

THE MINERAL INDUSTRY OF BULGARIA

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Bulgaria was a regional producer of nonferrous metal ores and concentrates that met most of the country's domestic and export requirements. Relatively small quantities of iron and manganese ores and a variety of industrial minerals also were mined (asbestos, barite, fluor spar, gypsum, and limestone), largely for domestic consumption. However, most of Bulgaria's requirements for iron ore, steel, and mineral fuels had to be met through imports. The country's economy in 1996 gradually continued to recover. Preliminary data for 1996 showed slight growth in the value of total industrial production compared with that of 1995. Major decreases of mineral production have been halted and the production of most minerals in 1996 was within the range of 1995 levels of production.

The Government of Bulgaria continued to implement policies aimed at decentralizing and denationalizing the country's economy and promoting corporate restructuring in accordance with guidelines established by the International Monetary Fund (IMF). In 1996, to reach a financial arrangement with the IMF, in 1996, the Government of Bulgaria examined a large number of uneconomic enterprise for possible closure, which included coal mines, petroleum refineries, and electric power stations (Troev, 1996).

Bulgaria was a significant regional producer of copper. The country's major copper deposits are in the Srednogorie-Panagjurishte region of the country. Three mines were in operation during the year: the Asarel-Medet and Elatsite surface mines and the Chelopech underground mine. The MDK S.A. copper metallurgy plant smelted and refined copper in this region at Pirdop (Kraicheva, 1996). The Asarel-Medet and Elatsite open pit operations mined low-grade (0.2% to 0.3% Cu) porphyry ores, which, on the one hand, was offset somewhat by the lesser expense of open pit mining and, on the other, posed some serious environmental problems. The Chelopech mining operation worked a polymetallic deposit containing arsenic, germanium, gold, iridium, palladium, and silver, in addition to copper. Gold was the most important economic element in the Chelopech deposit because it represented a major portion of Bulgaria's known natural gold resources. However, the high arsenic content of the ore at this deposit also presented potentially serious environmental hazards. Copper also was produced from skarn-vein type copper ore in the Burgasko-Strandjanski region of the country (Kraicheva, 1996).

The restructuring process that occurred in Bulgaria's copper industry had the following results: Chelopech was organized into a state-funded limited liability company. Asarel-Medet, Elatsite, and MDK were reorganized as joint-stock companies with the state as the single equity holder (Mining Journal,

1996a). At this stage of reorganization, Bulgaria's copper producing and processing enterprises, despite continuing state ownership, were granted a large degree of independence with respect to decisionmaking about production and marketing (Mining Journal, 1996a). The process of denationalization was guided by the Constitution of Bulgaria, which defines subsoil/subsurface environment and its contained natural resources as the province of the state. Additionally, the law for Underground Natural Wealth of December, 1996, which was being developed, provided the state with regulatory control of mineral usage rights. The process leading to private mineral industry ownership, however, was not fully developed (Mining Journal, 1996a).

International interest in Bulgaria's potential gold production at Chelopech increased as the Homestake Mining Corp. of the United States decided to exercise its option to acquire a 50% stake in Navan Bulgarian Mining (NBM), a wholly owned subsidiary of Navan Resources of Ireland (Mining Journal, 1996b). Formerly, NBM formed a joint venture with Chelopech management, BIMAK-AD, to mine copper and gold in Bulgaria, as well as to introduce pollution abating technology. Owing to the high arsenic content of the Topolnitz tailing dam, the environmental law of 1991 caused the Government of Bulgaria to prohibit the processing of Chelopech ore at MDK with copper concentrate produced at this facility containing as much as 0.75 % As. With output having declined to about one-fifth of capacity, the BIMAK-AD of Chelopech established a joint venture with Navan of Ireland that was to introduce biotechnology at this operation. In exchange for a share in the profits in the joint venture, Navan agreed to provide equipment, technology, and training. Also, Navan was to receive initially a 41.9% share in the Chelopech gold-copper project; this amount was to increase to 68% in the future (Mining Journal, 1996b; Metal Bulletin, 1996).

Homestake's option to acquire 50% of NBM was achieved in 1995 through the purchase of 6 million shares of Navan for US\$24 million. The provisions of this agreement included an advance of \$12 million by Homestake to BIMAK-AD and NBM that was conditional on NBM receiving permission from the Government of Bulgaria to expand production from 0.5 to 0.75 million metric tons per year (Mt/yr) of gold-bearing copper ore, and called for the construction of an Outokumpu roaster to remove arsenic from the copper concentrate. The remaining US\$36 million option price payment also was to depend on NBM receiving approval for further expansion of the mine and mill to produce 1.75 Mt/yr of ore, as well as on securing the necessary financing for facility expansion (Mining Journal,

1996b).

At the latter level of output, about 5.3 million grams of gold and 16,000 metric tons (t) of copper could be produced annually. In 1996, the estimated gold and copper resources at Chelopech amounted to about 193 t of gold and 726,000 t of copper at the cut-off of grade 4 grams per metric ton (g/t) of gold (Mining Journal, 1996b). Navan reportedly had undertaken additional mineral exploration on a 2,680 square-kilometer-area in Bulgaria, which the company described as being highly prospective (Metal Bulletin, 1996).

Some of the more recent improvements in the copper mining sector included acquisitions of new mining equipment through the reinvestment of profit from mining operations. Reportedly, new drilling equipment and automated production monitoring units for the copper concentrators have been procured, as well as new U.S.- and German-made hydraulic excavators (Kraicheva, 1996). The financial vehicle for these acquisitions was an agreement reached in 1992 with Voest Alpine of Austria to provide modern equipment to Bulgaria's copper industry in exchange for exports of copper concentrate. Additionally, in 1994, Bulgaria's copper industry signed a long-term credit arrangement with the Bank Austria Handelsbank, amounting to US\$24 million at a preferential interest rate. These arrangement allowed the copper industry to create a development program through 2002 (Kraicheva, 1996). A new electrolytic copper production line also was planned for the MDK SA copper smelter and refinery in Pirdop. The new facility will cost US\$100 million with funding possibly coming from Japanese financial institutions (Mining Journal, 1996a).

In the gold mining sector, developments apart from those pertaining to Chelopech, included Geo-Engineering Co. of Bulgaria reporting, after 10 years of exploration, that about 40 tons of gold could be extracted from the Surnak deposit in the Eastern Rhodopi mountains. The deposit reportedly graded 1.6 to 2.1 g/t of gold. Also, the discoveries of other gold deposits were reported in the Surnak region, as well as in the Central and Western Rhodopi Mountains, the Srednegorie region and in the vicinity of Trun and Radomir (Mining Journal, 1996c).

In 1996, an agreement was announced between the Overseas Co-operation Fund of Japan and the Ministry of Industry of Bulgaria that was to earmark a loan of US\$80 million to modernize KCM SA of Plovdiv, about 140 kilometers southeast of Sofia (Mining Journal, 1996a). KCM SA (formerly the Dimitur Blagoev lead and zinc smelter and refinery) has a design capacity to produce 55,000 t/yr of electrolytically refined zinc and 40,000 t/yr of lead. KCM SA, the larger of the two lead and zinc producers in Bulgaria, treats primarily sulfide concentrates as well as smaller quantities of secondary lead-bearing materials. The concentrates are sintered, followed by smelting and pyrorefining of lead bullion. Slag from the shaft furnace is treated in a fuming furnace to produce fume oxides with a high content of lead and zinc. The oxides are treated at the zinc plant and the resulting slags (containing heavy metals) are sold to cement plants. The zinc plant processes zinc sulfide concentrates and also secondary zinc-bearing materials. Concentrates are roasted in fluidized bed furnaces and zinc is electrowon following neutral leaching (with spent electrode),

thickening, and removing cadmium, cobalt, and copper from the neutral solution. To abate pollution and increase production efficiency, part of KCM SA's modernization effort included the installation of one 2.55-square-meter Larox PF 23 B5 automatic pressure filter for lead and two PF 35 BF filters for zinc slurries. The change from the disc vacuum filters and drying kilns to pressure filters would eliminate entirely emissions of heavy metals and fuel oil consumption, and increase the direct recovery of zinc (Mining Magazine, 1996).

In August, the Bulgarian state Privatization Agency offered up to 60% of the stock of the Government-owned Sodi Devnya soda ash plant for sale for cash to outside investors. Additionally, 25% was to be sold domestically under the provisions of the country's privatization program; the balance was to be offered to the company's employees. As many as 15 companies from Europe and Asia had placed bids following the offering. Reportedly, Solvay S.A. of Belgium and LG Chemicals of the Republic of Korea were among the contenders (Industrial Minerals, 1996). In late 1996, Solvay S.A. of Belgium reported having reached an agreement with the Bulgarian Privatization Agency to acquire 60% of Sodi for US\$160 million and a pledge to invest US\$67 million during the next 5-year period. The acquisition was to provide Solvay with greater access to markets in the Balkans, the Middle East, and Asia (Alperowicz, 1997).

In 1996, Bulgaria announced a major coal development plan to the year 2020 (Markov, 1996). The short-term strategy of the plan covers the period 1995-2010. The plan calls for annual coal output to reach 35 million tons by 2000. At the same time the coal industry was to be reoriented to meet consumer demand as well as corporate restructuring. The longer-term plan calls for domestically mined steam coal to account for 36% to 40% of the total electric power generated in the country, as opposed to about 30% in 1996. Most of the coal is to be mined at the Maritsa East open pit mine. The coal should be sufficient to produce annually 16 billion kilowatts, which will accommodate the expansion of thermal electric power station capacities in the region, as well as provide feedstock to the nearby coal briquet plant. Production of coal from the Bobov Dol open pit mines was to be maintained to produce annually 1,850,000 t of coal to supply the rebuilt Bobov Dol thermal electric power station (3 billion kilowatt capacity). The long-term plan additionally calls for production at the western Marishki coalfield to fully supply the Maritsa-3 electric power station. Moreover, the plan calls for the continuation of state subsidies to the coal mine mining industry to maintain output and expand production capacity. Additional coal production needs could be met from deposits at Elkhovo and Balsha. Subsidies to the coal sector are to be implemented in parallel with the state's investment strategy for the coal industry (Markov, Ivan, 1996).

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TABLE 1
BULGARIA: PRODUCTION OF MINERAL COMMODITIES 1/ 2/

(Metric tons unless otherwise specified)

Commodity	1992	1993	1994	1995	1996
METALS					
Aluminum metal, secondary	2,688	1,832	4,412 r/	4,519 r/	4,500 e/
Bismuth metal e/	40	40	40	40	40
Cadmium metal, smelter	200	265	286	250 e/	250 e/
Copper:					
Ore:					
Gross weight thousand tons	16,000 e/	19,700	19,000	20,852 r/	21,123
Cu content e/ do.	67	93	75	94 r/ 3/	106 3/
Concentrate:					
Gross weight do.	270	250	370 r/	387 r/	424
Cu content do.	35	33	74 r/	77	85
Metal, primary and secondary:					
Smelter	25,000	28,000	89,400 r/	107,500 r/	104,398
Refined	18,000	26,300	26,500	29,777 r/	22,301
Gold metal e/ kilograms	2,000	2,000	2,000	3,100 r/ 3/	3,390 3/
Iron and steel					
Iron ore:					
Gross weight e/ thousand tons	900	1,000	950	959 r/ 3/	1,000 3/
Fe content do.	239	266	268 r/	270 r/	312
Iron concentrates do.	351	428	462 r/	483 r/	475
Metal:					
Pig iron for steelmaking do.	837	998	1,442 r/	1,581 r/	1,513
Ferrous alloys, ferrosilicon e/ do.	20	20	20	8 r/ 3/	8 3/
Steel, crude do.	1,551	1,941	2,491	2,724 r/	2,483
Semimanufactures, rolled do.	1,315 r/	1,602 r/	2,120 r/	2,250 r/	1,580
Lead:					
Mine output, Pb content	45,000	40,000	50,000	37,000 r/	33,000
Concentrate: e/					
Gross weight	60,000	60,000	65,000	46,466 r/ 3/	40,681 3/
Pb content	39,000	39,000	43,000	33,000 r/ 3/	28,500 3/
Metal, refined, primary and secondary	53,099	56,994	61,950 r/	72,150 r/	70,300
Manganese ore:					
Gross weight	25,500	15,500	11,500	19,000 r/	44,300
Mn content	6,900	4,000	3,000	5,600 r/	13,100
Molybdenum, mine output, Mo content e/	120	120	120	110	110
Silver, mine output, Ag content e/	35	35	35	30 r/	25 3/
Tin, metal	23	23	22	13 r/	10 e/
Uranium, oxide, U content e/	600	600	600	600	600
Zinc:					
Mine output, Zn content	29,000	32,000	30,000	21,200 r/	25,700
Concentrate:					
Gross weight	70,000 e/	65,000 e/	54,900 r/	49,200 r/	38,000
Zn content	31,000 e/	30,000 e/	29,000 r/	26,000 r/	19,800
Metal, smelter, primary and secondary	57,820	54,039	64,005 r/	68,796 r/	67,786
INDUSTRIAL MINERALS					
Asbestos	500	500	100 r/	400 r/	1,000
Barite e/	850,000	900,000	950,000	990,100 3/	976,700 3/
Cement, hydraulic thousand tons	2,132	2,007	1,910 r/	2,070 r/	2,100 e/
Clays:					
Bentonite do.	80 e/	67	76 r/	126 r/	118
Kaolin, washed do.	104	111	145 r/	168 r/	150 e/
Feldspar do.	48 e/	51	65 r/	74 r/	30
Fluorspar e/ do.	5	5	5	4 3/	2 3/
Gypsum and anhydrite:					
Crude do.	125	143	161 r/	163 r/	169
Calcined do.	57	54	62 r/	64 r/	65 e/
Lime: Industrial do.	729	531	665 r/	952 r/	1,000 e/
Nitrogen: N content of ammonia do.	905	885	995 r/	1,203 r/	1,200 e/
Perlite	20,000 e/	20,000 e/	25,000	32,500	25,500
Pyrites, gross weight e/ thousand tons	170	150	150	150	150
Salt, all types do.	1,000	650	1,300 r/	1,500 r/	1,600
Silica sand e/ do.	700	700	750	835 r/ 3/	563 3/
Sodium carbonate, calcined do.	517	259	451 r/	796 r/	800 e/

See footnotes at end of table.

TABLE 1--Continued
BULGARIA: PRODUCTION OF MINERAL COMMODITIES 1/ 2/

(Metric tons unless otherwise specified)

Commodity	1992	1993	1994	1995	1996	
INDUSTRIAL MINERALS--Continued						
Sulfur: e/						
S content of pyrites	60,000	50,000	50,000	50,000	50,000	
Byproduct, all sources	50,000	50,000	50,000	50,000	50,000	
Total	110,000	100,000	100,000	100,000	100,000	
MINERAL FUELS AND RELATED MATERIALS						
Coal, marketable:						
Anthracite	thousand tons	45	41	29 r/	24 r/	23
Bituminous	do.	203	222	144 r/	170 r/	182
Brown	do.	3,352 r/	3,419 r/	3,155 r/	3,187 r/	3,949
Lignite	do.	26,736 r/	25,351 r/	25,429 r/	27,449 r/	28,101
Total	do.	30,336 r/	29,033 r/	28,757 r/	30,830 r/	32,255
Coke	do.	840	912	1,116 r/	1,240 r/	1,200 e/
Gas, natural, marketed	million cubic meters	8	7	8	22 r/	42
Petroleum:						
Crude, as reported	thousand tons	53	43	36	43 r/	34
Refinery products e/	thousand 42-gallon barrels	20,000	20,000	25,000	25,000	25,000

e/ Estimated. r/ Revised.

1/ Table includes data available through Oct. 1997.

2/ In addition to the commodities listed, chromite, magnesite, palladium, platinum, tellurium, uranium, and a variety of crude construction materials (common sand and gravel, dimension stone, and crushed stone) are produced, but available information is inadequate to make reliable estimates of output levels.

3/ Reported figure.

TABLE 2
BULGARIA: EXPORTS OF SELECTED MINERAL COMMODITIES 1/

(Metric tons unless otherwise specified)

S.I.T.C. CODES	Commodity	1993	1994	1995	1996 p/
METALS					
283.1	Copper, ore and concentrate	119,000	107,100	72,100	87,000
Iron and steel:					
281.5 & .6	Ore and concentrate, including roasted pyrite	23,475	--	--	--
673+674	Metal, semimanufactures, flat-rolled products of iron or nonalloy steel	545,000	819,600	1,022,400	683,200
686.1	Zinc, metal including alloys, unwrought	61,800	57,800	62,600	70,700
INDUSTRIAL MINERALS					
661.2	Cement 2/	584,200	1,149,800	1,863,700	1,824,000
562.11 & 562.13	Fertilizer materials, manufactured, nitrogenous	209,000	287,900	766,000	746,800
272.2	Nitrates, crude	2,900	1,000	2,300	2,400
523.72	Sodium compounds, n.e.s., soda ash, manufactured	127,500	299,100	572,700	631,200
273.1	Stone, sand and gravel, dimension stone, crude and partly worked	7,600	9,800	10,300	11,500

p/ Preliminary.

1/ Table prepared by Glenn J. Wallace.

2/ May include clinker.

Source: Republic of Bulgaria, National Statistical Institute, Statistical Yearbook, 1996.

TABLE 3
BULGARIA: 1993-96 SELECTED IMPORTS OF MINERAL COMMODITIES 1/

(Metric tons unless otherwise specified)

S.I.T.C. CODES	Commodity	1993	1994	1995	1996 p/
METALS					
684.1	Aluminum, metal including alloys, unwrought	9,900	9,300	13,600	7,000
Iron and steel:					
281.5 & .6	Ores	878,500	819,500	1,484,300	45,800
Metal:					
671.2 + .3, 672	Pig iron, cast iron, related materials; and steel, primary forms	17,200	42,100	48,900	14,900
679	Semimanufactures, tubes, pipes, fittings	57,700	23,300	24,600	22,800

See footnotes at end of table.

TABLE 3--Continued
BULGARIA: 1993-96 SELECTED IMPORTS OF MINERAL COMMODITIES 1/

(Metric tons unless otherwise specified)

S.I.T.C. CODES	Commodity	1993	1994	1995	1996 p/
	INDUSTRIAL MINERALS				
661.2	Cement 2/	12,400	17,400	17,400	12,100
	Fertilizer materials, manufactured:				
562.2	Phosphatic	92	5,390	338	3,597
562.3	Potassic	5,784	16,375	17,021	35,606
272.3	Phosphates, crude	237,900	275,200	267,500	437,100
278.3	Salt and brine	173,600	118,700	118,500	116,500
	MINERAL FUELS AND RELATED MATERIALS				
	Coal:				
321.1	Anthracite	1,671,700	1,046,700	630,900	2,006,100
321.2+322.1	Other and briquets	1,229,900	876,300	1,231,600	231,300
325	Coke and semicoke	92,200	750,600	146,600	178,900
	Petroleum:				
333.0	Crude	8,900	5,900	7,400	5,600
	Refinery products:				
334.1	Gasoline	143,200	107,100	12,600	1,200
334.3	Distillate fuel oil	566,200	168,600	3,100	100

p/ Preliminary.

1/ Table prepared by Glenn J. Wallace.

2/ May include clinker.

Source: Republic of Bulgaria, National Statistical Institute, Statistical Yearbook, 1996.

TABLE 4
BULGARIA: STRUCTURE OF THE MINERAL INDUSTRY FOR 1996

(Thousand metric tons unless otherwise specified)

Commodity	Major operating companies	Location of main facilities	Annual capacity
Cement	Reka Devnia	Devnia	1,825.
Do.	Zlatna Panega	Panega	1,300.
Do.	Others	Temelkovo, Dimitrovgrad, Pleven, and Beli Izvor	1,590.
Coal:			
Bituminous	Economic Mining and Power Combine (Smek) Balkanbass	Balkan coal basin in central Bulgaria, northwest of Silven	445.
Brown	G. Dimitrov	Pernik coal basin, southwest of Sofia	4,000.
Do.	Others	Bobov Dol and Pirin in western Bulgaria	3,100.
Lignite	SMEK East Maritsa	East Maritsa coal basin near Zagora	25,000.
Do.	Others	Marbas, Pernik, and Bobov Dol coal basins	5,300.
Copper (Cu):			
Concentrate, Cu content	Medet-Asarel Co.	Panagurishte, Pazardzhik District	25.
Do.	Chelopech Ltd.	Srednogie, Sofia District	5.
Do.	Bradtze	Malko Turnovo	2.
Do.	Elatzite-Med Ltd.	Srednogie, Sofia District	15.
Do.	Rosen	Burgas, near the Black Sea	1.
Do.	Tsar Asen	Srednogie, Sofia District	2.
Do.	Burgaskii Mines Ltd., Zidorovo	Burgas, near the Black Sea	0.5
Metal, refined	Georgi Damyanov	Srednogie, Sofia District	120.
Iron ore	Kremikovtsi Iron and Steel Combine	Kremikovtsi	2,000.
Lead-zinc (Pb-Zn):			
Concentrate, Pb-Zn content	Gorubso Co.	Erma Reka, Kurdjali, Laki, and Rudozem, all in Madan area near Greek border	59 Pb, 47 Zn.
Do.	Madzharovo Ltd.	Near Plovdiv	3 Pb, 2 Zn.
Do.	Ossogovo Ltd.	Ossogovo Mountains, western Bulgaria	3 Pb, 2 Zn.
Do.	Ustrem Ltd.	Near Thundza River, eastern Bulgaria	3.5 Pb, 0.8 Zn.

TABLE 4--Continued
 BULGARIA: STRUCTURE OF THE MINERAL INDUSTRY FOR 1996

(Thousand metric tons unless otherwise specified)

Commodity	Major operating companies	Location of main facilities	Annual capacity
Lead-zinc (Pb-Zn)--Continued:			
Metal:			
Pb, refined	KCM S.A., formerly, Dimitur Blagoev	Plovdiv	40.
Do.	Lead and Zinc Complex, Ltd.	Kurdjali	60.
Zn, smelter	KCM S.A., formerly, Dimitur Blagoev	Plovdiv	55.
Do.	Lead and Zinc Complex, Ltd.	Kurdjali	30.
Manganese ore	Mangan Ltd. (Obrotchishte)	Varna District	50.
Natural gas	Ministry of Power Supply	Chiren field, in northwest Bulgaria	(1/).
Petroleum:			
Crude	do.	do.	(1/).
Refined	barrels per day	Economic Trust for Petroleum Products	Refineries in Burgas, Plevan, and Ruse
Steel, crude:		Kremikovtsi Iron and Steel Works	Near Sofia
Do.		Stomana Iron and Steel Works	Pernik
			1,300.

1/ Insignificant capacity.