

THE MINERAL INDUSTRY OF CZECH REPUBLIC

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The Czech Republic continued to be an important regional producer of steel, industrial minerals, and construction materials. The country also had an important regional downstream heavy industry that included toolmaking, machine building, and chemicals.

In 1996, the Czech Republic reported positive economic results as the country's gross domestic product rose by 4.1% compared with that of 1995. Industrial production increased by 6.4% during the same period (Financial Times Survey, 1997). The country's minerals industry continued to show stabilization of production. As opposed to the sharp shifts in production in the early 1990's, the output of most commodities during the year was well within the range of 1995 production levels. A major production shift, however, did occur in the output of phosphatic fertilizers, which grew exponentially in 1996 from a low base level of output during the 1992-95 period. The mining and processing of ores of antimony, iron, lead and zinc, as well as number of other commodities that were uneconomic, were discontinued during the period from 1993 to 1994 (See table 1).

The Government of the Czech Republic continued to promote policies aimed at denationalizing the country's economy. To assist the minerals industry in developing a reliable forum of mineral information, the Ministry of Industry, under advisement from its Department of Minerals Resources and Geological Survey, continued to issue the "Mineral Commodity Summaries of the Czech Republic." This report contained extensive information on mineral characteristics, domestic production and use of metalliferous ores, industrial minerals and mineral fuels, mineral deposits and reserves, and the world's chief mineral producers.

The Mining Code of the Czech Republic (consolidated text of 1992, law No. 439/1992) and decree No. 364 of May 1992, issued by the Ministry of the Environmental Protection, on protected areas of mineral deposits, respectively, addressed issues pertaining to the exploitation of the country's mineral deposits and the protection of the environment in the vicinity of the deposits (Government of the Czech Republic, 1992). Law No. 17/1992, which was the operative environmental legislation for the Czech Republic, set basic definitions and principles regarding environmental protection as well as the obligations of "legal and physical persons (bodies)" for protecting the environment during the use of natural resources. A report, drafted by the Ministry of the Environment, titled, "The Environmental Policy of the Czech Republic" established priorities for the Government's environment policies to be in accord with those described in "An Environment for Europe" by the United Nation's Economic Commission for Europe

(Ministry of the Environment of the Czech Republic, 1993). It was based on the requirement to "limit risks to human health and risks which threaten to create irreversible changes and damage to the environment." Policy proposals specific to mining were covered under the geological environment component of the report. The stated aims of this report were to promote the efficient use of nonrenewable natural resources, to limit the contamination of the geological environment, and to protect rare natural occurrences, such as geological outcrops, and rare mineral and paleontological sites. Proposed measures in pursuit of these goals included restrictions on mining as a basis for formulating raw materials policies; the integration of cutbacks in the mining industry with the establishment of funds for land reclamation; the construction of hazardous waste dumps, including those for radioactive materials; and the enforcement of environmental auditing of mining operations. Additionally, recommendations were made to require abatement of raw materials and energy consumption, to increase the use of local secondary raw materials and renewable material resources, and to limit exports of primary raw materials.

Historically, the Czech Republic has mined a wide range of nonferrous metals ores that included antimony, copper, lead and zinc, tin, and tungsten. Following the abolition of central economic planning, uneconomic industrial activity was diminished or was ended through subsidy reductions and/or abolishment. The only mining-related activity involving nonferrous metals centered on gold exploration. Commercial activity for most metals was limited to foreign trade.

A leading issue to emerge in 1996 in the Czech Republic's gold exploration/mining sector involved opposition by local authorities and environmental groups to further exploration for gold and/or gold mine development in the gold-mining regions of the Czech republic. The West Bohemian Civic Association demanded the cessation of all gold survey and exploration work in the Somava Mountains, where a number of mostly Canadian-based mining companies had been active during the past 3 years (Mining Journal, 1996b, 1997). In 1996, the country's exports of gold amounted to 4,693 kilograms (kg) and imports reached 3,388 kg. Reserves of gold were estimated to be about 250,000 kg (GEOFOND, 1997c; for additional information, see GEOFOND 1993a, 1994, and 1995).

Although the Czech Republic had no mine production of titanium, the country has been a producer of titanium dioxide (TiO₂) at its Precheza a.s. plant, which has the capacity to produce 25,000 t/yr of TiO₂, using ilmenite as a feedstock. In 1996, production was used in the paint and pigment industry. The plant also produced iron oxide pigments (10,500-t/yr

capacity) from copperas [hydrated ferrous sulfate ($\text{FeSO}_4 \cdot 7\text{H}_2\text{O}$), used mainly in making inks and pigments]. The National Property Fund (NPF) of the Czech Republic issued a public tender in early 1996 for 53.5% of the share of stock in Precheza a.s. Demand for TiO_2 had declined to about 7,000 t/yr from 21,000 t/yr in 1990. Also Precheza's share of the domestic market had declined to 61% from 95% in 1990 (Industrial Minerals, 1996a).

In 1996, the Czech Republic continued to be a major Central European producer of durable goods with an important regional steel industry. The denationalization of the steel industry continued to be a major policy of the Government during the year. However, the NPF, the agency of the Government of the Czech Republic responsible for privatizing state-owned industries and properties, all but ruled out the sale of large steel mills to a single investor, which had been the case with the Poldi Ocel Steelworks in 1993. The NPF stipulated that blocks of shares, generally less than 10% of total stocks, could be offered on the domestic stock market at designated times (Metal Bulletin, 1996a). In early 1996, the Government announced in court the intention to nullify the sale Poldi Ocel, a major steel producer of the steel to resolve a financial crisis at the mill. The decision to seek a court-approved nullification reportedly followed failed negotiations between the Government and the owner of the steel mill, Bohemia Art (54% of the shares) to restructure the company and to hire new management. The Government negotiators also proposed reducing Bohemia Art's share of Poldi Ocel stock to less than 50% and selling 49% of the stock to Skoda Engineering Group (Burgert, 1996).

Additional developments in the country's steel sector included the acquisition of Zelezarny Hradek steelworks, a producer of billets and bars, by Ferra, a Prague-based firm established by steel trading interests. Ferra controlled 53.4% of stock; the balance, 46.6%, was owned by the Government and institutional investors. A partner in Ferra had acquired bar producer Zelezarny Veseli (80% of shares), and cooperation between the billet and the bar producers was expected. Zelezarny Hradek operated two electric arc furnaces (EAF) using scrap and pig iron feedstock (Metal Bulletin, 1996b).

Zelezarny Vitkovice, with a capacity to produce 900,000 t/yr of crude steel, reported plans to close its three blast furnaces by 2000 and rely on deliveries of pig iron produced near the Nová Hut steelworks. The iron would be transported in a torpedo ladle. In 1995, Vitkovice put a continuous slab caster on stream. The plant produces hot- and cold-rolled coil, bars, sections, pipe, and plate, as well as marine crankshafts (Shields, 1996).

The transition to a market economy entailed substantial changes in the general makeup of the Czech Republic's minerals industry. In contrast with domestic metals mining, industrial minerals continued to gain in importance and value, owing to the need for new commercial infrastructure that included transportation and communications networks, storage and bunkering facilities, and new buildings for commercial and residential uses. Economic resources of limestone, sand and gravel, and dimension stone, as well as cement production facilities, became the focus of foreign investment capital in

recent years because of the growing demand for these commodities and the high quality of the deposits and processing facilities producing them.

According to the Federation of Cement and Lime Producers of the Czech Republic, the production of cement and lime was in a depressed state in mid-1996 (lime production in 1995 was down 44% compared with that of 1988). The Federation, however, remained optimistic about the cement industry's future prospects owing to large-scale facility modernization in the industry and its improved efficiency (International Cement Review, 1996a). The second stage of modernization of the Cizkovice cement plant, a subsidiary of Lafarge, which was nearing completion at mid-year, would raise the plant's capacity from 1,500 metric tons per day (t/d) of clinker to 2,700 t/d, and reduce emissions of NO_x . A modern cyclone preheater with a calcination channel replaced an older shaft preheater (International Cement Review, 1996b).

In July 1995, a new cement-producing corporation, Cement Bohemia, comprising Kralodvorske Cementarny, Pragocement, and Cement Bohemia Praha, was established; Heidelberger Zement of Germany owned 80.2% of the shares of stock. The corporation would control about 20% of the cement market in the Czech Republic. The new company's investment plans included the construction of a new cement plant at Tman, as well as facility expansion and modernization at the company's existing plants. Also, in 1997, the Radotin cement works was to be reconstructed to comply with European Union standards (International Cement Review, 1995). Lime has been produced on a large-scale industrial basis in the Czech Republic for more than 100 years. In 1996, the most recent program of modernization in this industry involved the Čertovy schody lime works (VČS), about 40 kilometers west of Prague. About 11% of the capital allocated for the facility's modernization was earmarked for environment protection. Emission levels of dust had been reduced seven times compared with those prevalent in 1992. VČS's management, together with local authorities was reportedly involved in a major reclamation project at exhausted open pits. Other environmental protection measures at VČS included the addition of scrubbers, decontamination of soil polluted with petroleum products, water treatment, and the production of stabilizing agents to treat fly ash for use in road construction. The limestone feedstock for VČS comes from the nearby Čertovy schody open pit, which has the highest quality limestone in the region (Ministry of Industry and Trade, 1996, p. 18).

Developments in the clay mining and processing sector included a decision by the municipal authorities of Karlovy Vary in Western Bohemia in early 1996 to allocate land for kaolin mining in the nearby, sparsely populated Stara Role area. The designated area holds 5 deposits of kaolin and comprises about 5% of the Karlovy Vary territory. Sedlecký kaolin a.s., the regional mine operator, was required to build a road from Pocerny to Stara Role, to pay compensation for any environmental damage arising from the development and operation of mining, and to accept responsibility for on-site reclamation (Mining Journal, 1996a). Estimated commercial resources of kaolin in the Czech Republic in 1996 amounted to

more than 1.2 billion metric tons. Production of kaolin amounted to about 2.8 million metric tons (Mt) and exports and imports to 361,858 metric tons (t) and 5,846 t, respectively (GEOFOND, 1997e). Additionally, the country was a producer of bentonite, largely from deposits in Doupovské hory and Ceske stredohori Mountains. The country's only producer of bentonite was Keramost a.s.; the company also specialized in the production of nonmetallic minerals, including kaolin, ceramic clays, fireclay, and quartzite (Ministry of Industry and Trade, 1996, p. 27). About 59,000 t of bentonite was produced during the year and about 22,000 t was earmarked for export. During the same period about 5,400 t of bentonite was imported. Commercial resources of bentonite in 1996 amounted to about 231 Mt (GEOFOND, 1997a).

The Czech Republic also was a major regional producer of feldspar. The material has been mined for use in the production of sanitary ceramics, colored glass, porcelain, grinding wheels, etc. Production of feldspar in 1996 amounted to about 211,000 t with exports and imports amounting to 67,515 t and 3,923 t, respectively. Commercial resources of feldspar were estimated to be more than 87 Mt. Feldspar deposits in the Czech Republic comprise mainly feldspar gravels, leucocratic granitoids and pegmatites. Recently discovered resources of feldspar included significant deposits composed of granitic rocks with a high content of feldspatic phenocrysts. Leucocratic granitoids (fine- to medium-grained granites and granitic porphyries and diorites), in granitic massifs in Chvaletice, Blanice and other regions have been a very important commercial source of feldspar (GEOFOND, 1997b).

All the deposits of graphite in the Czech Republic are of a metamorphic origin based on clay and sand sediments with a high content of organic matter. Graphite deposits are found in the western part of the Bohemian Massif at Moldanubicum and in the Moravia-Silesia region. The main deposits are in Moldanubicum in Český Krumlov with mines at Blizna, Český Krumlov-Městský vrch, and Lazec. Deposits of graphite that have not been exploited include Spolí and Český Krumlov-Rybarská street. In the Moravian-Silesian region, the deposits of graphite are found in areas where metamorphism was less intense. The graphite at these deposits shows a lesser degree of crystallization and the ore contains more sulfur, which is associated with pyrite and pyrrhotite. In 1996, commercial resources of graphite were estimated at more than 15 million tons (GEOFOND, 1997c).

Used in the manufacture of electrodes, composite materials, lubricants, pastes, refractories, and other products, graphite was mined and processed by Grafít a.s. Netolice and Rudné doly Stare Mesto-F., s.r.o. Amorphous graphite has been produced from two of six commercial-grade deposits, and crystalline graphite was produced from two of the three commercial properties. In 1996, the production of graphite in the Czech Republic amounted to about 30,000 t. Exports and imports during this period were 2,722 t and 1,176 t, respectively (GEOFOND, 1997d).

Although mica was found throughout the Czech Republic (GEOFOND, 1997f), there is only one known commercial deposit of mica at Kovářská in the Krušné hory Mountains. This

deposit has been worked recently by GARMICA s.r.o. at Medenec. The company had been established in 1992 by private individuals and two Czech legal entities. A new processing plant, near the site of the old Medenec iron ore mine where mica was being worked, was designed to extract garnet and muscovite from the mica schist. The plant's capacity was 20,000 t/yr of mica. The processing operation included gravity and magnetic separation, flotation, drying, classifying, and packing. The processed material has been sold as a mica filler for use in a large number of products (Industrial Minerals, 1997). In 1996, resources of mica in the Czech Republic were estimated to be more than 1.5 billion tons. Exports and imports of mica were 40 t and 533 t, respectively (GEOFOND, 1997f).

The major deposits of glass sand in the Czech Republic are in the Bohemian Cretaceous basin in Lužice (Srní and Provodín) and Jizera (Střeleč). The raw material comprises mainly weakly consolidated quartz sandstones of Coniacian (Střeleč) and Middle Turonian (Srní, Provodín) ages. Glass sand from Střeleč is of the highest quality. Other important silica deposits in the Bohemian Cretaceous basin, or at or near environmentally sensitive areas, are commercially less important. Also, an atypical deposit, comprising Pliocene gravel sands is in the Cheb basin (Velký Luh). Commercial resources of silica in 1996 were estimated at 730,324,000 t (GEOFOND, 1997f).

The glass industry, a major consumer of silica, was being modernized and expanded, in part, because of increased foreign investment. Asahi Glass Co. Ltd. of Japan (Asahi), a major investor in the glass sector of the Czech Republic, indicated that it expected to invest from US\$56 million to US\$66 million by year-end to upgrade Glavunion's float glass furnace. Glavunion, a subsidiary of Asahi, expected to increase capacity by 1.5 times to about 300 t/d (from 73,000 t/yr to 109,500 t/yr) (Industrial Minerals, 1996b). About 50% of the production of float glass was to be consumed by the domestic automotive and construction industries; the balance was designated for export to neighboring countries. Glavunion has been using a process to manufacture float glass that was licensed by Pilkington PLC of the United Kingdom in 1969. Asahi assessed the regional demand for float glass would rise by as much as 10% in the near term. In 1996, production of silica sand in the Czech Republic amounted to about 2.2 Mt. Exports and imports for the same period were 692,336 t and 127,952 t, respectively (Industrial Minerals, 1996b).

In the Czech Republic, the brown coal/lignite-producing regions were at Brno, Kladno, Most, Plzeň, Skokolov, and Trutnov. Reportedly, 90% of the brown coal and lignite was extracted by surface mining. The brown coal and lignite from these regions were typically high ash and sulfur products, ranging from 6.6% to 41.1% in ash content (30% average). The coal's sulfur content ranged from 0.7% to 6.0% (1.8% average). Most of the brown coal and lignite has been consumed by the country's electric power generating industry, causing a significant problem with SO₂-emissions.

Bituminous coal was mined entirely underground (longwall method) at the East Bohemia, West Bohemia, Kladno, and Ostrava-Karvina coalfields in the Czech Republic. The Kladno and Ostrava-Karvina coalfields were the largest producers of

bituminous coal, accounting for about 6% and 88%, respectively, of the Czech Republic's total bituminous coal output. About 73% of the coal produced at Ostrava-Karvina has been used as coking coal. Kladno's entire output consisted of steam coal.

The structural changes that had taken place in the economy of the Czech Republic also involved the minerals industry, including the coal mining and processing sector. The policies of the Government were focused primarily on economic rationalization that resulted in full and partial coal mine closures. Moreover, the Government was to be fully involved in the closure of mines and collieries, and in providing solutions to problems arising from the social costs of mine closure, as well as in activities involving mine reclamation and environmental decontamination.

Following open competition during 1993-94, five joint stock companies were created, while smaller, less-competitive mining enterprises faced closure. During the most significant decline in coal production (1995-96), a number of mines were closed, and the amount of financial assistance by the Government to the affected areas rose steeply. Significantly, consumption of hard coal decreased to 17 Mt in 1995 from 22 Mt in 1990. During this period, consumption of brown coal declined by almost 30%, from 80 Mt to 57 Mt (Economic and Social Council, 1996).

In 1996, the NPF reportedly granted a subsidy of about \$35 million to Ostravsko-Karvinske Doly (OKD) coal mining company to conduct cleanup work at the Karolina coal mine in the northern Moravia Ostrava area. The subsidy to OKD was in addition to general Government subsidies to the country's mining companies to correct environmental damage caused by past mining practices. Soil contamination in the mine area was estimated to be 200,000 square meters. Apart from mining, electric power and coke production in the area contributed to the pollution problem. It has been estimated that cleanup and decontamination will take at least 5 years (Mining Journal, 1996d).

According to official Government sources, the country had 17 uranium deposits as of January 1, 1973. Only one deposit (Rozinka) was operational through 1996. The two major areas containing uranium deposits are at Rozna in western Moravia (hydrothermal mineralization), and at Hamr near Straz pod Ralskem in northern Bohemia (uranium-bearing sandstones bounded by chalks). Also, there are resources of uranium associated with tertiary sediments, near the Krušne Hory range. About 60% of the uranium has been extracted through underground mining, and the balance, at Straz pod Ralskem (near Hamr), by means of in situ underground chemical leaching. Total resources were measured at about 141,000 t of uranium metal contained in the ore, with commercially significant resources reportedly amounting to about 57,000 t (GEOFOND, 1993b, 1997h).

The Czech Republic was the only producer of uranium in the former Czechoslovakia. Production of uranium in the area began about 150 years ago when uraniferous material was used in the paintmaking process. After the Second World War uranium production was aimed primarily at constructing nuclear weapons for the former Soviet Union, as well as in the operation

nuclear electric power stations (Mining Journal, 1996e).

Solution mining was started near Hamr in 1968; the deposit was determined to be significant. The residual uranium metal contained in the ore was estimated to be about 12,000 t. Since the start of mining in the area, about 8,000 injection and recovery boreholes have been drilled. About 3.8 million metric tons of sulfuric acid, 270,000 t of nitric acid, and 103,000 t of NH_3 were injected into the leaching area. This has caused a major public health concern with respect to the contamination of the ground water at this deposit (Mining Journal, 1996e).

The uranium deposit at Hamr is contained within an Upper Cretaceous horizon of sedimentary rock (about 220 m thick) and specifically within a 60-m-thick sequence of Cenomanian sandstone, which also forms an important aquifer (Mining Journal, 1996e). Additionally, the overlying Turonian aquifer is an important source of potable water, and its pollution, too, has been a cause for concern. The Straz area leach fields were reported to extend over an area of about 6.3 square kilometers (km^2). About 188 million cubic meters of the Cenomanian aquifer appeared to have been affected by the leaching operation covering an area of about 28 km^2 (Mining Journal, 1996e). Leach solutions were believed to have dispersed horizontally and vertically not only within the Cenomanian horizon, but to the Turonian aquifer through the boreholes and fractures. Another problem involved the proximity of the Hamr underground mine, which no longer was being worked. In 1996, the Hamr underground mine was undergoing a process of backfilling and dewatering, the latter forming a cone of depression around the mine that impaired the solution mining operation (causing leach solution to migrate toward the cone) and required the construction of a protective hydraulic barrier comprising about 100 boreholes. Water from the Hamr Mine is pumped into the barrier to maintain an overpressure to allow normal solution mining operations. A number of corrective measures have been undertaken by DIAMO S.p., the state-owned uranium producing entity, aimed at preventing the further spread of pollution through the aquifer and decontaminating the water already polluted.

A reclamation project that was under way during the year involved the installation of a U.S.-built, \$230 million desalination plant. The plant was designed to treat about 5 cubic meters per minute of saline water and to separate 300 t/yr of uranium during the process. A longer-term project was to involve the precipitation of salt from the solution in the aquifer that could have commercial value. The project also envisaged the recovery of 250,000 t/yr of aluminum sulfate and its conversion to 30,000 t of aluminum oxide and 100,000 t of sulfuric acid. Additionally, 10,000 t/yr of insoluble material, containing such harmful substances as radionuclides, would be recovered for safe storage.

The flooding of the Drahonin uranium mine at Dolni Rozinka in southern Moravia from rain-swelled surface waters caused concern for public health. In January, a mine inspection recorded uranium levels times higher than expected with several hundred cubic meters of the contaminated water having leaked into local surface waters. Although the radius of contamination was small, the public health hazard was sufficient to warrant

such short-term measures as expanding capacity at the local water treatment plant to protect drinking water supplies (Mining Journal, 1996c).

In view of the transition of the Czech economy to a market-driven system, the cessation of Russian purchases of Czech uranium for processing, low world market prices for uranium, and Slovakia's decision to buy the abundant and less expensive Russian material, the future of this sector may depend on the continued operation of the Dukovany nuclear electric power station and the completion of construction of the Temelin nuclear power station. In 1996, production of uranium in the Czech Republic amounted to 589 t of metal contained in ore.

The Czech Republic's highly focused and vigorous economic restructuring program has stimulated substantial foreign investment in the country's minerals industries. With a strong tradition of science and technology as one of the main components of the country's culture, the Czech Republic can be expected to extend its influence throughout the region. The country's ceramics, construction materials, and steel industries will continue to play a prominent role in the economy.

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TABLE 1
CZECH REPUBLIC: PRODUCTION OF MINERAL COMMODITIES 1/

(Metric tons unless otherwise specified)

Commodity	1992	1993	1994	1995	1996e/
METALS					
Aluminum, secondary	--	30,000 e/	48,339	48,000	45,000
Antimony, mine output, Sb content	224	--	--	--	-- 3/
Antimony, metal	223	--	--	--	--
Copper:					
Metal:					
Refined, primary 2/	500	200	--	--	--
Refined, secondary	20,000 e/	20,000 e/	23,323	20,000	20,000
Gold metal kilograms	521	512	75	--	-- 3/
Iron and steel:					
Iron ore:					
Gross weight thousand tons	64	-- 3/	--	--	-- 3/
Fe content	20,608	--	--	--	--
Metal:					
Pig iron thousand tons	5,082	4,668	5,287	5,289	4,898 3/
Ferrous alloys, total electric furnace e/ do.	1	1	1	1	1
Steel, crude do.	7,340	6,732	7,075	7,189 r/	6,257 3/
Semimanufactures do.	7,000	7,000	6,445	8,851 r/	9,368 3/
Lead:					
Mine output, Pb content	1,100	100	--	--	--
Concentrate, gross weight	2,000	2,000	--	--	--
Pb content of concentrate	1,000	1,000	500	--	--
Metal, secondary	24,000	20,000	20,000	20,000	20,000
Silver kilograms	6,200	500	100	--	-- 3/
Uranium, mine output, U content	1,631	1,018	537	611	589 3/
Zinc: e/					
Mine output:					
Ore (Pb-Zn), gross weight	220,000	250,000	15,000	--	-- 3/
Zn content of ore	4,400	1,500	100	--	-- 3/
Concentrate, gross weight	9,000	9,000	9,000	--	-- 3/
Zn content	4,400	4,000	4,000	--	-- 3/
Metal, secondary	1,070 3/	1,000	1,000	1,000	1,000
INDUSTRIAL MINERALS					
Cement, hydraulic thousand tons	6,145	5,393	5,303	4,825	5,011 3/
Clays:					
Bentonite do.	135	63	65	54	59 3/
Kaolin do.	2,530	2,336	2,706	2,800	2,798 3/
Other do.	903	1,018	823	915	1,060 3/
Diatomite	57,000	39,000	40,000	29,000	35,000 3/
Diamond, synthetic e/ carats	5,000	5,000	5,000	5,000	5,000
Fertilizer, manufactured:					
Nitrogenous, N content	180,000 e/	180,000 e/	234,000 r/	264,000	252,600 3/
Phosphatic, P2O5 content	40,000 e/	40,000 e/	13,700	14,000	415,500 3/
Potassic, K2O content	20,000 e/	20,000 e/	21,900	22,000	25,000
Mixed	50,000 e/	50,000 e/	85,000 r/	117,000	552,300 3/
Feldspar	152,000	203,000	170,000	183,000	211,000 3/
Fluorspar	22,000	22,000	10,000	-- 3/	-- 3/
Gemstones, crude, pyrope-bearing rock	45,000	34,000	33,000	24,000 r/	39,000 3/
Graphite	20,000	27,000	25,000	27,000	30,000 3/
Gypsum and anhydrite, crude	660,000	560,000	591,000	542,000	443,000 3/
Lime, hydrated and quicklime thousand tons	1,337	1,147	1,206	1,186	1,176 3/
Mica	--	--	--	3,803	-- 3/
Nitrogen, N content of ammonia e/	200,000	200,000	287,000	250,000	250,000
Quartz	46,000	23,000	2,000	3,000	4,000 3/
Salt e/	180,000	180,000	180,000	180,000	180,000
Sand and gravel:					
Common sand and gravel thousand cubic meters	12,772	12,245	11,465	10,525	11,800 3/
Foundry sand thousand tons	1,075	954	1,093	964	1,079 3/
Glass sand do.	888	781	862	1,026	1,130 3/

See footnotes at end of table.

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

(Metric tons unless otherwise specified)

Commodity	1992	1993	1994	1995	1996e/	
INDUSTRIAL MINERALS--Continued						
Stone:						
Basalt (for casting)	107,000	134,000	85,000	108,000	90,000 3/	
Dimension stone	thousand cubic meters	177,000 r/	187,000 r/	225,000 r/	210,000 r/	190,000 3/
Limestone and other calcareous stones	thousand tons	11,134	10,498 r/	10,205	10,092	10,610 3/
Building Stone	thousand cubic meters	8,378 r/	8,077 r/	8,290 r/	9,021 r/	9,891 3/
Sulfur, byproducts, all sources e/		20,000	20,000	20,000	20,000	20,000 3/
Sulfuric acid e/		300,000	300,000	337,000 r/3/	340,000 r/3/	350,000
Wollastonite		--	--	--	800	800 3/
MINERAL FUELS AND RELATED MATERIALS						
Coal:						
Bituminous	thousand tons	24,691	23,862	20,910	21,309	21,784 3/
Brown and lignite	do.	69,519	68,154	60,728	58,773	60,441 3/
Coke	do.	5,721	5,236	5,125 r/	4,945	4,836 3/
Fuel briquets from brown coal	do.	800	800	499	616 r/	600
Gas:						
Manufactured, all types	million cubic meters	5,000 e/	5,000 e/	1,136	791 r/	800
Natural, marketed 4/	do.	132	106	154	165	146 3/
Petroleum:						
Crude:						
As reported	thousand tons	80	107	131	149	155
Converted	thousand 42-gallon barrels	542	550	889	1,010	1,052
Refinery products e/	do.	90,000	70,000	40,000	35,000 r/	27,000

e/ Estimated. r/Revised.

1/ Table includes data available through Nov. 1997. In addition to the commodities listed, arsenic, diatomite, dolomite, illite, sodium compounds, sulfuric acid, talc, and zeolite are produced, but information is inadequate to make reliable estimates of output levels.

2/ Produced as a byproduct from noncopper ores.

3/ Reported figure.

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

TABLE 2
CZECH REPUBLIC: STRUCTURE OF THE MINERAL INDUSTRY FOR 1996

(Thousand metric tons unless otherwise specified)

Commodity	Major operating companies	Location of main facilities 1/	Annual capacity
Bentonite	Keramost a.s.	Most	150
Cement	Bohemia, Cizkovic, Hranice, Karlov Dvor, Lochkov, Pracovice, and Velary	Bohemia	3,500
Do.	Bystre, Malomerice, Mokra, Ostrava-Kunice, and Zahorie	Moravia	2,800
Clay, kaolin	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	3,000
Graphite	Grafit a.s.	Netolice	35
	Rudne doly Stare Mesto-F s.r.o.	Stare Mesto	
Kaolin	Zapadoceske Kaolinove a Keramicke Zavody a.s.	Horni Briza	190
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.	140
Refinery	Kolin, Kralupy, Pardubice, and Zaluzi	Bohemia	NA

See footnotes at end of table.

TABLE 2--Continued
 CZECH REPUBLIC: STRUCTURE OF THE MINERAL INDUSTRY FOR 1996

(Thousand metric tons unless otherwise specified)

Commodity	Major operating companies	Location of main facilities 1/	Annual capacity
Steel, crude	Nova Hut sp (Ostrava)	Kunice-Ostrava	3,800
Do.	Zelezarne Vitkovice	Vitkovice-Ostrava	900
Do.	Trinecke Zelezarny (Trinecke Iron and Steel Works)	Trinec	3000
Do.	Poldi United Steel Works	Kladno-Prague	1,700
Do.	Zelezarny Bila Cerkev	Hradek-Rokycany	300
Do.	Zelezarny Veseli	Veseli and Moravou	300
Do.	Zelezarny Chomutov sp	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

NA Not available.

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