

# THE MINERAL INDUSTRIES OF CENTRAL EUROPE

## CZECH REPUBLIC, HUNGARY, POLAND, AND SLOVAKIA

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The Central European transitional economy countries of the Czech Republic, Hungary, Poland, and Slovakia represent one of the more economically dynamic regions of the former centrally planned economy countries of Europe and Central Eurasia. As founding members of the Central European Free Trade Agreement (Bulgaria, Romania, and Slovenia joined in 1999), these countries have continued to implement policies designed to harmonize standards and trade with a view to integrate themselves fully into the European Union (EU), as they had done already in the European security sphere through membership in the North Atlantic Treaty Organization. To accommodate new standards, the development of new commercial infrastructure in the region has added special importance to the region's cement and steel industries; major consumption increases of these commodities serve as markers for likely consumption increases of base metals and many other mineral commodity groups.

The trend toward large-scale foreign investment in the cement and associated quarrying industries in the Central European region that emerged during the 1990s became discernible more clearly in the region's iron and steel sectors during 2002 and 2003. In 2003, the denationalization of the iron and steel sectors was among the major issues in the Central European region. On balance, however, mining continued to undergo rationalization to meet market economy norms and no longer had the same share of industrial production and gross domestic product as it had during the years of central economic planning when Government policies dictated mineral self-sufficiency at all costs.

### CZECH REPUBLIC

The Czech Republic was an important Central European producer of heavy industrial goods manufactured by the country's toolmaking, machine building, and chemical industries. Steelmaking, the mining and processing of industrial minerals, and the production of construction materials continued to be of domestic and regional importance.

In 2003, the Czech Republic's gross domestic product (GDP) based on purchasing power parity increased by about 3.2% compared with that of 2002 (International Monetary Fund, 2004, p. 199). Industrial production increased by about 5.7% (U.S. Central Intelligence Agency, 2004, p. 250). According to data provided by the Czech Geological Survey (GEOFOND), which was the country's leading mineral information agency, the mining and processing sector's share of the GDP declined to 1.4% in 2002 from 3.7% in 1993 largely because of the economic transition to a market-based economy from a centrally planned economy (GEOFOND, 2004, p. 208). In 2003, the

privatization of the iron and steel sector continued to be a dominant issue in the country's mineral industry.

### Government Policies and Programs

The Government continued policies of economic development that were aimed at integrating the country into the European Union (EU). The country's membership in the International Monetary Fund, the Organisation for Economic Co-operation and Development (OECD), the World Bank for Reconstruction and Development, and the World Trade Organization, as well as participation in the General Agreement on Tariffs and Trade was largely an outcome of the Czech Republic's full orientation toward a Western European political system and market economy.

Three constituent acts comprise the country's mining law, which forms the foundation of the Government's mining and other mineral-related policies. These are Act No. 44/1988 Coll., on Protection and Use of Mineral Resources (the Mining Act), as amended; the Czech National Council Act No. 61/1988 Coll., on Mining Activity, Explosives, and State Mining Administration (Authority/Sedenka), as amended; and the Czech National Council Act No. 62/1988 Coll., on Geological Works, as amended. The Mining Act classifies minerals into "reserved" and "unreserved" categories. The "reserved" category refers to mineral deposits that, apart from immediate market considerations, are determined to be necessary for the development of the national economy (Luks, 1997; GEOFOND, 2004, p. 10, 11). Other provisions in the mining law address issues of licensing and Federal and regional compliance with environmental regulations during the exploration and exploitation of mineral deposits and the reclamation of mined-out areas.

To meet the needs of a developing market economy, major changes in the Czech Republic's environmental policies were enacted in 1997. On the basis of environmental principles that were approved by the Government in 1995, the new policy was officially formulated in the environmental law of 1997, Act No. 125/1997. Also, four of the six enabling provisions of the new law were formally adopted at the same time as the new law on January 1, 1998. The environmental law focuses on reducing the volume of waste, discreet collection of waste by category, and recycling. The law adopts the main provisions of EU and OECD regulations and the Basel Convention. The catalogue of wastes is compatible with the European Catalogue of Wastes of the EU.

### Production and Trade

In 2003, the iron and steel industry, which constituted the major part of the country's metallurgical sector, continued to

increase output of pig iron (by 7.4%) and crude steel (by 4.4%). The production of hot-rolled steel semifinished products amounted to about 5.5 million metric tons (Mt), which was an increase of about 3.7% compared with that of 2002 (International Iron and Steel Institute, 2004, p. 53, 55).

Since 2002, when mine output of iron ore ceased, the Czech Republic has depended entirely on imports for its iron ore requirements. Trade data for 2003 indicate that total iron ore imports by the Czech Republic amounted to about 8.2 Mt, or about 21% more than total imports in 2001. Ukraine (about 64%) and Russia (about 30%) accounted for the major share of the Czech Republic's imports of iron ore and concentrate. Net imports of pig iron amounted to about 22,000 metric tons (t), which was a decline of about 75% compared with those of 2002. Net exports of iron and steel scrap amounted to 673,000 t, which was about 2% less than those of 2002 (GEOFOND, 2004, p. 24).

In 2002, the production of mineral fuels registered mixed results. The production of brown coal and lignite increased by about 2% compared with that of 2002; bituminous coal declined by about 5% to almost 13.4 Mt. Natural gas production increased by about 44% compared with that of 2002 to about 131 million cubic meters; crude petroleum output rose by about 23%. Although the Czech Republic remained a net exporter of all forms of coal, the country continued to rely on imports of natural gas and petroleum to meet almost all its requirements. Total imports of petroleum amounted to about 6.3 Mt, which was a 4.3% increase compared with that of 2002 and about 68% of the Czech Republic's total petroleum imports. Russia also accounted for more than 74% of the Czech Republic's imports of natural gas, which in 2003 declined by almost 3% compared with those of 2002 and amounted to about 6,772 million cubic meters (GEOFOND, 2004, p. 71, 77, 80, 83, 89).

Major production changes in the industrial minerals sector included production increases of cement and feldspar and production downturns for graphite and gypsum (table 1).

## Commodity Review

### Metals

The Czech Republic's metals sector produced a broad range of base metals and semifinished products from imported primary raw materials (ores and concentrates) and secondary materials (scrap). Although interest in gold mining continued in some parts of the Czech Republic, other metals were reported to have been depleted. According to official data, most of the country's metallic mineral deposits as of December 31, 2000, were not economic. Gold-bearing and tin-tungsten ores were among the exceptions (GEOFOND, 2004, p. 21).

**Aluminum.**—With sources of aluminum limited to imports, the Czech Republic's aluminum industry chiefly processed secondary aluminum and fabricated semifinished and finished aluminum commodities. In 2002, the Czech Republic's imports of unwrought aluminum, alumina, and bauxite amounted to 149,570 t, 23,142 t, and 13,871 t, respectively. Bauxite and alumina imports were consumed by the country's

industrial minerals sector. The Czech Republic's main export of unfabricated aluminum consisted of 43,045 t of unwrought aluminum (primary shapes) (GEOFOND, 2004, p. 191).

**Copper.**—The Czech Republic relied almost exclusively on imports of refined copper, copper alloys, and scrap to meet its industrial needs. In 2003, imports of refined copper, which amounted to 6,209 t, fell for the second straight year, by about 48% compared with those of 2002. Germany, Poland, and Austria supplied about 51%, 31%, and 9%, respectively, of total imports.

The Czech Republic remained a substantial net exporter of copper scrap. In 2003, copper scrap exports, which exceeded imports of copper scrap by about 18 fold, amounted to 36,874 t. Germany was the major importer of copper scrap from the Czech Republic (GEOFOND, 2004, p. 34).

**Iron and Steel.**—As of December 31, 2003, only one economic deposit of magnetite was on the official registry. The remaining magnetite deposits were located at Kovarska in the northeastern part of the Czech Republic. These deposits contained about 15 Mt of subeconomic resources (GEOFOND, 2004, p. 24).

All the raw materials consumed by the country's steel industry—iron ore and concentrate, and pellets and agglomerate—were imported. In 2003, more than 8.2 Mt of iron ore and concentrate was imported mainly from Ukraine and Russia, which accounted for about 64% and 30% of the total imports, respectively. Net imports of pig iron amounted to about 22,000 t. Russia and Slovakia accounted for 94% of the total imports of pig iron by the Czech Republic (72,000 t); net exports of iron and steel scrap by the Czech Republic amounted to about 673,000 t (GEOFOND, 2004, p. 24).

The steel industry operated eight steel plants with a collective capacity to produce almost 11 million metric tons per year (Mt/yr) of steel. The main steel producers, in order of crude steel production capacity, were Nova Hut s.p. Ostrava (NH), Zelezarne Vitovice (ZV), Trinecke Zelezarny (TZ), and Poldi United Steel Works; these producers accounted for more than 87% of the country's total crude steel production capacity.

The rationalization of the iron and steel industry and the increasing foreign investor interest in Czech ferrous metallurgy continued in 2003. After extended negotiations for the purchase of NH, LNM Holdings Ltd. (LNM) of the United Kingdom finally acquired NH in January 2003. The value of the transaction amounted to more than \$800 million, of which about \$464 million was to be earmarked to cover NH's debts and liabilities, and about \$356 million was to be used for capital investment and as working capital. The deal also included the acquisition of pig iron producer Vysoke Pece Ostrava (Metal Bulletin, 2004b). In accordance with the EU's restructuring policies, LNM announced a downsizing of the workforce as part of NH's restructuring plan; the plan envisaged a 21% reduction of NH's 11,300-employee workforce (Metal Bulletin, 2004c). Another issue was talks held between representatives of NH's management and the Hungarian Steel Industry Association to rescind Hungary's quotas on imports of steel from NH, which total about 40,000 metric tons per year (t/yr) (Metal Bulletin, 2004a).

Other developments in the Czech steel sector included the decision by Osinek A.S. [a branch of the Czech Republic's National Property Fund (NPF)] to renew the sale offering of the Vitcovice A.S. iron and steel works; no sale date, however, had been set by yearend. In 2002, Osinek obtained about 99% of ZV stock in a transaction valued at about \$90 million (Metal Bulletin, 2003b).

**Lead and Zinc.**—The mining of the Czech Republic's lead and zinc ore deposits ended in early 1994. The number of registered lead deposits declined to 8 in 2003 from 17 in 1998. Similarly, the number of registered zinc deposits declined to 9 in 2003 from 18 in 1998. All but one of the registered deposits accounted for both metals, having galena and sphalerite (GEOFOND, 2004, p. 36, 40).

In 2003, net imports of unwrought lead amounted to about 48,600 t. Germany, Sweden, and Poland were the main suppliers of primary lead to the Czech Republic and accounted for 70%, 14%, and 7%, respectively, of Czech lead imports (GEOFOND, 2004, p. 38). The Czech Republic's net exports of lead scrap amounted to 2,018 t, of which all was shipped to Germany (GEOFOND, 2004, p. 38). The chief source of domestic lead scrap raw material was recycled batteries that were collected and processed by the Czech Republic's sole recycler of secondary lead, Kovohute Pribram. According to a company spokesperson, Kovohute Pribram expected sales of secondary lead to decline by yearend owing largely to a decline in the availability of battery scrap (Metal Bulletin, 2003a).

In 2003, about 37% of the Czech Republic's net imports of crude unwrought zinc (27,078 t) were supplied by Poland; Germany and Belgium supplied about 21% and 11%, respectively, of total imports. Net exports of zinc waste and scrap amounted to about 2,200 t, of which Germany was the major recipient (GEOFOND, 2004, p. 41).

**Manganese.**—Manganese, which is of prime importance to the steel industry, was obtained entirely from imports of ores and concentrates. In 2003, the Czech Republic imported 11,966 t of manganese ores and concentrates from Ukraine (54%), the Netherlands (21%), and Georgia (13%). Imports of ferrosilicomanganese amounted to about 56,000 t, which was more than twice that of 2002; Slovakia, Ukraine, and Romania supplied about 57%, 22%, and 9%, respectively, of total ferrosilicomanganese imports. Imports of ferromanganese amounted to more than 24,000 t; Ukraine and Norway accounted for about 41% and 31%, respectively, of total imports of ferromanganese (GEOFOND, 2004, p. 29).

### ***Industrial Minerals***

The Czech Republic was well endowed with and produced a broad range of industrial minerals that met most domestic construction and chemical industry requirements, as well as those for export. The availability of these minerals at the recent (2000-03) average rate of mining ranged from about 43 years for gem-grade pyrope ore to about 3,000 years for silica raw materials. Such corrective additives as clays, loams, loess, sands, and shales needed by the country's cement industry to regulate the content aluminum ( $\text{Al}_2\text{O}_3$ ), iron ( $\text{Fe}_2\text{O}_3$ ), and silicon oxides ( $\text{SiO}_2$ ) during clinker production were reported to have

a combined mining life of about 1,380 years. The industrial minerals that had the largest resources suitable for exploitation were, in order of deposit sizes, limestone, kaolin, and glass sand (GEOFOND, 2004, p. 92-93).

During the late 1990s, foreign investment in the Czech Republic's mineral industry focused primarily on the acquisition of cement plants and associated raw materials quarries.

### ***Mineral Fuels***

The energy policy of the Czech Republic has promoted the following aims: the decontrol of energy prices; denationalization, rationalization, and restructuring of the energy sector; increase in the level of conservation, health and safety, and pollution controls in the energy sector; diversification of electricity, natural gas, and petroleum supply; and raising of the efficiency of domestic fossil fuel production. To help make its governmental and economic structures more compatible with those of the EU, the Government will move to harmonize the country's energy sector's standards with those of the EU.

**Coal.**—Bituminous or hard coal occurs mainly in the Upper Silesian Basin. Of the resources in this region, only about 15% is in the Czech Republic; the balance of the resources is in Poland. Bituminous coal (phytokaustobiolite, as it is described in the Czech Republic's annual Mineral Commodity Summaries of the Czech Republic) has a higher degree of coalification than lower rank coals. Some of the characteristics of Czech bituminous coal include a carbon content of more than 73.4%; a volatile matter content of less than 50%; and a dry and ash-free calorific value that exceeds 24 megajoules per kilogram (MJ/kg). As of December 31, 2003, the Czech Republic reported that the total resource of bituminous coal amounted to about 16.110 billion metric tons (Gt). In 2003, the production of bituminous coal declined by about 5% compared with that of 2002. Imports that amounted to 1.281 Mt were derived almost exclusively from Poland (94%). About 5.7 Mt of bituminous coal was exported mainly to Austria, Germany, and Slovakia (GEOFOND, 2004, p. 70, 71).

In addition to bituminous coal, the Czech Republic distinguishes two types of lower rank coal—brown coal and lignite. Brown coal has a lower level of coalification; that is, it has a fixed level of carbon of less than 73.5%, volatiles of more than 50%, and a dry and ash-free calorific value of less than 24 MJ/kg. The vitrinite reflective boundary between hard/bituminous coal and brown coal is lower than 0.5% for brown coal. The boundary between brown coal and lignite, however, is not differentiated owing to the inclusion of high volatile lignite in the brown coal category (GEOFOND, 2004, p. 69). The Czech Republic's brown coal deposits are worked in the northwestern part of the country in the Bohemian brown coal basins. The major brown coal basins are found in Krusne Hory Mountains region and cover an area of 1,900 square kilometers ( $\text{km}^2$ ). Coal also is mined in the Cheb, the Sokolov, and the Zitava Basins. As of December 31, 2003, total resources of brown coal amounted to more than 9.501 Gt. Brown coal was used mainly as a fuel in the country's electric power industry; a minor amount was consumed by the chemicals sector. In 2003, major foreign commerce in brown coal centered on exports of

about 1.3 Mt; Slovakia (63%) and Hungary (22%) were the major recipients (GEOFOND, 2004, p. 76, 77). According to GEOFOND (2004, p. 79), Czech standards for coal describe high-volatile lignite as a variety of brown coal that has undergone the least amount of coalification and still has xylitic characteristics (fragments of wood, preserved tree trunks, etc.). Its dry and ash free calorific value is less than 17 MJ/kg. The boundary between brown coal and high-volatile lignite is not distinct. Lignite, which usually was consumed by the electric-power-generating sector, also was used for heating. The chief deposits occur in the Vienna Basin, which extends from Austria to Moravia. Total resources of lignite in the Czech Republic at the end of 2003 amounted to about 1.012 Gt (GEOFOND, 2004, p. 80).

**Natural Gas and Petroleum.**—According to GEOFOND (2004, p. 76), the Czech Republic's oil and gas-bearing/producing area is in the "Vienna-Moravia oil-bearing province." The deposits in this province are hosted in a large number of "individual oil-bearing structures and producing horizons . . ." to a depth of 2,800 meters (m) (GEOFOND, 2004, p. 82, 83). Sandstones of Middle and Upper Badenian age are described as hosting the most productive oil deposits. Hrusky was once the largest deposit, but most of the oil at Hrusky had been extracted and the structure now serves mainly as an underground gas storage facility. Exploration was being conducted, however, in another oil-bearing area in the Moravian region of the Carpathian foredeep. Petroleum in this region occurs in weathered crystalline Paleozoic rocks. The prevailing type of petroleum is a light sulfur-free paraffin to paraffin-naphthene oil. The Czech Republic's petroleum resources as of December 31, 2003, amounted to about 32.4 Mt, of which about 12.5 Mt was categorized as economic proven; 8.6 Mt as economic probable; and about 11.4 Mt as subeconomic (GEOFOND, 2004, p. 82, 83).

In 2003, the Czech Republic imported about 6.3 Mt of petroleum, of which about 68% (4.3 Mt) was imported from the Russian Federation and 15.8% (1 Mt), from Azerbaijan. Exports during the same period were about 133,000 t (GEOFOND, 2004, p. 82, 83). In 2003, domestic production of crude oil increased by about 23% compared with that of 2002. Petroleum production amounted to about 4.3% of net imports.

Natural gas production increased by about 44% to 131 million cubic meters compared with 91 million cubic meters produced in 2002. In 2003, the Russian Federation supplied the Czech Republic with about 74% of approximately 6.8 billion cubic meters of natural gas imports; about 26% was obtained from Norway (GEOFOND, 2004, p. 89, 90).

## Outlook

The Czech Republic will continue to rely on imports of natural gas and petroleum, given the country's limited resources of these commodities. Import reliance on base and precious metals also will continue, although demand is not expected to increase significantly. Owing to the fairly high technological level of the Czech Republic's fabrication and service sectors, material input per unit of output was expected to continue to decline from the high material input per output experienced during the country's central economic planning period.

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## HUNGARY

Bauxite remained the only major nonfuel mineral produced in Hungary that was significant in terms of European mineral production. In 2003, Hungary maintained production of modest amounts of fossil fuels, industrial minerals, and metals. Despite substantial production of bauxite and alumina, Hungary's production of primary aluminum remained modest owing to limited domestic sources of energy. The production of coal, natural gas, and petroleum was sufficient to satisfy only about one-half of the country's annual energy needs.

In 2003, Hungary's GDP based on purchasing power parity increased by about 4.5% compared with that of 2002 (International Monetary Fund, 2004, p. 199). The gross output (value) of industry rose by about 2.5% (U.S. Central Intelligence Agency, 2004, p. 250).

## Government Policies and Programs

The Government based its regulatory policies for mining and geologic survey work on provisions in the Mining Law of 1993 (Act XLVIII). Section 50 of the Mining Law was the basis for Governmental Decree No. 132/1993, which constitutes the legislative underpinning for the Hungarian Geological Survey. The Mining Law and related decrees and codes established the legislative bases for estimating reserves, determining environmental risks associated with mining, and providing the geologic and technical information needed to outline tender conditions.

Government agencies that were responsible for enforcing existing environmental protection laws and regulations included the Ministry of the Environment and Regional Planning (KTM) and the Hungarian Mining Office (MBH). The KTM was authorized to help only in the enforcement of existing environmental legislation prescribed by other ministries of the Government. With respect to mining and minerals, Hungary's Ministry of Industry and Commerce

had the primary responsibility for establishing environmental regulatory standards. The chief responsibility of the MBH was that of a certifying agency, which could review only technical developmental and operational plans. These plans were required to include provisions that pertain to environmental protection and land restoration by responsible entities.

## Production and Trade

The output of bauxite declined by about 7% compared with that of 2002. The production of crude steel decreased by about 7%, and that of rolled semimanufactures, by about 2% compared with respective production levels in 2002; all iron ores and concentrates consumed by the country's iron and steel sector were imported. Among industrial minerals, the production of cement remained at about the output level of 2002. Total coal output rose by about 7% compared with that of 2002 (table 3).

Hungary's output of fossil fuels and industrial minerals was modest. To meet the needs of its economy, the country relied heavily on imported mineral raw materials. In 2002 (the latest year for which trade data were available), the imports of crude raw materials, by volume, which included minerals, increased by about 3.7% compared with those of 2001; those of mineral fuels and electric power increased by about 7.4%. Crude raw material exports rose by about 3%; exports of mineral fuels and electric power, however, declined by almost 5% compared with those of 2001. The value of imports of metal ores and scrap rose above their 2001 import level by about 5.3%; exports of ore and scrap also declined by almost 12%. Imports and exports of iron and steel declined by 2.7% and 1.3%, respectively. Trade in nonferrous metals in 2002 registered declines in both imports and exports of 5.5% and 4.5%, respectively (Hungarian Central Statistical Office, 2003, p. 334, 340).

In 2002, imports of industrial mineral products rose by 11.4% compared with those of 2001. Exports of industrial mineral products, however, declined by 3.5%. With respect to mineral fuels, the total value of imports was about five times greater than the value of exports; imports of natural and manufactured gas, coal and coal products, and petroleum and refinery products declined by 13.4%, 6.3%, and 5.7%, respectively. The value of natural gas exports rose by more than 18%. Coal and petroleum exports declined by 53.4% and by about 5%, respectively, compared with those in 2001 (Hungarian Central Statistical Office, 2003, p. 341).

## Commodity Review

### Metals

Bauxite mining and refining to alumina and manganese mining (manganese carbonate and oxide ores mined at Urkut) remained the only major metal mining and processing operations in Hungary. Gallium was produced as a byproduct of alumina refining.

**Aluminum and Bauxite and Alumina.**—Bakony Bauxitbánya Kft. (Bakony Bauxite Mines Ltd.), which was a subsidiary of Magyar Aluminium Ltd. (MAL), mined bauxite in the Bakony District; Hungary's total resources of bauxite as

of December 31 2003, were estimated to be about 39 million metric tons (Mt) with a range of from 47% to 52%  $\text{Al}_2\text{O}_3$ , 6% to 8%  $\text{SiO}_2$ , and 20% to 25%  $\text{Fe}_2\text{O}_3$ . About one-third of the bauxite was mined by open pit method; the balance was mined underground (Fenyofó and Halimba). In 2003, bauxite production declined by almost 7% compared with that of 2002 owing mainly to the closure of the Halimba III Mine (table 1) (Magyar Aluminium Ltd., 2004, p. 6; Fodor and Kakas, 2005, p. 5). The new Halimba II bauxite mine, which was put into operation in 2003, was designed to account for about one-third of the bauxite feedstock needed by domestic alumina refiners through 2009. To assure continued supplies of bauxite to its alumina refineries, MAL acquired ownership of three bauxite mines (formerly Rudnici Boksita Jajce d.d.) in neighboring Bosnia and Herzegovina. In recent years, MAL has been the sole customer at the three Bosnian mines (Magyar Aluminium Ltd., 2004, p. 4).

**Copper.**—Although Hungary no longer mined copper, past surveys of the deep-lying [900 to 1,100 meters (m)] Reesk copper ore body in the Matra Mountains discovered between 172 and 175 Mt of copper ore at a grade of 1.12% copper and about 20 Mt of polymetallic ore at a grade of 4.22% lead and 0.92% zinc; smaller quantities of gold, molybdenum, and silver also were present. Geologic investigations conducted by the Government determined the area of mineralization to be about 10 square kilometers ( $\text{km}^2$ ). After years of failed efforts to attract foreign investment, the exploration shaft and adit at the Reesk copper deposit, which was under care and maintenance, finally was closed, the equipment removed, and the facilities flooded in 1999 (Molnar, 2001). Hungary's copper requirements were met through secondary refined copper production (table 3) and copper imports, which in 2002 (the latest year for which data were available) amounted to about 17,000 t. Hungary's imports of copper and copper semimanufactures amounted to about 42,000 t (International Copper Study Group, 2004, p. 32, 39).

**Iron and Steel.**—In Hungary in 2003, as in the other Central European countries, acquisitions and mergers in the steel sector increased, reflecting the Government's program to accommodate standards and practices that would ease Hungary's entry into the European Union (EU).

Following the decision in 2001 by the Hungarian state property agency (APV Rt.) to privatize Dunaferr Dunai Vasmű Rt. (Dunaferr), which was Hungary's leading integrated steel producer, the agency made only gradual movement towards the denationalization of the company. Until 2003, there were very few parties interested in acquiring Dunaferr owing to the company's low profitability and a capital requirement amounting to about \$750 million (Metal Bulletin, 2001). In 2003, a new tender for the sale of Dunaferr was proffered by APV Rt., which set the sale price at about \$279 million for about 80% of the company's shares of stock (Jones, 2003). APV Rt. required an increase of \$57 million in Dunaferr's capital over a 5-year period as one of the provisions in the tender (Shawcross, 2003). The major bidders on the tender included the Cia Siderurgica Nacional of Brazil, the Donbass Group of Ukraine, LNM Group (via Ispat Nova Hut) of the United Kingdom, and JSC Severstal of Russia. In late December, APV Rt. chose the Donbass

Group for the sale of Dunaferr. Donbass agreed to invest about \$310 million and to retain the existing workforces at Dunaferr during the subsequent 5-year period (Reuters, 2003; Shawcross and Kinch 2003). Major investment projects at Dunaferr in 2003 included the modernization of a 300,000-metric-ton-per-year (t/yr) cold-rolling mill undertaken by Voest Alpine Industrieanlagenbau AG of Austria and the completion of the No. 3 coke battery's refurbishment (Jones, 2003).

In 2003, high energy costs and the need for protective tariffs were major concerns of Hungary's iron and steel industry. Faced with rising energy costs as well as rising trade losses, Dam Steel (formerly Dam-Diósgyőr Acélművek Rt.), which was owned by Cogne Acciai Speciali Srl of Italy, initiated a liquidation process in the early part of the year. OAM-Ozdi Acélművek Kft (Ozd), which was owned by Max Aicher GmbH of Germany, was forced to interrupt production in early 2003 because of high costs of fuel (Metal Bulletin, 2003a). To protect the domestic iron and steel industry from dumping, the Hungarian Iron and Steel Association lobbied for higher tariffs, having asserted that as much as 60% of steel consumption in Hungary had been met through imports. A new tariff regime was instituted in the first half of the year, which specified import quotas from a number of countries that included Poland, Romania, Slovakia, and Ukraine, and a single quota for the EU. The new tariff regime would remain in effect until Hungary gains membership, which was scheduled for April 2004 (Metal Bulletin, 2003b).

**Manganese.**—In 2003, the output of mainly manganese carbonate ore by the Urkut Mine in the Bakony Mountains amounted to about 48,000 t, which was about 2% less than that produced in 2002. Hungary's manganese ore was used to produce mainly blast furnace ferromanganese (table 3).

### **Industrial Minerals**

Hungary produced a broad range of industrial minerals that included aggregates, bentonite, kaolin, and perlite. Such industrial minerals as construction aggregates and cement continued to play an important role in Hungary's economy, especially in the modernization of the country's infrastructure. Highway construction planned through 2008 would continue to be an important element in the country's development of infrastructure.

### **Mineral Fuels**

Domestically produced coal, natural gas, and petroleum have accounted for 40% of Hungary's energy needs. In 2003, Hungary produced about 1.13 million metric tons per year (Mt/yr) of crude petroleum from reserves that amounted to about 22 Mt; most petroleum (9 Mt), however, was imported from Russia via the Friendship pipeline (Fodor and Kakas, 2005; table 3). Similarly, a substantial and increasing amount of natural gas was being imported from Russia through Russia's gas-main network (Molnar, 2003).

Hungary classifies its coals into three categories—bituminous (hard) coal, brown coal, and lignite. Brown coal and lignite were mined, for the most part, to fuel the country's thermal

electric power stations. Lignite was mined by open pit at the Bukkabrany and the Visonta mines; the output from these mines was used entirely at the Matra electric powerplant. In 2003, the output of lignite rose by about 13% compared with that of 2002; the production of brown coal and bituminous coal declined by about 22% and 15%, respectively. Resources of bituminous coal and lignite plus brown coal as of January 1, 2003, amounted to about 197 Mt and 3,100 Mt, respectively (Fodor and Kakas, 2005).

### **Outlook**

Hungary will continue to rely on imports of natural gas and petroleum and most metals. The need to develop modern infrastructure that conforms to EU standards should stimulate an increase in the consumption of construction-related industrial minerals and base metals.

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### **POLAND**

Poland was endowed with significant mineral resources, which included bituminous coal, copper and lead-zinc ores, salt, silver, and sulfur. The country's reserve base of copper amounted to about 6% of the world total; that of elemental sulfur represented about 9% of the total (Edelstein, 2004; Ober, 2004). Resources of coal and salt were considered to be of world significance and those of silver, lead, and zinc amounted to about 18%, 8%, 3%, respectively. The latest available inventory of the country's mineral resources (for 2002) indicated net gains in geologically documented resources, mainly for gravel aggregates and natural gas (table 6).

In 2003, Poland was the second ranked producer of copper in Europe and Central Eurasia after Russia and remained among the top 10 world mine producers of copper (Edelstein, 2004). Poland also continued to be among the world's leading producers of nitrogen (in ammonia), salt, silver, and sulfur. In Europe and Central Eurasia, the country was a significant producer of lead and zinc and a leading producer of lime. According to the most recent data available (2002), Poland accounted for more than 3.0% of total world output of bituminous coal (Główny Urząd Statystyczny, 2004, p. 529, 530).

According to the International Monetary Fund, Poland's gross domestic product (GDP) based on purchasing power parity registered a growth of 4.4% compared with that of 2002. The value of industrial production in constant prices increased by about 7.6% compared with that of 2002. During the same period, the value of output of the mining and quarrying sector declined by about 2%. The gross output of industry represented about 22% of the GDP (Główny Urząd Statystyczny, 2004, p. 438).

The sales value (current prices) of industrial minerals, coke and refined petroleum, and base metals accounted for 4.6%, 4.2%, and 3.6%, respectively, of total industrial sales in 2003 (Główny Urząd Statystyczny, 2004, p. 320, 321).

Total sales for the year by the mining and quarrying sector (constant prices) contracted by about 4.4% compared with those of 2002; of this total, collective sales by the coal, lignite, and peat mining industries fell by about 4.3%. Sales of industrial minerals, however, increased by about 10%; those of base metals rose by about 4.0% compared with those of 2002; and sales of coke and refined petroleum collectively increased by about 2% (Główny Urząd Statystyczny, 2004, p. 322, 323).

## Government Policies and Programs

The Government of Poland remained committed to privatizing fully the country's iron and steel industry. The latest data available (2002) show that the total number of mining enterprises increased to 742 in 2002 from 695 in 2001, of which the state-owned enterprises declined to 33 from 35 in 2001 (Ney and Smakowski, 2003, p. x). Limited-liability companies, joint-stock companies, and partnerships constituted about 80%, 11%, and 4%, respectively, of the total mining enterprises. Steel trade issues and efforts to restructure and privatize Poland's steel industry continued to be among the leading mineral industry concerns during the year.

## Production and Trade

As in 2002, Poland's production of minerals showed mixed results in 2003. The metals sector reported output increases of copper (smelter and refined), gold, lead in concentrates and refined; pig iron, crude steel and semimanufactures; and silver. The production levels of aluminum and copper in concentrates declined compared with those of 2002.

Among industrial minerals, production increases in 2003, among others, were reported for hydraulic cement, dolomite, natural gypsum, lime, limestone, and salt. The production of most other industrial minerals also showed output gains when

compared with respective output levels in 2002. Among mineral fuels, production gains were reported for coal, natural gas, and crude petroleum (table 1).

Although Poland was a leading European producer and processor of minerals and mineral fuels, Poland still depended heavily on imports to meet demand. According to the Mineral and Energy Economy Research Institute of Poland's Academy of Sciences, of the 130 mineral commodities that were reviewed, about 50 (38%) were in the category of total import dependence. Additionally, 14 mineral commodities, or about 11% of the total, were in the category of import dependence that ranged from more than 50% to about 99% of demand (Ney and Smakowski, 2003, p. xii, xvii).

In 2002, Poland's mineral imports, in order of value, included petroleum (\$2.9 billion), natural and associated gas (\$1.2 billion), unwrought aluminum and aluminum alloys (\$227 million), and iron ore and concentrates (\$182 million). Major mineral exports were, in order of value, bituminous coal (\$816 million), refined copper (\$419 million), silver (\$185 million), and iron, and iron and steel scrap (\$164 million) (Główny Urząd Statystyczny, 2003, p. 154-507; Ney and Smakowski, 2003, p. xxiii). Poland's overall mineral trade deficit in 2002 amounted to more than \$3 billion. Given the anticipated increases in demand for aluminum, iron ore, natural gas, and petroleum, the mineral trade debt was expected to increase.

## Commodity Review

### Metals

**Aluminum and Bauxite and Alumina.**—Poland's primary aluminum, which was produced in Konin at Aluminium Konin-Impexmetal S.A. (Konin), was based entirely on imported alumina. Alumina imports in 2002 (the latest year for which trade data were available) amounted to about 123,000 metric tons (t) and were chiefly used in primary aluminum production. A small amount (less than 15%) was used in the nonmetallurgical sphere (cement, chemicals, glass, and refractories).

In 2003, the production of primary aluminum metal declined by about 8%. Imports of aluminum and aluminum products in 2002 totaled about 374,000 t, which was an increase of about 21% compared with those of 2001. Exports of aluminum and aluminum products totaled about 264,000 t, or about a 15% increase compared with that of the preceding year (tables 2 and 3).

Imports of bauxite in 2002 amounted to about 50,000 t and, given that no exports were recorded, were equivalent in volume to bauxite consumption during the same period. Bauxite was used to produce abrasives, aluminous cement, and refractory products. In 2002, bauxite imports rose by about 31% compared with those of 2001 (Ney and Smakowski, 2003, p. 22, 46, 48).

In mid-2003, Impexmetal, which was Konin's parent company, studied possible sale venues of up to 50% of its 88% holding of Konin's stock shares (Reuters, 2003b).

**Cadmium.**—Because of its association with sphalerite (zinc-iron sulfide), cadmium in Poland was produced as a byproduct of lead and zinc mining and processing operations in the Silesia-

Krakow region. In 2003, refined cadmium production at Huta Cynku "Miasteczko Slaskie" amounted to about 450 t, which was about 2% more than that produced in 2002. Data available for 2002 showed cadmium consumption to have risen almost threefold compared with that of 2001 and constituted about 89% of production. Cadmium reserves as of December 31 2002, amounted to 66,450 t, of which 21,990 t was being worked (Ney and Smakowski, 2003, p. 65).

**Copper.**—All copper ore in Poland was mined by Kombinat Gorniczo Hutniczy Miedzi (KGHM) Polska Miedz S.A. (KGHM S.A.), which was a major world copper mining, beneficiation, smelting, and refining complex in the Lubin area. KGHM S.A. accounted for almost 4% of world mine copper production in 2002. Using the room and pillar method, the ore was worked at the Lubin, the Polkowice-Sieroszowice, and the Rudna Mines at five deposits at depths that ranged from 600 to 1,200 meters (m) (about 1,900 to 3,700 feet). Chalcocite was the principal mineral in the ore; smaller amounts of bornite and chalcopyrite also were present. The mineralization was mainly in the shale horizon, but extends into the overlying carbonate and underlying sandstone layers. As of December 31, 2002, total copper resources amounted to about 2.4 billion tons (Gt) that contained about 48 million metric tons (Mt) of copper. Reserves that were under exploitation, amounted to about 1.5 Gt of ore that contained about 30 Mt of copper (table 3). In 2002, ore grades ranged from 1.86% to 2.01% Cu (Ney and Smakowski, 2003, p. 126).

The Rudna Mine was the leading copper ore producer with a mining capacity of about 12.8 million metric tons per year (Mt/yr). The concentrator at Rudna processed Rudna ores, as well as some ores from the Polkowice-Sieroszowice Mine; its capacity was rated to produce about 700,000 t/yr of concentrate. Annual output by the Polkowice-Sieroszowice Mine and concentrator amounted to about 9.2 Mt of ore and 450,000 t of concentrate. The Lubin Mine accounted for about 7.5 Mt/yr of ore to produce about 465,000 t/yr of concentrate (Ney and Smakowski, 2003, p. 128-129).

In 2003, Poland's production of copper (in ore) remained at about the level of output in 2002. Similarly, the recovery of copper in concentrate was at a slightly lesser level than that attained in 2002. The output of primary and secondary smelter copper registered an increase of about 1% to about 543,500 t from about 540,100 t in 2002. The total output of electrolytically refined copper (primary and secondary) increased by about 4% compared with that of 2002 (table 1).

Trade data for 2002 shows that Poland's net exports of unwrought refined copper and copper alloys amounted to 264,000 t (valued at about \$450 million), which was an increase of about 15% compared with that of 2001. Although exports of copper manufactures and semimanufactures declined by about 14%, total copper exports rose by 9.3% during the same period (Glowny Urzad Statystyczny, 2003, p. 143). France, Germany, China, and Austria (in order of volume of imports) remained the principal importers of copper from Poland in 2002. China's imports of copper from Poland amounted to about 45,000 t, which was an increase of about 29% compared with those of 2001 and more than twice the amount imported in 1998. In 2002, Poland's apparent consumption of refined copper returned

to the demand level of 2000 (about 246,000 t) (Ney and Smakowski, 2003, p. 131-133).

KGHM S.A. finished operations for the fourth quarter of 2003 with a net profit of about \$35 million, which contrasted with losses of about \$18 million during the same quarter in 2002 (Kozlowski, 2004). At yearend, KGHM S.A. reported having signed a contract for the sale of copper cathode, which was valued at \$123 million, to MKM Mansfelder Kupfer und Messing of Germany (Reuters, 2003c).

**Gold.**—In 2002, Poland's gold production continued to be based almost entirely on the country's copper mining operations. The gold content of the copper concentrates produced by KGHM S.A. were reported to be about 1 gram per metric ton; total reserves were determined to be about 50 t (Ney and Smakowski, 2003, p. 197-199). Byproduct gold was produced at KGHM S.A. The gold was recovered at KGHM S.A.'s 550-kilogram-per-year precious metals plant (Boliden, Klado method), which was a division within the Glogow smelter and refinery. The amount of gold recovered at Glogow has varied with changes in the proportion of ores produced at the three mines, each of which has a different average gold content. Poland's annual domestic consumption of gold in recent years was in the range of from about 260 to 390 kilograms.

**Iron and Steel.**—In 2003, the output of crude steel and pig iron rebounded from the production shortfalls of 2002. Output levels of crude steel and pig iron rose by about 9% and 6.3%, respectively, compared with those of 2002. Hot-rolled steel output increased by about 8% compared with that of 2002 (table 5).

Poland depended on imported iron ores and concentrates, as well as on manganese, chromite, and titanium ores to produce the ferroalloys that were needed by the steel industry. According to the latest trade figures, in 2002, imports of these alloying metal ores amounted to about 7 Mt, 15,000 t, 9,000 t, and 75 t, respectively.

In 2003, Poland's iron and steel sector continued to undergo denationalization. As an outcome of the "Iron and Steel Restructuring Program—Update 2002," which was a plan adopted by the Government of Poland to rationalize the steel industry for accelerated privatization, Polskie Huty Stali S.A. (PHS) (a state treasury-owned holding company) was created. PHS's holdings initially comprised Huta Cedler S.A., Huta Florian S.A., Huta Katowice S.A., and Huta im. T. Sendzimira S.A.

Although Poland's steel industry lagged behind the steel industries of the European Union (EU) with respect to energy, labor, and material inputs in the steel production process, significant improvements were achieved owing to capital investments (\$2.7 billion) that were made in the steel sector from 1991 to 2002. Open-Hearth steelmaking declined to virtually nil by 2002 from about 25% of total steel production in 1991; continuous casting increased to 74% of total casting in 2002 from about 8% in 1991. The "Iron and Steel Restructuring Program" [Journal of Law No. 111, item 1196 (article 2, Act of 24 August)] was developed to help ease Poland's entry into the EU by developing industrial conformity with EU standards and making the steel industry economically viable by 2006. The EU's European Commission reportedly audited and approved

the restructuring program in 2002 (Ney and Smakowski, 2003, p. 239).

A final version of Poland's restructuring plan for the steel industry sought EU approval to allow state financial aid to rationalize the steel production sector further in preparation for privatization. The planned state aid, which was approved in early 2003, would amount to about \$700 million and the planned investment outcome would be a modernized steel industry with an effective total crude steel production capacity reduction of 991,000 t (to about 13 Mt/yr) by 2006. About 80% of the planned capacity reduction was to be accounted for by the steel producers under the management of PHS (Reuters, 2003a).

In early 2003, PHS undertook the modernization of Huta Cedler's two-strand-wire rolling mill that would increase production by about 200,000 t/yr and would conform to EU steel industry standards. The project was initiated following a contract signed at the end of December 2002 with Danieli Morgardshammar (a U.S. subsidiary of Danieli & C. S.p.A. of Italy), which undertook the modernization work (Metal Bulletin, 2003f).

The denationalization of PHS and other enterprises in Poland's iron and steel industry played a major role in the country's economy during 2003. Following bids that were submitted for the purchase of PHS by U.S. Steel Corporation and a number of European steel producers, the Government of Poland chose the LNM Group of the United Kingdom as the new owner of PHS properties at yearend. The deal was valued at \$1.05 billion and called for bringing PHS into full profitability by 2006 (Kozlowski, 2003; Reuters, 2003d). In addition, LNM's total investment for new equipment at PHS was to amount to about \$600 million by 2009 (Metal Bulletin, 2003d).

Other steel companies that were privatized in 2003 included Huta Ostrowiec S.A. (HO) and Huta Zawiercie S.A. (HZ). HO, which was a producer of steel products that included bar, rebar, and forgings, was purchased in October by the Celsa Group of Barcelona, Spain, for about \$15.7 million. Additionally, Celsa planned to invest \$15.1 million on environmental protection technology in the HO melt shop and about \$3.8 million on upgrading the rolling mill (Metal Bulletin, 2003a). In December, Commercial Metals Company of the United Kingdom acquired controlling interest (71% stake) in HZ for about \$52 million. HZ was a producer of rolled and cast product that included reinforcing and merchant bar and billets. HZ officials also reported that the company had been operating at 90% of capacity and was expected to produce about 1 Mt in 2003 compared with 850,000 t in 2002 (Metal Bulletin, 2003b, c). Despite bids by foreign investors, which included LNM, the privatization status of platemaker Huta Czestochowa S.A. remained undetermined at yearend (Metal Bulletin, 2003e).

**Lead and Zinc.**—Poland worked 3 of the 21 known lead-zinc deposits in the Silesia-Krakow area, which held about 41 Mt of ore out of a total resource of about 180 Mt of lead and zinc ore. Lead and zinc also were recovered from copper ore mined by KGHM S.A. in the Lubin region. About 39% of total mined lead came from copper mining and processing. Despite the presence of sphalerite in KGHM's copper deposits, the low zinc content of the ore made metal recovery uneconomical (Ney and Smakowski, 2003, p. 255-264).

In 2003, overall mine production of lead and zinc ore remained at the level of output of 2002. The total output of refined lead (primary and secondary) increased by about 3% compared with that of 2002. In 2002 (the latest year for which trade data were available), the volume of imports of refined lead was about equal to that of refined lead exports, which resulted in an approximate demand at yearend of 65,200 t, which was about 5% less than that of 2001 (tables 7 and 8).

Zinc was obtained from lead-zinc ores in the Silesia-Krakow area from two underground mines. The Olkusz-Pomorzany Mine, which is located near Olkusz and was part of the Zakiady Gorniczko-Hutnicze (ZGH) Boleslaw operation, produced ore that graded about 1.69% lead and 4.2% zinc, and the Trzebionka Mine and concentrator at Trzebionka produced ore that graded 1.67% lead and 3.4% zinc. The declining trend in the mine production of zinc for the years 1999 to 2003 (table 5) was attributed mainly to depletion of the ore (Ney and Smakowski, 2003, p. 489-492).

In 2003, total refined zinc production (smelter and electrolytic) declined by about 6% compared with that of 2002. In 2002, total imports of zinc and zinc-lead concentrates, in terms of gross weight, amounted to about 112,200 t (about 67,400 t of contained zinc), which was a decline of about 4%. The main suppliers of zinc concentrates to Poland were, in descending order, Romania, Canada, and Honduras. Poland's exports of zinc concentrates amounted to about 61,400 t (about 33,600 t of contained zinc). Exports of zinc in all forms, including fabricated items, amounted to about 89,000 t and had a value of about \$75 million (Ney and Smakowski, 2003, p. 258-299, 491).

**Silver.**—In 2003, Poland remained among the major world producers of silver and accounted for about 6% of world mine production (Hilliard, 2004). Copper and, to a lesser extent, lead and zinc mining were Poland's domestic sources of primary silver. The country's copper mining, smelting, and refining complex, which was operated by KGHM S.A. in the Lubin area, produced about 98% of the country's byproduct silver, which amounted to 1,237 t in 2003. In 2002, exports of silver amounted to about 1,135 t and had a net value of more than \$181 million. The top three importers of Polish silver were, in descending order of value, the United Kingdom, Germany, and Belgium [Glowny Urzad Statystyczny, 2003, p. 147, 513].

### *Industrial Minerals*

Poland produced a broad range of industrial minerals that included calcareous and silicate rocks and aggregates, clays, feldspar, gypsum, magnesite, salt, and sulfur, which served the needs of the country's chemical and construction industries. Poland remained among the leading world producers of lime, nitrogen (in ammonia), salt, and sulfur (Kostick, 2004; Kramer, 2004; Miller, 2004; Ober, 2004).

**Cement.**—In 2003, the output of hydraulic cement increased by more than 3% compared with that of 2002. In 2002, Poland's cement exports declined by almost 47% compared with those of 2001. Imports of clinker declined by about 73%. Total cement imports, however, increased to almost double those of 2001 (Ney and Smakowski, 2003, p. 258-299, 491).

**Sulfur.**—Native sulfur production in 2003 appeared to have stabilized with output slightly greater than that in 2002. Poland's native sulfur production declined substantially in 2001 following the closure of two of the country's three main mine producers. In 2002, native sulfur declined further to 760,000 t (19%).

### **Mineral Fuels**

**Coal.**—Poland, which accounted for about 3.1% of the world's output of bituminous coal and about 6.9% of the total world output of lignite, remained a significant world producer of coal [Główny Urząd Statystyczny, 2004, p. 492]. In 2003, the country's production of bituminous coal and lignite amounted to about 103 Mt and 61 Mt, respectively. Bituminous coal production declined slightly (by 1%) compared with that of 2002; the production of lignite increased by about 5%. In 2002, the country's net exports of bituminous coal and anthracite amounted to about 20 Mt, which was a decline of about 6.4% compared with those of 2001. The major importers of Polish coal were, in order of volume, Germany, Austria, and Finland (Ney and Smakowski, 2003, p. 217-223).

Poland's bituminous coal was mined in three basins of Late Carboniferous age. The Upper Silesian, the Lower Silesian, and the Lublin Basins have exploitable resources that amounted to 44,100 Mt of coal in 128 deposits. The Upper Silesian Basin represented the major portion of the country's total reserves with about 79% of the total in 110 deposits (Ney and Smakowski, 2003, p. 217-218).

**Natural Gas and Petroleum.**—The production of natural gas increased by about 1%; the extraction of petroleum increased by about 5% compared with that of 2002. Poland depended on imports to meet its needs for oil and gas. In 2002, Poland's imports of petroleum increased to nearly 18 Mt, or by about 2% compared with those in 2001. Poland's imports of natural gas, however, decreased by about 7%. The Russian Federation remained Poland's chief source of supply of both hydrocarbons which, in 2001, supplied most of Poland's imports of petroleum (96%) and natural gas (86%) (Ney and Smakowski, 2003, p. 177, 325).

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## **SLOVAKIA**

Slovakia was a modest regional producer of a variety of minerals. Aluminum and steel production formed the dominant elements of the country's metals sector. Steel production was based largely on imported raw materials, and that of aluminum was based entirely on imported bauxite and alumina. Small quantities of copper, gold, lead, and zinc also were produced. Industrial minerals production included that of barite, clays, magnesite, and salt. Slovakia's production of mineral fuels comprised brown coal and lignite and minor quantities of gas and petroleum (table 7).

The economy of Slovakia continued to develop towards a full market system. The need to denationalize the state's commercial assets and to reduce subsidies to the public sector expeditiously often was tempered by policies promulgated to maintain social stability that often resulted in increased public sector employment and uneven economic performance. In 2003, Slovakia's GDP based on purchasing power parity increased by 5.5% compared with that of 2002. Industrial production in 2003 continued to show recovery with a growth rate of 7.2% compared with that of 2002.

Slovalco was Slovakia's sole producer of primary aluminum. The enterprise, which was originally known as ZSNP Aluminum Works, was put into full operation in 1953. Following the restructuring of the ZSNP's assets in 1993, Slovalco became a subsidiary of ZSNP and was solely involved in primary aluminum production. After 1993, Slovalco began a program of modernization and facility expansion that garnered investment capital from the European Bank for Reconstruction and Development (EBRD) and Hydro Aluminium AS of Norway. Hydro and EBRD acquired 14.5% and 10% of Slovalco's shares, respectively; the balance remained with ZSNP (Slovalco,

2000, p. 5-8). In 2001, following an agreement among Slovalco's shareholders, EBRD and Hydro each acquired 40% of Slovalco's shares of stock, and ZSNP retained ownership of the remaining 20%. A provision in the transaction gave Hydro the option to acquire EBRD's shares if the option is exercised by yearend 2006. This transaction also allowed ZSNP to restructure its bank debts.

Work on facility expansion at Slovalco, which included the addition of 54 new reduction cells, continued during 2003. Full primary aluminum production capacity was expected to amount to about 180,000 t by 2004 (Metal Bulletin, 2003). The production of alumina and primary alumina increased by 18% and 12%, respectively, compared with that of 2002 (table 10).

Although gold mine production ceased in 2001, small amounts of gold were produced from remaining stocks during the year. Exploration for gold and resource assessment at the Kremnica gold exploration area continued during 2003 under the auspices of the Tournigan Gold Corporation of Canada (Tournigan Gold Corporation, 2004).

In 2003, the output of iron pellets and concentrate declined by about 12% compared with that of 2002, which followed a decline of about 25% in 2002 (Balaz, 2003). Slovakia's production of iron ore concentrate and pellets from domestic sources in 2002 satisfied less than 7% of the country's industrial needs. Slovakia's total resources of siderite amounted to about 94 Mt, of which ore reserves totaled about 23 Mt. Russia and Ukraine were Slovakia's main suppliers of iron ore and concentrate and accounted for 47% and 52%, respectively, of the total imports of about 5 Mt in 2002 (Balaz and Treger, 2003).

Major developments at U.S. Steel Kosice in 2003 included the startup of a new tinning line and a new annealing line, which raised the enterprise's tin production capacity to 375,000 t/yr from 154,000 t/yr (U.S. Steel Corporation, 2003). In 2003, pig iron production rose by almost 10% compared with that of 2002; the production of crude steel increased by about 6.4%.

In the mineral fuels sector, brown coal production declined by about 9.5% in 2003 compared with that of 2002. Petroleum production declined by about 9.5% (Balaz, 2003). In 2002, Russia remained Slovakia's chief supplier of natural gas and petroleum and accounted for more than 98% of the country's imports of these fuels.

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TABLE 1  
CZECH REPUBLIC: PRODUCTION OF MINERAL COMMODITIES<sup>1</sup>

(Metric tons unless otherwise specified)

| Commodity <sup>2</sup>   | 1999                | 2000               | 2001                 | 2002                 | 2003                 |
|--|---------------------|--------------------|----------------------|----------------------|----------------------|
| METALS   |                     |                    |                      |                      |                      |
| Aluminum, secondary <sup>e</sup>                                 | 40,000              | 40,000             | 20,000               | 20,000               | 20,000               |
| Copper, refined, secondary <sup>e</sup>                          | 23,037 <sup>3</sup> | 20,000             | 18,000               | 18,000               | 18,000               |
| Gold metal kilograms   | 3,207               | 3,000 <sup>e</sup> | 2,000                | 2,000 <sup>e</sup>   | 1,000 <sup>e</sup>   |
| Iron and steel:  |                     |                    |                      |                      |                      |
| Iron ore:  |                     |                    |                      |                      |                      |
| Gross weight thousand tons                                       | 23                  | 21                 | 20                   | --                   | -- <sup>e</sup>      |
| Fe content <sup>e</sup>  | 6,000               | 6,000              | 6,000                | --                   | --                   |
| Metal:   |                     |                    |                      |                      |                      |
| Pig iron thousand tons   | 4,022               | 4,621              | 6,316                | 4,840                | 5,200                |
| Ferrous alloys, total electric furnace <sup>e</sup> do.          | 1                   | 1                  | 1                    | 1                    | --                   |
| Steel, crude do.   | 6,107               | 6,216              | 6,316                | 6,512                | 6,800                |
| Semimanufactures do.   | 10,207              | 11,637             | 12,645               | 12,500 <sup>e</sup>  | 12,500 <sup>e</sup>  |
| Lead, metal, secondary <sup>e</sup>                              | 29,280 <sup>3</sup> | 25,000             | 25,000               | 25,000               | 20,000               |
| Silver <sup>e</sup>  | 24 <sup>3</sup>     | 25                 | 25                   | 25                   | 25                   |
| Uranium, mine output, U content                                  | 605                 | 498                | 490                  | 477                  | 458                  |
| Zinc, metal, secondary <sup>e</sup>                              | 145 <sup>3</sup>    | 150                | 250                  | 250                  | 250                  |
| INDUSTRIAL MINERALS  |                     |                    |                      |                      |                      |
| Cement, hydraulic thousand tons                                  | 4,241               | 4,093              | 3,550                | 3,217                | 3,465                |
| Clays:   |                     |                    |                      |                      |                      |
| Bentonite do.  | 160                 | 280                | 224                  | 174                  | 199                  |
| Kaolin do.   | 5,183               | 5,573              | 5,543                | 3,650                | 4,155                |
| Other do.  | 1,070               | 1,120              | 585                  | 564                  | 550 <sup>e</sup>     |
| Diamond, synthetic <sup>e</sup> carats                           | 5,000               | 5,000              | 5,000                | 5,000                | 5,000                |
| Diatomite  | 37,000              | 34,000             | 83,000               | 28,000               | 30,000 <sup>e</sup>  |
| Feldspar   | 244,000             | 337,000            | 373,000              | 401,000              | 421,000              |
| Fertilizer, manufactured:  |                     |                    |                      |                      |                      |
| Nitrogenous, N content   | 220,000             | 257,000            | 250,000 <sup>e</sup> | 250,000 <sup>e</sup> | 251,000              |
| Phosphatic, P <sub>2</sub> O <sub>5</sub> content <sup>e</sup>   | 100,000             | 100,000            | 100,000              | 100,000              | 100,000              |
| Potassic, K <sub>2</sub> O content <sup>e</sup>                  | 20,000              | 20,000             | 20,000               | 20,000               | 20,000               |
| Mixed  | 77,000              | 75,000             | 75,000 <sup>e</sup>  | 75,000               | 36,000               |
| Gemstones, crude, pyrope-bearing rock                            | 54,000              | 62,000             | 47,000               | 52,000               | 50,000 <sup>e</sup>  |
| Graphite   | 22,000              | 23,000             | 17,000               | 16,000               | 9,000                |
| Gypsum and anhydrite, crude                                      | 136,000             | 82,000             | 24,000               | 108,000              | 104,000              |
| Lime, hydrated and quicklime thousand tons                       | 1,142               | 1,202              | 1,300                | 1,120                | 1,263                |
| Nitrogen, N content of ammonia <sup>e</sup>                      | 250,000             | 250,000            | 206,000 <sup>r</sup> | 215,000 <sup>r</sup> | 235,000              |
| Quartz   | 3,000               | --                 | --                   | --                   | --                   |
| Sand and gravel:   |                     |                    |                      |                      |                      |
| Common sand and gravel thousand cubic meters                     | 12,781              | 12,640             | 12,100               | 12,464               | 13,400               |
| Foundry sand thousand tons                                       | 717                 | 829                | 771                  | 476 <sup>r</sup>     | 712                  |
| Glass sand do.   | 980                 | 985                | 974                  | 853                  | 904                  |
| Stone:   |                     |                    |                      |                      |                      |
| Basalt (for casting)   | 89,000              | 14,000             | 15,000 <sup>e</sup>  | 14,000 <sup>r</sup>  | 13,000               |
| Dimension stone thousand cubic meters <sup>f</sup>               | 300,000             | 320,000            | 300,000              | 285,000              | 280,000 <sup>e</sup> |
| Limestone and other calcareous stones thousand tons <sup>r</sup> | 11,703              | 11,808             | 10,887               | 10,186               | 10,236               |
| Building stone thousand cubic meters <sup>f</sup>                | 9,442               | 9,451              | 10,500               | 10,600               | 12,500               |
| Sulfur, byproducts, all sources <sup>e</sup>                     | 40,000              | 40,000             | 40,000               | 40,000               | 40,000               |
| Sulfuric acid  | 350,000             | 350,000            | 220,200              | 240,524              | 239,000              |
| MINERAL FUELS AND RELATED MATERIALS                              |                     |                    |                      |                      |                      |
| Coal:  |                     |                    |                      |                      |                      |
| Bituminous thousand tons   | 17,227              | 17,028             | 14,808               | 14,097               | 13,382               |
| Brown and lignite do.  | 45,370              | 51,063             | 51,643               | 49,335               | 50,390               |
| Coke do.   | 3,340               | 3,411              | 3,519                | 3,536                | 3,556                |
| Fuel briquets from brown coal do.                                | 288                 | 253                | 280                  | 302                  | 314                  |

See footnotes at end of table.

TABLE 1--Continued  
CZECH REPUBLIC: PRODUCTION OF MINERAL COMMODITIES<sup>1</sup>

(Metric tons unless otherwise specified)

| Commodity <sup>2</sup>                         | 1999                       | 2000   | 2001   | 2002               | 2003               |
|--|----------------------------|--------|--------|--------------------|--------------------|
| MINERAL FUELS AND RELATED MATERIALS--Continued |                            |        |        |                    |                    |
| Gas:   |                            |        |        |                    |                    |
| Manufactured, all types <sup>e</sup>           | million cubic meters       | 800    | 800    | 800                | 800                |
| Natural, marketed <sup>4</sup>                 | do.                        | 143    | 118    | 101                | 131                |
| Petroleum:                                     |                            |        |        |                    |                    |
| Crude:   |                            |        |        |                    |                    |
| As reported                                    | thousand tons              | 176    | 168    | 178                | 253                |
| Converted                                      | thousand 42-gallon barrels | 1,197  | 1,142  | 1,100 <sup>e</sup> | 1,620 <sup>e</sup> |
| Refinery products <sup>e</sup>                 | do.                        | 35,000 | 35,000 | 35,000             | 35,000             |

<sup>e</sup>Estimated; estimated data are rounded to no more than three significant digits. <sup>f</sup>Revised. -- Zero.

<sup>1</sup>Table includes data available through September 2004.

<sup>2</sup>In addition to the commodities listed, arsenic, dolomite, illite, sodium compounds, talc, and zeolite are produced, but information is inadequate to make reliable estimates of output levels.

<sup>3</sup>Reported figure.

<sup>4</sup>Includes gas produced from coal mines. Gross output of natural gas is not reported, but is believed to exceed reported marketed output by an inconsequential amount.

TABLE 2  
CZECH REPUBLIC: STRUCTURE OF THE MINERAL INDUSTRY IN 2003

(Thousand metric tons unless otherwise specified)

| Commodity                       | Major operating companies   | Location of main facilities <sup>1</sup> | Annual capacity |
|---------------------------------|---|--|-----------------|
| Bentonite                       | Keramost a.s.   | Most                                     | 150             |
| Cement                          | Bohemia, Cizkovice, Hranice, Karlov Dvor, Lochkov Pracovice, and Velary | Bohemia                                  | 3,500           |
| Do.                             | Bystre, Malomerice, Mokra, Ostrava-Kunice, and Zahorie                  | Moravia                                  | 2,800           |
| Clay, koalin                    | Mines in Karlovy vary area  | West Bohemia                             | 450             |
| Do.                             | Mines in Plzen area   | Central Bohemia                          | 150             |
| Coal:                           |   |  |                 |
| Bituminous                      | Mines in OKD coal basin   | Ostrava-Karvina, north Moravia           | 22,100          |
| Do.                             | Mines in KD coal basin  | Kladno, central Bohemia                  | 3,000           |
| Brown                           | SHD administration  | Most, northwest Bohemia                  | 61,000          |
| Do.                             | HDB administration  | Sokolov, west Bohemia                    | 17,000          |
| Lignite                         | JLD administration  | Hodonin, south Moravia                   | 5,000           |
| Copper, ore                     | Zlate Hory  | North Moravia                            | 300             |
| Graphite                        | Grafitove doly Stare Mesto-F s.r.o.                                     | Stare Mesto                              | 35              |
| Mica                            | GARMICA s.r.o.  | Netolice                                 | 5               |
| Lead-zinc, ore                  | Horni Benesov and Zlate Hory  | do.                                      | 400             |
| Lead, metal, secondary, refined | Kovohute Pribram  | Pribram                                  | 26              |
| Natural gas                     | billion cubic meters  | Gasfields around Hodonin                 | 25              |
| Petroleum:                      |   |  |                 |
| Crude                           | Oilfields around Hodonin  | do.                                      | 160             |
| Refinery                        | thousand 42-gallon barrels per day                                      | Kolin, Kralupy, Pardubice, and Litvinov  | 200             |
| Steel, crude                    | Nova Hut s.p. (Ostrava)   | Kunice-Ostrava                           | 3,800           |
| Do.                             | Zelezarne Vitkovice   | Vitkovice-Ostrava                        | 900             |
| Do.                             | Trinecke Zelezarny (Trinecke Iron and Steel Works)                      | Trinec                                   | 3,000           |
| Do.                             | Poldi United Steel Works  | Kladno-Prague                            | 1,700           |
| Do.                             | Zelezarny Bila Cerkev   | Hradek-Rokycany                          | 300             |
| Do.                             | Zelezarny Veseli, a.s.  | Veseli and Moravou                       | 300             |
| Do.                             | Zelezarny Chomutov s.p.   | Chomutov                                 | 350             |
| Do.                             | Bohumin Iron and Steel Works  | Bohumin                                  | 400             |
| Titanium dioxide                | Precheza A.S  | Precheza                                 | 25              |
| Uranium                         | DIAMO s.p.  | Straz pod Ralskem                        | 2               |

<sup>1</sup>Names and locations of mines and crude oil refineries are identical.

TABLE 3  
HUNGARY: PRODUCTION OF MINERAL COMMODITIES<sup>1</sup>

(Metric tons unless otherwise specified)

| Commodity <sup>2</sup>                                 | 1999                              | 2000               | 2001                 | 2002                | 2003 <sup>e</sup>     |                     |
|--|-----------------------------------|--------------------|----------------------|---------------------|-----------------------|---------------------|
| METALS   |                                   |                    |                      |                     |                       |                     |
| Aluminum:  |                                   |                    |                      |                     |                       |                     |
| Bauxite, gross weight                                  | thousand tons                     | 935                | 1,046                | 1,000               | 720                   | 666 <sup>3</sup>    |
| Alumina, gross weight, calcined basis                  | do.                               | 295                | 357                  | 300                 | 220 <sup>e</sup>      | 250                 |
| Metal:   |                                   |                    |                      |                     |                       |                     |
| Primary  |                                   | 34,000             | 33,850               | 34,000              | 35,000 <sup>e</sup>   | 35,000              |
| Secondary  |                                   | 54,000             | 55,000               | 76,000              | 75,000 <sup>e</sup>   | 50,000              |
| Total  |                                   | 88,000             | 88,850               | 110,000             | 110,000 <sup>e</sup>  | 85,000              |
| Copper, metal, refined, secondary <sup>e</sup>         |                                   | 12,000             | 12,000               | 12,000              | 10,000 <sup>r</sup>   | 10,000              |
| Iron and steel, metal:                                 |                                   |                    |                      |                     |                       |                     |
| Pig iron   | thousand tons                     | 1,309              | 1,340                | 1,225               | 1,334                 | 1,300               |
| Ferroalloys <sup>e,4</sup>                             |                                   | 8,000              | 8,000                | 8,000               | 8,000                 | 8,000               |
| Steel:   |                                   |                    |                      |                     |                       |                     |
| Crude  | thousand tons                     | 1,813              | 1,969                | 2,056               | 2,141                 | 2,100               |
| Semimanufactures, hot-rolled only <sup>e</sup>         | do.                               | 1,954 <sup>3</sup> | 1,900                | 1,900               | 1,831 <sup>r</sup>    | 1,800               |
| Manganese ore:   |                                   |                    |                      |                     |                       |                     |
| Run of mine:   |                                   |                    |                      |                     |                       |                     |
| Gross weight   |                                   | 41,000             | 41,000               | 38,000              | 49,000 <sup>r,e</sup> | 48,000 <sup>3</sup> |
| Mn content <sup>e</sup>                                |                                   | 11,000             | 11,000               | 10,000              | 11,400 <sup>r,3</sup> | 11,000              |
| Concentrate: <sup>e</sup>                              |                                   |                    |                      |                     |                       |                     |
| Gross weight   |                                   | 15,000             | 15,000               | 15,000              | 15,000                | 15,000              |
| Mn content   |                                   | 5,000              | 5,000                | 5,000               | 5,000                 | 5,000               |
| INDUSTRIAL MINERALS                                    |                                   |                    |                      |                     |                       |                     |
| Cement, hydraulic                                      | thousand tons                     | 2,978              | 3,358                | 3,452               | 3,510                 | 3,500               |
| Clays:   |                                   |                    |                      |                     |                       |                     |
| Bentonite:   |                                   |                    |                      |                     |                       |                     |
| Raw  |                                   | 9,301              | 4,818                | 5,200               | 3,700 <sup>r</sup>    | 3,500               |
| Processed <sup>e</sup>                                 |                                   | 6,000              | 2,000                | 2,500               | 1,400                 | 1,400               |
| Kaolin, raw and washed                                 |                                   | 9,000              | 7,100                | 8,000               | 4,300 <sup>r</sup>    | 4,500               |
| Gypsum and anhydrite <sup>e</sup>                      |                                   | 222,000            | 251,000              | 252,000             | 72,200 <sup>r</sup>   | 75,000              |
| Lime, calcined <sup>e</sup>                            | thousand tons                     | 500                | 500                  | 500                 | 500                   | 500                 |
| Nitrogen, N content of ammonia <sup>e</sup>            | do.                               | 250                | 250                  | 224 <sup>r</sup>    | 238 <sup>r</sup>      | 232 <sup>3</sup>    |
| Perlite  |                                   | 148,000            | 150,000 <sup>e</sup> | 151,000             | 140,000               | 140,000             |
| Sand and gravel:                                       |                                   |                    |                      |                     |                       |                     |
| Gravel   | thousand tons                     | 10,297             | 13,490               | 10,645 <sup>r</sup> | 29,138 <sup>r</sup>   | 30,000              |
| Sand:  |                                   |                    |                      |                     |                       |                     |
| Common <sup>e</sup>                                    | thousand cubic meters             | 250                | 300                  | 300                 | 300                   | 300                 |
| Foundry  |                                   | 175,000            | 173,000              | 168,000             | 152,000 <sup>r</sup>  | 150,000             |
| Glass  |                                   | 490,400            | 340,000              | 339,000             | 317,000 <sup>r</sup>  | 320,000             |
| Stone:   |                                   |                    |                      |                     |                       |                     |
| Dimension, all types <sup>e</sup>                      | thousand tons                     | 5,000              | 5,000                | 5,000               | 5,626 <sup>r,3</sup>  | 5,500               |
| Dolomite   | do.                               | 861                | 787                  | 800                 | 4,196 <sup>r</sup>    | 4,000               |
| Limestone  | do.                               | 382                | 668                  | 700                 | 7,152 <sup>r</sup>    | 7,000               |
| Sulfur, byproduct, elemental, all sources <sup>e</sup> |                                   | 30,000             | 30,000               | 30,000              | 30,000                | 30,000              |
| Sulfuric acid <sup>e</sup>                             |                                   | 80,000             | 80,000               | 80,000              | 80,000                | 80,000              |
| Talc <sup>e</sup>                                      |                                   | 500                | 500                  | 500                 | 500                   | 500                 |
| MINERAL FUELS AND RELATED MATERIALS                    |                                   |                    |                      |                     |                       |                     |
| Coal:  |                                   |                    |                      |                     |                       |                     |
| Bituminous   | thousand tons                     | 738                | 744                  | 573                 | 660 <sup>r</sup>      | 567                 |
| Brown  | do.                               | 5,207              | 5,670                | 5,384               | 4,570 <sup>r</sup>    | 4,038               |
| Lignite  | do.                               | 7,696              | 7,862                | 8,043               | 7,574 <sup>r</sup>    | 8,564               |
| Total  | do.                               | 13,641             | 14,276               | 14,000              | 12,804 <sup>r</sup>   | 13,169              |
| Coke, metallurgical <sup>e</sup>                       |                                   | 650                | 650                  | 650                 | 650                   | 650                 |
| Gas, natural, marketed                                 | million cubic meters <sup>r</sup> | 3,100              | 3,350                | 3,280               | 3,353                 | 3,010               |
| Peat, agricultural use <sup>e</sup>                    | thousand tons <sup>r</sup>        | 50                 | 50                   | 50                  | 150 <sup>r</sup>      | 200 <sup>3</sup>    |

See footnotes at end of table.

TABLE 3--Continued  
HUNGARY: PRODUCTION OF MINERAL COMMODITIES<sup>1</sup>

(Metric tons unless otherwise specified)

| Commodity <sup>2</sup>                         | 1999                       | 2000               | 2001               | 2002               | 2003 <sup>c</sup>  |                    |
|--|----------------------------|--------------------|--------------------|--------------------|--------------------|--------------------|
| MINERAL FUELS AND RELATED MATERIALS--Continued |                            |                    |                    |                    |                    |                    |
| Petroleum:                                     |                            |                    |                    |                    |                    |                    |
| Crude:   |                            |                    |                    |                    |                    |                    |
| As reported                                    | thousand tons              | 1,243              | 1,128              | 1,064              | 1,050              | 1,133 <sup>3</sup> |
| Converted                                      | thousand 42-gallon barrels | 9,484 <sup>r</sup> | 8,607 <sup>r</sup> | 8,118 <sup>r</sup> | 8,011 <sup>r</sup> | 8,640              |
| Refinery products <sup>e,5</sup>               | do.                        | 40,000             | 40,000             | 40,000             | 40,000             | 40,000             |

<sup>c</sup>Estimated; estimated data are rounded to no more than three significant digits; may not add to totals shown. <sup>r</sup>Revised. -- Zero.

<sup>1</sup>Table includes data available through September 2004.

<sup>2</sup>In addition to the commodities listed, diatomite and a variety of other crude construction materials, such as common clays, are produced, but available information is inadequate to make reliable estimates of output levels.

<sup>3</sup>Reported figure.

<sup>4</sup>Hungary is believed to produce some blast furnace ferromanganese.

<sup>5</sup>Excludes refinery fuel and losses.

TABLE 4  
HUNGARY: STRUCTURE OF THE MINERAL INDUSTRY IN 2003

(Thousand metric tons unless otherwise specified)

| Commodity              | Major operating companies   | Location of main facilities  | Annual capacity |
|------------------------|---|--|-----------------|
| Alumina                | Hungarian Aluminum Industrial Corp. (HUNGALU)   | Ajka Timfoldgyar plant, about 120 kilometers southwest of Budapest, near Lake Balaton  | 400             |
| Do.                    | do.   | Almasfuzito Timfoldgyar plant near the Czech Republic border, 63 kilometers northwest of Budapest  | 240             |
| Do.                    | do.   | Moson-Magyarovar plant, in northwestern corner of Hungary, about 12 kilometers from Austrian and Czechoslovak borders                                      | 30              |
| Aluminum, primary      | do.   | Inota plant, near Varpalota, 75 kilometers southwest of Budapest   | 46              |
| Bauxite                | Hungarian Aluminum Industrial Corp. (HUNGALU) (Bakony Bauxite Mines Ltd.)                   | Bakony District, extending roughly 100 kilometers northeast along Lake Balaton   | 1,500           |
| Cement                 | Belpafatvalvi Cement es Meszipari Rt [Heidelberger & Schwenk (Germany) and Hungarian Group] | Belapatfalva, near Miskolc, 125 kilometers northeast of Budapest   | 1,100           |
| Do.                    | Beremend Cement es Meszipari Rt [Heidelberger & Schwenk (Germany), 100%]                    | Beremend, 45 kilometers south of Pecs  | 1,090           |
| Do.                    | Dunai Cement es Meszmu Kft [Heidelberger & Schwenk (Germany), 100%]                         | Vac, 50 kilometers north of Budapest   | 1,200           |
| Do.                    | Hejocsabai Cement es Meszipari Rt [Holderbank (Germany) and Hungarian Group]                | Hejocsaba, 150 kilometers northeast of Budapest  | 1,450           |
| Do.                    | Labatlani Cementipari kft [Holderbank (Germany), 100%]                                      | Labatlan, 20 kilometers north of Tatabanya   | 550             |
| Clays                  | Agyag-Asvany Kft [Navan Resources PLC (Ireland)]  | Felsopeteny, one underground and two open pit mines and a 5,000-metric-tons-per-year processing plant. Products are ball clay, kaolin, and refractory clay | 35              |
| Coal:                  |   |  |                 |
| Bituminous and lignite | Magyar Szenbanyaszati Troszt (MSZT) (Hungarian Coal Mining Trust)                           | Tatabanya and Oroszlany coal mining region, 45 kilometers west of Budapest   | 8,900           |
| Do.                    | do.   | Mecsek coal mining region, near Pecs and Komlo, north of the Yugoslav border   | 3,100           |
| Do.                    | do.   | Borsod coal mining region, 130 kilometers northeast of Budapest  | 5,200           |
| Lignite                | do.   | Thorez opencast mine at Visonta, 80 kilometers northeast of Budapest   | 7,000           |
| Manganese              | Orszagos Erc-es Asvanybanyak (National Ore and Mineral Mines)                               | Urkut manganese ore mines, 120 kilometers southwest of Budapest  | 160             |
| Natural gas            | million cubic feet<br>Hungarian Oil and Gas Co. (MOL)                                       | Szeged and Algyo gasfields, southern Hungary   | 152,000         |
| Do.                    | do.   | Hajduszoboszo gasfields, 180 kilometers east of Budapest   | 50,000          |
| Do.                    | do.   | Smaller gasfields are Szank, Kardoskut, Bekes, Berefurdo, and others   | 39,000          |
| Perlite                | Perlit 92 Kft [Navan Resources PLC (Ireland) and Hungarian Group]                           | Palhaza, northeastern Hungary; open pit mine and processing plant  | 150             |
| Petroleum:             |   |  |                 |
| Crude                  | million<br>42-gallon barrels<br>Hungarian Oil and Gas Co. (MOL)                             | Szeged-Algyo Field, near Romanian-Yugoslav border; 50% of total capacity   | 7               |
| Refined                | Subsidiaries of Hungarian Oil and Gas Co. (MOL):  |  |                 |
| Do.                    | do.   | Danube Petroleum Refining Co.  | Szazhalombatta  |
| Do.                    | do.   | Tisza Petroleum Refining Co.   | Leninaváros     |
| Do.                    | do.   | Zala Petroleum Refining Co.  | Zalaegerszeg    |
| Silica                 | Uveg-Asvany Kft. [Navan Resources PLC (Ireland) and Hungarian Group]                        | Mine and plant at Fehevarcsugo   | 660             |
| Steel                  | Dunaferr Dunai Vasmu Rt   | 60 kilometers south of Budapest  | 1,400           |
| Do.                    | OAM-Ozdi Acelmuvek Kft  | 120 kilometers northeast of Budapest   | 360             |
| Do.                    | DAM-Steel   | Diosgyoer, 145 kilometers northeast of Budapest  | 850             |

TABLE 5  
POLAND: PRODUCTION OF MINERAL COMMODITIES<sup>1</sup>

(Metric tons unless otherwise specified)

| Commodity <sup>2</sup>                           | 1999          | 2000                 | 2001               | 2002                | 2003 <sup>e</sup>    |                      |
|--|---------------|----------------------|--------------------|---------------------|----------------------|----------------------|
| METALS   |               |                      |                    |                     |                      |                      |
| Aluminum:  |               |                      |                    |                     |                      |                      |
| Primary  | 50,974        | 46,941               | 44,723             | 49,125              | 45,371 <sup>3</sup>  |                      |
| Secondary  | 6,100         | 5,400 <sup>r</sup>   | 9,900 <sup>r</sup> | 9,700 <sup>r</sup>  | 9,500                |                      |
| Total  | 57,074        | 52,341               | 54,623             | 58,825              | 54,900               |                      |
| Cadmium:   |               |                      |                    |                     |                      |                      |
| Metal, primary                                   | --            | 6                    | 330                | 440 <sup>r</sup>    | 450                  |                      |
| Oxide  | 27            | --                   | --                 | --                  | --                   |                      |
| Copper:  |               |                      |                    |                     |                      |                      |
| Ore:   |               |                      |                    |                     |                      |                      |
| Gross weight                                     | thousand tons | 28,395               | 28,503             | 30,227              | 29,705               | 29,992 <sup>3</sup>  |
| Metal content                                    |               | 523,120              | 525,000            | 545,000             | 568,000 <sup>r</sup> | 570,000              |
| Concentrate:                                     |               |                      |                    |                     |                      |                      |
| Gross weight                                     | thousand tons | 1,900 <sup>e</sup>   | 1,755              | 1,834               | 1,935                | 1,900                |
| Metal content                                    |               | 464,000              | 509,000            | 532,000             | 503,000              | 495,000 <sup>3</sup> |
| Metal:   |               |                      |                    |                     |                      |                      |
| Smelter:   |               |                      |                    |                     |                      |                      |
| Primary  |               | 472,084              | 498,146            | 485,900             | 510,700 <sup>r</sup> | 515,000              |
| Secondary <sup>e</sup>                           |               | 27,300               | 19,700             | 27,900              | 29,400 <sup>r</sup>  | 28,500               |
| Total  |               | 499,384              | 517,846            | 513,800             | 540,100 <sup>r</sup> | 543,500 <sup>3</sup> |
| Refined, electrolytically, primary and secondary |               | 470,494              | 486,002            | 498,451             | 508,674              | 529,616 <sup>3</sup> |
| Gold, metal, smelter <sup>3</sup>                | kilograms     | 489                  | 367                | 349                 | 296                  | 300                  |
| Iron and steel:                                  |               |                      |                    |                     |                      |                      |
| Pig iron:  |               |                      |                    |                     |                      |                      |
| For foundry use                                  | thousand tons | 197                  | 246                | 98                  | 52 <sup>r</sup>      | 132                  |
| For steel production                             | do.           | 5,036                | 6,246              | 5,343               | 5,245 <sup>r</sup>   | 5,500                |
| Total  |               | 5,233                | 6,492              | 5,441               | 5,297 <sup>r</sup>   | 5,632 <sup>3</sup>   |
| Ferroalloys:                                     |               |                      |                    |                     |                      |                      |
| Blast furnace, ferromanganese                    |               | 100                  | --                 | 500                 | 600 <sup>r</sup>     | 500                  |
| Electric furnace:                                |               |                      |                    |                     |                      |                      |
| Ferrosilicomanganese                             |               | 10,000               | 19,000             | 20,000              | 7,500 <sup>r</sup>   | 8,000                |
| Ferrosilicon                                     |               | 62,481               | 56,000             | 48,600              | 41,800 <sup>r</sup>  | 42,000               |
| Other  |               | 2,700                | --                 | --                  | --                   | --                   |
| Total  |               | 75,281               | 75,000             | 69,100 <sup>r</sup> | 49,900 <sup>r</sup>  | 50,500               |
| Steel, crude:                                    |               |                      |                    |                     |                      |                      |
| From open hearth furnaces                        | thousand tons | 379                  | 424                | 178                 | 169                  | 207                  |
| From oxygen converters                           | do.           | 5,452                | 6,794              | 5,822               | 5,531                | 6,200                |
| From electric furnaces                           | do.           | 3,022                | 3,290              | 2,809               | 2,667                | 2,700                |
| Other  | do.           | 1                    | --                 | --                  | --                   | --                   |
| Total  | do.           | 8,854                | 10,508             | 8,809               | 8,367                | 9,107 <sup>3</sup>   |
| Semimanufactures:                                |               |                      |                    |                     |                      |                      |
| Hot rolled                                       | do.           | 6,433                | 7,616              | 6,599               | 6,114                | 6,595 <sup>3</sup>   |
| Cold rolled                                      | do.           | 1,673                | 1,826              | 1,350               | 1,349 <sup>r</sup>   | 1,533 <sup>3</sup>   |
| Pipe   | do.           | 484                  | 483                | 440                 | 309                  | 309 <sup>3</sup>     |
| Lead:  |               |                      |                    |                     |                      |                      |
| Pb-Zn ore, gross weight                          | do.           | 5,068                | 4,500              | 4,600               | 4,500 <sup>e</sup>   | 4,500                |
| Mine output:                                     |               |                      |                    |                     |                      |                      |
| Pb content of Pb-Zn ore                          |               | 81,849               | 67,800             | 69,600              | 73,500 <sup>r</sup>  | 74,000               |
| Pb content of Cu ore                             |               | 35,000               | 46,000             | 52,000              | 46,900 <sup>r</sup>  | 45,000               |
| Total Pb mine content                            |               | 116,849              | 113,800            | 121,600             | 120,400 <sup>r</sup> | 119,000              |
| Concentrate:                                     |               |                      |                    |                     |                      |                      |
| Gross weight                                     |               | 104,000 <sup>e</sup> | 84,400             | 86,400              | 85,000               | 85,000               |
| Pb content                                       |               | 62,900               | 51,200             | 52,600              | 56,600 <sup>r</sup>  | 63,000 <sup>3</sup>  |
| Metal:   |               |                      |                    |                     |                      |                      |
| Smelter:   |               |                      |                    |                     |                      |                      |
| Primary  |               | 31,000               | 29,700             | 30,800              | 29,400 <sup>r</sup>  | 25,000               |
| Secondary  |               | 53,600               | 46,400             | 39,500              | 44,700               | 45,000               |
| Total  |               | 84,600               | 76,100             | 70,300              | 74,100               | 70,000               |

See footnotes at end of table.

TABLE 5--Continued  
POLAND: PRODUCTION OF MINERAL COMMODITIES<sup>1</sup>

(Metric tons unless otherwise specified)

| Commodity <sup>2</sup>                              | 1999                | 2000                | 2001                | 2002                 | 2003 <sup>e</sup>    |
|---|---------------------|---------------------|---------------------|----------------------|----------------------|
| METALS--Continued                                   |                     |                     |                     |                      |                      |
| Lead--Continued:                                    |                     |                     |                     |                      |                      |
| Metal--Continued:                                   |                     |                     |                     |                      |                      |
| Refined:  |                     |                     |                     |                      |                      |
| Primary <sup>e</sup>                                | 50,000              | 35,412 <sup>3</sup> | 45,000              | 26,000               | 28,000               |
| Secondary <sup>e</sup>                              | 13,985 <sup>3</sup> | 20,000              | 20,000              | 40,000               | 40,000               |
| Total   | 63,985              | 55,412              | 65,000              | 66,000               | 68,000               |
| Palladium, average content of slimes <sup>e,4</sup> | 12                  | 12                  | 12                  | 12                   | 10                   |
| kilograms   |                     |                     |                     |                      |                      |
| Platinum, average content of slimes <sup>e,4</sup>  | 21                  | 21                  | 20                  | 20                   | 20                   |
| do.   |                     |                     |                     |                      |                      |
| Selenium  | 67                  | 65                  | 65                  | 68                   | 65                   |
| Silver, refined primary                             | 1,100               | 1,144               | 1,190               | 1,222                | 1,237 <sup>3</sup>   |
| Zinc:   |                     |                     |                     |                      |                      |
| Mine output, Zn content                             | 185,689             | 182,000             | 172,300             | 171,200 <sup>r</sup> | 172,000              |
| Concentrate output, Zn content                      | 154,800             | 156,900             | 152,700             | 152,200 <sup>r</sup> | 152,300 <sup>3</sup> |
| Metal, refined, including secondary                 | 178,900             | 173,000             | 174,700             | 158,900 <sup>r</sup> | 150,000 <sup>3</sup> |
| INDUSTRIAL MINERALS                                 |                     |                     |                     |                      |                      |
| Barite, beneficiated                                | 500                 | 2,000               | 2,500               | 2,700                | 2,700                |
| Cement:   |                     |                     |                     |                      |                      |
| Clinker   | 11,678              | 11,559              | 9,335               | 8,500                | 8,000                |
| thousand tons                                       |                     |                     |                     |                      |                      |
| Hydraulic   | 15,555              | 15,046              | 12,074              | 10,948               | 11,300 <sup>3</sup>  |
| do.   |                     |                     |                     |                      |                      |
| Portland  | 14,310              | 13,802              | 11,115              | 10,000               | 9,500                |
| do.   |                     |                     |                     |                      |                      |
| Clays and clay products, crude:                     |                     |                     |                     |                      |                      |
| Bentonite   | 96,000              | --                  | --                  | --                   | --                   |
| Fuller's earth                                      | 5,000               | 29,700              | 29,000              | 26,200 <sup>r</sup>  | 27,000               |
| Fire clay   | 140                 | 153                 | 140                 | 128 <sup>r</sup>     | 144 <sup>3</sup>     |
| thousand tons                                       |                     |                     |                     |                      |                      |
| Kaolin:   |                     |                     |                     |                      |                      |
| Crude   | 286                 | 344                 | 267                 | 252 <sup>r</sup>     | 250                  |
| do.   |                     |                     |                     |                      |                      |
| Beneficiated  | 89                  | 99                  | 129                 | 114 <sup>r</sup>     | 115 <sup>3</sup>     |
| do.   |                     |                     |                     |                      |                      |
| Diatomite   | 1,200               | 1,300               | 1,000               | 1,000                | 1,000                |
| Feldspar:   |                     |                     |                     |                      |                      |
| Run of mine   | 9,000               | 54,000              | 69,000              | 85,000 <sup>r</sup>  | 80,000               |
| Processed, including imported material              | 120,100             | 165,200             | 220,600             | 293,000 <sup>r</sup> | 290,000              |
| Gypsum and anhydrite: <sup>5</sup>                  |                     |                     |                     |                      |                      |
| thousand tons                                       |                     |                     |                     |                      |                      |
| Natural:  |                     |                     |                     |                      |                      |
| Gypsum rock   | 926                 | 997                 | 794                 | 867 <sup>r</sup>     | 1,038 <sup>3</sup>   |
| Anhydrite   | 237                 | 285                 | 300                 | 280 <sup>r</sup>     | 300                  |
| Total   | 1,163               | 1,282               | 1,094               | 1,147 <sup>r</sup>   | 1,338 <sup>3</sup>   |
| Synthetic   | 860                 | 1,140               | 1,134               | 1,040 <sup>r</sup>   | 1,000                |
| Total gypsum and anhydrite                          | 2,023               | 2,422               | 2,228               | 2,187 <sup>r</sup>   | 2,338 <sup>3</sup>   |
| Lime, hydrated and quicklime                        | 2,299               | 2,192               | 1,954               | 1,865                | 1,955 <sup>3</sup>   |
| thousand tons                                       |                     |                     |                     |                      |                      |
| Magnesite:  |                     |                     |                     |                      |                      |
| Ore, crude  | 54,800              | 30,000              | 23,000              | 24,000 <sup>r</sup>  | 24,000               |
| Concentrate   | 38,800              | 26,100              | 22,200              | 22,100 <sup>r</sup>  | 22,100               |
| Calcined  | --                  | --                  | 200                 | 100 <sup>r</sup>     | 100                  |
| Nitrogen, N content of ammonia                      | 1,151               | 1,208               | 1,169               | 1,362                | 1,912 <sup>3</sup>   |
| thousand tons                                       |                     |                     |                     |                      |                      |
| Salt:   |                     |                     |                     |                      |                      |
| Rock  | 923                 | 841                 | 787                 | 839                  | 848 <sup>3</sup>     |
| do.   |                     |                     |                     |                      |                      |
| Recovered from brine                                | 2,488               | 2,652               | 2,689 <sup>r</sup>  | 2,719 <sup>r</sup>   | 3,812 <sup>3</sup>   |
| do.   |                     |                     |                     |                      |                      |
| Total   | 3,411               | 3,493               | 3,476 <sup>r</sup>  | 3,558 <sup>r</sup>   | 4,660 <sup>3</sup>   |
| do.   |                     |                     |                     |                      |                      |
| Sand and gravel, excluding glass sand:              |                     |                     |                     |                      |                      |
| Aggregates:   |                     |                     |                     |                      |                      |
| Mine output   | 84,639              | 88,514              | 73,107              | 66,722 <sup>r</sup>  | 65,000               |
| Processed   | 71,196              | 73,588              | 62,534 <sup>r</sup> | 62,799 <sup>r</sup>  | 63,000               |
| Foundry sand  | 905                 | 1,055               | 849 <sup>r</sup>    | 628                  | 650                  |
| thousand tons                                       |                     |                     |                     |                      |                      |
| Filling sand  | 11,352              | 9,298               | 8,914               | 9,122 <sup>r</sup>   | 9,000                |
| do.   |                     |                     |                     |                      |                      |
| Lime-sand brick production sand                     | 673                 | 718                 | 492                 | 411 <sup>r</sup>     | 450                  |
| thousand cubic meters                               |                     |                     |                     |                      |                      |

See footnotes at end of table.

TABLE 5--Continued  
POLAND: PRODUCTION OF MINERAL COMMODITIES<sup>1</sup>

(Metric tons unless otherwise specified)

| Commodity <sup>2</sup>              | 1999                 | 2000            | 2001               | 2002               | 2003 <sup>c</sup>   |                      |
|-------------------------------------|----------------------|-----------------|--------------------|--------------------|---------------------|----------------------|
| INDUSTRIAL MINERALS--Continued      |                      |                 |                    |                    |                     |                      |
| Silica:                             |                      |                 |                    |                    |                     |                      |
| Glass:                              |                      |                 |                    |                    |                     |                      |
| Construction, flat                  | thousand tons        | 479             | 427                | 394                | 400 <sup>e</sup>    | 400                  |
| Technical                           | do.                  | 64              | 68                 | 54                 | 60 <sup>e</sup>     | 60                   |
| Commercial                          | do.                  | 79              | 79                 | 81                 | 80 <sup>e</sup>     | 80                   |
| Packing                             | do.                  | 928             | 976                | 993                | 900 <sup>e</sup>    | 900                  |
| Processed:                          |                      |                 |                    |                    |                     |                      |
| Glass sand                          |                      | 1,418           | 1,532              | 1,423              | 1,235 <sup>f</sup>  | 1,300                |
| Quartz and quartz crystal           |                      | 23,000          | 52,200             | 65,900             | 27,000 <sup>f</sup> | 30,000               |
| Quartzite, refractory               |                      | 171,700         | 176,700            | 114,200            | 32,000 <sup>f</sup> | 40,000               |
| Quartz schist                       |                      | --              | 5,500              | 5,500              | 3,000 <sup>f</sup>  | 3,000                |
| Sodium compounds, n.e.s.:           |                      |                 |                    |                    |                     |                      |
| Carbonate (soda ash), 98%           | thousand tons        | 910             | 1,018              | 1,062              | 1,054               | 1,110 <sup>3</sup>   |
| Caustic soda (96% NaOH)             | do.                  | 737             | 394                | 348                | 395                 | 413 <sup>3</sup>     |
| Stone:                              |                      |                 |                    |                    |                     |                      |
| Mine output:                        |                      |                 |                    |                    |                     |                      |
| Crushed and dimension stone         | do.                  | 23,877          | 24,483             | 22,466             | 22,619 <sup>f</sup> | 23,000               |
| Dolomite                            | do.                  | 1,861           | 2,204              | 1,639              | 1,585               | 1,815 <sup>3</sup>   |
| Limestone:                          |                      |                 |                    |                    |                     |                      |
| For lime production                 | do.                  | 12,373          | 13,858             | 11,324             | 10,306 <sup>f</sup> | 11,000               |
| For non-lime end use                | do.                  | 28,914          | 28,257             | 24,289             | 23,233              | 23,747 <sup>3</sup>  |
| Sulfur:                             |                      |                 |                    |                    |                     |                      |
| Byproduct:                          |                      |                 |                    |                    |                     |                      |
| From metallurgy                     | do.                  | 278             | 279                | 277                | 275 <sup>f</sup>    | 275                  |
| From petroleum                      | do.                  | 74              | 131                | 162                | 180                 | 175                  |
| Total                               | do.                  | 352             | 410                | 439                | 455 <sup>f</sup>    | 450                  |
| Native, Frasch                      | do.                  | 1,175           | 1,369              | 942                | 760 <sup>f</sup>    | 762 <sup>3</sup>     |
| From gypsum <sup>e</sup>            | do.                  | -- <sup>f</sup> | --                 | 10                 | 10                  | 10                   |
| Grand total                         | do.                  | 1,527           | 1,779              | 1,391 <sup>f</sup> | 1,225 <sup>f</sup>  | 1,220                |
| MINERAL FUELS AND RELATED MATERIALS |                      |                 |                    |                    |                     |                      |
| Carbon black                        |                      | 18,700          | 12,500             | 15,100             | 16,900 <sup>f</sup> | 17,000               |
| Coal:                               |                      |                 |                    |                    |                     |                      |
| Bituminous                          | thousand tons        | 111,894         | 103,331            | 103,992            | 103,546             | 102,873 <sup>3</sup> |
| Lignite and brown                   | do.                  | 60,839          | 59,484             | 59,557             | 58,210              | 60,919 <sup>3</sup>  |
| Total                               | do.                  | 172,733         | 162,815            | 163,549            | 161,756             | 163,792 <sup>3</sup> |
| Coke, coke oven                     | do.                  | 8,575           | 8,972              | 8,844              | 8,787               | 10,111 <sup>3</sup>  |
| Fuel briquets, all grades           | do.                  | 50              | 50                 | 50                 | 50 <sup>e</sup>     | 50                   |
| Gas:                                |                      |                 |                    |                    |                     |                      |
| Natural                             | million cubic meters | 4,757           | 4,956              | 5,175              | 5,259               | 5,315 <sup>3</sup>   |
| Manufactured:                       |                      |                 |                    |                    |                     |                      |
| Town                                | do.                  | 7               | 7                  | 6                  | 6                   | 6                    |
| Coke oven                           | do.                  | 3,579           | 3,905              | 3,919 <sup>f</sup> | 3,752 <sup>f</sup>  | 3,800                |
| Generator <sup>e</sup>              | do.                  | 400             | 400                | 300                | 300                 | 300                  |
| Total                               | do.                  | 3,986           | 4,312 <sup>f</sup> | 4,225 <sup>f</sup> | 4,058 <sup>f</sup>  | 4,110                |
| Peat, fuel and agricultural         | thousand tons        | 310             | 380                | 325                | 300 <sup>e</sup>    | 300                  |
| Petroleum:                          |                      |                 |                    |                    |                     |                      |
| Crude, as reported                  | do.                  | 425             | 653                | 767                | 721                 | 754 <sup>3</sup>     |
| Refinery products <sup>6</sup>      | do.                  | 16,784          | 18,695             | 18,680             | 17,540              | 16,886 <sup>3</sup>  |

<sup>e</sup>Estimated; estimated data are rounded to no more than three significant digits; may not add to totals shown. <sup>f</sup>Revised. -- Zero.

<sup>1</sup>Table includes data available through September 2004.

<sup>2</sup>In addition to the commodities listed above, antimony and germanium, associated with polymetallic deposits, and cobalt and nickel, associated with copper ores, are produced in quantities that so far have not warranted further recovery.

<sup>3</sup>Reported figure.

<sup>4</sup>Estimates based on reported platinum and palladium-bearing final (residual) slimes and their average Pt and Pd content from electrolytic copper refining.

<sup>5</sup>Includes building gypsum, as well as an estimate for gypsum used in the production of cement.

<sup>6</sup>Includes virtually all major products.

TABLE 6  
POLAND: STRUCTURE OF THE MINERAL INDUSTRY IN 2003<sup>1</sup>

(Thousand metric tons unless otherwise specified)

| Commodity           | Major operating companies  | Location of main facilities  | Annual capacity                 |
|---------------------|--|--|---------------------------------|
| <b>Aluminum:</b>    |  |  |                                 |
| Primary             | Huta Aluminium "Konin" S.A.  | Konin  | 55.                             |
| Secondary           | Zaklady Metalurgiczne "Skawina"  | Skawina  | 20.                             |
| Do.                 | Zaklady Metali Lekkich SA "Kety"   | Kety   | NA.                             |
| Do.                 | Zaklady Metalurgiczne "Trzebinia"  | Trzebinia  | NA.                             |
| Barite <sup>2</sup> | Przedsiębiorstwo Hondlowo Usługowe<br>R&S Spolka Jawna   | Boguszow, Stanislawow  | 3.                              |
| Cement              | Zaklady Cementowo-Wapiennicze<br>Gorazdze S.A.   | Chorula  | 1,800 clinker,<br>2,400 cement. |
| Do.                 | Cementownia "Ozarow" S.A.  | Ozarow   | 2,200 clinker,<br>2,400 cement. |
| Do.                 | Cementownia "Chelm" S.A.   | Chelm  | 1,440 clinker,<br>2,640 cement. |
| Do.                 | Kombinat Cementowo-Wapienniczy<br>Warta S.A.   | Dzialoszyn   | 600 clinker,<br>1,150 cement.   |
| Do.                 | Cementownia "Malogoszcz" S.A.  | Malogoszcz   | 1,840 clinker,<br>1,800 cement. |
| Do.                 | Zaklady Cementowo-Wapiennicze<br>Nowiny S.A.   | Sitkowka   | 785 clinker,<br>1,070 cement.   |
| Do.                 | Cementownia "Strzelce Opolskie" S.A.   | Strzelce Opolskie  | 1,257 clinker,<br>1,630 cement. |
| Do.                 | Kombinat Cementowo-Wapienniczy<br>"Kujawy" S.A.  | Bielawy  | 900 clinker,<br>1,000 cement.   |
| Do.                 | Cementownia "Rudniki" S.A.   | Rudniki  | 840 clinker,<br>1,470 cement.   |
| Do.                 | Cementownia "Wierzbica" S.A.   | Wierzbica  | 759 clinker,<br>1,000 cement.   |
| Do.                 | Cementownia "Nowa Huta" S.A.   | Krakow   | 290 clinker,<br>1,100 cement.   |
| Do.                 | Cementownia "Rejowiec" S.A.  | Rejowiec   | 600 clinker,<br>845 cement.     |
| Do.                 | Cementownia "Odra" S.A.  | Opole  | 433 clinker,<br>800 cement.     |
| Do.                 | Cementownia "Warszawa"   | Warszawa (Warsaw)  | 600 cement.                     |
| Do.                 | Cementownia "Groszowice" Sp. z o.o.  | Opole  | 304 clinker,<br>425 cement.     |
| Do.                 | Cementownia "Polcement-Saturn"   | Wojkowice  | 400 cement.                     |
| Do.                 | Cementownia "Wiek"   | Ogrodzieniec   | 710 clinker,<br>240 cement.     |
| Do.                 | Fabrika Cementu "Wysoka"   | Lazy   | 304 clinker,<br>425 cement.     |
| Do.                 | Cementownia "Wejhorowie"   | Wejhorowo  | 42 clinker,<br>45 cement.       |
| <b>Coal:</b>        |  |  |                                 |
| Anthracite          | Zaklad Wydobywczwo<br>Przetworczy Antracytu Walbrzych-Gaj  | Lower Silesia  | 200.                            |
| Bituminous          | Bytomska Spolka Weglowa S.A.<br>Rudzka Spolka Weglowa S.A.<br>Gliwicka Spolka Weglowa S.A.<br>Katowicki Holding Weglowy S.A.<br>Nadwislanska Spolka Weglowa S.A.<br>Rybnicka Spolka Weglowa S.A.<br>Jastrzebska Spolka Weglowa S.A.<br>Seven independent mines<br>Walbrzyskie Kopalnie Wegla<br>Kamienego<br>KWK "Nowa Ruda"<br>KWK "Bogdanka" S. A. | Upper Silesia (9 mines)<br>do. (6 mines)<br>do. (7 mines)<br>do. (11 mines)<br>do. (8 mines)<br>do. (5 mines)<br>do. (6 mines)<br>do.<br>Lower Silesia<br>do.<br>do. | 140,000.                        |

See footnotes at end of table.

TABLE 6--Continued  
POLAND: STRUCTURE OF THE MINERAL INDUSTRY IN 2003<sup>1</sup>

(Thousand metric tons unless otherwise specified)

| Commodity                                      | Major operating companies   | Location of main facilities  | Annual capacity |
|--|---|--|-----------------|
| <b>Coal--Continued:</b>                        |   |  |                 |
| Lignite  | KWK "Belchatow"   | Belchatow  | 75,000.         |
|  | KWK "Turow"   | Turow  |                 |
|  | KWK "Konin"   | Konin  |                 |
|  | KWK "Adamow"  | Adamow   |                 |
|  | KWK "Sieniawa"  | Sieniawa   |                 |
| Coke   | Zaklady Koksownicze im. Powstancow Sl.  | Upper Silesia  | 12,000.         |
|  | Zaklady Koksownicze "Przyjazn"  | do.  |                 |
|  | Kombinat Koksochemiczny "Zabrze"  | do.  |                 |
|  | Huta im. Sendzimira   | do. (Krakow)   |                 |
|  | Huta "Czestochowa"  | do. (Czestochowa)  |                 |
|  | Zaklady Koksownicze "Walbrzych"   | Lower Silesia  |                 |
| <b>Copper:</b>                                 |   |  |                 |
| Ore, gross weight<br>(1.2%-2.2% Cu)            | Kombinat Gorniczo Hutniczy<br>Miedzi (KGHM) Polska Miedz S.A.<br>[KGHM, S.A.] | Lubin Mine, Lubin-Glogow District  | 7,000.          |
| Do.  | do.   | Polkowice- Sieroszowice Mine, Lubin-Glogow District                                    | 9,200.          |
| Do.  | do.   | Rudna Mine, Lubin-Glogow District  | 11,000.         |
| Concentrate, gross weight<br>(25.2% -25.9% Cu) | do.   | Lubin beneficiation plant, Lubin-Glogow District                                       | 465.            |
| Do.  | do.   | Polkowice beneficiation plant, Lubin-Glogow District                                   | 450.            |
| Do.  | do.   | Rudna beneficiation plant, Lubin-Glogow District                                       | 700.            |
| Metal, refined                                 | do.   | Refineries at Glogow I, Glogow II, and Legnica   | 480.            |
| Feldspar                                       | Strzeblowskie Kopalnie Surowcow<br>Mineralnych                                | Mine at Sobotka, Lower Silesia, workings at<br>Pagorki Zachodnie and Pagorki Wschodnie | 50.             |
| <b>Ferroalloys:</b>                            |   |  |                 |
| Electric furnace (FeSiMn, FeMn,<br>FeCr, FeSi) | Huta "Laziska" S.A.   | Upper Silesia at Laziska Gome  | 170.            |
| Blast furnace (FeMn)                           | Huta "Pokoj" S.A.   | Upper Silesia, Ruda Slaska   | 90.             |
| Gold kilograms                                 | KGHM "Polska Miedz" S.A.  | Refinery at Glogow "Trzebinia"   | 550.            |
| Gypsum and anhydrite                           | Zaklady Przemyslu Gipsowego<br>"Dolina Nidy"                                  | Southeastern Poland, Gacki   | 1,400.          |
|  | Zaklad Gipsowy "Stawiany"   | Southeastern Poland, Szarbkow  |                 |
|  | Kopalnia Anhydrytu "Nowy Lad"<br>KGHM "Polska Miedz" S.A.                     | Lower Silesia, Niwnice<br>Lower Silesia, Iwiny   |                 |
| Helium million<br>cubic meters                 | Zaklad Odazotowania Gazu  | Western Poland, Odolanow   | 3.              |
| Kaolin   | KSM "Surmin-Kaolin" S.A.  | Lower Silesia, Nowogrodziec  | 50.             |
| <b>Lead-zinc:</b>                              |   |  |                 |
| Concentrate                                    | Zaklady Gorniczo-Hutnicze (ZGH)<br>"Boleslaw"                                 | Mines and concentrators at Olkusz and<br>Pomorzany, Bukowno region                     | 60 Pb, 160 Zn.  |
| Do.  | Zaklady Gornicze "Trzebionka" S.A.  | Mines and concentrator at Trzebinia  |                 |
| <b>Metal:</b>                                  |   |  |                 |
| Pb, refined                                    | Huta Cynku "Miasteczko Slaskie"   | Refinery at Miasteczko Slaskie   | 60.             |
| Do.  | Huta Metali Niezaleznych<br>"Szopienice"                                      | Katowice   | 35.             |
| Zn, refined                                    | Huta Cynku "Miasteczko Slaskie"   | Imperial Smelter at Miasteczko Slaskie   | 60.             |
| Do.  | Zaklady Metalurgiczny "Silesia"<br>(input from Huta "Miasteczko<br>Slaskie")  | Refinery at Katowice   | -30.            |
| Do.  | Zaklady Gorniczo-Hutnicze "Boleslaw"  | Refinery at Boleslaw   | 65.             |
| Do.  | Huta Metali Niezaleznych<br>"Szopienice"                                      | Katowice   | 28.             |

See footnotes at end of table.

TABLE 6--Continued  
POLAND: STRUCTURE OF THE MINERAL INDUSTRY IN 2003<sup>1</sup>

(Thousand metric tons unless otherwise specified)

| Commodity         | Major operating companies   | Location of main facilities  | Annual capacity |
|-------------------|---|--|-----------------|
| Lime <sup>3</sup> | Zakłady Przemysłu Wapienniczego<br>Truskawica   | Kieleckie County, Swietokrzyskie Mountains   | 4,500.          |
|                   | Slaskie Zakłady Przemysłu<br>Wapienniczego Opolwap S.A.   | Opole County   |                 |
|                   | Zakłady Przemysłu Wapienniczego<br>Bukowa   | Kieleckie County, Swietokrzyskie Mountains   |                 |
|                   | Kombinat Cementowo-Wapienniczy<br>Kujawy S.A.   | Bydgoskie County   |                 |
|                   | Zakłady Cementowo-Wapiennicze<br>Gorazdze S.A.  | Opole County   |                 |
|                   | Zakłady Cementowo-Wapiennicze<br>Nowiny   | Kieleckie County   |                 |
|                   | Produkcyjno-Handlowo-Uslugowe<br>Wapmo-Sabinow  | Czestochowa County   |                 |
|                   | Wojcieszowskie Zakłady Przemysłu<br>Wapienniczego Sp. z o.o.  | Jeleniogorskie County  |                 |
|                   | Zakłady Przemysłu Wapienniczego<br>w Sulejowie  | Piotrkowskie County  |                 |
|                   | Zakład Wapienniczy w Plazie   | Katowickie County  |                 |
| Natural gas       | million<br>cubic meters<br>Ministry of Mining and Energy  | Gasfields at pre-Carpathian foothills<br>Carpathian Mountains Lowlands, near<br>Ostrow Wielkopolski, Poznan, and Trzebnica,<br>north of Wroclaw  | 4,900.          |
| Nitrogen:         |   |  | 2,400.          |
| Ammonia           | Zakłady Azotowe "Pulawy" S.A.<br>Zakłady Azotowe "Kedzierzyn" S.A.<br>Zakłady Azotowe "Wloclawek" S.A.<br>Zakłady Azotowe S.A. w Tarnowie<br>Zakłady Azotowe S.A. w Chorzowie<br>Zakłady Chemiczne "Police"   | Pulawy in eastern Poland<br>Kedzierzyn in Upper Silesia<br>Wloclawek in central Poland<br>Tarnow in southern Poland<br>Chorzow in Upper Silesia<br>Police in northwest Poland  |                 |
| Fertilizer (N)    | do.   | do.  | 1,700.          |
| Petroleum:        |   |  |                 |
| Crude             | Polskie Gornictwo Naftowe i<br>Gazownictwo Warszawa   | Oilfields in northern and northwestern<br>lowlands; sub-Carpathian region and<br>Carpathian Mountains  | 200.            |
| Do.               | Predsiębiorstwo Poszukiwan i<br>Eksploracji Rpy i Gazu "Petrobaltic"  | Baltic Sea Shelf   | 100.            |
| Refined           | Petrochimia-Plock<br>Rafineria "Gdansk"<br>Rafineria "Czechowice"<br>Rafineria "Trzebinia"<br>Rafineria "Glimar" Gorilice<br>Rafineria "Jedlicze"<br>Podkarpackie Zakłady Rafyneryjne<br>w Jasle  | Plock in central Poland<br>Gdansk in northern Poland<br>Czechowice in southern Poland<br>Trzebinia in southern Poland<br>Gorilice in southern Poland<br>Jedlicze in southern Poland<br>Jaslo in southern Poland  | 13,500.         |
| Salt, all types   | Inowroclawskie Kopalnie Soli S.A.<br><br>Kopalnia Soli "Klodawa"<br>Kopalnia Soli "Wieliczka"<br><br>Kopalnia Soli "Bochnia"<br><br>KGHM "Polska Miedz" S.A.<br>Kopalnia Wegla Kamiennego<br>"Debiensko"<br>Janikowskie Zakłady Sodowe<br>"Janikosoda" S.A. | Gora, Mogilno I, and Mogilno II mines<br>at Inowroclaw in central Poland<br>Klodawa in central Poland<br>Wieliczka in southern Poland, near Krakow,<br>mining deposits at Barycz and Wieliczka<br>Southern Poland, mines at the Lezkowice<br>and Siedlec-Moszczenica-Lapczyca<br>deposit. Not known to have operated in 1999<br>Sierszowice in southwestern Poland<br>Debiensko, Upper Silesia<br><br>Janikowo in central Poland | 6,500.          |

See footnotes at end of table.

TABLE 6--Continued  
POLAND: STRUCTURE OF THE MINERAL INDUSTRY IN 2003<sup>1</sup>

(Thousand metric tons unless otherwise specified)

| Commodity                  | Major operating companies   | Location of main facilities  | Annual capacity |
|----------------------------|---|--|-----------------|
| Selenium                   | Huta Metali Niezaleznych "Szopienice"<br>KGHM "Polska Miedz" S.A. | Katowice<br>Refinery at Glogow   | 80              |
| Silver                     | KGHM "Polska Miedz" S.A.<br>Zaklady Metalurgiczne Trzebinia       | Refined from dore produced by the<br>Szopienice Pb-Zn smelter-refinery<br>largely from KGHM-supplied slimes                  | 1               |
| Steel:                     |   |  | 14,000 (crude). |
| Crude and semimanufactures | Huta Katowice S.A.  | Plant at Dobrowa Gornicza, producing pig<br>iron, crude steel, hot-rolled products, and<br>cast steel                        |                 |
|                            | Huta im. T. Sendzimir S.A.  | Steelworks at Krakow, producing pig iron,<br>crude steel, hot-rolled products, cold-rolled<br>products, pipes, and cast iron |                 |
|                            | P.P. Huta "Zawierciu"   | Steelworks at Zawierciu, producing crude<br>steel, hot-rolled products, cast iron, and cast<br>steel                         |                 |
|                            | Huta Czestochowa S.A.   | Steelworks at Czestochowa, producing pig<br>iron, crude steel, hot-rolled sheets, pipes,<br>and cast iron                    |                 |
|                            | Huta "Ostrowiec" S.A.   | Steelworks at Ostrowiec-Swietokrzyski,<br>producing crude steel, hot-rolled products   |                 |
|                            | P.P. Huta "Labedy"  | Steelworks at Gliwice, producing crude<br>steel, and hot-rolled products   |                 |
|                            | Huta "Lucchini-Warszawa" Sp. z o.o.                               | Steelworks in Warsaw, producing crude steel,<br>hot-rolled products, and cold-rolled strip                                   |                 |
|                            | Huta Florian S.A.   | Steelworks in Swietochlowicach, producing<br>crude steel, hot-rolled products,<br>galvanized sheet, and cold-rolled strip    |                 |
|                            | Huta "Stalowa Wola" S.A.  | Steelworks at Stalowa Wola, producing<br>crude steel   |                 |
|                            | Huta "Jednosc" S.A.   | Steelworks at Siemianowice Slaskie,<br>producing crude steel, hot-rolled products,<br>and pipes                              |                 |
|                            | Huta "Batory" S.A.  | Steelworks at Chorzow, producing crude steel,<br>hot-rolled products, and pipes  |                 |
|                            | P.P.Huta "Baildon"  | Steelworks in Katowice, producing crude<br>steel, hot-rolled products, cold-rolled strip,<br>and cast steel                  |                 |
|                            | Huta "Malapanew" S.A.   | Steelworks at Ozimek, producing crude steel<br>and cast steel  |                 |
|                            | Huta "Zabrze" S.A.  | Steelworks at Zabrze, producing crude steel,<br>cast iron, and cast steel  |                 |
|                            | Huta "Zygmunt" S.A.   | Steelworks at Bytom, producing crude steel,<br>cast iron, and crude steel  |                 |
| Semimanufactures only      | Huta Cedler S.A.  | Steelworks in Sosnowiec, producing hot-rolled<br>products, cold-rolled strip, and cast iron                                  |                 |
|                            | P.P. Huta "Kosciuszko"  | Steelworks at Chorzow, producing hot-rolled<br>products  |                 |
|                            | Huta "Pokoj" S.A.   | Steelworks at Ruda Slaska, producing hot-<br>rolled products   |                 |
|                            | Huta "Andrzej" S.A.   | Steelworks at Zawadskie, producing pipes   |                 |
|                            | Huta "Ferrum" S.A.  | Steelworks in Katowice, producing pipes  |                 |
|                            | P.P. Huta "Bobrek"  | Steelworks in Bytom, producing pig iron, hot-<br>rolled products, and cast iron  |                 |
|                            | Huta "Buczek" S.A.  | Steelworks in Sosnowiec, producing pipes and<br>cast iron  |                 |
|                            | P.P. Huta "1 Maja"  | Steelworks in Gliwice, producing hot-rolled<br>products  |                 |
|                            | Zaklad Wielkopiecowy "Szczecin"<br>Sp. z o.o.                     | Steelworks at Szczecin, producing pig iron   |                 |

See footnotes at end of table.

TABLE 6--Continued  
 POLAND: STRUCTURE OF THE MINERAL INDUSTRY IN 2003<sup>1</sup>

(Thousand metric tons unless otherwise specified)

| Commodity | Major operating companies                               | Location of main facilities   | Annual capacity |
|-----------|---|---|-----------------|
| Sulfur    | P.P.Kopalne i Zaklady Przetworcze<br>Siarki "Siarkopol" | Operations at Tarnobrzeg, mining the Jeziorko-<br>Grebow-Wydza deposit. | 5,700.          |
| Do.       | P.P. Kopalnie i Zaklady Chemiczne<br>Siarki "Siarkopol" | Operations at Grzybow, mining the Osiek and<br>Grzybow-Gacki deposits.  | NA.             |

NA Not available.

<sup>1</sup>The data presented in this table were compiled, in large measure, from information provided in the Minerals Yearbook of Poland (Bilans Gospodarki Surowcami Mineralnymi w Polsce Na Tle Gospodarki Swiatowej 1995) prepared and published by the Department of Mineral and Energy Policy, Mineral and Energy Economy Research Centre of the Academy of Science of Poland, The Ministry of Environmental Protection, Natural Resources, and Forestry. Additionally, very valuable information and criticism was provided by Mr. Krystof Galos and other members of his academic department.

<sup>2</sup>The production of barite at the "Boguszow " Barite Mine was stopped in 1997 because of large-scale area flooding and its future status is uncertain.

<sup>3</sup>In order of size.

TABLE 7  
POLAND: RESOURCES OF MAJOR MINERALS IN 2002

| Commodity                                       | Number of deposits |           | Geologically documented resources <sup>1</sup> |           |                          |
|---|--------------------|-----------|--|-----------|--------------------------|
|   | Total              | Exploited | Total  | Exploited | Annual percentage change |
| <b>METALS</b>                                   |                    |           |  |           |                          |
| Copper  | 14                 | 5         | 2,369  | 1,451     | -5.1                     |
| Lead and zinc                                   | 21                 | 3         | 180  | 41        | --                       |
| <b>INDUSTRIAL MINERALS</b>                      |                    |           |  |           |                          |
| Raw materials for chemicals:                    |                    |           |  |           |                          |
| Sulfur, native                                  | 17                 | 4         | 471  | 41        | -4.7                     |
| Rock salt                                       | 20                 | 4         | 80,251   | 8,327     | -1.6                     |
| Barite  | 5                  | --        | 6  | --        | --                       |
| Potassium-magnesium salts                       | 5                  | 1         | 669  | 72        | --                       |
| Raw materials for construction:                 |                    |           |  |           |                          |
| Chalk   | 186                | 64        | 195  | 36        | -23.4                    |
| Clay:   |                    |           |  |           |                          |
| Argillaceous material for construction ceramics | 1,205              | 390       | 3,993  | 628       | -4.0                     |
| Bentonite                                       | 8                  | 1         | 2.7  | 0.5       | --                       |
| Ceramic clays                                   | 28                 | 7         | 141  | 11        | --                       |
| Refractory clays                                | 18                 | 4         | 56   | 6         | -25.0                    |
| Kaolin  | 14                 | 2         | 215.9  | 83.5      | NA                       |
| Dolomites                                       | 11                 | 4         | 352  | 163       | -1.2                     |
| Feldspar ore                                    | 7                  | 2         | 86.9   | 12.3      | --                       |
| Gypsum and anhydrite                            | 15                 | 4         | 265  | 120       | -0.7                     |
| Magnesite                                       | 6                  | 1         | 13.3   | 3.1       | -53.0                    |
| Sand and gravel:                                |                    |           |  |           |                          |
| Filling sand                                    | 33                 | 10        | 4,693  | 1,196     | 1.0                      |
| Moulding sand                                   | 77                 | 11        | 352  | 118       | -0.8                     |
| Quartz sand for brick and concrete              | 158                | 51        | 727  | 149       | 2.6                      |
| Gravel aggregates                               | 4,655              | 1,676     | 14,454   | 3,185     | 1.7                      |
| Silica:   |                    |           |  |           |                          |
| Glass sand                                      | 30                 | 7         | 605  | 138       | -1.4                     |
| Quartz, veined                                  | 7                  | 3         | 7  | 6         | --                       |
| Quartzite, refractory                           | 19                 | 1         | 16   | 9         | --                       |
| Stone:  |                    |           |  |           |                          |
| Stone for construction and road use             | 534                | 216       | 8,065  | 3,860     | -1.0                     |
| Limestone and marl for lime and cement use      | 176                | 38        | 17,384   | 6,197     | -0.4                     |
| <b>MINERAL FUELS AND RELATED MATERIALS</b>      |                    |           |  |           |                          |
| Coal:   |                    |           |  |           |                          |
| Bituminous                                      | 128                | 46        | 44,084   | 15,888    | -1.0                     |
| Lignite   | 76                 | 10        | 13,861   | 2,014     | -3                       |
| Gas: <sup>2</sup>                               |                    |           |  |           |                          |
| Natural   | 245                | 183       | 149  | 128       | 8.5                      |
| Coal methane                                    | 43                 | 18        | 80   | 12        | --                       |
| Petroleum                                       | 85                 | 73        | 13   | 12        | --                       |

NA Not available.

<sup>1</sup>Million metric tons unless otherwise specified.

<sup>2</sup>Billion cubic meters.

Sources: Central Statistical Office of Poland, 2004, Statistical Yearbook of Industry; Polish Academy of Sciences, 2004, Minerals Yearbook of Poland.

TABLE 8  
POLAND: IMPORTS OF SELECTED MINERAL COMMODITIES

(Thousand metric tons unless otherwise specified)

| Commodity                              | 2000                 | 2001   | 2002   |       |
|--|----------------------|--------|--------|-------|
| METALS                                 |                      |        |        |       |
| Aluminum and articles thereof          | 303                  | 310    | 374    |       |
| Chromite                               | 29                   | 26     | 9      |       |
| Iron ore and concentrate               | 9,737                | 7,709  | 6,957  |       |
| Lead:                                  |                      |        |        |       |
| Concentrates, Pb content               | --                   | 4      | 5      |       |
| Refined                                | 14                   | 12     | 21     |       |
| Manganese                              | 39                   | 44     | 15     |       |
| Steel:                                 |                      |        |        |       |
| Flat-rolled, nonalloy semimanufactures | 1,897                | 2,535  | 2,357  |       |
| Stainless and articles thereof         | 79                   | 84     | 91     |       |
| Pipes and hollow profiles              | 259                  | 289    | 344    |       |
| INDUSTRIAL MINERALS                    |                      |        |        |       |
| Alumina                                | 151                  | 135    | 123    |       |
| Barite                                 | 7                    | 7      | 6      |       |
| Bauxite                                | 27                   | 38     | 50     |       |
| Bentonite                              | 62                   | 65     | 68     |       |
| Cement (clinker)                       | 606                  | 251    | 67     |       |
| Feldspar                               | 82                   | 144    | 168    |       |
| Fluorspar                              | 5                    | 5      | 6      |       |
| Glass                                  | 429                  | 466    | 549    |       |
| Graphite                               | 39                   | 52     | 58     |       |
| Gypsum and anhydrite                   | 78                   | 23     | 46     |       |
| Kaolin, washed                         | 90                   | 101    | 114    |       |
| Mineral fertilizers                    | 1,288                | 1,426  | 1,609  |       |
| MINERAL FUELS AND RELATED MATERIALS    |                      |        |        |       |
| Coal, including briquettes             | 1,503                | 1,903  | 2,768  |       |
| Natural gas                            | million cubic meters | 7,676  | 8,325  | 7,775 |
| Petroleum:                             |                      |        |        |       |
| Crude                                  | 18,002               | 17,513 | 17,872 |       |
| Refined                                | 1,797                | 2,318  | 2,501  |       |
| --Zero                                 |                      |        |        |       |

Sources: Central Statistical Office of Poland, Yearbook of Foreign Trade, 2002 and 2003; Polish Academy of Sciences, Minerals Yearbook of Poland, 1998-2002.

TABLE 9  
POLAND: EXPORTS OF SELECTED MINERAL COMMODITIES

(Thousand metric tons unless otherwise specified)

| Commodity                              | 2000        | 2001   | 2002   |
|--|-------------|--------|--------|
| METALS                                 |             |        |        |
| Aluminum and articles thereof          | 216         | 230    | 264    |
| Cadmium                                | metric tons | --     | 198    |
| Cobalt                                 | do.         | 41     | 48     |
| Copper:                                |             |        |        |
| Refined copper and copper alloys       | 284         | 233    | 288    |
| Copper manufactures                    | 149         | 143    | 123    |
| Lead:                                  |             |        |        |
| Concentrates, Pb content               | 45          | 56     | 58     |
| Metal, refined                         | 9           | 10     | 21     |
| Silver and articles thereof            | metric tons | 1,042  | 1,094  |
| Steel:                                 |             |        |        |
| Pig iron                               | 138         | 41     | 3      |
| Steel, crude                           | --          | 2      | 3      |
| Flat-rolled, nonalloy semimanufactures | 2,185       | 2,219  | 2,151  |
| Pipes and hollow profiles              | 178         | 202    | 35     |
| Zinc:                                  |             |        |        |
| Concentrate, Zn content                | 12          | 16     | 34     |
| Metal and articles thereof             | 87          | 92     | 89     |
| INDUSTRIAL MINERALS                    |             |        |        |
| Cement                                 | 978         | 897    | 478    |
| Glass                                  | 598         | 682    | 662    |
| Salt                                   | 427         | 376    | 343    |
| Sulfur                                 | 1,024       | 774    | 600    |
| MINERAL FUELS AND RELATED MATERIALS    |             |        |        |
| Coal:                                  |             |        |        |
| Anthracite and bituminous              | 23,247      | 23,032 | 22,626 |
| Lignite                                | 9           | 15     | 41     |
| Coke and semicoke                      | 3,690       | 3,924  | 4,226  |
| Petroleum, refined                     | 2,154       | 2,523  | 2,446  |

-- Zero.

Sources: Central Statistical Office of Poland, Yearbook of Foreign Trade, 2001, 2002; Polish Academy of Sciences, Minerals Yearbook of Poland, 1996-2001.

TABLE 10  
SLOVAKIA: PRODUCTION OF MINERAL COMMODITIES<sup>1</sup>

(Metric tons unless otherwise specified)

| Commodity <sup>2</sup>                             | 1999                 | 2000                   | 2001                | 2002                 | 2003               |
|--|----------------------|------------------------|---------------------|----------------------|--------------------|
| METALS   |                      |                        |                     |                      |                    |
| Aluminum:  |                      |                        |                     |                      |                    |
| Alumina  | 100,000 <sup>e</sup> | 109,813                | 110,078             | 111,618 <sup>r</sup> | 132,089            |
| Aluminum ingot, primary                            | 127,000              | 136,753                | 133,672             | 146,958              | 165,290            |
| Copper:  |                      |                        |                     |                      |                    |
| Mine output, concentrate, Cu content               | --                   | 11                     | 6                   | 2                    | 2                  |
| Metal, refined, primary and secondary <sup>c</sup> | 1,432 <sup>3</sup>   | -- <sup>r</sup>        | 8,000 <sup>r</sup>  | 8,100 <sup>r</sup>   | 5,800 <sup>3</sup> |
| Gallium, metal <sup>c</sup>                        | 500                  | 500                    | 500                 | 500                  | 500                |
| Gold, metal  | 363                  | 306                    | 157                 | 53 <sup>r</sup>      | 50                 |
| Iron and steel:                                    |                      |                        |                     |                      |                    |
| Iron ore:  |                      |                        |                     |                      |                    |
| Gross weight, Fe content (av. 34%)                 | 891                  | 909                    | 888 <sup>r</sup>    | 1,300 <sup>r</sup>   | 1,324              |
| Fe content   | 255 <sup>r</sup>     | 255 <sup>r</sup>       | 238 <sup>r</sup>    | 175 <sup>r</sup>     | 200                |
| Concentrate, gross weight                          | 465                  | 477                    | 435                 | 326                  | 400                |
| Metal:   |                      |                        |                     |                      |                    |
| Pig iron   | 2,987                | 3,166                  | 3,255               | 3,533 <sup>r</sup>   | 3,500 <sup>e</sup> |
| Ferroalloys, total electric furnace <sup>e,4</sup> | 95                   | 95                     | 95                  | 95                   | 95                 |
| Ferrocromium                                       | 6,986                | 17,702                 | 5,968 <sup>r</sup>  | 5,695 <sup>r</sup>   | 1,924              |
| Ferrosilicon <sup>c</sup>                          | 70,000 <sup>3</sup>  | 50,000                 | 50,000              | 50,000               | 50,000             |
| Steel, crude                                       | 3,569                | 3,733                  | 3,989               | 4,275 <sup>r</sup>   | 4,549              |
| Semimanufactures <sup>e</sup>                      | 3,500                | 3,500                  | 3,500               | 3,500                | 3,500              |
| INDUSTRIAL MINERALS                                |                      |                        |                     |                      |                    |
| Barite, concentrate                                | 15,900               | 13,700                 | 14,450              | 25,820               | 10,000             |
| Cement, hydraulic                                  | 4,718                | 3,045                  | 3,123               | 3,141                | 3,147              |
| Clays:   |                      |                        |                     |                      |                    |
| Bentonite  | 64,390               | 66,528                 | 82,915              | 66,128               | 74,938             |
| Kaolin   | 22,930               | 32,000                 | 34,700              | 33,000 <sup>r</sup>  | 35,000             |
| Refractory   | 3,000                | 2,000                  | 3,000               | 3,000 <sup>e</sup>   | 3,000              |
| Ceramic  | 47,000               | 61,000                 | 59,000              | 55,000               | 50,000             |
| Diamond, synthetic <sup>c</sup>                    | 5,000                | 5,000                  | --                  | --                   | -- <sup>3</sup>    |
| Dolomite   | 1,505                | 1,176                  | 1,471               | 1,357                | 1,250              |
| Gypsum and anhydrite, crude                        | 117,000              | 124,000                | 169,000             | 121,700              | 125,000            |
| Lime, hydrated and quicklime                       | 759                  | 754                    | 816                 | 911                  | 847                |
| Magnesite, concentrate                             | 918,000              | 1,001,000 <sup>r</sup> | 961,000             | 930,000              | 397,259            |
| Nitrogen, N content of ammonia <sup>c</sup>        | 250,000              | 215,000                | 209,000             | 326,000              | 230,200            |
| Perlite  | 19,460               | 17,020                 | 14,910              | 18,630               | 19,000             |
| Salt   | 119,000              | 121,700                | 123,000             | 97,400               | 95,000             |
| Sand and gravel                                    | 1,469                | 1,271                  | 1,272 <sup>r</sup>  | 1,399 <sup>r</sup>   | 1,300              |
| Stone:   |                      |                        |                     |                      |                    |
| Limestone and other calcareous stones for cement   | 7,000                | 6,700                  | 3,596               | 3,694                | 3,453              |
| Crushed stone                                      | 2,844                | 2,868                  | 4,602               | 4,715                | 5,075              |
| Talc   | 1,900                | 1,800                  | 2,600               | 2,290                | 1,000              |
| Zeolite  | 14,000               | 15,000                 | 23,000 <sup>r</sup> | 28,000 <sup>r</sup>  | 25,000             |
| MINERAL FUELS AND RELATED MATERIALS                |                      |                        |                     |                      |                    |
| Coal, brown and lignite                            | 3,745                | 3,589                  | 3,424               | 3,401 <sup>r</sup>   | 3,077              |
| Coke: <sup>c</sup>                                 |                      |                        |                     |                      |                    |
| Metallurgical                                      | 1,515 <sup>3</sup>   | 1,500                  | 1,500               | 1,500                | 1,500              |
| Unspecified  | 200                  | 200                    | 200                 | 200                  | 200                |
| Natural gas  | 235                  | 202                    | 212                 | 212                  | 212                |
| Petroleum:   |                      |                        |                     |                      |                    |
| Crude:   |                      |                        |                     |                      |                    |
| As reported  | 59                   | 60                     | 54                  | 53 <sup>r</sup>      | 48                 |
| Converted <sup>c</sup>                             | 450                  | 450                    | 400                 | 400                  | 350                |
| Refinery products <sup>c</sup>                     | 40,000               | 40,000                 | 40,000              | 40,000               | 40,000             |

<sup>e</sup>Estimated; estimated data are rounded to no more than three significant digits. <sup>r</sup>Revised. -- Zero.

<sup>1</sup>Table includes data available through September 2004.

<sup>2</sup>In addition to the commodities listed, arsenic, diatomite, feldspar, illite, sodium compounds, sulfur, sulfuric acid, and talc are produced, but information is inadequate to make reliable estimates of output levels.

<sup>3</sup>Reported figure.

<sup>4</sup>May include some FeCrSi and FeNi, if any was produced.

TABLE 11  
SLOVAKIA: STRUCTURE OF THE MINERAL INDUSTRY IN 2003

(Thousand metric tons unless otherwise specified)

| Commodity           | Major operating companies <sup>1</sup> | Location of main facilities <sup>2</sup> | Annual capacity |
|---------------------|--|--|-----------------|
| Aluminum            | ZSNP Aluminum Works (Slovakco)         | Ziar and Hronom, central Slovakia        | 108             |
| Antimony:           |  |  |                 |
| Ore                 | Liptovska Dubrava                      | Central Slovakia                         | 50              |
| Do.                 | Pezinok                                | Western Slovakia                         | 50              |
| Smelter             | Vajsikova                              | Central Slovakia                         | 2               |
| Cement              | Lietavska Lucka, Stupava, and Turna    | Slovakia                                 | 5,400           |
| Coal:               |  |  |                 |
| Brown               | Hornonitranske Bane, a.s.              | Prievidza, central Slovakia              | 3,500           |
| Do.                 | Bana Dolina, a.s.                      | V'lkky Krtis, southern Slovakia          | 500             |
| Lignite             | Bana Zhorie, a.s.                      | Holic, Western Slovakia                  | 400             |
| Copper:             |  |  |                 |
| Ore                 | Slovinky, Hodrusa-Hamre, and Rudnany   | Central Slovakia                         | 500             |
| Refinery            | Krompachy                              | do.                                      | 27              |
| Gallium             | kilograms ZSNP Aluminum Works          | Ziar and Hronom, central Slovakia        | 4,000           |
| Iron:               |  |  |                 |
| Ore                 | Nizana Slana and Rudnany               | Central Slovakia                         | 1,600           |
| Concentrate         | do.                                    | do.                                      | 1,300           |
| Lead-zinc, ore      | Banska Stiavnica                       | do.                                      | 200             |
| Magnesite           | SMZ a.s. Jelsava                       | Eastern Slovakia                         | 350             |
| Do.                 | Slovmag a.s., Lubenik                  | Central Slovakia                         | 150             |
| Petroleum, refinery | Bratislava, Dubova                     | Slovakia                                 | NA              |
| Salt                | Solivary a.s., Presov                  | Eastern Slovakia                         | 150             |
| Steel, crude        | U.S. Steel Kosice                      | Eastern Slovakia, Kosice                 | 4,000           |
| Do.                 | Zeleziarne Podbrezova a.s.             | Slovakia, Podbrezova                     | 600             |

NA Not available.

<sup>1</sup>All mining companies are Government owned.

<sup>2</sup>Names and locations of mines and crude oil refineries are identical.