

THE MINERAL INDUSTRIES OF THE NORTHERN BALKANS

BULGARIA AND ROMANIA

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Bulgaria and Romania form the northeastern part of the Balkan Peninsula, which borders the Black Sea to the east, Ukraine and Moldova to the north, Greece and Turkey to the south and southeast, Macedonia and Serbia and Montenegro to the west, and Hungary to the northwest. The Danube River forms a natural boundary between Bulgaria in the south and Romania in the north. Bulgaria is encompassed within the Mediterranean Alpine folded zone, which comprises the Carpatho-Balkan branch to the north and the Dinaric-Hellenic branch to the south (Bogdanov, 1982). The Carpatho-Balkan branch also constitutes the primary folded zone in Romania, which incorporates the eastern and southern Carpathian Mountains, and the Apuseni Mountains within the Carpathian Arc to the west of the Transylvanian Plateau (Ivanovici and Borcos, 1982).

Mining and metalworking in this region has a long history that was well-documented by Roman times when Bulgaria and Romania, which were known as Thrace and Dacia, respectively, were important sources of base and precious metals. Gold and nonferrous metals mined in this region have remained attractive investment opportunities to foreign investors.

BULGARIA

Bulgaria's mineral industry included the mine output of ferrous and nonferrous metals, mineral fuels (mainly coal), and such industrial minerals as clays, gypsum, and rock salt. Additionally, the metallurgical sector smelted and refined copper, gold, iron and steel, lead, silver, and zinc. Cement, dimension stone, and other construction materials also were produced. On a world scale, however, Bulgaria's mineral industry was small and mainly of regional importance. Although most of the country's mineral requirements were met through domestic production, the country continued to depend on imports of copper ores, iron ore, lead and zinc ores, steel, and mineral fuels.

According to the International Monetary Fund (2005¹), Bulgaria's gross domestic product (GDP) based on purchasing power parity amounted to \$64.4 billion, which was an increase of about 6.8% compared with that of 2003. Industrial production, which accounted for about 26% of the GDP, grew by about 5.3% (U.S. Central Intelligence Agency, 2005, p. 84).

Government Policies and Programs

The Government remained committed to transforming the economy to a market-based economic system. The Law on Transformation and Privatization of State and Municipal-Owned Enterprises was adopted by Parliament in 1992, and

¹References that include a section mark (§) are found in the Internet Reference Cited sections.

the Underground Resources Act was adopted in 1998; these laws were adopted to promote private enterprise and foreign investment. Despite explicitly stipulating state ownership of underground minerals, the Underground Resources Act provides for the submission and approval procedures for permits and claims by domestic and foreign companies to develop and operate mineral deposits for up to 35 years with additional 15-year extensions. Exploration rights to private companies could be granted for up to 3 years (Kousseff, 1999). In addition, the National Program for Sustainable Development of Mining in Bulgaria was drafted and approved in 1998. The Government continued to work to improve the country's environmental condition.

Commodity Review

Metals

Metals have been a substantial component of the mineral industry's production. Bulgaria's mine output included copper, iron, lead and zinc, and manganese. Additionally, byproduct gold, molybdenum, silver, and other metals have been produced chiefly from the processing of copper and lead and zinc ores and concentrates. Bulgaria's production of primary aluminum shapes (ingot) was based entirely on aluminum scrap.

Copper.—In 2004, Bulgaria's copper mining and processing sector reported decreases of mine production of about 7.8% for copper in ore and about 13% for copper in concentrate. The output of refined and smelter copper, however, increased by about 25% and 5%, respectively; this increase reflected the increase in tolling operations (table 1).

Bulgaria's major copper deposits were developed and exploited in the Srednogorie-Panagurishte region of the country; three mines were in operation—the Asarel-Medet and the Elatsite surface mines and the Chelopech underground mine. The Pirdop copper smelter and refinery (owned and operated by N.V. Umicore S.A. of Belgium) remained the principal producer of copper in Bulgaria.

The Chelopech mining operation, which was located about 70 kilometers (km) east of Sofia, worked a polymetallic deposit that contained mainly copper and associated precious metals (gold and silver). Although the Chelopech Mine was primarily considered to be a gold producer owing to the much higher value of gold produced, the copper content of the ore averaged about 1.6%, and copper ore production ranged from about 8,000 to 10,000 metric tons per year (t/yr). In 2004, Dundee Precious Metals Inc. (Dundee) of Canada, having acquired mining and exploration assets at Chelopech from Navan plc of Ireland in 2003, continued an active exploration program for copper and gold at Chelopech and several other areas (Dundee Precious

Metals Inc., 2004b, c). Major activities in the copper sector included plans by the Government to offer the Eliseina Copper Smelting enterprise for sale. The Eliseina smelter, which is located about 80 km north of Sofia, would require investments of about \$15 million for pollution-control equipment. Although Eliseina was offered for sale in 2000 and 2002, little interest in the sale was reported. The closure of the facility in 2001 was attributed to such factors as unfavorable copper markets and financial losses. In 2004, the enterprise's debt amounted to about \$11 million. Eliseina, which had a capacity of about 14,000 t/yr of blister copper, exported most of its output to western Europe (Reuters, 2004).

Gold.—Gold production in 2004 was in excess of 2.4 metric tons (t), which exceeded gold production in 2003 by about 14%. Gold production, however, was about 7% below the production level of 2002.

Hereward Ventures plc of the United Kingdom explored for gold at six sites that define an arc along the southeastern border with Greece and Turkey in Bulgaria. In 2004, Hereward's exploratory work totaled 2,413 meters (m) of drill core and 3,957 m of trenching in a total permit area of 880 square kilometers (km²). The Rosino permit, which covers an area of about 188 km² in the Rhodope Mountains near Krumovgrad, showed a resource of gold of about 9,331 kilograms (kg) at the Tashkala Hill mineralization. Significant gold resources were found in the Dobroselets permit area, which covered a 92.7-km² area near Topolovgrad and hosted the Chaira deposit. The Chaira mineralization contained a gold resource that amounted to about 6.74 million metric tons (Mt) of ore grading from 1.35 to 2.67 grams per metric ton (g/t) gold. The Gornoseltsi permit, which also is located near Krumovgrad, encompassed an area of about 155 km²; by yearend, minor gold values were found in silicified Palaeogene strata, and although a determination of the gold resource was not completed, the site was considered to be promising. The Lozen, the Polski Gradets, and the Sveta Marina permit areas represented sites that also were under exploration for gold during the year (Hereward Ventures plc, 2004, p. 7).

Dundee also acquired development rights at the Ada Tepe deposit, which was located near Krumovgrad, and several exploration licenses that covered areas in the central and eastern Rhodope region. A contract was awarded at yearend to Ausenco Ltd. of Australia for a feasibility study of the Krumovgrad (Ada Tepe) mining project, which was to be available for banks in 2005 as part of the financing requirement. Measured and indicated resources of recoverable precious metals at Ada Tepe amounted to about 5.2 Mt of ore that contained more than 25,900 kg of gold and about 13,700 kg of silver (Dundee Precious Metals Inc., 2004a, p. 6, 7; b).

Dundee planned a \$40 million investment program at the Chelopech Mine, which would include expansion of the milling capacity to increase production of concentrate to about 1.5 Mt/yr from 600,000 t/yr. Additionally, facility expansion at Chelopech would include the conversion of operations to open stope mining and the construction of a surface decline. Dundee's plans for 2005 to 2007 included feasibility studies for the installation of an autoclave to produce metals and environmental improvements in production work. Measured and indicated resources of recoverable precious metals at Chelopech amounted

to almost 25 Mt of ore that contained more than 99,800 kg of gold and more than 249,000 kg of silver (Dundee Precious Metals Inc., 2004a, p. 6, 7; b).

In 2004, exploration for gold and silver also was undertaken by EurOmax Resource Ltd. of Vancouver, British Columbia, Canada, at the Silver Mountain Rakitovo prospect in the Rhodope Mountains. EurOmax also received an exploration license for the 139-km² Trun region in the western part of the country, which included the Krushov Dol and the Zlata mineralizations (EurOmax Resources Ltd., 2004a, b).

Iron and Steel.—In 2004, Bulgaria reported a substantial reduction in the output of iron ore (gross weight), which declined by about 82% compared with that of 2003. Iron ore has constituted a small proportion of the feedstock required by the iron and steel sector, and the steep production decline suggests that iron ore mining may be approaching an end (table 1). The production of pig iron and crude steel, which was based mainly on imported raw materials, showed mixed results; pig iron output remained at the production level of 2003, and crude steel production increased by about 23% compared with that of 2003 (table 1).

In 2004, Sidenor S.A. of Greece, which was the majority stock share owner of Stomana AD (80%), announced plans at yearend for facility expansion at Stomana, which would include a rolling mill for light carbon-steel long products and such new equipment as automation and control equipment; a billet welder; bundling, finishing, and stacking facilities; and a preheating furnace. The new facilities and equipment were scheduled to come onstream in mid-2006 (Metal Bulletin, 2004c).

The modernization program for 2004 at the Kremikovtzi Corp. (Finmark Ltd., 71% equity), which included the installation of two new 800,000-t/yr single-strand slab casters, a Corex 3000-DRI plant, and coke and sinter plants, was placed in abeyance while Finmark sought new financial partners to help restructure operations and conduct modernization projects (Glasson, 2003; Metal Bulletin, 2004a, b).

Lead and Zinc.—The lead and zinc industry in Bulgaria was based on mining and processing operations near Plovdiv, in the Ossogovo Mountains in western Bulgaria, near the Thundza River in southeastern Bulgaria, and in the Madan area near the Greek border. Lead and zinc smelting and refining were centered in Kurdjali in the Madan area and in Plovdiv. The underground lead and zinc mining complex at Gorubso continued to be the country's major producer of lead and zinc ore.

In 2004, total mine production of lead in concentrate declined by about 23% compared with that of 2003. The output of zinc (in concentrate) declined by about 18% compared with that of 2003 (table 1). Total primary and secondary lead production declined by about 9% compared with that of 2003; the output of primary and secondary zinc, however, increased by about 17% (table 1).

Manganese.—Despite an almost sevenfold increase in production (manganese in ore) in 2004 compared with that of 2003, production at the Obrochishte manganese mine remained small by world standards (table 1; Corathers, 2005). Euromangan AD continued to operate the Obrochishte ore body (25-year concession), which was predominantly the

carbonite type (rhodochrosite) hosted in Oligocene-age volcano sedimentary deposits (aleurolite, clay, glauconitic sandstone, marl, and tuff). In 2004, Euromangan was acquired by Tempsford Trading Limited of Nicosia, Cyprus, which sought new investments valued between \$8 million and \$10 million for a new mechanized mining system. Apart from the mining operations that were engaged at the Obrochishte deposit, Ore Vest plc of the United Kingdom undertook exploration of a 10.4-km² section of the deposit, which was located about 3 km southeast of the mine, with the aim of developing a new mine. Discussions were conducted during the year with the Government of Bulgaria for a contract renewal that would permit the continuation of this work in 2005 (Metal Bulletin, 2004a; Dimitrova, 2005; OreVest plc, 2005).

Industrial Minerals

Bulgaria produced a broad range of industrial minerals suitable for chemical and construction industry uses. These included barite, calcareous rock, cement, clays, lime, salt, and silica. Bentonit AD and Kaolin AD were the major producers of industrial minerals in Bulgaria.

Kaolin AD operated quarries and processing facilities at Vetovo and Kaolinovo (kaolin), Shoumen and Varna (quartz-feldspathic sands), and Konarata and Ustrem (potassium and sodium feldspars). Final output included kaolin, glass sand, and dry and wet silica sands. Bentonit AD was a major Bulgarian producer of bentonite, perlite, and zeolite. With bentonite, zeolite, and perlite resources amounting to about 7.3 Mt, 2.8 Mt, and 0.8 Mt, respectively, Bentonit AD's corresponding processing capacities were reported to be 280,000 t/yr, 15,000 t/yr, and 30,000 t/yr, respectively (Keegan, 1999, p. 51).

Mineral Fuels

In 2004, total coal output declined by about 4% compared with that of 2003. Coal mining, which supplied about 45% of the fuel needed to generate electric power, was the predominant fossil fuel-producing sector in Bulgaria. The country's production of natural gas showed substantial gains in 2004 compared with those of 2003 as offshore natural-gas-producing capacities were coming onstream (table 1); petroleum production increased by only 11% during the same period.

Outlook

Bulgaria's application to join the European Union carries a broad range of requirements, which include modernization of industrial plant and infrastructure. To meet these requirements, Bulgaria is expected to continue to develop its industrial minerals sector, particularly quarries and processing facilities for the production of construction materials. Exploration for precious metals also will expand.

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ROMANIA

Romania's production of metals (aluminum, copper, lead and zinc, manganese, steel, and ferroalloys), industrial minerals, and mineral fuels was mainly of regional importance. Compared with 2003, major production gains in the metals sector in 2004 included those for alumina (68%), primary aluminum (11%), primary refined copper (46%), and crude steel (6%). Among industrial minerals, cement production increased by about 4% compared with that of 2003; marketable bentonite and kaolin production each rose by about 3% (table 3).

In 2004, Romania's gross domestic product based on purchasing power parity rose by about 6% compared with that of 2003 (International Monetary Fund, 2004\$). Industrial production increased by about 4% (U.S. Central Intelligence Agency, 2005, p. 444). The Government of Romania continued to develop policies that were aimed at reforming the industrial sector to raise competitiveness in preparation for privatization and to abate pollution from mine-based point sources (World Bank, The, 2004b, p. 111-112).

Government Policies and Programs

In 2004, the Government gave greater impetus to the reform of Romania's mining industry with the publication of a program to streamline the mining sector. The plan included closures of mines (mostly those that produced nonfuel and fuel minerals). Romania's requirements for accession to the European Union stimulated the Government to develop plans to reduce and/or eliminate subsidies to the mining sector, which in 2004, amounted to about \$150 million. In April, the Government adopted the 2004-2010 Mining Sector Strategy (MSS), which planned to eliminate all subsidies to metal and industrial mineral mining operations by 2007; subsidies to coal mining enterprises were to be eliminated by 2010 (World Bank, The, 2004a, p. 1).

The MSS set short-, medium-, and long-term phases to implement the reforms. In the short term (by yearend 2004), regulations were developed to convert the mining industry to a full market-based system from remaining aspects of central economic planning; these regulations stipulated transparency and accountability on the part of the mining sector. The medium-term phase (2005 to 2006) would involve restructuring those parts of the mining sector scheduled for closure and allocating their financial resources and assets to more profitable mining enterprises that would be privatized. The medium-term phase also would include the organization of oversight agencies to supervise mine site reclamation and environmental rehabilitation. The long-term phase (2006 to 2010) would be concerned with the full elimination of state subsidies to the mining industry and the closure of up to 31 uneconomic mining operations (World Bank, The, 2004a, p. 26).

The metal mining and processing operations identified for closure by MSS included the following enterprises: Balan Central Mine (underground copper ore extraction), Harghita County; Borsa Beneficiation Plant (treatment of copper, gold, and silver ore), Maramures County; Burloia Central Gura Barii Superior (underground copper, lead, and zinc ore extraction), Maramures County; Buturuosa Baia de Aries Mine (underground copper, gold, and silver ore extraction), Alba County; Fagu Cetatii Mine (underground copper ore extraction), Harghita County; Poiana Orizont 110 Mine (underground copper ore extraction), Harghita County; and Santimbru Mine (open pit extraction of mercury ore), Harghita County.

Among industrial minerals mining enterprises, MSS designated for closure the Calamani Negoiu Mine, Suceava County, which extracted sulfur by the open pit and underground methods. The closure of bituminous coal mining and processing facilities in Hunedoara County included the Aninoasa Mine (underground), the Balomir Mine (open pit), the Iscroni-Livenzi Sud Mine (underground), the Uricani 5 Est Mine (underground), and the Valea de Brazi Mine (underground). Beneficiation plants for bituminous coal in Hunedoara County that were designated for closure included the Lupeni, the Petrila, and the Uricana plants. Lignite mines slated for closure included the Bodos Mine (open pit), Covasna County; the Budoii Mine and Briqueting Plant (underground), Bihor County; and the Racos Put Mine and Briqueting Plant (underground), Covasna County (World Bank, The, 2004a, p. 36-47).

Commodity Review

Metals

Aluminum.—In 2004, total aluminum production increased by about 9.3% compared with that of 2003; the production of primary aluminum increased by 11%. Alumina production increased by about 68% compared with that of 2003 owing to the restart of operations at the BBG Alum S.A. alumina refinery, which was temporarily closed during contractual negotiations with primary aluminum smelter SC Alro S.A. (Alro), and to the increase of production capacity to 600,000 metric tons per year (t/yr) of alumina from 400,000 t/yr (Metal Bulletin, 2004c).

Copper.—Copper was mined in the northeastern part of the country (mainly at the Baia Sprie, the Cavnic, and the Lesul Ursului Mines), and in the southwestern part of the country (mainly at the Moldova Noua, the Rosia Poieni, and the Rosia Montana mines). Generally, such major producing mines as Moldova Noua and Rosia Poieni were hoisting ore that graded about 0.35% or less copper. Concentrates from these areas have been smelted and refined at Baia Mare and Zlatna. At Baia Mare, SC Allied Deals Phoenix SA operated an Outokumpu flash smelter, an electrolytic copper refinery, and a continuous caster. At Zlatna, SC Ampelum SA processed copper concentrates and operated a smelter and an electrolytic refinery (Moreno, 2000, p. 408-409). In 2004, the output of copper in concentrate declined by about 20% compared with that of 2003. The production of total refined copper increased by about 46% (table 3).

Gold.—European Goldfields Ltd. continued exploration work at Certej. Indicated gold resources at the Certej deposit were estimated to be about 31.4 million metric tons (Mt) of ore at grades that averaged 2.1 grams per metric ton gold (g/t) and 11 g/t silver. In 2004, the company began a prefeasibility study of the Certej deposit, which was scheduled for completion in the second quarter of 2005 (European Goldfields Ltd, 2005, p. 10). Preliminary assessments indicated that the quantity and quality of Certej's ore warranted the development of an open pit mine to work the deposit (European Goldfields Ltd., 2004).

Preparation for modern mining operations by Gabriel Resources Ltd. of Canada at Rosia Montana progressed in 2004; this included the issuance of environmental permitting documentation and the conduct of detailed engineering work for the new mine. In addition to the work undertaken at Rosia Montana, Gabriel continued exploration of the Rodu and the Frasin deposits in the Bucium exploration license area (Gabriel Resources Ltd., 2004; Mining Journal, 2005).

Additional exploration for gold was conducted by Carpathian Gold Inc. at the Apuseni, the Baia Mare, the Lapusna, and the Oravita areas (Carpathian Gold Inc., 2005). Ore-Leave Capital Inc. of Canada conducted exploration for gold in Oravita and Baia Spria (Ore-Leave Capital Inc., 2004).

Iron and Steel.—The iron and steel sector reported continued growth in 2004. The production of pig iron increased by about 3.5% compared with that of 2003; the production of crude steel and rolled semimanufactures increased by 6.1% and 3.5%, respectively (table 3).

In 2004, the main events in Romania's steel industry included an announcement by Siderurgica SA Hunedoara to LNM Holdings NV of the United Kingdom that the company would be investing \$100 million in its Ispat Sidex integrated strip and long products facility. The investments included the conversion of one of the three electric arc furnaces to a ladle furnace and the modernization of reheating furnaces. The major portion of the investment (\$88 million), however, was allocated for modernizing the No. 1 3.1-million-metric-ton-per-year slab caster, the Nos. 3 and 5 blast furnaces, and the No. 4 coke battery (Metal Bulletin, 2004a).

In 2004, TMK Pipe Metallurgical Co. of Russia acquired the major share of assets of CSR S.A. Resita, which reverted to Government ownership in 2003 because of nonfulfillment of investment and other sales contract provisions by United States-based private owner Noble Ventures Marketing (Metal Bulletin, 2004b).

In midyear, Tenaris S.A. of Luxembourg acquired S.C. Silicotub S.A., which was a producer of small-diameter seamless steel pipe in Zalau Romania. The purchase of Silicotub, which had a production capacity of 180,000 t/yr, was valued at \$42 million (Metal Bulletin, 2004d; Tenaris S.A., 2004).

Lead and Zinc.— Relatively low-grade lead and zinc ores were produced at underground mines in the Baia Mare, the Borsa, the Certej, and the Rodna districts; the ores graded between 0.4% lead and 0.6% zinc and 1.0% lead and 1.2% zinc. Romania's lead and zinc ores also contained copper (0.35%), and associated antimony, bismuth, cadmium, gold, and silver. Because of the complex mineralogy of the lead and zinc ores, concentrates produced from them have been uneven. Metal recovery from concentrates has ranged between 50% and 75% for lead and zinc (Commodity Research Unit Ltd., 1990, p. 206-209). Smelting and refining of lead and zinc from domestic and imported ores and concentrates was carried out at the Sometra S.A.'s facilities at Copsa Mica. In 2004, Romania's production of lead in concentrate declined by about 5% compared with that of 2003; the production of zinc in concentrate declined by about 16% (table 3).

Industrial Minerals

Romania was known to have a broad range of industrial minerals that included barite, various calcareous rocks, clays, granitic/pegmatitic sources of feldspar and mica, graphite, gypsum, salt, and silica-group minerals. Seven privately owned companies and one state-owned company were involved in the mining and quarrying of industrial minerals. The modernization of the country's economy and infrastructure was expected to increase the domestic demand for industrial minerals and construction materials. In 2004, the production of cement increased by about 3.6% compared with that of 2003.

Mineral Fuels

The petroleum and refining industries historically have been among Romania's leading industrial sectors. Although small by world standards, the petroleum industry continued to

be an important component of the country's energy balance. Estimates of petroleum resources have ranged from 1.0 to 1.6 billion metric tons (Gt). The extraction of crude petroleum in recent years, however, has exhibited a declining trend. From 1997 through 2004, inclusively, petroleum output declined each year by about 2%, 3%, 2%, 2%, 1%, 3%, 3%, and 3%, respectively, compared with the preceding year (table 3). The output of natural gas has shown a similar declining trend in production; in 2004, however natural gas production showed a slight increase (almost 1%) compared with that of 2003. Coal was produced at 34 mines from resources that amounted to 3.5 Gt, of which 75% was lignite; 22%, bituminous coal; and 3%, brown coal.

Outlook

Romania's application to join the European Union carries a broad range of requirements, which include modernization of industrial plant and infrastructure. To meet these requirements, Romania is expected to continue to develop its industrial minerals sector, particularly quarries and processing facilities for the production of construction materials. As in Bulgaria, gold exploration is expected to continue to be an important aspect of foreign investment in the country's mineral industry.

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TABLE 1
BULGARIA: PRODUCTION OF MINERAL COMMODITIES¹

(Metric tons unless otherwise specified)

Commodity ²	2000	2001	2002	2003	2004
METALS					
Aluminum, metal, secondary	8,430	2,000	2,000	2,000	2,000 ^c
Bismuth, metal ^c	40	40	40	40	30
Cadmium, metal, smelter	331	333	345	307	356
Copper:					
Ore:					
Gross weight	22,829	24,878	26,030	26,415	23,879
Cu content ^c	113	115	112	116	107 ³
Concentrate:					
Gross weight	462	438	464	458	398
Cu content	92	88	93	92	80
Metal, primary and secondary:					
Smelter	178,000	157,000	181,000	215,300	227,100
Refined, electrolytically	32,400	34,400	40,000 ^r	42,000	52,500
Gold, metal	2,347	2,540	2,612 ^r	2,142	2,431
Iron and steel:					
Iron ore:					
Gross weight	559	325	373	466	83
Fe content	178	92	105 ^c	127	27
Iron concentrates	304	240	167	248	250 ^c
Metal:					
Pig iron for steelmaking	1,220	1,211	1,072	1,386	1,400
Ferroalloys, ferrosilicon ^c	10	10	10	10	10
Steel, crude	2,023	1,942	1,860	1,950	2,400
Semimanufactures, rolled	1,455	1,598 ^r	1,539 ^r	1,500	1,500 ^c
Lead:					
Mine output, Pb content	14,000	16,000	24,000	31,000	20,000
Concentrate:					
Gross weight	15,019	26,400	31,108	35,200	29,900
Pb content ^c	10,500	18,500	21,800	24,600	19,000
Metal, refined, primary and secondary	84,100	88,300	66,000	66,000	63,000
Manganese ore:					
Gross weight	--	1,516	4,000 ^r	4,000	28,000
Mn content ^c	--	450	1,100 ^r	1,100	7,600
Silver, mine output, Ag content	55	57	60	50	60
Tin, metal ^c	10	10	10	10	10
Uranium oxide, U content ^c	600	600	600	600	600
Zinc:					
Mine output, Zn content ^c	10,000	10,600	25,800	31,000	35,000
Concentrate:					
Gross weight	18,096	23,301	28,672	36,200	29,200
Zn content ^c	9,400	12,100	14,900	18,800	15,500
Metal, smelter, primary and secondary	84,200	88,600	83,000	86,800	101,500

See footnotes at end of table.

TABLE 1--Continued
BULGARIA: PRODUCTION OF MINERAL COMMODITIES¹

(Metric tons unless otherwise specified)

Commodity ²	2000	2001	2002	2003	2004	
INDUSTRIAL MINERALS						
Asbestos, fiber, all grades ^c	300	300	300	300	300	
Barite ore, run-of-mine	875,000	825,000	656,000	637,000	237,000	
Cement, hydraulic	thousand metric tons	2,209	2,088	2,137	2,100	2,100 ^e
Clays:						
Bentonite	do.	296	320	212	146	225
Kaolin, washed ^c	do.	150	150	160	170	180
Refractory	do.	34	37	38	40	30
Feldspar	do.	22	23	34	4	5
Fluorspar ^c	do.	2	2	2	2	2
Gypsum and anhydrite:						
Crude	do.	170	167	156	168	176
Calcined ^c	do.	65	50	50	50	60
Lime, industrial	do.	1,388	1,248	1,136	2,902	2,882
Limestone and dolomite ^c	do.	11,000	11,000	11,000	11,000	11,000
Nitrogen, N content of ammonia	do.	647	580	328	321	320
Perlite	do.	17	12	11	17	8
Pyrites, gross weight ^c	do.	150	150	150	150	150
Salt, all types	do.	1,700	1,931	1,800	1,882	1,900
Sand and gravel	thousand cubic meters	2,291	2,375	2,385	2,098	3,333
Silica, quartz sand	thousand metric tons	690	677	607	412	545
Sodium carbonate, calcined ^c	do.	800	800	800	800	800
Sulfur: ^c						
S content of pyrites		50,000	30,000 ^r	30,000 ^r	30,000	25,000
Byproduct		50,000	203,000 ^r	245,000 ^r	289,000	301,000
Total		100,000	233,000 ^r	275,000 ^r	319,000	326,000
Sulfuric acid		641,430	620,315	751,018	750,000	750,000 ^e
Zeolite		15,000	15,000	15,000	15,000	15,000
MINERAL FUELS AND RELATED MATERIALS						
Coal, marketable:						
Anthracite	thousand metric tons	18	14	13	9	--
Bituminous	do.	100	101	109	44	170
Brown	do.	3,211	3,151	3,232	3,044	3,071
Lignite	do.	23,765	23,856	23,202	24,597	23,385
Total	do.	27,094	27,122	26,556	27,694	26,626
Coke ^c	do.	1,200	1,200	1,200	1,200	1,200
Natural gas, marketed	million cubic meters	15	22	11	11	333
Petroleum:						
Crude, reported	thousand metric tons	41	32	33	27	30
Refinery products ^c	thousand 42-gallon barrels	25,000	25,000	25,000	25,000	25,000

^cEstimated; estimated data are rounded to no more than three significant digits; may not add to totals shown. ^rRevised. -- Zero.

¹Table includes data available through January 2006.

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

³Reported figure.

TABLE 2
BULGARIA: STRUCTURE OF THE MINERAL INDUSTRY IN 2004

(Thousand metric tons unless otherwise specified)

Commodity	Major operating companies	Location of main facilities	Annual capacity
Bentonite, mine output	Bentonite AD	Kardjali	280.
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:			
Concentrate, Cu content	Asarel-Medet AD.	Panagurishte, Pazardzhik District	55.
Do.	Chelopech Ltd.	Srednogorie, Sofia District	10.
Do.	Bradtze	Malko Turnovo	2.
Do.	Elatzite-Med Ltd.	Srednogorie, Sofia District	20.
Do.	Rosen	Burgas, near the Black Sea	1.
Do.	Tsar Asen	Srednogorie, Sofia District	2.
Do.	Burgaskii Mines Ltd., Zidorovo	Burgas, near the Black Sea	0.5.
Metal, smelter	N.V. Umicore S.A. Pirdop Smelter	Srednogorie, Sofia District	150.
Metal, refined	N.V. Umicore S.A. Pirdop Refinery	do.	30.
Iron ore	Kremikovtzi Iron and Steel Works	Kremikovtzi	2,000.
Lead-zinc:			
Concentrate, Pb-Zn content	Gorubso Co.	Erma Reka, Kurdjali, Laki, and Rudozem, all in Madan area near Greek border	59 lead, 47 zinc.
Do.	Madzharovo Ltd.	Near Plovdiv	3 lead, 2 zinc.
Do.	Ossogovo Ltd.	Ossogovo Mountains, western Bulgaria	3 lead, 2 zinc.
Do.	Ustrem Ltd.	Near Thundza River, eastern Bulgaria	3.5 lead, 0.8 zinc.
Metal:			
Pb, refined	KCM SA [formerly Dimitur Blagoev]	Plovdiv	44.
Do.	Lead and Zinc Complex Ltd.	Kurdjali	60.
Zn, smelter	KCM SA [formerly Dimitur Blagoev]	Plovdiv	60.
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)
Perlite, mine output	Bentonite AD	Kardjali	30.
Petroleum:			
Crude	do.	do.	(1)
Refined	42-gallon barrels per day Economic Trust for Petroleum Products	Refineries in Burgas, Pleven, and Ruse	260,000.
Steel, crude	Kremikovtzi Iron and Steel Works	Near Sofia	2,300
Do.	Stomana Iron and Steel Works	Pernik	1,300.
Zeolite, mine output	Bentonite AD	Kardjali	15.

¹Insignificant capacity.

TABLE 3
ROMANIA: PRODUCTION OF MINERAL COMMODITIES¹

(Metric tons unless otherwise specified)

Commodity ²	2000	2001	2002	2003	2004
METALS					
Aluminum:					
Alumina, calcined, gross weight	416,587	319,403	361,407	332,852	559,307
Ingot, including alloys:					
Primary	179,038	181,831	187,052	196,844 ^r	218,534
Secondary	2,305	682	3,308	7,892 ^r	5,260
Total	181,343	182,513	190,360	204,736 ^r	223,794
Bismuth, mine output, Bi content ^c	40	40	40	40	40
Copper:					
Mine output, Cu content of concentrate	16,099	19,185	18,962	23,389 ^r	18,767
Metal:					
Smelter:					
Primary	16,429	8,979	8,871	4,456	61
Secondary ^c	2,000	2,000	2,000	500	10
Total	18,429	10,979	10,871	4,956	71
Refined:					
Primary	15,303	18,522	11,453	16,739 ^r	24,383
Secondary ^c	4,000	4,000	2,000	2,000	2,000
Total	19,303	22,522	13,453	18,739 ^r	26,383
Gold, mine output, Au content ^e	500	500	500	400 ^r	400
Iron and steel:					
Iron ore:					
Gross weight	116	292	342	304	275
Metal content	55	76	89	82 ^r	74
Metal:					
Pig iron	3,066	3,243	3,979	4,101	4,244
Ferrous alloys, electric furnace:					
Ferrosilicon	8,309	5,823	--	--	--
Ferromanganese	1,989	384	--	--	--
Ferrosilicomanganese	62,320	71,921	84,720	141,899	194,945
Silicon metal ^c	200	200	200	100	--
Total	72,818	78,328	84,920	141,999	194,945
Steel, crude	4,672	4,936	5,491 ^r	5,692 ^r	6,042
Semimanufactures:					
Pipes and tubes	465	665	562	453 ^r	328
Rolled products	3,687	3,582	3,907	4,757 ^r	5,062
Lead:					
Mine output, Pb content of concentrate	18,750	19,676	15,136	15,747 ^r	14,952
Smelter, primary ^c	15,000	15,000	15,000	16,000	15,000
Refined:^c					
Primary	25,000	24,000	23,100	23,100 ³	23,100
Secondary	3,000	3,000	3,000	5,000	5,000
Total	28,000	27,000	26,100	28,100	28,100
Manganese:					
Ore, gross weight	24	70	60 ^e	90	95
Concentrate:³					
Gross weight ^c	19	55	40	60	65
Mn content	5	14	12	15	16
Silver, mine output, Ag content	18	12	15 ^e	18	18 ^e
Zinc:					
Mine output, Zn content of concentrate	27,452	29,786	21,250	22,081 ^r	18,604
Metal, smelter, primary and secondary	51,900	47,200	51,600	48,000 ^r	50,000
INDUSTRIAL MINERALS					
Barite, processed	4,266	2,851	100	23 ^r	--
Cement, hydraulic	6,058	5,668	5,680	5,992 ^r	6,210

See footnotes at end of table.

TABLE 3--Continued
ROMANIA: PRODUCTION OF MINERAL COMMODITIES¹

(Metric tons unless otherwise specified)

Commodity ²	2000	2001	2002	2003	2004	
INDUSTRIAL MINERALS--Continued						
Clays:						
Bentonite:						
Run of mine ^e	75,000	60,000	40,000	40,000	40,000	
Marketable	37,687	24,779	15,389	17,637	18,161	
Kaolin:						
Run of mine ^e	70,000	70,000	71,000	70,000	70,000	
Marketable	18,942	21,867	22,517	21,724	22,337	
Diatomite	8,890	9,743	20,922	33,296 ^r	14,192	
Feldspar	37,157	43,037	51,959	72,827 ^r	60,636	
Fluorspar ^c	15,000	15,000	15,000	15,000	15,000	
Graphite	1,251	1,176	1,001	1,014	395	
Gypsum	thousand metric tons	218	275	421	410 ^r	486
Lime	do.	1,666	1,790	1,918	1,936 ^r	1,958
Nitrogen, N content of ammonia	do.	1,033	949	930	1,180	1,172
Pyrites, gross weight ^c	do.	70	70	70	70	70
Salt:						
Rock	do.	52	49	46	47	43
Other	do.	2,256	2,176	2,211	2,370 ^r	2,355
Total	do.	2,308	2,225	2,257	2,417 ^r	2,398
Sand and gravel	do.	814	733	761	3,061 ^r	1,458
Sodium compounds, n.e.s.:						
Caustic soda	do.	343	346	343	382 ^r	414
Soda ash, manufactured, 100% Na ₂ CO ₂ basis	do.	391	448	454	407	401
Sulfur:						
S content of pyrites	do.	10	2	--	--	--
Byproduct, all sources ^e	do.	200	200	200	200	200
Total	do.	210	202	200 ^e	200 ^e	200 ^e
Sulfuric acid	do.	181	58	58	65	28
Talc	do.	7,850	7,270	7,310	10,082	9,725
MINERAL FUELS AND RELATED MATERIALS						
Carbon black	do.	14,756	15,538	8,106	2,000	2,000
Coal, washed:						
Anthracite and bituminous	thousand metric tons	3,251	14	13	10 ^r	1
Of which, for coke and semicoke production ⁴	do.	13	14	13	10 ^r	1
Brown	do.	291	324	245	240 ^r	112
Lignite	do.	25,752	32,457	30,154	32,813 ^r	31,479
Total	do.	29,294	32,795	30,412	33,063 ^r	31,592
Coke:						
Metallurgical	do.	1,534	1,343	1,680	1,550 ^r	1,573
Other	do.	79	70	186	88 ^r	--
Total	do.	1,613	1,413	1,866	1,638 ^r	1,573
Gas, natural, gross:						
Associated	million cubic meters	1,249	1,424	1,403	1,345 ^r	1,267
Nonassociated	do.	13,358	12,666	12,244	11,829 ^r	12,023
Total	do.	14,607	14,090	13,647	13,174 ^r	13,290
Petroleum:						
Crude:						
As reported	thousand metric tons	6,042	6,011	5,810	5,651 ^r	5,465
Converted	thousand 42-gallon barrels	45,300	45,100	44,000	42,500 ^e	41,000
Refinery products ^c	do.	75,000	75,000	75,000	75,000	75,000

^eEstimated; estimated data are rounded to no more than three significant digits; may not add to totals shown. ^rRevised. -- Zero.

¹Table includes data available through January 2006.

²In addition to the commodities listed, antimony, asbestos, and a variety of construction materials are produced, and molybdenum may have been produced as a byproduct of copper from 1988 on; output is not reported quantitatively and available information is inadequate to make reliable estimates of output levels.

³Estimated series were based on published data on concentrate production.

⁴To avoid double counting, data not included in total coal production.

TABLE 4
ROMANIA: STRUCTURE OF THE MINERAL INDUSTRY IN 2004

(Thousand metric tons unless otherwise specified)

Commodity	Major operating companies (Government owned unless otherwise specified)	Location of main facilities	Annual capacity
Alumina	Soc Com Alor SA	Plant at Oradea, near Hungarian border	250.
Do.	BBG Alum S.A. (51% owned by the Balli Group of the United Kingdom and the Bayraktar Co. of Turkey)	Plant at Tulcea, Danube Delta	400.
Aluminum, primary	SC Alro S.A. (Slatina Aluminium Enterprise)	120 kilometers west of Bucharest	270.
Barite	Ministry of Industry	Ortra mine, Rosia Montana, southwest of Cluj	100.
Bauxite	do.	Oradea-Dobresti Mining Complex, near Hungarian border	350.
Cement	Cimentul SA Turda	Plant at Turda, 600 kilometers from Port of Constanta	cement, 1360; clinker, 850.
Do.	Cimentul SA Cimus	Plant at Cimpulung, about 499 kilometers from Port of Constanta	cement, 2,200; clinker, 1,360.
Do.	Moldocim SA Bicz	Plant at Bicz, about 450 kilometers from Port of Constanta	cement, 3,100; clinker, 1,520.
Do.	Romcif SA Fieni	Plant at Fieni, about 420 kilometers from Port of Constanta	cement, 1,600; clinker, 960.
Do.	Romcim SA	Plant at Alesd, 812 kilometers from Port of Constanta	cement, 3,500; clinker, 2,120.
Do.	do.	Plant at Hoghiz, 437 kilometers from Port of Constanta	cement, 2,200; clinker, 1,520.
Do.	do.	Medgidia plant, about 35 kilometers west of Constanta	cement, 3,500; clinker, 1,980.
Do.	do.	Plant at Jiu, about 533 kilometers from the Port of Constanta	cement, 3,000; clinker, 2,045.
Coal:			
Bituminous	Compania Nationala a Huilei-Petrosani	Valea Jiului Mining Complex, near Hunedoara	10,400.
Lignite	Societatea Nationala a Lignitului Oltenia-Targu Jui	Jiu Valley, Oltenia County, north of Craiova	20,300.
Do.	Societatea Nationala a Carbunelui-Ploiesti	About 50 kilometers north of Bucharest	8,700.
Copper:			
Ore (concentrate)	Compania Nationala REMIN S.A. and Compania Nationala Minvest	Baia Mare, Baia Sprie, and Cavnic mines, northwestern area near the Ukrainian border; Rosia Montana, Noud, Borsa Balan, and Lesul Ursului Mines--in east-west arc along Carpathian range; Rosia Poieni Mine; and Moldova Noua Mine, southwest near Danubian border with Yugoslavia	180.
Metal	SC Allied Deals Phoenix SA	Outokumpu flash smelter and electrolytic refinery at Baia Mare in the Northwestern area, near the Ukrainian border	40.
Do.	SC Ampelum SA	Zlatna smelter and refinery, Apuseni, northwest Romania	13.
Ferroalloys	Ferom-Joint Stock Co.	Complex at Tulcea	280.

TABLE 4--Continued
ROMANIA: STRUCTURE OF THE MINERAL INDUSTRY IN 2004

(Thousand metric tons unless otherwise specified)

Commodity		Major operating companies (Government owned unless otherwise specified)	Location of main facilities	Annual capacity
Iron ore		Compania Nationala Minvest	Mining complex at Hunedoara, in west-central Romania	1,320.
Do.		do.	Resita Mining Complex, southwestern Romania, near Yugoslav border	660.
Do.		do.	Napoca-Cluj Mining Complex, northwestern Romania on the Somesul River	990.
Lead:				
In ore		Compania Nationala REMIN S.A.	Baia Mare Mine, near Ukrainian and Hungarian borders	24.
Do.		Compania Nationala Minvest	Balan Mine, 50 kilometers southwest of Piatra Neamt	10.
Metal		Sometra S.A.	Imperial Smelter at Copsa Mica, central Romania, on the Tirnava Mare River	42.
Natural gas	million cubic feet per year	Ministry of Industry, Department of Energy	Tirgu Mures Field at Tirgu Mures, north-central Romania	996,000.
Do.	do.	do.	Ploesti Field, 50 kilometers north of Bucharest	249,000.
Petroleum:				
Crude	42-gallon barrels per day	do.	Ploesti-Teleajen, Pitesti, and Tirgoviste Fields, in Prahova Valley around Bucharest; Bacau Field at Bacau, east-central Romania near the Siretul River; and West Carpathian Field, southeastern Carpathian Mountains, between the west bank of the Olt River and Tirgu Jiu	250,000.
Refined	do.	do.	Refineries at Brazil, Pitesti, Onesti, Barcau, Borzesti, Brasov, Cimpina, Darmanesti, Oradea, Ploesti, Teleajen, and Navodari	664,000.
Steel		Gavazzi Steel SA (formerly Otel Rosu)	Caras-Severin, southeastern region, near Yugoslav border	400.
Do.		SC Industrie Sarnei SA	Campia Turzii, Cluj, northwestern Romania	300.
Do.		Ispat Sidex SA Galati (Ispat, India and United Kingdom)	Danube River, north of Brail, near the Ukrainian border	10,000.
Do.		Siderurgica SA Hunedoara (LNM Holdings NV, United Kingdom)	West-central Romania, near Calan	2,135.
Do.		CSR S.A. Resita	Southwestern Romania, about 20 kilometers southwest of Caransebes	1,200.
Do.		Siderica SA Calarasi	Near the Bulgarian border close to the Danube	2,200.
Do.		COST SA Targoviste	Targoviste, Dimbovita, near Bucharest	1,100.
Zinc:				
In ore		Compania Nationala Minvest	Baia Mare, near Ukrainian and Hungarian borders	60.
Metal		Sometra S.A.	Imperial Smelter at Copsa Mica, Tirnava River, central Romania	66.