

THE MINERAL INDUSTRY OF THE REPUBLIC OF KOREA

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In 1999, the Republic of Korea overcame its financial crisis and began to recover its economic vitality and stability. After the severe recession in 1998, the gross domestic product registered a 10.7% growth in 1999 compared with the previous year. Consumption increased by 8.5%, the current account posted a surplus of \$25 billion, and consumer prices increased only 0.8% (Bank of Korea, 2000b, p. 14). The Korean Government focused on a policy of increasing fiscal spending to stimulate growth and job creation in the first half of 1999. The Bank of Korea also focused its monetary policy on keeping the capital market sufficiently liquid to maintain stability. The increased inflows of foreign capital released the pressure for the appreciation of the Korean won.

Industrial output rose by 24.2% in 1999, which was a reversal from the 6.5% decline in 1998, and all industrial sectors except construction showed a significant turnaround. In 1999, the light industrial sector posted the fastest growth with a 21.6% increase, though the mining and quarrying sectors grew by only 5.2%, compared with growth in 1998. The demand for machinery and transportation equipment was the driving force for the increase. Construction, however, shrank for the second consecutive year by posting negative growth of 10.1%; the sharpest decline was in private construction, especially on housing (Bank of Korea, 2000b, p. 14). The employment situation improved markedly, although the structure of employment, which underwent substantial change, included a rise in the share of those working on a temporary basis. Many companies opted for workforce flexibility by reducing the number of permanent employees and using temporary employment as a way to adjust operation costs.

Government Policies and Programs

The first stage of foreign-exchange liberalization began in April 1999. The Korean Government decided to simplify regulation of external payments and to deregulate most exchange transactions related with business activities. The Government set up foreign intervention and sterilization policies to shield the financial and real estate sectors from the impact of exchange rate changes in the domestic foreign-exchange market. The Government continued to rehabilitate the financial system. Chungbuk Bank and Kangwon Bank were merged into Chohung Bank. Korea First Bank was sold to a U.S. consortium led by Newbridge Capital. A number of credit unions, merchant banks, mutual savings, and financial institutions were closed. The Government injected \$3.3 billion (30 trillion won) for the payment of deposit insurance claims and for support to financial institutions and planned to issue

laws and regulations to strengthen investor protection and market discipline (Bank of Korea, 2000a).

The Korean business conglomerates were under pressure from the International Monetary Fund bailout program and the Korean Government to reduce the number of their affiliates and to conduct their operations according to international standards. For the improvement of corporate financial structure, the Government passed the Corporate Liquidation Act and the Court Reconciliation Act to deal with agreements made between corporations and creditor banks (Bank of Korea, 2000a).

Trade

The Republic of Korea lacks a significant amount of natural resources. It relied on imports to meet its increasing demand for minerals. Mineral imports were expected to increase in the future; the Government, however, would continue to support state-owned or private sector enterprises that invested in such mineral-rich countries as Australia, Canada, and Chile.

Total foreign trade reached \$263.4 billion in 1999. Exports grew by 8.6% to \$143.7 billion and imports increased by 28.4% to \$119.7 billion. In 1999, Korea's mineral imports excluding coal and oil were \$25.2 billion, and its exports, \$6 billion. During that period, Korea imported a total of \$16.7 billion in coal and oil. Excluding coal and oil, major imported minerals and metals were aluminum metal, copper concentrates and metal, gold, iron ore, lead metal, and zinc metal. Cement was the major export commodity. Korea imported 301 metric tons (t) of gold valued at \$2.81 billion in 1999 (Mining Journal, 2000a).

Commodity Review

Industrial Minerals

In 1999, 10 cement producers operated 12 plants with a total output capacity of about 80.5 million metric tons per year (Mt/yr); this did not include the white cement producer Union Corp. The local construction sector was affected severely by the financial crisis. Domestic demand for cement, which had remained unchanged during the past 2 years, fell more than 20% from a peak of 61.7 million metric tons (Mt) in 1997. Ssangyong Cement Industrial Co. Ltd., which was the largest Korean cement producer, had an output capacity of 17.9 Mt/yr; Sung Shin Cement Manufacturing Co. Ltd., 13.7 Mt/yr; Tong Yang Major Corp., 12.6 Mt/yr; and Lafarge Halla Cement Corp., 9.5 Mt/yr. Exports of cement began to increase again in

1999 because of surplus cement in the domestic market. The United States replaced Japan as the largest importer of Korean cement (Korea Cement Industrial Association, 2000). After the Government completed the restructuring of the industrial and financial sectors, the construction sector was expected to see some signs of recovery. It might take Korea's cement producers 2 years to see some improvement in demand for cement from the construction sector.

Metals

Copper.—Korea had two refined copper companies, LG-Nikko Copper Inc. and Korea Zinc Co. Ltd. With no active copper mine in Korea, metal producers were required to import all their raw materials from Australia, Chile, Canada, Papua New Guinea, and the United States for their smelters/refineries. In 1999, domestic copper cathode demand was about 900,000 t, and the total copper metal output capacity was less than 500,000 metric tons per year (t/yr), therefore, the country imported more than 400,000 t of copper metal to fill the gap.

In March 1999, the LG Group, which was the fourth largest business conglomerate in Korea, announced that the company had signed a memorandum of understanding with Nippon Mining and Metals Co. Ltd. of Japan to form the joint venture LG-Nikko Copper Inc. at 50% equity each. Each company invested \$20 million in the joint venture that took control of LG's Changhang and Onsan copper smelting and refining operations, which had an estimated value of \$830 million. Nippon, Mitsui Mining, and Marubeni Corp. formed a consortium for participation in the joint venture. LG had a smelting capacity of 350,000 t/yr and a total refining capacity of 420,000 t/yr (Korea Economic Daily, 1999, LG to sell its copper refining unit to Nikko Metals, accessed March 15, 1999, via URL <http://search.ked.co.kr>). In November 1999, Gerald Metals of the United States agreed to purchase shares from the Japanese consortium to participate in LG-Nikko; Gerald Metals had a strategic plan to be a partner with global nonferrous metal producers (Korean Business Review, 1999a; Metal Bulletin, 1999a).

LG International Corp., which was a subsidiary of the LG Group, and Korean Resources Corp., which was a mining and investment agency of the Korean Government, signed an agreement with Climex Mining Ltd. of Australia to commit \$138 million to the Dinkidi copper-gold project in the Philippines. Dinkidi had proven reserves of 17.7 Mt at an average grade of 2.37 grams per metric ton (g/t) gold and 0.67% copper. Initial output was targeted at 55,000 t/yr of concentrates grading 60 g/t gold and 30% copper (Mining Journal, 2000b).

Korea Resources Corp. had identified three small narrow-vein deposits that contain 9.97 t of gold. Songju-gu in North Kyongsang Province, which was the largest of the three, measured between 0.1 and 0.9 meter in width, and contained about 1.8 Mt at an average grade 4.0 g/t gold. Yoong Poong Corp. held the development rights for this area. The other two deposits were at Kasado in southwestern South Cholla Province and at Umsong-gun in North Ch'ungch'ong Province, which were much smaller. Development rights to these were held by

Korean Exploration Inc. and Kumpoong Mining and Construction Co., respectively (Mining Journal, 1999).

Iron and Steel.—The iron and steel sector played a leading role in the country's rapid economic growth in the past two decades. Owing to the financial crisis, domestic demand for steel fell by 34% in 1998; with the rapid rebound of the country's economy, however, domestic steel consumption in such sectors as automobiles and appliances increased by 33.4% in domestic steel demand in 1999 compared with that of 1998. As for crude steel production, the growth was relatively flat compared with those of the early 1990's. In 1999, the output of crude steel increased by 2.9% compared with that of 1998 mainly because of the closing of Dongkuk Steel Mill Co. Ltd.'s Pusan plant and the temporary shutdown at Kangwon Industries Co. Ltd. For finished steel products, domestic demand increased by more than 11% from 1998. Owing to the recovery of the domestic market and the shortage of certain products, Korean imports of steel rose significantly in 1999 (Korea Iron and Steel Association, 2000, p. 5).

With limited iron ore resources, the output of domestic iron ore mines supplied only about 1% of the country's needs. In the past decade, Korea's iron producers imported more than 30 Mt/yr of iron ore from Australia, Brazil, Chile, India, and Peru (Korea Iron and Steel Association, 2000, p. 120). The country also consumed about 20 Mt/yr of steel scrap, of which about one-third was imported.

The Korean Government continued its effort to auction off shares of Pohang Iron and Steel Co. Ltd. (POSCO), which was the largest crude steel producer in the world, under the privatization program in 1999 (Metal Bulletin, 2000c). After acquiring Kwangyang Steel Co., POSCO became the only integrated iron and steel producer in the Republic of Korea. In 1999, Korea had ironmaking output capacity of 26.1 Mt/yr and total steelmaking output capacity of 48.7 Mt/yr of which 26.2 Mt/yr were from basic oxygen furnaces and 22.5 Mt/yr were from electric arc furnaces (EAF) (Korea Iron and Steel Association, 2000, p. 245).

The no. 5 blast furnace at POSCO's Kwangyang Works which was completed in 1999, was scheduled to start production in 2000. The 3,800-cubic-meter furnace had a designed capacity to produce 3.07 Mt/yr of iron. POSCO planned to decrease output at the other four furnaces at Kwangyang, especially the no. 1, which had been operating since 1987. In 1999, POSCO produced 14.3 Mt of steel at the Kwangyang site and 12.2 Mt at the Pohang site. In 2000, POSCO planned to produce about 27 Mt of steel from the two steelmaking sites (Posco Weekly, January 27, 2000, Early opening of a new blast furnace, accessed August 22, 2000, at URL <http://wwwposco.co.kr/news/en/20000127/en-3.html>).

POSCO and Nippon Steel Corp., which were the world's two largest steel producers, formed a strategic alliance by increasing their holdings of each other's stock, and expanding such cooperative activities as research and development, overseas joint investment, and information technology (Metal Bulletin, 2000c). The two companies had agreed to form a friendly mutual ownership arrangement in 1998, which strengthened the steelmakers position in negotiations with

carmakers and construction groups and allowed them to lower some research and development expenses. The two companies had joint investment in Thailand's Siam United Steel. The two companies encouraged other steelmakers in Asia to join their alliance (Posco Weekly, August 3, 2000, POSCO forges strategic ties with Nippon Steel, accessed August 22, 2000, at URL <http://www.posco.co.kr/news/en/20000803/en-3.html>).

In 1999, POSCO decided to scrap its two-tier domestic shipments pricing system, which favored exporters over local suppliers. The abolishment of price disparity was related to a trade dispute in which the U.S. Government maintained that POSCO's shipment practices were inconsistent with the General Agreement on Trade and Tariffs. POSCO had supplied a certain portion of its domestic steel shipment to exporters at favored "local prices." The local prices were fixed on a quarterly basis in consideration of international market prices and foreign-exchange rates. The planned unified system for POSCO's domestic steel shipment would affect some domestic steel producers who had increased purchases from POSCO when local prices fell below the domestic market prices and expected that the demand in the international market would increase (Korea Herald, March 9, 1999, POSCO to abolish local price system to evade trade disputes, accessed July 8, 1999, at URL http://www.koreaherald.co.kr/news/1999/03/_05/19990309_0510.html).

In December 1999, POSCO Engineering and Construction Co., which was a subsidiary of POSCO, won a contract from the National Iranian Steel Co. to assist Isfahan Steel, which was a subsidiary of Iranian Steel, to build a 1.4-Mt/yr iron plant in Iran at a cost of \$233 million. Under the terms of the contract, POSCO would supply a blast furnace and processing systems for the plant and provide technical advice on construction of the new plant, which was scheduled to be completed in 2003. Financing of the \$157 million contract was arranged through the Export-Import Bank of Korea (Metal Bulletin, 1999e).

In 1999, the merger of Incheon Iron and Steel Co. Ltd. and Kangwon Industries Co. Ltd. formed the largest minimill steel producer in the Republic of Korea. Kangwon had been having financial problems during the past couple of years and tried to resolve debts with its creditors under a "workout" program. The creditors wrote off part of Kangwon's loans and converted part of the loans to equity. As the result, Kangwon's creditors owned a combined 29% of the new Incheon. Kangwon's plants at Pohang were renamed as Pohang Works of Incheon Steel. After merging, Incheon had a total output capacity of 7.89 Mt/yr of crude steel, of which 4.75 Mt/yr was from the Donggu site and 3.14 Mt/yr was from the Pohang site. The Hyundai Group (formerly Incheon's major owner) believed that the merger would save about \$690 million during a 10-year period by consolidating production lines in two plants and reorganizing the two companies' transportation systems; Donggu is located in the west, and Pohang is in the east. The merger also allowed Incheon to tap into Kangwon's domestic scrap collection network (Metal Bulletin, 2000b).

Sammi Steel Co.'s creditors delayed their schedule to name a potential buyer for the bankrupt stainless steel producer.

Dongbu Steel Co. and Incheon were two final competitors to acquire Sammi. Sammi controlled about 22% of Korea's stainless steel market before its bankruptcy in 1997, while Incheon held about 21%. A monopoly could arise if Incheon was awarded the sale; this would result in a violation of the antitrust laws in Korea (Korea Business Review, 1999b).

The Hyundai Group decided to sell off its aluminum, oil, and steel units and to concentrate on its core business (automaking, construction, electronics, heavy industries, and finance) in the future. In 1999, Hyundai reduced its shares in Incheon and discussed the sales of Hyundai Oil Refining and Daehan Aluminum with potential buyers (Korea Herald, September 2, 1999, Hyundai Group to spin off oil, steel, aluminum units, accessed September 20, 1999, at URL http://www.koreaherald.co.kr/cgi-bin/searched_word.asp?qstr=aluminum.../19990902_0509.html).

In 1999, Dongkuk and Kawasaki Steel Corp. of Japan signed an agreement to form an alliance. Under the terms of the agreement, Kawasaki would buy up to 10% of Dongkuk's shares and provide Dongkuk and its affiliates with Kawasaki production technology. In return for its investment in Dongkuk, Kawasaki would supply about 400,000 t of slabs and hot coils to Dongkuk. At Pohang, Dongkuk had a 140-t, a 50-t, and a 40-t EAF that produced a combined 3.6 Mt/yr of steel products including angles, channels, H-beams, and plates, while at Incheon, the company was equipped with one 100-t and two 30-t EAF's and produced 1.45 Mt/yr of steel products (Metal Bulletin, 1999b).

Nickel.—Korea Nickel Corp. commissioned its 32,000-t/yr nickel plant at Onsan. Inco Ltd. of Canada, which held 25% of the company equity, would supply most of the nickel oxide feeds for the Onsan plant. Korea Nickel expected that the new plant would operate at its full capacity in 2000 and its old 16,500-t/yr plant would be kept on standby to run only when the new plant required maintenance or when nickel demand increased. In 1999, Korea consumed about 95,000 t of nickel; the steel sector accounted for about 70% of the consumption (Metal Bulletin, 1999c).

Lead and Zinc.—Korea's only lead and zinc mine, Kumba, supplied about 10% of the country's demand lead and zinc concentrates; the remaining was imported. In 1999, Korean demand for refined zinc increased as the local automobile sector increased its output. Domestic sales and imports of zinc metal increased in 1999 compared with those of 1998. As the economic recovery was anticipated to continue in 2000, domestic production and imports of zinc metal were expected to increase.

Korea Zinc, which was one of the largest primary zinc producers in the world, completed the expansion of its zinc plant at Onsan complex to 350,000 t/yr in 1999. Sun Metals Corp., which was the company's overseas subsidiary, produced its first zinc metal at Townsville, in Queensland, Australia, in November 1999. The Townsville refinery was designed to produce 170,000 t/yr and was expected to consume about 400,000 t/yr of zinc concentrates sourced from Cominco

Alaska's Red Dog Mine in Alaska, MIM Holding Ltd.'s George Fisher Mine in Western Australia, and Pasminco Ltd.'s Century Mine in Queensland. The total investment in the new refinery was \$425 million (Metal Bulletin, 1999d).

Korea Zinc signed an agreement with Ausmelt of Australia to install three additional Ausmelt-technology furnaces at its Onsan plant. The first two of the new furnaces would form a new plant for recovery of lead and zinc from lead tailings and zinc residue. The third furnace would be used to increase the slag treatment capacity from the existing lead smelter. After completion in 2001, the Onsan complex would have a zinc metal output of 420,000 t/yr (Metal Bulletin, 2000a).

Young Poong Corp., which was the parent company of Korea Zinc, intended to increase zinc metal output capacity at its Sukpo zinc refinery in the North Kyongsang Province. The plan included building a new refinery and modernizing the existing one. After completion in 2001, zinc metal output capacity would increase from 110,000 t/yr to 198,300 t/yr at a cost of \$115 million (Mining Journal, 2000c).

Mineral Fuels

Coal.—Domestic coal supplied less than 20% of total energy requirements. In the Republic of Korea, owing to its low quality and heating value, anthracite coal was used mainly in home heating and to feed small boilers. Steam coal for powerplants and metallurgical-grade coal for steelmaking were imported mainly from Australia and China.

Natural Gas and Oil.—With minimal domestic oil and gas resources, the country must import all of its crude oil and liquefied natural gas (LNG). In 1999, petroleum and LNG accounted for more than 60% of primary energy consumption in Korea: 2.0 million barrels per day of oil were consumed, and more than 15 billion cubic meters (Gm³) of LNG were imported. Owing to the total reliance on oil imports, the country had short- and long-term policies for fulfilling its oil needs. Korea National Oil Corp. (KNOC), which was a state-owned company, was assigned by the Government to manage the country's strategic petroleum reserve program. In the long-term, KNOC planned to pursue equity stakes in oil and gas exploration and development around the world and also to explore offshore basins around the country. KNOC was preparing to bring the Donghai-1 gasfield in the Ulleung basin, 60 kilometers off Ulsan, on-stream in 2002. Donghai-1 was estimated to have 8.5 Gm³ of gas. Production plans included the design and construction of a production platform and related facilities to supply the gas to the Kyounsangnam region (Oil & Gas Journal, 2000).

In 1999, the Republic of Korea and Russia discussed cooperation efforts to develop their natural resources. The agenda included cooperation on investing in and extracting coal from the Tugnisky coal mine in Russia. Russia intended to

increase its coal export volume to Korea. With respect to potential joint development of oil and gas deposits, Russia invited Korean companies to participate in gas projects at Irkutsk, Sakhalin-1, and Sakhalin-2 and in reprospecting and extracting oil in the Yurubcheno-Tokhomy zone (Korea Business Review, 1999c).

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Ministry of Trade, Industry, and Energy
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Monthly Statistics of Korea.
Korea Energy Economic Institute, Seoul:
Yearbook of Energy Statistics.

TABLE 1
REPUBLIC OF KOREA: PRODUCTION OF MINERAL COMMODITIES 1/ 2/

(Metric tons unless otherwise specified)

| Commodity | 1995 | 1996 | 1997 | 1998 | 1999 |
|---------------------------------|-----------|------------|------------|------------|-----------|
| METALS | | | | | |
| Bismuth, metal | -- | -- | 112 | 117 | 120 |
| Cadmium, smelter | 1,665 | 501 | 570 | 1,178 r/ | 1,791 |
| Copper: | | | | | |
| Mine output, Cu content | 31 | 3 | -- | 41 | -- |
| Metal: | | | | | |
| Smelter e/ | 223,000 | 225,000 | 225,000 | 293,000 r/ | 370,000 |
| Refined, primary | 234,895 | 246,305 | 265,426 | 373,305 | 450,444 |
| Gold, metal kilograms | 13,418 | 14,096 | 14,872 | 22,822 | 23,730 |
| Iron and steel: | | | | | |
| Iron ore and concentrate: | | | | | |
| Gross weight thousand tons | 184 | 221 | 296 | 238 | 188 |
| Fe content do. | 103 | 124 | 166 | 133 | 106 |
| Metal: | | | | | |
| Pig iron do. | 22,344 | 23,010 | 22,712 | 23,092 | 23,329 |
| Ferroalloys: | | | | | |
| Ferromanganese | 118,798 | 126,135 r/ | 158,755 r/ | 158,418 r/ | 140,208 |
| Ferro-silicon | -- | -- | -- | -- r/ | -- |
| Ferrosilicomanganese | 97,785 | 83,375 r/ | 77,375 r/ | 106,997 r/ | 116,091 |
| Other | 3,264 | 4,687 r/ | 2,174 r/ | 2,785 r/ | 4,639 |
| Total | 219,847 | 214,197 r/ | 238,304 r/ | 268,200 r/ | 260,938 |
| Steel, crude thousand tons | 36,772 | 38,903 | 42,554 | 39,896 | 41,042 |
| Lead: | | | | | |
| Mine output, Pb content | 4,064 | 5,131 | 3,632 | 3,558 | 1,822 |
| Metal, smelter | 129,744 | 88,584 | 122,631 | 133,066 r/ | 140,317 |
| Silver, metal kilograms | 299,104 | 254,386 | 267,911 | 339,442 | 488,792 |
| Zinc: | | | | | |
| Mine output, Zn content | 7,747 | 8,384 | 8,992 | 10,488 | 9,832 |
| Metal, primary | 279,335 | 286,604 | 335,390 | 390,260 r/ | 430,108 |
| INDUSTRIAL MINERALS | | | | | |
| Asbestos e/ | 1,800 | 1,500 | -- | -- | -- |
| Barite | 90 | 80 | 105 | -- | -- |
| Cement, hydraulic thousand tons | 55,130 | 58,434 | 60,317 | 46,791 | 48,157 |
| Clays, kaolin | 2,792,139 | 2,501,600 | 2,688,489 | 2,259,809 | 1,858,359 |
| Diatomaceous earth | 81,303 | 69,543 | 53,538 | 37,649 | 30,222 |
| Feldspar | 367,578 | 319,112 | 341,018 | 248,493 | 409,334 |
| Fluorspar, metallurgical-grade | -- | -- | 617 | -- | -- |
| Graphite, all types | 1,938 | 1,113 | 83 | 62 | 62 |
| Mica, all grades | 43,709 | 35,923 | 34,489 | 38,459 | 24,733 |
| Nitrogen, N content of ammonia | 615,800 | 611,000 r/ | 526,000 r/ | 496,000 r/ | 489,000 |
| Salt e/ | 770,000 | 770,000 | 770,000 | 770,000 | 750,000 |
| Soda ash, manufactured e/ | 310,000 | 320,000 | 320,000 | 300,000 r/ | 310,000 |
| Stone, sand and gravel: | | | | | |
| Limestone thousand tons | 84,280 | 84,740 | 88,937 | 69,871 | 74,061 |
| Quartzite do. | 2,701 | 2,814 | 2,478 | 1,821 | 2,160 |
| Sand, including glass sand do. | 1,718 | 1,690 | 1,222 | 1,257 | 1,306 |
| Sulfur, byproduct: e/ | | | | | |
| Metallurgy do. | 255 | 260 | 265 | 270 | 290 |
| Petroleum do. | 200 | 200 | 200 | 200 | 200 |
| Total do. | 455 | 460 | 465 | 470 | 490 |
| Talc and related materials: | | | | | |
| Pyrophyllite | 789,994 | 780,062 | 994,366 | 843,609 | 754,657 |
| Talc | 29,364 | 19,066 | 25,751 | 24,411 | 15,313 |

See footnotes at end of table.

TABLE 1--Continued
REPUBLIC OF KOREA: PRODUCTION OF MINERAL COMMODITIES 1/ 2/

(Metric tons unless otherwise specified)

| Commodity | 1995 | 1996 | 1997 | 1998 | 1999 | |
|--|----------------------------|------------|------------|------------|------------|---------|
| MINERAL FUELS AND RELATED MATERIALS | | | | | | |
| Carbon black | 323,409 | 354,837 | 425,605 | 384,318 | 438,128 | |
| Coal, anthracite | thousand tons | 5,720 | 4,978 | 4,572 | 4,356 | 4,197 |
| Coke e/ | do. | 5,700 | 5,800 | 5,700 | 5,700 | 5,700 |
| Fuel briquets, anthracite briquets e/ | | 13,000 | 12,000 | 13,000 | 12,500 | 13,000 |
| Petroleum refinery products: | | | | | | |
| Gasoline | thousand 42-gallon barrels | 38,000 e/ | 71,372 | 81,848 | 76,388 | 76,039 |
| Jet fuel e/ | do. | 9,800 | 9,900 | 9,900 | 9,800 | 9,900 |
| Kerosene | do. | 30,000 e/ | 49,634 | 71,128 | 61,697 | 94,798 |
| Distillate fuel oil | do. | 160,000 e/ | 216,177 | 262,255 | 236,641 | 221,138 |
| Residual fuel oil | do. | 180,000 e/ | 227,842 | 275,798 | 205,397 | 229,638 |
| Lubricants | do. | 4,000 e/ | 4,100 e/ | 5,645 r/ | 4,702 r/ | 6,243 |
| Other e/ | do. | 19,000 | 19,000 | 20,000 | 19,000 | 19,000 |
| Refinery fuel and losses e/ | do. | 4,000 | 4,000 | 4,000 | 4,000 | 4,000 |
| Total e/ | do. | 445,000 r/ | 602,000 r/ | 731,000 r/ | 618,000 r/ | 661,000 |

e/ Estimated. r/ Revised. -- Zero.

1/ Table includes data available through November 15, 2000.

2/ Data are rounded to no more than three significant digits; may not add to totals shown.

TABLE 2
REPUBLIC OF KOREA: STRUCTURE OF THE MINERAL INDUSTRY IN 1999

(Thousand metric tons unless otherwise specified)

| Commodity | Major operating companies and major equity owners | Location of main facilities | Annual capacity | |
|-------------------|---|--|--------------------|-----|
| Aluminum, primary | Aluminium of Korea Ltd. | Ulsan (smelter) | 18 | |
| Bismuth, metal | metric tons | Korea Tungsten Mining Co. Ltd. | Sangdong (smelter) | 135 |
| Cement | Ssangyong Cement Industrial Co. Ltd. | Plants at Chandong, Kwang Yang, Mungyong, Pukyong, and Yongwol | 17,900 | |
| Do. | Sung Shin Cement Manufacturing Co. Ltd. | Tanyang plant | 13,700 | |
| Do. | Tong Yang Major Corp. | Plants at Pukyong and Samchok | 12,600 | |
| Do. | Lafarge Halla Cement Corp. | Plants at Kwang Yang and Okkye | 9,500 | |
| Do. | Hyundai Cement Co. Ltd. | Plants at Tanyang and Yongwol | 8,600 | |
| Do. | Hanil Cement Manufacturing Co. | Plants Chungbuk and Tanyang | 7,900 | |
| Do. | Asia Cement Manufacturing Co. Ltd. | Plants at Daegu and Jaechon | 4,600 | |
| Copper, metal | LG Metals Corp. | Changhang (smelter and refinery) | 60 | |
| Do. | do. | Onsan (smelter and refinery) | 360 | |
| Graphite | Kaerion Graphite Ltd. | Kangwon | 25 | |
| Do. | Wolmyong Mining Co. | do. | 26 | |
| Lead, metal | Korea Zinc Co. Ltd. | Onsan (smelter and refinery) | 200 | |
| Nickel, metal | Korea Nickel Corp. | do. | 49 | |
| Steel | Pohang Iron and Steel Co. Ltd. | Kwangyang plant | 15,000 | |
| Do. | Inchon Iron and Steel Co. Ltd. | Pohang plant | 13,000 | |
| Do. | | Donggu plant | 4,750 | |
| Do. | | Pohang plant | 3,140 | |
| Do. | Dongkuk Steel Mill Co. Ltd. | Inchon Works | 1,450 | |
| Do. | | Pohang Works | 3,600 | |
| Talc | Dongyang Talc Mining Co. | Chungju Mine | NA | |
| Zinc, metal | Korea Zinc Co. Ltd. | Onsan (smelter and refinery) | 350 | |
| Do. | Young Poong Corp. | Sukpo (smelter and refinery) | 110 | |

NA Not available.