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, p. 215). 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 (Ianovici and Borcos, 1982, p. 55-58).

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 minerals 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 minerals industry was small and only of regional importance. Although most of the country's minerals 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 (2003, p. 4), Bulgaria's gross domestic product (GDP), based on purchasing power parity, grew by about 4.8% in 2002 compared with that of 2001. Industrial production, which accounted for about 28% of the GDP, grew by about 2% (U.S. Central Intelligence Agency, 2003). Foreign direct investment (FDI) in the economy contracted by about 34% in comparison with that of 2001 but was expected rebound in 2003 and 2004 (International Monetary Fund, 2003, p. 25). On balance, the continuing improvement of Bulgaria's economy and the anticipated accession of the country to the European Union (EU) in 2004 further diminished the many uncertainties that accompanied transition from central economic planning to a market economy (Commission of European Communities, 2002, p. 36).

The new legal structure upon which the country's privatization process was based was an important factor in the increase of FDI (European Bank for Reconstruction and Development, 2001, p. 23). The Government remained committed to transforming the economy to a market-based economic system. To promote private enterprise and foreign investment the Law on Transformation and Privatization of State and Municipal-Owned Enterprises was adopted by Parliament in 1992 and the Underground Resources Act was adopted in 1998. Although the Act stipulates that underground mineral wealth is the property of the state, it provides for claims by domestic and foreign companies to be approved for the development and operation of mineral deposits for up to 35 years with 15-year extensions. Exploration rights could be granted to private companies for up to 3 years (Kousseff, 1999, p. 41).

The National Program for Sustainable Development of Mining in Bulgaria had been 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, silver, molybdenum, and other metals were produced chiefly from the processing of copper and lead and zinc ores and concentrates.

Aluminum.—Bulgaria's production of primary aluminum shapes (ingot) was based entirely on aluminum scrap. Vi-Vesta Metal SA operated two secondary smelters, Dolna Oriahovitsa and Stara Zagora, which also processed copper scrap. In 2002, Vi-Vesta planned to restart secondary aluminum production at the Stara Zagora facility, which had been interrupted because of high domestic scrap prices that limited scrap availability. The heightened demand on Bulgaria's secondary aluminum was attributed to China's and India's rising consumption (Metal Bulletin, 2002a).

Copper.—In 2002, Bulgaria's copper mining and processing sector reported production gains of about 18%, 15%, and 5% for refined copper, smelter copper, and copper ore, respectively,

compared with levels of production attained in 2001. The Pirdop copper smelter and refinery, which was owned by N.V. Umicore S.A. of Belgium [formerly (2001) Union Miniere S.A.], accounted for about 93% of the country's total smelter copper production, the bulk of which was exported as anode feedstock to Umicore's refinery at Olen, Belgium (Kousseff, 2003). Facility expansion at Pirdop undertaken by Umicore would raise production capacity for anodes to 215,000 metric tons per year (t/yr), and that for electrolytically refined copper, to 45,000 t/yr.

Bulgaria's major copper deposits were developed and exploited in the Srednogorie-Panagjurishte region of the country. Three mines were in operation—the Asarel-Medet and the Elatsite surface mines and the Chelopech underground mine. The Asarel-Medet and the Elatsite open pit operations mine a low-grade (0.2%-0.5% copper) porphyry ore that was offset somewhat by the lesser expense of open pit mining but which also could pose more-serious environmental problems (Tsotsorkov, 1998).

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 there, the copper content of the ore averaged about 1.6%, and copper ore production amounted to about 8,000 metric tons (t) in 2002 (Kousseff, 2003).

Other developments in the copper sector included plans by the Government to sell off 70% of the shares of stock of the Eliseina copper smelter. Following formal publication of the tender, participants would be required to deposit $50,000. The Eliseina smelter had the capacity to produce about 12,000 t/yr of smelter copper mainly from scrap (Metal Bulletin, 2002b).

Gold.—Major activities in Bulgaria's gold mining and exploration sector included the continuing exploration for gold by Hereward Ventures plc of the United Kingdom at the company's 189-square-kilometer (km^2) Rosino permit. Within the permit area, work was directed mainly on the Tashlaka Hill region but also included exploration in the Byalgradets, the Kostilkovo, and the Lensko areas, which confirmed and expanded earlier Government estimates of gold resources in these areas of at least 23,300 kilograms (about 750,000 troy ounces) of gold (Hereward Ventures plc, 2002).

Navan Mining plc of Ireland continued to explore for gold at the Krumovgrad Ada Tepe and the Kuklitsa prospects. By August, the company's diamond drill hole and reverse circulation drill program for Ada Tepe totaled 10,000 meters; the intercepts reportedly yielded significant gold values. So far the exploratory work set Ada Tepe's resources at 6.1 million metric (Mt) tons with an average grade of about 4.6 grams per metric tons (g/t) gold (Navan Mining plc, 2002; Kousseff, 2003).

The prospects for Navan's future participation in the Chelopech mining operations, however, were uncertain given the company's bankruptcy status. In early 2002, Navan sought to refinance its debt by raising $25 million through the issuance of new stock shares. If successful, then the company planned to allocate about 32% of the capital for continued exploration for gold at Krumovgrad (about 49% for debt reduction) and the balance for working capital and maintenance (Metal Bulletin, 2002d).

Other developments in the gold mining sector included a propose a buyout of the 518-km^2 Chala gold exploration license area by European Minerals Corporation of the United Kingdom from Balkan Mineral Resources Ltd. Chala was determined to be an epithermal gold deposit with mineralization zones that graded more than 20 g/t gold (European Minerals Corporation, 2002).

Iron and Steel.—Sidenor S.A. of Greece, which owned 75% of the stock in Stomana AD, announced modernization plans for Stomana in 2002 that were to include the upgrading of the continuous bloom caster and two rolling mills for long products. The modernization program additionally called for raising capacity utilization of Stomana's three electric arc furnaces (EAFs) to 800,000 t/yr of crude steel from 500,000 t/yr. Although the total nominal steelmaking capacity was 1.1 million metric tons per year (Mt/yr), only two of the three EAFs were operating during the year. The modernization plan would cost about $63 million and could be financed partly through with the assistance of international financial institutions (Metal Bulletin, 2002e).

The principal activities at the Kremikovtzi Corp. (Finmark Ltd., 71% equity) included facility expansion and improvement. The installation of two new 800,000-t/yr single-strand slab casters began in April with completion and full operation scheduled for summer 2003 at a cost of about $33 million. The startup of the newly renovated 550,000-t/yr No.1 blast furnace in November will allow the last two blast furnaces to be taken offline for a refurbishing and modernization program that was valued at about $50 million. Czech, German, and Swedish companies would participate in the modernization of the blast furnaces (Metal Bulletin, 2002c).

The total output of crude steel declined by about 4% from about 1.9 Mt produced in 2001.

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 eastern Bulgaria, and in the Madan area near the border with Greece. Lead and zinc smelting and refining were in Kurdjali in the Madan area and in Plovdiv.

The underground lead and zinc mining complex at Gorubso was fully privatized in 2002, which contributed to the overall increase in the total output of ore. Mine production of lead-zinc ore rose by about 14%; lead in concentrate, by about 6%; and zinc in concentrate by about 7% compared with respective production levels in 2001 (Kousseff, 2003).

Manganese.—The Obrochishte Regional Government announced plans during the year to create a new manganese exploration and mining company that would be backed by unspecified mining and financial interests. Should the planned exploration work succeed in discovering new reserves at Obrochishte, the new company, Batova AD, would produce as much as 500,000 t/yr of manganese during a 20- to 25-year period (Kousseff, 2003).

The main mining operations at Obrochishte, which were suspended in 1999 by state-owned Euromangan Ltd. (Olbert Holdings of Switzerland), remained on a care-and-

maintenance basis. The restart of mining operations, however, was planned to begin in 2003, with output in the range of about 400,000 t/yr. The Obrochishte ore body is mainly the carbonite type (rhodocrosite) and is hosted in Oligocene-age volcanosedimentary deposits (aleurolite, clay, glauconitic sandstone, marl, and tuff).

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. In 2001, the privatization process continued in the sector and included the sale offering of gypsum mining operations (Kousseff, 2002). By yearend, the cement and dimension stone industries had achieved the highest level of privatization in the sector. 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 800,000 t, respectively, Bentonit AD's processing capacities for bentonite, zeolite, and perlite were reported to be 200,000 t/yr, 50,000 t/yr, and 150,000 cubic meters per year, respectively (Silver & Barytes Ores Mining Co. S.A., 2003).

The growth of FDI toward the end of the 1990s resulted in substantial foreign ownership in Bulgaria's cement industry. Major investment came from the EU and included the Italcementi Group (Devnya Cement), Heidelberger Zement (Zlatna Panega Cement), and Holcim Ltd. (Beloizvorski Cement). To facilitate exports to the EU, the Government adopted legislation to establish EU standards for the cement and construction materials sector in 2000 (European Bank for Reconstruction and Development, 2001, p. 23).

Mineral Fuels

In 2002, total coal output fell by about 2% compared with that of 2001. 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 and petroleum was on a significantly lower rung as a source of energy. According to the latest available trade data, domestic production of crude oil in 2001 was less than 0.3 % of total imports of crude and refined oil (National Statistical Institute, 2002, p. 256; Kousseff, 2003).

Although the mineral fuels sector, unlike that of nonfuel minerals, was mainly State owned and operated, the effort to privatize the energy sector became more discernible with the proposed formation of a joint venture between Entergy Power Development Corp. of the United States (EPDC) and Natsionalna Elektricheska Kompania EAD (NEK) of Bulgaria, which was the Government-owned electric power company, to own, modernize, and operate the lignite-powered Maritza East III electric power station. The proposed joint venture, ME-III, would undergo modernization that would be in accordance with the country's environmental regulations. A long-term power purchase agreement that was adopted by the Government for Maritza East III would remain in effect, and lignite supplies would continue from the adjacent Mini Maritza Istok EAD Mine, which was Government owned and operated. EPDC and NEK would own 73% and 27% of the shares of stock, respectively (Multilateral Investment Guarantee Agency, 2002).

At yearend, the Government of Bulgaria decided to deactivate two of its oldest Soviet-made reactors at the Kozloduy nuclear powerplant, which is located about 201 km north of Sofia. The closure of the reactor block was in compliance with an agreement that Bulgaria reached in 1999 with the EU. The construction of the Belene reactor on the Danube River, which was suspended in 1991 owing to earlier environmental concerns, would resume and help compensate for the generating capacity loss (Toshkov, 2002).

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ROMANIA

Romania's production of metals (aluminum, copper, lead and zinc, manganese, and steel and ferroalloys), industrial minerals, and mineral fuels was mainly of regional importance. Major production gains in the metals sector in 2002 included those for aluminum, copper, and crude steel. Most industrial minerals had favorable production gains during the year.

In 2002, Romania's gross domestic product, based on purchasing power parity, rose by 4.9% compared with that of 2001 (International Monetary Fund, 2003, p. 19). Industrial production increased by about 6% (U.S. Central Intelligence Agency, 2003). The policies of Romania's Government were aimed at reforming the industrial sector to raise its competitiveness in preparation for privatization.

Commodity Review

Metals

Aluminum.—The sale of the Government's assets (54.7%, or almost $55 million) of SC ALRO S.A., which was Romania's enterprise for primary aluminum production, to Marco International Inc. of the United States was finalized during the year. In 2000 and 2001, a consortium, which comprised principally Marco and included Romania's Conef SA, had acquired about 42% of ALRO stock. The consortium indicated that it planned to invest about $60 million to upgrade and expand smelter capacity [now about 175,000 metric tons per year (t/yr)] and the construction of an electric power station in Slatina (Reuters, 2002; Mining Journal, 2003).

In late 2002, Marco placed a bid to obtain the Government's almost 70% stake in the country's aluminum rolling mill SC Alprom SA in Slatina. Alprom supplied about 50% of Romania's consumption requirements for rolled aluminum (Metal Bulletin, 2002e). Romania's aluminum and bauxite industries, on balance, had positive results during the year. Production of alumina increased by about 9.6%, and that of primary aluminum, by almost 3%. The overall output of aluminum (primary and secondary), however, rose by only about 2.7% owing to a substantial decline in secondary aluminum output (table 3).

Copper.—Copper was mined predominantly 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 (major mines at Moldova Noua, Rosia Poieni, and Rosia Montana). Generally, ore grades were low with major producing mines (Moldova Noua and Rosia Poieni) being able to hoist ore that graded 0.35% copper or less. Concentrates from these areas were smelted and refined at Baia Mare and Zlatna. At Baia Mare, SC Allied Deals Phoenix SA operated an electrolytic copper refinery, a continuous caster, and an Outokumpu flash smelter. At Zlatna, SC Ampelum SA processed copper concentrates and operated a smelter and an electrolytic refinery (Moreno, 2000, p. 407, 409).

In 2002, RBG Resources Plc, which was the parent company of Allied Deals, offered the Baia Mare copper smelter and the Zalau copper rod- and wire-producing plant for sale. The sale offering was, in part, RBG's attempt to compensate for debts that had accumulated because of legal issues that faced the company in the United Kingdom (American Metal Market, 2002; Mining Journal, 2003).

The turnover at the Zalau facility (60,000 t/yr of semimanufactures) amounted to about $30 million per year, and that at Baia Mare (40,000 t/yr of cathode) amounted to about $28 million (Metal Bulletin, 2002f).

On balance, the output of copper in concentrate increased by about 2.2% in 2002 compared with that of 2001. The production of primary smelter copper declined by about 2%, and that of primary refined copper, by about 38% (table 3).

Gold.—According to preliminary reports, Romania's mine production of gold declined by about 14% in 2002 compared with that of 2001. European Goldfields Ltd. of Toronto, Ontario, Canada, reported the transfer on licenses for mining the Bolcana, the Certej, and the Zlatna deposits to its subsidiary, Deva Gold S.A. (80% owned), from Minvest S.A., which was a state-owned mining company. European Goldfields continued exploration work at Certej. Gold resources at the Certej deposit were estimated to be about 44 million metric tons (Mt) of ore with a grade of 1.9 grams per ton (g/t) gold. In 2001, European Goldfields reported the discovery of gold at nearby Teascu (1.62-1.79 g/t; 8 g/t cutoff grade). The decision to proceed with the development of modern mining operations at Rosia Montana was a major issue in the gold sector in 2002. Having undertaken exploration and planning mine development in the region, Gabriel Resources Ltd. of Canada, which owned 80% of Rosia Montana Gold Corporation, was faced with uncertainties about its future plans owing to the need to relocate long-established settlements in the region. Gabriel planned to develop an open pit operation that was expected to produce 13 million metric tons per year (Mt/yr) of ore and yield 311 metric tons (t) of gold and 1,617 t of silver. At a development cost of about $253 million, the company envisaged that the mine would operate for about 16 years (European Goldfields Ltd, 2001; Mining Journal, 2002, 2003).

Iron and Steel.—The iron and steel sector reported robust growth in 2002. The production of pig iron increased by about 23% compared with that of 2001, and that of rolled semimanufactures and crude steel, by 39% and 11%, respectively (table 3).

In 2002, the denationalization of Romania's steel industry continued. In March, the Government offered to sell off S.C. Cost S.A. Targoviste, which was a major producer of special steel long products. The planned sale was largely completed later in the year with the acquisition of about 84% of Targoviste's assets by Conares Trading AG, which was a Switzerland-based group with strong connections to steel interests in the Russian Federation. Targoviste had an installed steelmaking capacity of about 700,000 t/yr and a steel-rolling capacity of about 500,000 t/yr. At Targoviste, however, steel production (carbon, alloy, and stainless) had been well below capacity in recent years; output in 2001 amounted to only about 300,000 t (Metal Bulletin, 2002a, g). Earlier in the year, LBE Facilities, which produced silicon steel sheet mainly for motor and transformer production at Targoviste, was purchased by Turkish steel producer Erdemir Metal San. A.S. for about $8 million. LBE had been producing about 40,000 t/yr of silicon steel sheet, which was well below the plant's 100,000-t/yr capacity. The company announced a modernization plan at this facility, which was valued at about $10 million, that would restore operations to full capacity (Metal Bulletin, 2002b).

Ispat Sidex (formerly Sidex S.A. Galati) announced a new investment program that would amount to about $350 million during a 10-year period. About $175 million would be spent during the initial 5-year period and would include about $76 million earmarked for such environmentally related facilities as automation units for reheating furnaces to reduce energy consumption and desulfurization installations (Metal Bulletin, 2002d). Ispat Sidex was acquired fully at the end of 2001 by United Kingdom-based Ispat/LNM Holdings Ltd. In 2001, the steel mill's output of steel amounted to about 2.7 Mt. Siderurgica Hunedoara SA was the remaining steel mill to be privatized (Metal Bulletin, 2001). Although Ispat/LNM also expressed interest in acquiring Hunedoara during the year, its status was unchanged at yearend (Metal Bulletin, 2002c).

In a possible departure from the privatization trend in the steel sector, the assets of CSR S.A. Resita would revert to Government ownership should its United States-based private owner Noble Ventures Marketing not live up to its investment commitments that were part of the sales agreement in 2000 (Metal Bulletin, 2002c).

In 2002, the Government's steel policy aimed to increase the steel sector's competitiveness by lowering taxes on profits derived from steel exports, which included those from iron and steel scrap. Scrap merchants also began to redirect sales to foreign purchasers owing to low domestic demand caused by financial problems at the major domestic steelmaking and processing enterprises (Metal Bulletin, 2002h,i, j).

Lead and Zinc.—Generally, low-grade lead and zinc ores that graded between 0.4% lead and 0.6% zinc and 1.0% lead and 1.2% zinc were produced at underground mines in the Baia Mare, the Borsa, the Certej, and the Rodna districts. Moreover, 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. Lead and zinc from domestic and imported ores and concentrates were smelted and refined at Sometra S.A. (Moreno, 2000, p. 409).

Industrial Minerals

Romania was known to have a broad range of industrial minerals that included barite; various calcareous rocks; granitic/pegmatitic sources of clays, feldspar, and mica; gypsum; graphite; silica group minerals; and salt. 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 (Harris, 2001). In 2002, the production of cement remained stable; output was slightly higher than that of 2001. Sand and gravel production rose by about 4%, and salt production, by about 1.5%. Major production increases were registered by the country's diatomite and feldspar mining sectors with gains of about 207% and 18%, respectively, compared with comparable levels in 2001.

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 billion to 1.6 billion metric tons (Gt). The extraction of crude petroleum in recent years, however, has exhibited a declining trend. From 1997 through 2002, petroleum output declined each year by about 2%, 3%, 2%, 2%, 1%, and 3%, respectively, compared with that of the preceding year (table 3). Some stabilization in the country's petroleum production could be expected should offshore Black Sea exploration prove successful. In 2001, the Pescarus 62 offshore delineation well showed good results; further exploration contracts were offered to foreign investors (Oil & Gas Journal, 2001). The country's refined petroleum products capacity amounted to about 25 Mt/yr.

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. Coal accounted for about 60% of the primary fuel for the country's principal electric power stations (Lynch, 1999). The total output of marketable coal in 2002 declined by about 7% compared with that of 2001. The production of coke, however, rose by more than 27%.

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TABLE 1
BULGARIA: PRODUCTION OF MINERAL COMMODITIES[1, 2]

(Metric tons unless otherwise specified)

Commodity		1998	1999	2000	2001	2002 [e]
METALS						
Aluminum, metal, secondary		6,685	4,192	8,430	2,000	2,000
Bismuth, metal[e]		40	40	40	40	40
Cadmium, metal, smelter		195	217	233	233	235
Copper:						
Ore:						
Gross weight	thousand tons	21,207	22,346	22,829	24,878	26,030 [3]
Cu content[e]	do.	105	113	113	115	120
Concentrate:						
Gross weight	do.	438	482	462	438	422 [3]
Cu content	do.	88	96	92	88	84
Metal, primary and secondary:						
Smelter		119,500	107,000	178,000	157,000	181,000 [3]
Refined, electrolytically		36,400	21,000	32,400	34,400	40,000 [3]
Gold, metal	kilograms	1,253	2,743	2,347	2,540	2,612 [3]
Iron and steel:						
Iron ore:						
Gross weight	thousand tons	895	699	559	325	373 [3]
Fe content	do.	250 [e]	223	178	92	105
Iron concentrates	do.	463	361	304	240	167 [3]
Metal:						
Pig iron for steelmaking	do.	1,390 [r]	1,152 [r]	1,220 [r]	1,211 [r]	1,072 [3]
Ferroalloys, ferrosilicon[e]	do.	10	10	10	10	10
Steel, crude	do.	2,240	1,890	2,023	1,942	1,860 [3]
Semimanufactures, rolled	do.	1,942 [r]	1,535	1,455	1,353 [r]	1,400
Lead:						
Mine output, Pb content		22,000	14,000	14,000	16,000	24,000
Concentrate:						
Gross weight		34,595	25,208	15,019	26,400	28,000 [3]
Pb content[e]		24,200	17,000	10,500	18,500	19,600 [3]
Metal, refined, primary and secondary		77,100	81,600	84,100	88,300	66,000 [3]
Manganese ore:						
Gross weight		55,600	--	--	1,516	4 [3]
Mn content[e]		17,000	--	--	450	--
Silver, mine output, Ag content		68	59	55	57	60 [3]
Tin, metal		10 [e]	10 [e]	10	10	10
Uranium, oxide, U content[e]		600	600	600	600	600
Zinc:						
Mine output, Zn content[e]		18,000	12,000	10,000	10,600	25,800 [3]
Concentrate:						
Gross weight		33,600	19,560	18,096	23,301	28,672 [3]
Zn content[e]		17,000	10,200	9,400	12,100	14,900 [3]
Metal, smelter, primary and secondary		86,100	83,700	84,200	88,600	83,000 [3]
INDUSTRIAL MINERALS						
Asbestos fiber, all grades		300 [e]	300 [e]	300	300	3,000
Barite ore, run of mine		452,197	1,124,000	875,000	825,000	656,000 [3]
Cement, hydraulic	thousand tons	1,742	2,060	2,209	2,088 [r]	2,100
Clays:						
Bentonite	do.	176	232	296	320 [r]	211 [3]
Kaolin, washed	do.	150 [e]	140 [e]	150	150	160
Refractory	do.	56	48	34	37	38 [3]

See footnotes at end of table.

TABLE 1--Continued
BULGARIA: PRODUCTION OF MINERAL COMMODITIES[1, 2]

(Metric tons unless otherwise specified)

Commodity		1998	1999	2000	2001	2002 [e]
INDUSTRIAL MINERALS--Continued						
Feldspar	do.	36	28	22	23	34 [3]
Fluorspar[e]	do.	2	2	2	2	2
Gypsum and anhydrite:						
Crude	do.	184	149	170	167	150 [3]
Calcined	do.	75 [r, e]	55 [e]	65	50	50
Lime, industrial	do.	1,000 [e]	1,068	1,388	2,025	2,000
Limestone and dolomite	do.	11,000 [e]	11,000 [e]	11,000	11,000	11,000
Nitrogren, N content of ammonia	do.	527	378	647	580 [r]	600
Perlite	do.	12	13	17	12	10 [3]
Pyrites, gross weight[e]	do.	150	150	150	150	150
Salt, all types	do.	2,400	1,300	1,700	1,931	1,800 [3]
Sand and gravel	thousand cubic meters	5,767 [r]	2,829 [r]	2,291 [r]	2,375 [r]	2,500
Silica (quartz sand)	thousand tons	593	533	690	677	607 [3]
Sodium carbonate, calcined	do.	800	800	800	800	800
Sulfur: [e]						
Sulfur content of pyrite		50,000	50,000	50,000	50,000	50,000
Byproduct		50,000	50,000	50,000	50,000	50,000
Total		100,000	100,000	100,000	100,000	100,000
Sulfuric acid		500,000 [e]	500,000 [e]	500,000	500,000	500,000
MINERAL FUELS AND RELATED MATERIALS						
Coal, marketable:						
Anthracite	thousand tons	16	17	18	14	13 [3]
Bituminous	do.	105	106	100	101	109 [3]
Brown	do.	3,692	3,074	3,211	3,151	3,232 [3]
Lignite	do.	27,435	22,696 [r]	23,765	23,856	23,202 [3]
Total	do.	31,248	25,893	27,094	27,122	26,556
Coke	do.	1,200 [e]	1,200 [e]	1,200	1,200	1,200
Natural gas, marketed	million cubic meters	33	27	15	22	11 [3]
Petroleum:						
Crude, reported	thousand tons	32	39	41	32	33 [3]
Refinery products[e]	thousand 42-gallon barrels	25,000	25,000	25,000	25,000	25,000

[e]Estimated. [r]Revised. -- Zero.

[1]Table includes data available through October 2003.

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

[3]Reported figure.

TABLE 2
BULGARIA: STRUCTURE OF THE MINERAL INDUSTRY IN 2002

(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:			
Concentrate, Cu content	Asarel-Medet AD	Panagurishte, Pazardzhik district	25.
Do.	Chelopech Ltd.	Srednogorie, Sofia district	5.
Do.	Bradtze	Malko Turnovo	2.
Do.	Elatzite-Med Ltd.	Srednogorie, Sofia district	15.
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, refined	Union Miniere Pirdop Copper Smelter & Refinery	Srednogorie, Sofia district	120.
Iron ore	Kremikovtsi Iron and Steel Combine	Kremikovtsi	2,000.
Lead-zinc:			
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.
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)
Petroleum:			
Crude	do.	do.	(1)
Refined barrels per day	Economic Trust for Petroleum Products	Refineries in Burgas, Pleven, and Ruse	260,000.
Steel, crude:	Kremikovtsi Iron and Steel Works	Near Sofia	2,300.
Do.	Stomana Iron and Steel Works	Pernik	1,300.

[1]Insignificant capacity.

TABLE 3
ROMANIA: PRODUCTION OF MINERAL COMMODITIES[1, 2]

(Metric tons unless otherwise specified)

Commodity		1998	1999	2000	2001	2002
METALS						
Aluminum:						
Bauxite, gross weight		161,865	--	---	--	--
Alumina, calcined, gross weight		250,226	277,388	416,587	319,403	350,164
Ingot including alloys:						
Primary		174,038	174,452	179,038	181,831	187,088
Secondary		1,110	146	2,305	682 r	278
Total		175,148	174,594	181,343	182,513	187,366
Bismuth, mine output, Bi content[e]		40	40	40	40	40
Cadmium metal, smelter		--	--	--	--	--
Copper:						
Mine output, Cu content of concentrate		19,065	16,807	16,099	19,185	18,000
Metal:						
Smelter:						
Primary		18,708	24,010	16,429	8,979 r	8,810
Secondary[e]		1,000	2,000	2,000	2,000	3,000
Total		19,708	24,010	18,429	10,979	11,810
Refined:						
Primary		21,008	20,294	15,303	18,522	11,453
Secondary[e]		2,000	4,000	4,000	4,000	2,000
Total		23,028	24,294	19,303	22,522	13,453
Gold, mine output, Au content[e]	kilograms	3,500	3,500	3,500	3,500	3,000
Iron and steel:						
Iron ore:						
Gross weight	thousand tons	459	131	116	292 r	296
Metal content	do.	85	71	55	76 r	77
Metal:						
Pig iron	do.	4,541	3,006	3,066	3,243 r	3,976
Ferroalloys:						
Ferrochromium		873	--	--	--	--
Ferrosilicon		5,553	5,000	8,309	5,823	--
Ferromanganese		4,170	25	1,989	384	--
Ferrosilicomanganese		83,617	550	62,320	71,921	88,665
Silicon metal[e]		150	--	200	200	200
Steel, crude	thousand tons	6,336	4,355	4,672	4,936 r	5,491
Semimanufactures:						
Pipes and tubes	do.	661	348	465	665 r	555
Rolled products	do.	4,391	3,377	3,687	3,582 r	4,649
Lead:						
Mine output, Pb content of concentrate		15,144	20,484	18,750	19,676	18,102
Smelter, primary[e]		10,000	15,000	15,000	15,000	15,000
Refined:[e]						
Primary		15,000	13,000	25,000	24,000	26,000
Secondary		3,000	3,000	3,000	3,000	3,000
Total		18,000	16,000	28,000	27,000	29,000
Manganese:						
Ore, gross weight	thousand tons	100	60	24	70	60 e
Concentrate:[3]						
Gross weight	do.	73	42	19	55	40
Mn content	do.	19	11	5	14	12
Silver, mine output, Ag content		60	18	18	12 r	15
Zinc:						
Mine output, Zn content of concentrate		25,650	26,536	27,452	29,786	21,250
Metal, smelter, primary and secondary		29,427	29,000	51,900	47,200	48,000

See footnotes at end of table.

TABLE 3--Continued
ROMANIA: PRODUCTION OF MINERAL COMMODITIES[1, 2]

(Metric tons unless otherwise specified)

Commodity		1998	1999	2000	2001	2002
INDUSTRIAL MINERALS						
Barite, processed		10,327	4,641	4,266	2,851 r	100
Cement, hydraulic	thousand tons	6,577	5,580	6,058	5,668	5,680
Clays:						
Bentonite:						
Run of mine[e]		60,000	45,000	75,000	60,000	40,000
Marketable		25,434	19,609	37,687	24,779 r	15,402
Kaolin:						
Run of mine[e]		75,000	73,000	70,000	70,000	71,000
Marketable		24,742	23,586	18,942	21,867 r	22,514
Diatomite		34,600	11,592	8,890	9,743 r	20,128
Feldspar		37,010	36,635	37,157	43,037 r	50,864
Fluorspar[e]		15,000	15,000	15,000	15,000	15,000
Graphite		1,951	1,041	1,251	1,176	1,001
Gypsum	thousand tons	297	305	218	275 r	278
Lime	do.	1,813	1,464	1,666	1,790 r	18,289
Nitrogen, N content of ammonia	do.	385	687	1,033	1,000	1000 e
Pyrites, gross weight	do.	200	68	70 e	70 e	70 e
Salt:						
Rock salt	do.	68	100	52	49 r	46
Other	do.	2,220	2,199	2,256	2,176	2,211
Total	do.	2,288	2,299	2,308	2,224	2,257
Sand and gravel	do.	1,049	748	814	733	761
Sodium compounds, n.e.s.:						
Caustic soda	do.	310	289	343	346	477
Soda ash, manufactured, 100% sodium carbonate basis	do.	482	431	391	448 r	455
Sulfur:						
S content of pyrites	do.	50	17	10	2	--
Byproduct, all sources[e]	do.	200	200	200	200	200
Total[e]	do.	250	217	210	202	200
Sulfuric acid	do.	229	234	181	58	58
Talc		8,134	8,289	7,850	7,270 r	7,292
MINERAL FUELS AND RELATED MATERIALS						
Carbon black		18,450	12,490	14,756	15,538	8,106
Coal, washed:						
Anthracite and bituminous:	thousand tons	3,201	2,751	3,251	14 r	13
Of which:						
For coke and semicoke production	do.	192	110	13	14	13
For other uses	do.	2	1	--	--	--
Brown	do.	--	--	291	324 r	244
Lignite	do.	26,037	22,472	25,752	32,457 r	30,189
Total	do.	29,238	25,223	29,294	32,795	30,446
Coke:						
Metallurgical	do.	2,929	1,593	1,534	1,343 r	1,797
Other	do.	--	--	79	70	1
Total	do.	2,929	1,593	1,613	1,413	1,798
Gas, natural, gross:						
Associated	million cubic meters	1,210	1,164	1,249	1,424 r	1,399
Nonassociated	do.	13,231	13,413	13,358	12,666 r	12,026
Total	do.	14,441	14,577	14,607	14,090	13,425

See footnotes at end of table.

TABLE 3--Continued
ROMANIA: PRODUCTION OF MINERAL COMMODITIES[1, 2]

(Metric tons unless otherwise specified)

Commodity		1998	1999	2000	2001	2002
MINERAL FUELS AND RELATED MATERIALS--Continued						
Petroleum:						
Crude:						
As reported	thousand tons	6,309	6,154	6,042	6,011 r	5,840
Converted	thousand 42-gallon barrels	47,020	45,866	45,300	45,100	44,000
Refinery products[e]	do.	95,000	77,265	75,000	75,000	75,000

[e]Estimated. [r]Revised. --Zero.

[1]Includes data available through September 2003.

[2]In addition to the commodities listed, antimony, asbestos, and a variety of crude 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.

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

TABLE 4
ROMANIA: STRUCTURE OF THE MINERAL INDUSTRY IN 2002

(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.	Soc Com Alor SA (51%-owned by the Balli Group of the United Kingdom and the Bayrakter Co. of Turkey)	Plant at tulcea, Danube Delta	400.
Aluminum, primary	Alro SA (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, 1,360; 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 Bicaz	Plant at Bicaz, 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 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 National a Lignitului Oltenia-Targu Jui	Jiu Valley, Oltenia County, north of Craiova	20,300.
Do.	Societatea National 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	Compania Nationala REMIN S.A.	Outokumpu flash smelter and electrolytic refinery at Baia Mare in the northwestern area near the Ukrainian border	35.
Do.	do.	Zlatna smelter and refinery, Apuseni	13.

TABLE 4--Continued
ROMANIA: STRUCTURE OF THE MINERAL INDUSTRY IN 2002

(Thousand metric tons unless otherwise specified)

Commodity		Major operating companies (Government-owned unless otherwise specified)	Location of main facilities	Annual capacity
Ferroalloys		Ferom-Joint Stock Co.	Romania Complex at Tulcea	280.
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.
Lead metal		Sometra S.A.	Imperial Smelter at Copsa Mica, on the Tirnava Mare River, central Romania	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	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.
Petroleum, 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 Sarmei SA	Campia Turzii, Cluj, northwestern Romania	300.
Do.		Sidex S A Galati	Danube River, north of Brail, near the Ukrainian border	10,000.
Do.		Siderurgica SA Hunedoara	West-central Romania, near Calan	2,135.
Do.		CSR SA 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.