The Mineral Industry of Greece

By Harold R. Newman

The mineral industry, which consisted of the sectors that mine and process metallic and nonmetallic minerals, was a small but important part of the national economy. Alumina and aluminum were produced from karstic bauxite resources, and ferronickel alloy, from laterite-derived sedimentary nickeliferous iron ores. These were the main products of metal mining and processing. Steel production was from imported scrap.

Greece has a land area of 130,800 square kilometers (km^2); borders the Aegean, the Ionian, and the Mediterranean Seas; and is located between Albania and Turkey. In 2004, the gross domestic product (GDP) in purchasing power parity was $223.5 billion, and per capita income was $20,362. The annual growth rate was estimated to be 4.3%; the inflation rate, 3.1%, and the unemployment rate, 8.9% (International Monetary Fund, 2005§[1]).

Government Policies and Programs

Greece has a capitalist economy. The public sector accounted for about 40% of the GDP. In 2004, the country was a major beneficiary of European Union (EU) aid, which was equal to about 3.3% of the annual GDP. Greece's economic growth was driven, in part, by infrastructure upgrades for the 2004 Olympic Games. Despite strong growth, Greece has failed since 2000 to meet the EU's Growth and Stability Pact budget deficit criteria of 3% of the GDP; public debt, inflation, and unemployment were also above the eurozone average. Further restructuring of the economy would need to include privatizing of several state enterprises, undertaking pension and other reforms, and minimizing bureaucratic inefficiencies. In October 2004, Greece was elected a nonpermanent member of the United Nations Security Council (U.S. Central Intelligence Agency, 2005§).

Environmental Issues

Environmental concern is the responsibility of the Ministry of Environment, Town Planning, and Public Works. The Government takes an active role in environmental protection. The general laws that have been enacted by the Government include law 1360/76 (Site Arrangement and Environment), Presidential Executive Order 1180/81, and law 1650/86 (Environmental Protection) and form the basis of the active legislative framework. To comply with EU Order 88/609 concerning emission limitations, the Government executed Ministry Decision 58751/2370/15.4.93, which included the limits of the main airborne pollutants from electricity-generating plants. Greece's natural hazard was severe earthquakes.

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

Production

Because northern Greece was thought to contain a significant amount of exploitable mineral resources, it received the most attention in exploration activities. In 2004, most activities continued to be directed toward gold.

In terms of value of production, bauxite was the most important of Greece's mineral commodities. Greece was a leading producer of bauxite, magnesium, nickel, and perlite in the EU (table 1). Mine production of lead and zinc ceased in 2004 with the temporary closure of the Kassandra Mines in northern Greece. A schedule for reopening the mines was not stated. The country's mineral processing industry was relatively small, as was the demand for and consumption of mineral products. Major commodities and companies are listed in table 2.

Trade

In 2004, exports totaled $14.4 billion, and imports totaled $50 billion. The higher imports probably reflected increased needs because of the 2004 Olympic Games. Major markets for exports were, in descending order, Germany, Italy, France, the United States, and the United Kingdom. Major suppliers were, in descending order, German, Italy, France, Japan, and the United States. Exports of minerals, such as bauxite, bentonite, nickel, and perlite, made up a major share of total revenues. About 50% of the country's mineral production was being exported (U.S. Department of State, 2005§).

Commodity Review

Metals

Aluminum.—Aluminium de Grèce S.A. (AdG) established its alumina and aluminum plant in 1960 at Agios Nikolaos on the northern coast of the Gulf of Corinth to take advantage of the important bauxite deposits. The site combines proximity to the large bauxite deposits of Beotia and Phokifda, which were mined by Delphi-Distomon S.A. (a subsidiary of AdG), and sea transportation facilities.

AdG announced that its cogeneration project, which would supply its operations with energy, was progressing well. The cogeneration station could produce 100% of the company's energy needs. The station was scheduled to come online when a reliable gas supply infrastructure was in place. The project was a direct result of an indepth review to determine the best alternatives for supplying power to the plant when the power contract between AdG and Public Power Corp. expires on March 31, 2006 (Capital Link Inc., 2004a§).

Alcan Inc. of Canada announced that it had entered into a binding agreement for the sale of its controlling interest in AdG to Mytilineos Holdings S.A. of Greece. In 2003, Alcan acquired

control of Pechiney Group of France, which had previously controlled AdG. Under the terms of the agreement, Mytilineos will acquire a 53% equity position in AdG at a cost of €6.95 ($8.47) per share for a total cost of €79.5 ($96.9) million. Mytilineous was one of Greece's leading players in the defense, energy, and metallurgy sectors (Alcan Inc., 2004§).

Bauxite and Alumina.—Bauxite mining and processing continued thru 2004. Delphi-Distomon produced about 1 million metric tons per year (Mt/yr), which was sold to AdG's operation at Boeotia. Although the bauxite ore had an average alumina content of 53%, it also had a high silica content that made it hard to process. The company maintained its refinery's production of 750,000 metric tons per year by mixing the local ore with other bauxite (Alcan Inc., 2003, p. 34).

Gold.—In May 2003, Hellas Gold S.A. filed for bankruptcy and closed its Kassandra Mines in Halkidiki. This move followed a court ruling that on environmental grounds, gold could not be mined at the site. In November 2004, European Goldfields Ltd. acquired a 65% interest in Hellas Gold; Aktor S.A., which was Greece's leading construction company, had the remaining 35%. These assets in northern Greece included three near-production deposits with a 70-year concession that covers an area of 317 km^2. The properties include the polymetallic deposits of Olympias and Stratoni, which contain gold, lead, silver, and zinc and the copper-gold porphyry deposit referred to as "Skouries." Estimated proven reserves at Olympia was 10 Mt of ore grading 8.1 grams per metric ton (g/t) gold, 108 g/t silver, 3.5% lead, and 4.6% zinc. Estimated probable reserves were 4 Mt grading 9.7 g/t gold, 148 g/t silver, 4.9% lead, and 6.6% zinc. Estimated proven reserves at Stratoni were 1 Mt grading 191 g/t silver, 8% lead, and 10% zinc. Estimated probable reserves were 862,000 t grading 189 g/t silver, 8% lead, and 11.7% zinc. The Skouries gold-copper porphyry deposit probable reserves were estimated to be 129 Mt at grades of 0.89 g/t gold and 0.56% copper. This deposit was one of the largest defined deposits in Europe. Both Olympias and Stratoni were previously in production and have existing mining and plant infrastructure and a shiploading facility on the Aegean Sea (European Goldfields Ltd., 2004§).

A feasibility study, which incorporated a comprehensive financial model, to develop the Sappes gold mining project was completed. Greenwich Resources plc was proceeding with the development of an underground mine in the high-grade Viper ore deposit and also an open pit mine on the St. Demetrious ore deposit. The project comprises an area of about 20 km^2 and three adjacent exploration licenses that cover about 30 km^2. Ore processing would take place onsite and use gravity and flotation only to produce a copper concentrate with a high content of gold. The concentrate was to be exported to an overseas smelter where the copper and gold would be recovered. Cyanidation of flotation tailings has been excluded from the gold recovery process as a direct consequence of the sensitive political climate in Greece (Greenwich Resources plc, 2004§).

Frontier Pacific Mining Corp. acquired a 100% interest in Thracean Gold Mining S.A.'s (TGM) Perama Hill project, which is located 30 kilometers (km) northwest of Alexandroupolis in northeastern Greece. The purchase price for the shares of TGM was $12 million with a $3 million payment due at mine startup and a 2.5% royalty on production. After more than 19,000 meters (m) of drilling in 245 holes and a feasibility analysis, resources at Perama Hill were estimated to be 11.7 million metric tons (Mt) of oxide material at grades of 3.7 g/t gold and 8.3 g/t silver. The proposed annual milling rate would be 1.25 Mt through a conventional carbon-in-leach plant. The estimated recovery rates were 90% for gold and 60% for silver. Total estimated gold production for the 9-year mine life was 37,200 kilograms (kg). Estimated initial capital investment was $72.6 million (Frontier Pacific Mining Corp., 2004§).

Nickel.—Larco G.M.M. S.A. was the only producer of nickel in Europe that used only domestic nickel ores. Larco had three main mining areas—Evia (open pit) with annual production of about 1.5 Mt of ore, Agios Ioannis (underground) with an annual production of about 700,000 t of ore, and Kastoria (open pit) with annual production of about 300,000 t. The ore is from a lateritic type of deposit and is part of a belt of mineralization that extends from Turkey to Albania. Nickeliferous ore reserves were more than 250 Mt with an ore grade that ranged from 1.0% to 1.5% nickel. Annual production of nickel covered about 6% of European market demand (Larco G.M.M.S.A., 2004§).

Iron and Steel.—Corinth Pipeworks S.A. (CPW) was a steel pipe and hollow sections manufacturer and was initially established to produce spiral-welded pipe for water transport. The construction and oil and gas industries have also become part of its prime focus. CPW's plant at Thisvi produced and coated, externally and/or internally with anticorrosive materials, medium- and large-diameter welded steel pipes and hollow sections. Corinth used two processes to produce its products. Hot finished welded (HFW) is the process of forming a longitudinal seam by electric resistance or electric induction welding. In HFW, the edges to be welded are mechanically pressed together, and the heat for welding is generated by the resistance to the flow of electric current. The other process is hexagon submerged arc welding (HSAW). The HSAW process produces the coalescence of metals by heating them with an arc or arcs between a bare metal consumable electrode and the parent material. No pressure is used and part or all of the filler material is obtained from the electrodes (Corinth Pipeworks S.A., 2004§).

Industrial Minerals

Anhydrite and Gypsum.—Lava Mining and Quarrying Co. extracted anhydrite and gypsum from its quarry at Altsi on the island of Crete. Quarrying was carried out by using explosives. The quarried material was fed to trucks by means of loaders and transported to the crushing plant. The production capacity of the quarry was 500,000 t/yr. The end products that came from the Altsi quarry consisted of anhydride and hydrous gypsum, which was mainly used in the production of cement (Lava Mining and Quarrying Co., 2004a§).

Attapulgite and Saponite.—Geohellas S.A.'s fully integrated mining and processing operation at Grevena, western Macedonia Prefecture, was brought onstream, and development of new attapulgite and saponite deposits began. Attapulgite (Fullers earth in the United States) and saponite are complex hydrated magnesium aluminum silicates. The sedimentary

deposits, which contain 60% to 90% palygorskite (attapulgite deposits) and 60% to 70% smectite (saponite deposits), appear to have originated by diagenetic transformation of preexisting smectic/saponitic material. Geohellas commissioned its 100,000-t/yr processing plant in early 2004. The plant had a design arrangement to double capacity within a relatively short period. Until 2004, attapulgite production was limited mainly to Senegal, Spain, and the United States, and the even less common saponite was produced on a small scale in Spain and the United States (Industrial Minerals, 2004b).

Bentonite.—S&B Industrial Minerals, S.A. was the leading bentonite and perlite producer in Europe and the leading graded perlite supplier internationally. S&B remained focused on industrial markets for bentonite, notably for foundry uses, and was still an important supplier to the cat litter market. None of this was finished, packed material; it was all supplied in bulk granular form (Industrial Minerals, 2004a).

Cement.—During the past 5 years, the domestic cement market consumed, on the average, about 10 Mt/yr of cement. Of the total, 20% was consumed by the public works sector while the rest was by private activity. Projects related to the Olympics represented, on an annual basis, about 5% of the domestic consumption. In 2004, Heracles Cement S.A. delivered 535,000 t of cement for infrastructure projects and another 435,000 t of cement to the Olympic projects and sites (Capital Link Inc., 2004b§).

Magnesium.—Grecian Magnesite S.A. (GM) was one of the leading magnesite producers in the western world. GM's major deposits and production facilities were located at Yerakini and Kalives, Chalkidike Prefecture. After mining, the material was processed, beneficiated, and fed into rotary or shaft kilns. GM produced and marketed caustic calcined magnesite, deadburned magnesia, and raw magnesite. The annual capacity for the conversion to caustic or dead-burned magnesia was 200,000 t (Industrial Minerals, 2004c).

Perlite.— With a production of 650,000 t/yr, S&B was the leading producer of raw perlite internationally and was the leader in the European market for perlite used in building materials, cyrogenics, formed products, and horticulture, as well as filteraids. S&B mined perlite not only in Greece, but also in China, Italy, and Turkey (S&B Industrial Minerals S.A., 2004§).

Pumice and Pumicite.—Lava Mining and Quarrying mined pumice on the island of Yali. The pumice was the product of volcanic action of the adjacent volcano at Nissiros, which erupted 200,000 years ago. Its cellular structure was caused by the release of volcanic gasses when the magma cooled abruptly; this was responsible for the excellent lightweight structural properties of pumice. The deposit was quarried without the use of explosives. Bulldozers fed a series of belt conveyors, screens, and crushers, which fed the graded product to stockpiles. Thereafter, a second series of belt conveyors fed ships that can hold up to 30,000 t, at a rate of 1,000 metric tons per hour (Lava Mining and Quarrying S.A., 2004b§).

Stone, Dimension.—In 2004, the Greek marble industry continued to play a leading role in the international dimension stone market as a result of continued marble production in almost all areas of the country and the variety of uses and the many colors of the marble (ash, black, brown, green, pink, red, and multicolored). The marble industry was active in the quarrying, processing, and sale of blocks and finished products.

Mineral Fuels and Related Materials

Coal.—Public Power Corporation (PPC) was Greece's major producer of lignite (brown coal), which was the predominant fuel in electricity generation in Greece. Most PPC lignite was produced from the Ptolemais-Amyntaion Basin; lesser amounts were produced from the Megalopolis Basin. Lignite reserves were estimated to be about 2,900 Mt. Because the country has no hard coal (black coal) reserves, it imported it from, in descending order, South Africa, Russia, Venezuela, and Colombia. Domestic production was partly opened to private companies, but PPC was the leading producer with the right to 63% of the known reserves (U.S. Energy Information Administration, 2004§).

The mining of lignite for the country's power generation has benefited many. The low extraction costs have guaranteed stable prices and cheap energy over the years; lignite accounted for about 65% of the raw material for the country's power generation. Greeks pay about 50% less for their electricity than the average European citizen (Mining Magazine, 2004).

Natural Gas and Petroleum.—With Greece's limited natural gas reserves and petroleum resources, production was negligible. Its Mediterranean location, however, makes it conveniently close to several important producing regions, such as the Caspian area, the Middle East, and North Africa.

Turkey postponed the construction tender of a Greek-Turkish natural gas pipeline project, the Southern Europe Gas Ring Project; it will carry Iranian gas to Europe through Turkey. Greece and Turkey agreed in 2003 to build a $300 million pipeline between them to carry up to 11 billion cubic meters per year, of which 3 billion cubic meters would be for Greece itself and the rest for reexport to Europe. The pipeline would be 285 km long (178 miles) with a diameter of 91 centimeters (36 inches). Gas transmission was scheduled to start in 2006 with 750 million cubic meters to be delivered during the first year of operation (Alexander's Gas & Oil Connections, 2004a§).

Kavala Oil S.A. (a subsidiary of Regal Petroleum plc of the United Kingdom) completed the drilling of an exploration well in the Kallirachi field; hydrocarbons were detected. Additional technical interpretation and analysis were begun to quantify and confirm the deliverability of the reservoir (Regal Petroleum plc, 2004§).

Renewable Energy.—The Greek Government planned to create a steadily developing market for renewable energy sources that would boost entrepreneurship and regional development and attract new and foreign investments. The Government placed renewable energy sources equally alongside electricity, natural gas, and liquid fuel in its energy program. Enterprises have acquired operating licenses to build wind-power parks; power could total 660 megawatts. Construction on these parks had not started by yearend 2004 (Alexander's Gas & Oil Connections, 2004b§).

Greek waters were opened to foreign ferries at yearend 2003 as deregulation of coastal shipping continued to break domestic monopolies in accordance with EU directives. EU-flagged vessels may now bid to operate on Greek ferry routes. The new

legislation was the first real step towards the full deregulation required by the EU. As a result, the five leading ferry operators placed orders worth more than $2 billion at Asian and European shipyards for more than 20 fast ferries. In addition, three high-speed catamarans worth $75 million were on order at an Australian shipyard. The new ships would enable Greece's four leading ferry operators (Anek Lines, Attica Enterprises, Minoan Lines, and Strintzis Lines) to build market share on the Greece-Italy crossing and on domestic routes (GreeceNow, 2004§).

Outlook

Greece is expected to remain a major supplier in the international market of industrial minerals. The economic impetus of the activities that pertained to the Olympics in 2004 is expected to continue, albeit on a smaller scale.

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Major Sources of Information

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Ministry of Development
Directorate of Raw Materials Mineral Policy, Section A
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TABLE 1
GREECE: PRODUCTION OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity[2]		2000	2001	2002	2003	2004[e]
METALS						
Aluminum:						
Bauxite		1,965,561	1,931,497	2,468,865 r	2,442,312 r	2,444,000 3
Alumina, Al_2O_3		667,141	678,934 r	749,500 r	758,800 r	760,000
Metal:						
Primary		167,507	163,581 r	165,262 r	167,797 r	167,300 3
Secondary[e]		3,000	3,000	2,000	3,000 r	3,000
Iron and steel:						
Iron ore and concentrate, nickeliferous, Fe content[e]		575,000	575,000	600,000 r	600,000 r	575,000
Metal:						
Steel, crude		1,088,000	1,281,000	1,835,000	1,701,000 r	1,967,000 3
Ferroalloys, ferronickel, gross weight		81,662	88,755 r	97,761 r	95,376 r	96,000
Lead:						
Mine output, Pb content		18,235	28,619	29,300 e	20,000 e	--
Metal, secondary	thousand metric tons	5	5	5	4	4
Manganese:						
Ore, crude:[e]						
Gross weight		330	90	100	100	100
Mn content		63	17	16	15 r	15
Concentrate:						
Gross weight[e]		60	20	20	20	20
Mn content		49	9 r	15 e	15 e	15
Nickel:						
Ore:						
Gross weight[e]	thousand metric tons	2,400	2,600	2,800	2,700	2,700
Ni content of nickeliferous iron ore		19,535	20,830	22,670	21,410 r	21,700 3
Metal, Ni content of ferronickel		17,470	17,750 r	19,230	18,000 r, e	18,115 3
Silver, mine output, Ag content	kilograms	37,145	61,500	74,800	79,200 r	78,000
Zinc, mine output, Zn content by analysis		20,336	20,461	33,000	30,400 r	--
INDUSTRIAL MINERALS						
Abrasives, natural emery		8,000	8,000	8,000	8,000	8,000
Barite, concentrate[e]		100 r	100 r	100 r	100 r	100
Cement, hydraulic[e]	thousand metric tons	15,463 3	15,500	15,000 r	15,300 r	15,000
Clays:						
Bentonite:						
Crude		1,148,694	1,258,872 r	1,056,598 r	1,156,642 r	1,160,000
Processed		41,367	26,297	15,806 r	10,835 r	11,000
Kaolin:						
Crude		54,226	60,075 r	57,885 r	59,680 r	60,000
Processed[e]		300	300	300	300	300
Feldspar		94,700	126,400	124,100 r	102,800 r	103,000
Gypsum and anhydrite		801,025	808,890 r	850,786 r	731,785 r	735,000
Magnesite:						
Crude		442,785	483,296	558,057 r	549,049 r	550,000
Dead-burned		33,945	30,113	48,220 r	43,713 r	44,000
Caustic-calcined		109,730	113,355	105,234 r	98,357 r	100,000
Huntite, crude[e]		19,451 3	18,000	18,000	18,000	18,000
Nitrogen, N content of ammonia		121,200	56,500 r	66,100 r	123,300	131,500 3
Perlite:						
Crude		817,825	840,660 r	838,997 r	1,079,036 r	850,000
Screened		503,929	449,139 r	515,715 r	739,729 r	525,000
Pozzolan, Santorin earth		935,450	1,308,131 r	1,291,198 r	1,383,546 r	1,400,000
Pumice		852,000	802,000 r	810,000 r	893,000 r	890,000
Salt, all types		244,709	208,776 r	126,118 r	192,161 r	190,000
Silica[e]		125,000	125,000	125,000	130,000 r	130,000

See footnotes at end of table.

TABLE 1--Continued
GREECE: PRODUCTION OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity[2]		2000	2001	2002	2003	2004[e]
INDUSTRIAL MINERALS--Continued						
Sodium compounds:[e]						
Carbonate		750	750	750	750	750
Sulfate		5,000	5,000	5,000	5,000	5,000
Stone:[e]						
Dolomite		90,000	90,000	90,000	90,000	90,000
Marble	cubic meters	191,130 [3]	202,069 [r, 3]	178,839 [r, 3]	233,436 [r, 3]	230,000
Flysch		80,000	80,000	80,000	75,000 [r]	75,000
Quartz, processed		6,500	6,500	6,500	6,000 [r]	6,000
Sulfur:[e]						
S content of pyrites		9,600	9,500	9,500	9,500	9,500
Byproduct, natural gas and petroleum		150,000 [r]	153,000 [r]	157,000 [r]	162,000 [r]	160,000
Talc and steatite		2,300	2,073	670	500	500
MINERAL FUELS AND RELATED MATERIALS						
Coal:						
Lignite	thousand metric tons	64,026	66,987	71,074 [r]	69,411 [r]	68,000
Lignite briquets[e]		34,000	34,000	35,000 [r]	32,000 [r]	32,000
Gas:[e]						
Manufactured, gasworks	million cubic meters	15	15	15	15	15
Natural	do.	36	36	36	36	30
Natural gas plant liquids	thousand 42-gallon barrels	350	350	350	350	140
Petroleum:						
Crude	do.	2,093	1,435	1,417 [r]	1,026 [r]	1,100
Refinery products:						
Liquefied petroleum gas	do.	8,886	8,839 [r]	8,909 [r]	8,932 [r]	8,900
Gasoline	do.	31,943	32,045 [r]	32,300 [r]	32,725 [r]	32,000
Naphtha	do.	8,806	7,489 [r]	8,075 [r]	7,905 [r]	8,000
Mineral jelly and wax[e]	do.	28 [3]	20 [r]	20 [r]	20 [r]	20
Jet fuel	do.	16,696	14,168 [r]	14,725 [r]	14,400 [r]	14,000
Kerosene	do.	70	93 [r]	101 [r]	116 [r]	115
Distillate fuel oil	do.	42,127	40,672 [r]	41,031 [r]	41,776 [r]	42,000
Refinery gas	do.	3,416	3,612 [r]	3,640 [r]	3,710 [r]	3,700
Lubricants	do.	1,120	1,190 [r]	1,225 [r]	1,260 [r]	1,200
Residual fuel oil	do.	50,017	50,000 [e]	49,280 [r]	49,617 [r]	50,000
Bitumen	do.	3,133	3,066 [r]	3,091 [r]	3,151 [r]	3,200
Petroleum coke	do.	897	886 [r]	908 [r]	880 [r]	900
Other	do.	462	707 [r]	770 [r]	756 [r]	750
Refinery fuel and losses	do.	7,126	7,434 [r]	7,455 [r]	7,490 [r]	7,500
Total	do.	174,727	170,221 [r]	171,530 [r]	172,738 [r]	172,000

[e]Estimated; estimated data are rounded to no more than three significant digits; may not add to totals shown. [r]Revised. -- Zero.

[1]Table includes data available through February 2006.

[2]In addition to the commodities listed, other crude construction materials are produced, but available information is inadequate to make estimates of output.

[3]Reported figure.

TABLE 2
GREECE: STRUCTURE OF THE MINERAL INDUSTRY IN 2004

(Thousand metric tons unless otherwise specified)

Commodity		Major operating companies and major equity owners	Location of main facilities	Annual capacity
Alumina		Aluminium de Grèce S.A. (Mytilineos Holdings S.A., 53%)	Agios Nikolaos, Boeotia area	750
Aluminum		do.	do.	160
Anhydrite		Lava Mining and Quarrying Co. S.A. (Lafarge Group)	Altsi, Crete Island	500
Asbestos		Hellenic Mineral Mining Co. S.A.	Mines at Zidani, near Kozani	100
Barite, $BaSO_4$		S&B Industrial Minerals, S.A. (Eliopoulos-Kyriakopoulos Group)	Milos Island	1
Bauxite		do.	Mines at Phocis, plants at Phocis and Itea	2,000
Do.		Eleusis Bauxites Mines, S.A.	Mines near Drama, Itea, and Phthiotis-Phocis	300
Do.		do.	Plants in Aghia Marina, Drama, and Itea	400
Do.		Delphi-Distomon S.A.; Hellenic Bauxites of Distomon S.A. (Aluminium de Grèce S.A.)	Open cast mines at Delphi-Distomon area	500
Bentonite:				
Crude		Mediterranean Bentonite Co. S.A. (Industria Chemica Mineraria S.p.A., Italy)	Surface mines on Milos Island	20
Do.		Mykobar Mining Co. S.A. (Silver & Baryte Ores Mining Co. S.A.)	Mines at Adamas, Milos Island	300
Do.		do.	Plants at Adamas, Milos Island	200
Do.		S&B Industrial Minerals, S.A. (Eliopoulos-Kyriakopoulos Group)	Mines at Adamas, Milos Island	600
Processed		do.	Plant at Voudia Bay, Milos Island	400
Cement		Halkis Cement Co. S.A. (Lafarge Group)	Micro-Vathi plant, west-central Euboea Island	3,000
Do.		Halyps Cement S.A. (Ciments Français, France)	Paralia Aspropyrgos plant, Athens	800
Do.		Heracles General Cement Co. S.A. (Lafarge Group)	Plant at Milaki	1,900
Do.		do.	Plant at Volos	4,600
Do.		Titan Cement Co. S.A.	Elefsis plant, Athens area	400
Do.		do.	Kamari plant, Boeotia	2,600
Do.		do.	Patras plant, northern Peloponnesus	1,900
Do.		do.	Salonica plant, Salonica	1,650
Ferroalloys, ferronickel, Ni content		General Mining & Metallurgical Co. S.A.	Larymna metallurgical plant	25
Gold, Au in concentrate	kilograms	Hellas Gold S.A. (European Goldfields Ltd.)	Kassandra Mines, Olympias (closed)	5,000
Gypsum		Lava Mining and Quarrying Co. S.A.	Altsi, Crete Island	500
Do.		Titan Cement Co. S.A.	do.	280
Hunite/hydromagnesite		Microfine S.A.	Mines in Kozani Basin	100
Lead, mine, Pb in concentrate		Hellas Gold S.A. (European Goldfields Ltd.)	Kassandra Mines (Olympias, Stratoni) northeastern Chalkidike (closed)	30
Lignite		Public Power Corporation (Government)	Aliveri Mine, Euboea Island	420
Do.		do.	Megalopolis Mine, central Peloponnesus	7,000
Do.		do.	Ptolemais Mine, near Kozani	28,000
Magnesite, concentrate		Grecian Magnesite S.A.	Mine and plant at Yerakini and Kalives, Chalkidike, N. Greece	200
Manganese, battery-grade MnO_2		Eleusis Bauxite Mines Mining, Industrial and Shipping S.A. [National Bank of Greece (OAE)]	Nevrokopi, Drama	10
Marble, slab	cubic meters	Aghia Marina Marble Ltd.	Pallini	100,000
Do.	do.	Chris G. Karantanis & Sons Co.	Korinthos	60,000
Natural gas	million cubic meters per day	Public Petroleum Corporation (Government)	Prinos offshore gasfield and oilfield, east of Thasos Island	125
Nickel, ore		Larco G.M.M. S.A.	Agios Ioannis Mines near Larymna	500
Nitrogen, N content of ammonia		Phosphoric Fertilizers S.A.	Nea Karvall	150

TABLE 2--Continued
GREECE: STRUCTURE OF THE MINERAL INDUSTRY IN 2004

(Thousand metric tons unless otherwise specified)

Commodity		Major operating companies and major equity owners	Location of main facilities	Annual capacity
Perlite		S&B Industrial Minerals, S.A. (Eliopoulos-Kyriakopoulos Group)	Mines on Kos and Milos Islands; plant at Pireaus	650
Do.		Otavi Minen Hellas S.A. (Otavi Minen AG, Germany)	Milos Island	150
Do.		Bouras Co.	Kos Island	50
Petroleum, refined	42-gallon barrels per day	Hellenic Aspropyrgos Refinery S.A.	Aspropyrgos	95,000
Do.	do.	Motor Oil (Hellas) Corinth Refineries S.A.	Aghii Theodori, Corinth	140,000
Do.	do.	Petrola Hellas S.A.	Eleusis	100,000
Do.	do.	Thessaloniki Refining Co. A.E.	Thessaloniki	76,000
Pozzolan (Santorin earth)		Lava Mining and Quarrying Co. (Heracles General Cement Co. S.A.)	Xylokeratia, Milos Island	600
Do.		Titan Cement Co. S.A.	do.	300
Pumice		Lava Mining and Quarrying Co. (Heracles General Cement Co. S.A.)	Yali Island	100
Quartz		do.	Adamas, Milos Island	150
Steel, crude		Halyvourgia Thessalias S.A. (Manessis Bros. and Voyatzis S.A., 65%, and National Investment Bank for Industrial Development, 35%)	Steelworks at Volos	1,500
Do.		Halyvourgiki, Inc.	Steelworks at Eleusis	1,200
Do.		Hellenic Steel Co.	Steelworks at Thessaloniki	1,000
Do.		Corinth Pipeworks S.A.	Steelworks at Thisvi	750
Do.		Sidenor S.A. (also known as Halivourgia Voriou Ellados S.A.)	Steelworks at Volos	600
Do.		do.	Steelworks at Corinth	245
Zeolite		S&B Industrial Minerals, S.A. (Eliopoulos - Kyriakopoulos Group)	Mine at Pendalofos; plant at Ritsona	100
Zinc, mine, Zn in concentrate		Hellas Gold S.A. (European Goldfields Ltd.)	Kassandra Mines (Olympias and Stratoni), northeastern Chalkidike (closed)	30