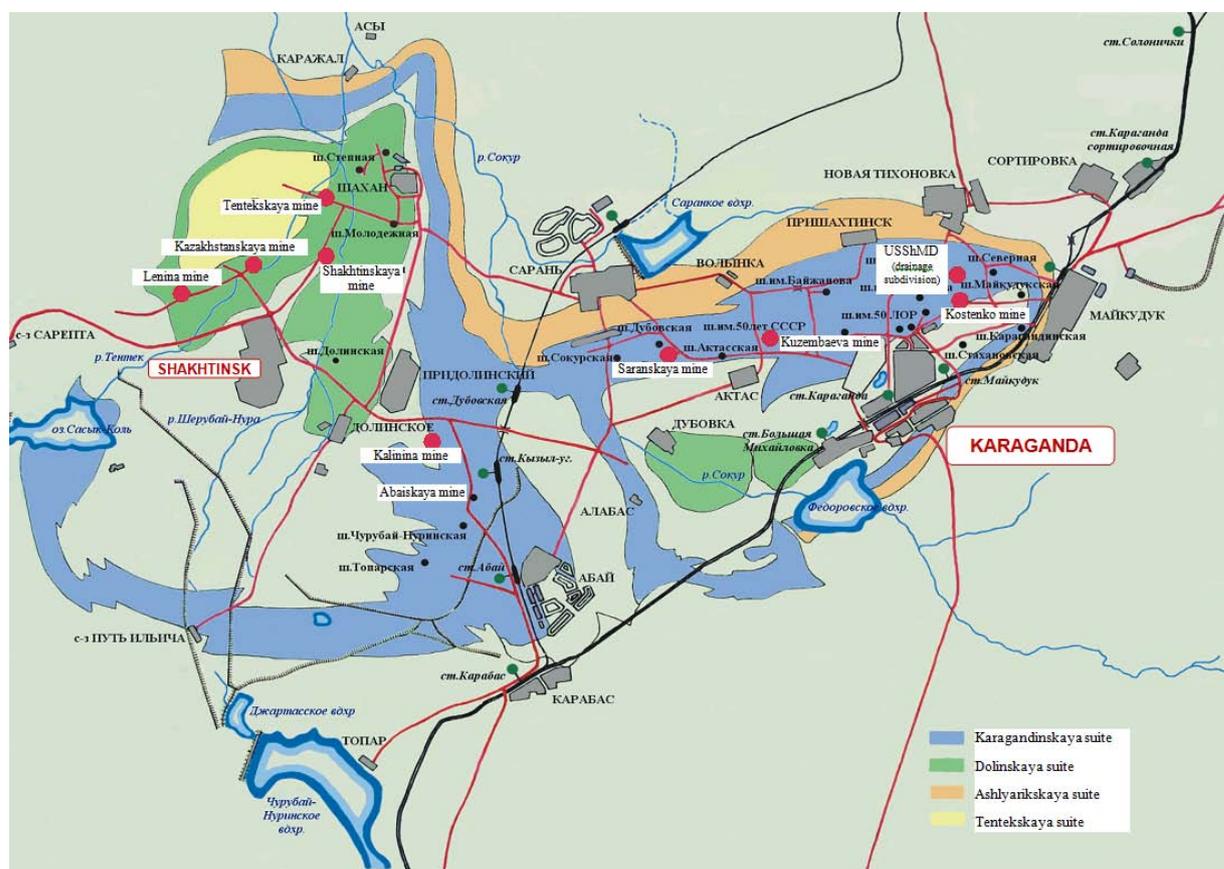


Figure 1. The Karaganda Coal Basin

Total coal resources of the basin up to a depth of 1800m are estimated at 41.3 billion tons.

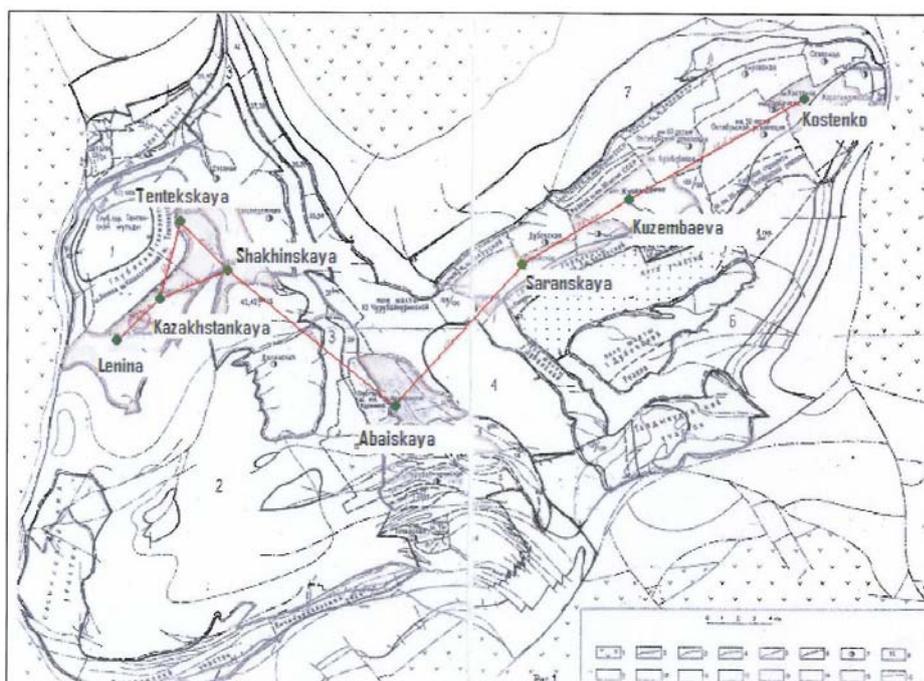


Figure 2. Eight Coal Mines of ArcelorMittal Temirtau

### ***Karaganda Coal Mines***

ArcelorMittal Temirtau acquired 15 coal mines in 1996 in the Karaganda Coal Basin region (all deep mines in the region). These mines were restructured into eight captive coal mines: Kostenko, Kuzembaev, Saranskaya, Abaiskaya, Kazakhstanskaya, Lenina, Shaktanskaya, and Tentetskaya (Figure 2). These coal mines are all underground mines that use the retreat longwall mining method.

The mines produce primarily coking coal used for steelmaking at Temirtau and thermal coal for ArcelorMittal Temirtau's power plants. For beneficiation of coking coal, two washeries are operated—one located near several of the coal mines and the other at the ArcelorMittal Temirtau steel plant. Surplus coal is supplied to group steel plants, mainly ArcelorMittal Kryviy Rih, Ukraine.

## Kazakhstanskaya Mine

The Kazakhstanskaya mine, which is located in the Shakhtinskiy area of Karaganda region (approximately 60 km from the city of Karaganda and 80 km from Karaganda airport), was commissioned in 1969 with a designed capacity of 2.7 million tons of coal per year. During the period from 1969 to 2010, the mine produced 67.6 million tons of coal. The maximum amount of production was reached in 1973—2.8 million tons. The Coal Division of JSC “ArcelorMittal Temirtau” acquired the mine on July 1, 1996 and it has been a large, highly mechanized enterprise since then.

Coal mining operations are held by complexes Glinik 15/29, GM 14/22 (Poland) with combines SL-300, SL-300N and plow unit "Glyaitobel" (Germany) with the mechanical roof support Glienicke 066/16. Drifting is run by combines KSP-32, GPKS, P110-01. Other mine characteristics include:

- *Mined coal type:* KZh
- *Total reserves of the mine:* 103.4 million tons
- *Mine shafts:* Mine operations secured with 8 shafts
- *Total length of existing roadways:* 74.9 km
- *Employees:* 1860 employees work at the mine

ArcelorMittal Temirtau plans to mine 1.6 million tons of coal at Kazakhstanskaya mine in 2011, 1.8 million tons in 2012, and 1.8 million tons for 2013. In the second half of 2011, longwall 232D6 was in operation with an extraction capacity of 2.3 m of the seam thickness; the total thickness of the seam is 4.97 m. ArcelorMittal Temirtau began to prepare a high gas content longwall 312D6 in 2011.

The average daily mining rate for the longwall is 3,300. The gas extraction for the longwall is 11 m<sup>3</sup>/min. The longwall is operated without a gas drainage system.

### **Specification of Coal Seams**

The Kazakhstanskaya mine has rights to develop the following coal seams: T3, T1, T11, D10, D9, D6, D5, D4, D3, and D1. Seams D6 and D11 are currently being developed, and D10 is being prepared for development.

Seam D6 is the thickest and most stable seam of the Dolinskaya suite. Its effective thickness varies from 2.92 to 7.04 m, with an average thickness of 5.44m. The seam has a complex structure where up to 8-10 interlayers of strata of different thicknesses (usually not exceeding 0.2m) are being noted. The most stable is the waste strata interlayer of 0.05-0.20m, appearing in the upper part of the seam. The other strata interlayers are lens-shaped.

Seam D11 is relatively stable and of moderately complex structure. Its effective thickness varies from 0.7 to 1.69m, with an average thickness of 1.13m. Thin strata interlayers of 0.05-0.20m are noted in the upper part of the seam. The seam has a complex, easy-breaking roof, with a thickness of 0.5-0.7m.

Seam D10 is relatively stable and has a complex structure and thickness of 1.14m. The formation interlayer of 0.05-0.30m splits the seam into two banks, with the upper bank being 1.5-2 times larger than the lower one.

In terms of continuity of thickness and structure, the coal seams are specified as follows:

- Continuous – D6
- Relatively continuous – T3, T1, D11, D10, D1
- Irregular seams – D9, D5, D4, D3.

Additional specifications of the seams are shown in Table 1.

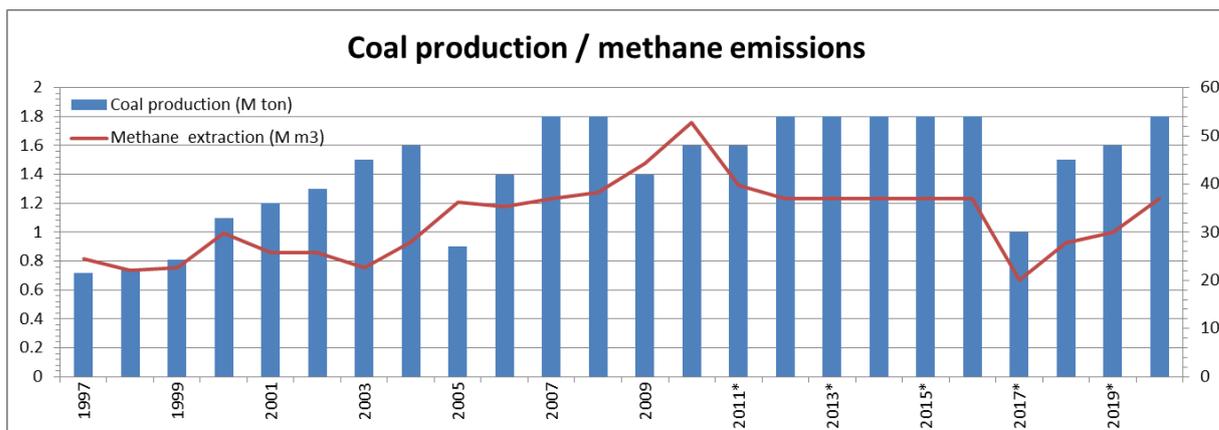
**Table 1. Specifications of coal seams (Kazakhstanskaya)**

Seam index	Thickness, m	Seam ash content, %	Ash content of coal basis, %	Inherent gas content, m <sup>3</sup> /t. dry ash-free basis
T3	1.66	40.0	24.9	13.5
T1	1.62	29.2	22.0	20-21.2
D11	1.13	24.0	19.2	19.2-21.5
D10	1.14	28.8	19.0	19.2-21.5
D9	1.29	23.5	19.1	19.2-21.5
D6	5.44	21.8	18.4	19.2-24.2
D5	0.90	21.0	21.0	9.0-23.2
D4	0.80	23.0	23.0	9.0-23.2
D3	0.80	25.0	22.0	9.0-23.2
D1	1.30	21.0	16.0	9.0-23.2

**Table 2. Basic specifications of the mine (Kazakhstanskaya)**

Depth of mining operations, m	470-640
Total area of mining allotment, km <sup>2</sup>	30
Depth of shafts, m	240 to 815
Mining rate, t/day	3,300
Annual electricity consumption, MWh	60,054
Annual heat consumption, 2010, Gcal/a	85,602
Type of boilers	KV-11.6/150 (4 units)
Fuel consumption, tons/a	2010 – 14,546 2011 – 15,124
Covered fuel demand (CMM), %	0

### Statistical Data and Trends (Kazakhstanskaya)



\*Projection: 2011-2020

### Historical Production and Emissions (Kazakhstanskaya)

Years	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
<b>Coal (mln.t/a)</b>	0.72	0.75	0.81	1.1	1.2	1.3	1.5	1.6	0.9	1.4	1.8	1.8	1.4	1.6	1.6
<b>Methane, ventilation (mln.m3)</b>	22.1	20.2	21.3	23.2	21.6	23.4	15.8	25.3	31.1	28.32	30.2	32.4	36.5	34.2	29.3
<b>Methane, degasification (capturing) (mln.m3)</b>	2.3	1.8	1.4	6.6	4.2	2.3	6.9	2.6	5.2	7.03	6.8	5.8	7.8	18.6	10.4
<b>Emissions (mln.m3)</b>	24.4	22.0	22.7	29.8	25.8	25.7	22.7	27.9	36.3	35.3	37.0	38.2	44.3	52.8	39.7
<b>Overall emissions (mln.m3)</b>	24.4	22.0	22.7	29.8	25.8	25.7	22.7	27.9	36.3	35.3	37.0	38.2	44.3	52.8	39.7

### Production and Emission Forecast (Kazakhstanskaya)

Years	2012	2013	2014	2015	2016	2017	2018	2019	2020
<b>Coal (mln.t/a)</b>	1.8	1.8	1.8	1.8	1.8	1.0	1.5	1.6	1.8
<b>Methane, ventilation (mln.m3)</b>	30.2	30.2	30.2	30.2	30.2	15.3	22.1	23.7	30.2
<b>Methane, degasification (capturing)</b>	6.8	6.8	6.8	6.8	6.8	4.8	5.7	6.3	6.8

<b>(mln.m3)</b>									
<b>Emissions (mln.m3)</b>	<b>37.0</b>	<b>37.0</b>	<b>37.0</b>	<b>37.0</b>	<b>37.0</b>	<b>20.1</b>	<b>27.8</b>	<b>30.0</b>	<b>37.0</b>
<b>Overall emissions (mln.m3)</b>	<b>37.0</b>	<b>37.0</b>	<b>37.0</b>	<b>37.0</b>	<b>37.0</b>	<b>20.1</b>	<b>27.8</b>	<b>30.0</b>	<b>37.0</b>

## Lenina Mine

Lenina mine is located in Shakhtinskiy district of Karaganda oblast (approximately 60 km from Karaganda city and 80 km from Karaganda airport). It was commissioned in 1964 with a designed capacity of 2.1 million tons of coal per year. From 1964 to 2010, Lenina mine produced 92.8 million tons of coal. The maximum amount of production, 3.09 million tons, was reached in 1977. The Coal Division of JSC “ArcelorMittal Temirtau” acquired the mine in July 1, 1996 and it has been a large, highly mechanized enterprise since then.

Coal mining operations are held by complex 2OKP-70K and combine 1KShE. Drifting is run by combines KSP-32, GPKS. Other mine characteristics include:

- *Mined coal type:* KZh
- *Total reserves of the mine:* 65.6 million tons
- *Mine shafts:* Mine operations secured with 8 shafts
- *Total length of existing roadways:* 75.1 km
- *Employees:* 1812 employees work at the mine

ArcelorMittal Temirtau plans to mine 1.13 million tons of coal at Lenina Mine in 2011, 1.15 million tons in 2012, and 1.3 million tons in 2013. The extracting capacity of the longwall 401D6-1Z is 3.5 m and the total thickness of the seam is 6m.

The average daily mining rate for the longwall is 3,460. Overall gas extraction for the site is 55.3 m<sup>3</sup>/min, incl. 25.28 m<sup>3</sup>/min by ventilation and 20.02 m<sup>3</sup>/min by the gas drainage system.

### **Geological Conditions**

The field of Lenina mine is represented by an asymmetrical synclinal fold that is complicated by plicative and disjunctive imperfections and faults. The geological structure of coal-bearing strata is represented by argillites, siltstones and sandstones of carbonic age. The productive layer is presented by seams of Dolinskaya suite: D1, D3, D5, D6, D9, D10. Slope angles of the seams are 34-20° (at the outcrop up to 70°). All of the seams are considered dangerous with outbursts. The main coal grade is KZh with rare 1K Coke and 2K Coke.

**Table 3. Specification of coal seams (Lenina)**

Seam index	Thickness, m	Inherent gas content, m <sup>3</sup> /t. dry ash-free basis
D1	1.0-1.3	19-20
D3	1.1-1.46	19-20
D4	up to 1.0	19-20
D5	0.5-1.1	19-20

D6	4.7-6.5	25-27
D9	1.2-2.2	19.8-21.4
D10-11	up to 2.5	19.8-21.7

**Table 4. Basic specification of the mine (Lenina)**

Depth of mining operations, m	655	
Total area of mining allotment, km <sup>2</sup>	10.7	
Depth of shafts, m	240 to 828	
Mining rate, t/day	3000	
Annual electricity consumption, MWh	67.164	
Annual heat consumption, 2010, Gcal/a	92,953	
Type of boilers	KVTS-10 (4 units) KV-11.6 (1 unit)	
Fuel consumption, tons/a	20,030	
Covered fuel demand (CMM), %	20	

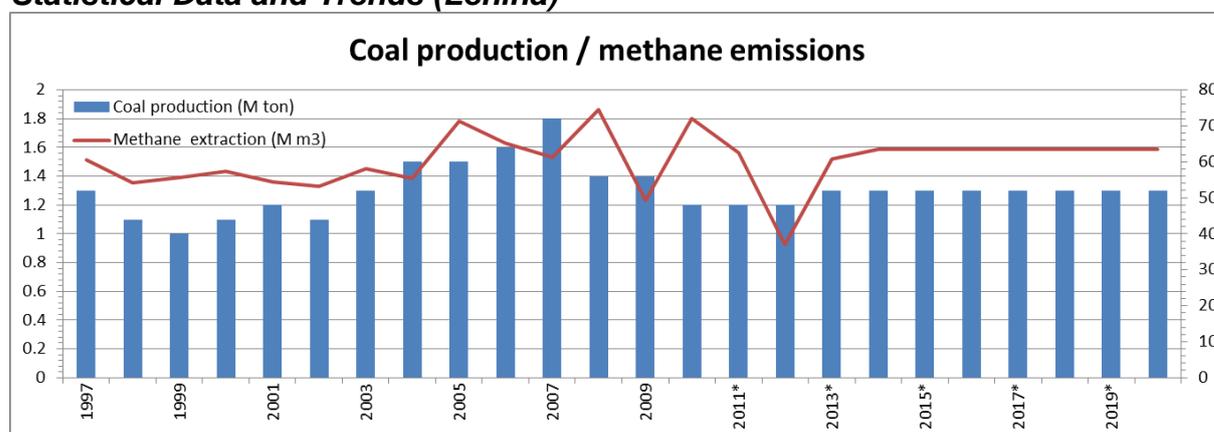
### Project Highlight

In November 2011, the first CMM-fired power generation unit in the Karaganda coal basin was installed at Lenina mine. The design institute Promelektronika-K worked on the pilot project and supplied a 1.4MW Jenbacher engine. USShMD of the Coal Division of JSC ArcelorMittal Temirtau was responsible for the gas transportation and treatment design. Sergazy Baimukhametov, Advisor to the Director on Modernization and Production Development of JSC ArcelorMittal Temirtau, coordinated the project's overall implementation.

The installed auxiliary equipment includes a gas cooling device, a vacuum-pumping station (MDRS-180 of PRO-2), a 2-MW transformer, an insulated gas pipeline of 500mm in diameter and approximately 1 km length, and connection to the grid of about 2.5 km.

The current level of power generation by the unit is close to the designed capacity (1.4 MW/h) with a CMM concentration in the pipeline varying from 24 to 50% and a flow of about 10 m<sup>3</sup>/min (pure methane). The generated electricity is fed to the group substation of Lenina mine and covers up to 20% of its power load. The unit is automatically operated.

### Statistical Data and Trends (Lenina)



\*Projection: 2011-2020

**Historical Production and Emissions (Lenina)**

Years	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
<b>Coal (mln.t/a)</b>	1.3	1.1	1.0	1.1	1.2	1.1	1.3	1.5	1.5	1.6	1.8	1.4	1.4	1.2	1.2
<b>Methane, ventilation (mln.m3)</b>	52.3	46.4	43.6	48.8	45.1	44.2	43.2	37.3	49.8	38.8	36.8	50.7	31.3	49.8	38.1
<b>Methane, degasification (capturing) (mln.m3)</b>	8.2	7.8	12.1	8.5	9.3	8.9	15.0	18.0	21.5	26.4	24.6	23.9	18.1	22.2	24.3
<b>Emissions (mln.m3)</b>	60.5	54.2	55.7	57.3	54.4	53.1	58.2	55.3	71.3	65.2	61.4	74.6	49.4	72.0	62.4
<b>Overall emissions (mln.m3)</b>	60.5	54.2	55.7	57.3	54.4	53.1	58.2	55.3	71.3	65.2	61.4	74.6	49.4	72.0	62.4

**Production and Emission Forecast (Lenina)**

Years	2012	2013	2014	2015	2016	2017	2018	2019	2020
<b>Coal (mln.t/a)</b>	1.2	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3
<b>Methane, ventilation (mln.m3)</b>	45.1	46.7	46.7	46.7	46.7	46.7	46.7	46.7	46.7
<b>Methane, degasification (capturing) (mln.m3)</b>	15.8	16.7	16.7	16.7	16.7	16.7	16.7	16.7	16.7
<b>Emissions (mln.m3)</b>	60.9	63.4	63.4	63.4	63.4	63.4	63.4	63.4	63.4
<b>Overall emissions (mln.m3)</b>	60.9	63.4	63.4	63.4	63.4	63.4	63.4	63.4	63.4

## Abaiskaya Mine

The Abaiskaya mine is located in the Abai district of Karaganda oblast (approximately 35 km from Karaganda city and 55 km from the Karaganda airport). The mine was commissioned in 1961 with a designed capacity of 0.9 million tons of coal per year. From 1961 to 2010, the mine produced 48.9 million tons of coal. The maximum amount of production, 1.45 million tons, was reached in 1991. The Coal Division of JSC ArcelorMittal Temirtau acquired the mine on July 1, 1996 and it has been a large, highly mechanized enterprise since then.

Coal mining operations are held by complex 2OKP-70K and combine SL-300. Drifting is run by combines KSP-32, GPKS, P110-01M. Other mine characteristics include:

- *Mined coal type:* K
- *Total reserves of the mine:* 81.6 million tons
- *Mine shafts:* Mine operations secured with 6 shafts
- *Total length of existing roadways:* 45.7 km
- *Employees:* 1133 employees work at the mine

ArcelorMittal Temirtau anticipates mining 1.15 million tons of coal at Abaiskaya Mine in 2011, 1.1 million tons in 2012, and 1.1 million tons in 2013. Extracting capacity of the longwall 321K10-U is 3.9 m, and the total thickness of the seam is 4.8m.

Average daily mining rate for the longwall is 2,500. Overall gas extraction for the site is 131.2 m<sup>3</sup>/min, incl. 17.1 m<sup>3</sup>/min by ventilation and 114.1 m<sup>3</sup>/min by gas drainage system.

### **Geological Conditions**

The geological structure of the Abaiskaya mine (formerly the Kalinina mine) is represented by sedimentations of carbonic, paleogene, neogene, and quarternary age. The carbonic section is represented by a full section of Karaganda suite divided into three sub-suites: lower (seams K1-K6), middle (seams K7- K14), and upper (seams K15- K20). Lithological content of the strata is represented by interbedding of sandstones, siltstones, argillites, carbonaceous argillites, and coal seams. Thickness of the suite sedimentations is 750m. The field of the Abaiskaya mine is located in the Southern part of the northeastern flank of Sherubai-Nurinskaya synclinal as a big tectonic block limited by a series of overlap faultings. Slope of the seam mainly varies 10 to 25° to the northwest. The area is complicated with folds and disjunctive imperfections. Results of exploratory works have indicated 91 disjunctive faults and 82 low-swing imperfections with amplitude distortion of 3-5m spreading from 50 to 300m. Zones of the imperfections have intensive cleavage of the strata with trace of drifts along sliding surfaces.

**Table 5. Specification of coal seams (Abaiskaya)**

Seam index	Inherent gas content, m <sup>3</sup> /t. dry ash-free basis
K18 (top)	18-22
K13 (bot)	18-20
K12	18-20
K10	20-24
K11	18-20
K7	20-22

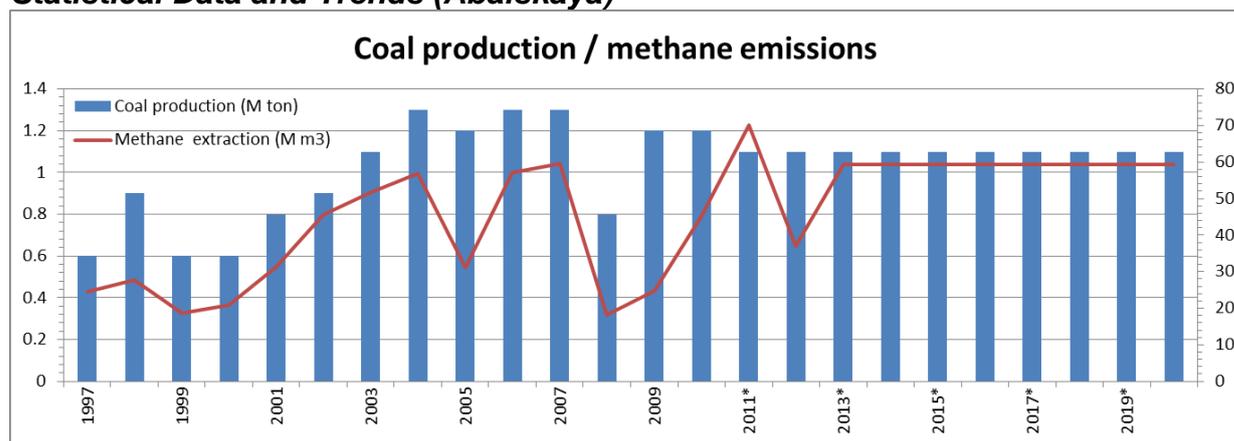
**Table 6. Basic specification of the mine (Abaiskaya)**

Depth of mining operations, m	549
Total area of mining allotment, km <sup>2</sup>	34.45
Depth of shafts, m	250 to 490
Mining rate, t/day	3,313
Annual electricity consumption, MWh	45.570
Annual heat consumption, 2010, Gcal/a	36,412
Type of boilers	KE-25/14 (3 units – coal) KVTS-10 (1unit – gas)
Fuel consumption, tons/a	8,797
Covered fuel demand (CMM), %	76.6

- coal-based thermal energy consumption – 27891 Gcal;

- methane-based thermal energy consumption – 8521 Gcal.

### Statistical Data and Trends (Abaiskaya)



\*Projection: 2011-2020

**Historical Production and Emissions (Abaiskaya)**

Years	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
<b>Coal (mln.t/a)</b>	0.6	0.9	0.6	0.6	0.8	0.9	1.1	1.3	1.2	1.3	1.3	0.8	1.2	1.2	1.1
<b>Methane, ventilation (mln.m3)</b>	17.8	20.4	18.6	17.1	22.1	26.7	28.1	29.0	22.1	26.5	28.4	15.9	18.9	26.3	25.9
<b>Methane, degasification (capturing) (mln.m3)</b>	6.8	7.3	0.1	0.1	9.4	18.9	23.6	27.9	9.1	30.7	31.3	2.3	5.8	18.8	44.3
<b>Emissions (mln.m3)</b>	24.6	27.7	18.7	20.8	31.5	45.6	51.7	56.9	31.2	57.2	59.7	18.2	24.7	45.1	70.2
<b>Overall emissions (mln.m3)</b>	24.6	27.7	18.7	20.8	31.5	45.6	51.7	56.9	31.2	57.2	59.7	18.2	24.7	45.1	70.2

**Production and Emission Forecast (Abaiskaya)**

Years	2012	2013	2014	2015	2016	2017	2018	2019	2020
<b>Coal (mln.t/a)</b>	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1
<b>Methane, ventilation (mln.m3)</b>	28.1	28.1	28.1	28.1	28.1	28.1	28.1	28.1	28.1
<b>Methane, degasification (capturing) (mln.m3)</b>	31.3	31.3	31.3	31.3	31.3	31.3	31.3	31.3	31.3
<b>Emissions (mln.m3)</b>	59.4	59.4	59.4	59.4	59.4	59.4	59.4	59.4	59.4
<b>Overall emissions (mln.m3)</b>	59.4	59.4	59.4	59.4	59.4	59.4	59.4	59.4	59.4

## Tentekskaya Mine

The Tentekskaya mine is located in the Shakhtinskiy district of Karaganda oblast (approximately 60 km from Karaganda city and 80 km from the Karaganda airport). The mine was commissioned in 1979 with a designed capacity of 4 million tons of coal per year. From 1979 to 2010, the mine produced 50.2 million tons of coal. The maximum amount of production, 2.895 million tons, was reached in 1988. The Coal Division of JSC ArcelorMittal Temirtau acquired the mine on July 1, 1996. Like the other ArcelorMittal Temirtau mines, Tentekskaya mine been a large, highly mechanized enterprise since then.

Coal mining operations are held by complex 2OKP-70K and combine SL-300. Drifting is run by combines KSP-32, GPKS and P110. Other mine characteristics include:

- *Mined coal type:* KZh
- *Total reserves of the mine:* 134.9 million tons
- *Mine shafts:* Mine operations secured with 7 shafts
- *Total length of existing roadways:* 61 km
- *Employees:* 1605 employees work at the mine

0.959 million tons of coal are planned for mining in 2011; 0.9 million tons are planned for 2012; and 1.2 million tons are planned for 2013. Extracting capacity of the longwall 193D6-U is 3.8 m, and the total thickness of the seam is 4.8m.

The average daily mining rate for the longwall is 2,400. Overall gas extraction for the site is 43.2 m<sup>3</sup>/min, including 16.8 m<sup>3</sup>/min by ventilation and 26.4 m<sup>3</sup>/min by the gas drainage system.

### **Geological Conditions**

Technical borders of the mine include the following 10 working coal seams: T3, T1, D11, D10, D9, D7, D6, D5, D4, D1. Mining activities are currently held on developing the seams T1 and D6.

Geological structure of the mine field is represented by sedimentations of over-karaganda, dolinskaya, and tentekskaya suites of carbonic age, overlaid by neogene, paleogene, and quaternary sedimentations of overall thickness from 7 to 86 m.

Over-karaganda suite is represented by argillites, siltstones, fine-grained sandstones, and lenses of coal interlayers.

Dolinskaya suite of overall thickness 520-550m is composed of argillites, siltstones, sandstones and coal seams D1-D11.

Coal seams and coal-bearing strata extend to the west with a 10°-20° angle. Slope angles in the central part of monoclinal increase up to 30°, and at the Northern part, up to 40°-50°.

The field of the mine is complicated by a significant number of disjunctive faults and plicative folding and limited by the big Churubai-Nurinskiy fault.

The Tentekskaya mine is considered dangerous with spontaneous coal and gas outbursts. Coal seams T1 and D6 (south, center) are dangerous at a depth of 350 m and seam D6 (north) – at a depth of 230 m.

The mine is noted for danger from dust.

Coals of the seam D6 are noted for spontaneous combustions.

The seam D6 is a subject to fire risk.

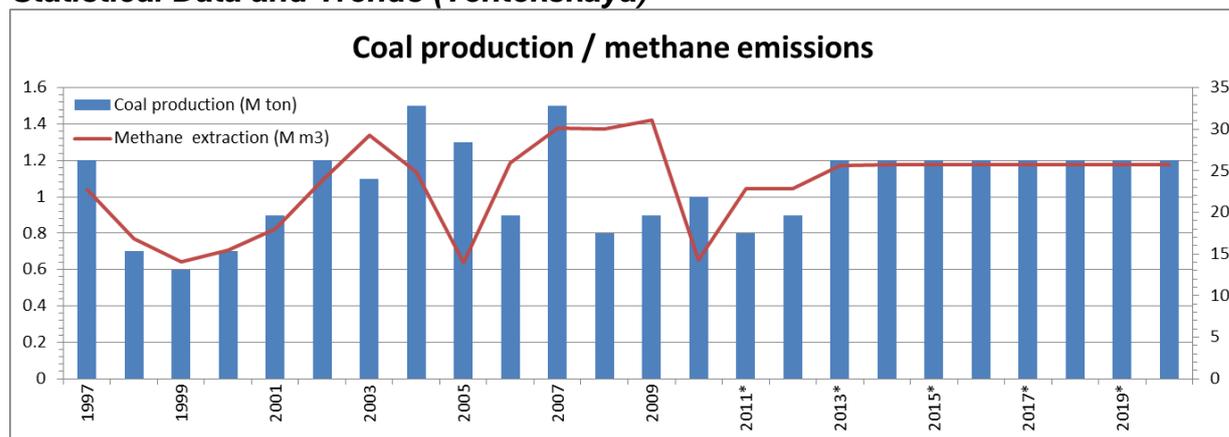
**Table 7. Specification of coal seams (Tentekskaya)**

Seam index	Thickness, m	Ash content of coal basis, %	Inherent gas content, m <sup>3</sup> /t. dry ash-free basis
D6	4-6	22	5-26
T1	1.3-2.0	20	5-20

**Table 8. Basic specification of the mine (Tentekskaya)**

Depth of mining operations, m	500
Total area of mining allotment, km <sup>2</sup>	71.47
Depth of shafts, m	119 to 578
Mining rate, t/day	3,000
Annual electricity consumption, MWh	40.3
Annual heat consumption, 2010, Gcal/a	46,028.68
Type of boilers	DKVR-20/13 (3 units) KV-1.6/150 (4unit) KE25/14 (1 unit)
Fuel consumption, tons/a	24,000
Covered fuel demand (CMM), %	Yes

**Statistical Data and Trends (Tentekskaya)**



\*Projection: 2011-2020

**Historical Production and Emission Forecast (Tentekskaya)**

Years	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
<b>Coal (mln.t/a)</b>	1.2	0.7	0.6	0.7	0.9	1.2	1.1	1.5	1.3	0.9	1.5	0.8	0.9	1.0	0.8
<b>Methane, ventilation (mln.m3)</b>	21.3	16.1	13.8	14.5	17.8	22.1	26.3	20.3	14.0	20.5	24.0	22.8	18.1	11.5	12.8
<b>Methane, degasification (capturing) (mln.m3)</b>	1.4	0.8	0.3	0.9	1.2	1.7	3.0	4.6	-	5.5	6.1	7.2	13.0	2.8	10.1
<b>Emissions (mln.m3)</b>	22.7	16.9	14.1	15.4	18.0	23.8	29.3	24.9	14.0	26.0	30.1	30.0	31.1	14.3	22.9
<b>Overall emissions (mln.m3)</b>	22.7	16.9	14.1	15.4	18.0	23.8	29.3	24.9	14.0	26.0	30.1	30.0	31.1	14.3	22.9

**Production and Emission Forecast (Tentekskaya)**

Years	2012	2013	2014	2015	2016	2017	2018	2019	2020
<b>Coal (mln.t/a)</b>	0.9	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
<b>Methane, ventilation (mln.m3)</b>	19.8	21.3	21.3	21.3	21.3	21.3	21.3	21.3	21.3
<b>Methane, degasification (capturing) (mln.m3)</b>	3.1	4.3	4.4	4.4	4.4	4.4	4.4	4.4	4.4
<b>Emissions (mln.m3)</b>	22.9	25.6	25.7	25.7	25.7	25.7	25.7	25.7	25.7
<b>Overall emissions (mln.m3)</b>	22.9	25.6	25.7	25.7	25.7	25.7	25.7	25.7	25.7

**Sources:**

Sergazy Baimukhametov, Advisor on Modernization and Production Development, Personal communication, Coal Division of JSk ArcelorMittal Temirtau, 2011;

USShMD (specialized degasation subdivision) of CD of ArcelorMittal Temirtau, Historical gas drainage systems' performance statistic data by mines: Kazakhstanskaya Mine, Lenina Mine, Abaiskaya Mine, Tentekskaya Mine

Coalbed Methane Deposits of Central Kazakhstan: INDUSTRIAL AND INVESTMENT POTENTIAL OF CARBONIFEROUS COAL FIELDS, Karjaev V.A., Mustafin R.K., Umarhadzhiyeva N.S., Alekseev E.G., 2006.

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