

THE MINERAL INDUSTRY OF

CHINA

By Pui-Kwan Tse

The economic crisis in Asia seemed like a storm passing over the entire region, but China's economy appeared relatively unaffected because the exchange rate was firm and there was no sign of instability. The main reason for the firm exchange rate was that the renminbi was not yet convertible under capital accounts. Therefore, it was difficult, if not impossible, for funds to flow in and out of the country's stock markets. Compared with other countries in Asia and the Pacific region, China's economy performed well with inflation continuing to drop and foreign exchange reserves increasing sharply. Preliminary statistics indicated that the gross domestic product (GDP) grew by 8.8% and the retail price index rose by 2.8% in 1997, compared with those of 1996 (China Daily, 1998c; China Statistical Information and Consultancy Service Center, 1998). These were attributed to the Government's continuing macroeconomic policies in place since 1993. The unemployment rate in urban registered at 3.1% but economists estimated that joblessness was probably closer to 10% nationwide and much higher in the northeastern region of the country (Chinese Science News-Oversea Edition, 1998).

The share of the state sector in China's economy dropped to 40% in 1996 from 76% in 1980 (State Statistical Bureau, 1997). The share held by the private sector, including entrepreneurs, private companies, and foreign ventures, increased to 24%. The rest was held by collectives or township and village enterprises. The central bank, the People's Bank of China (PBC), cut interest rates in October 1997 as part of its efforts to ease the debt burden on the state-owned enterprises (Financial Times, 1997d).

In Heilongjiang Province, one of the most important industrial bases in China, more than 30% of the workers in the state-owned enterprises were underemployed and more than 20% of the total provincial workforce did not receive their regular salaries (China Daily, 1997g). In Tianjin, Shanghai, and Sichuan Province, where state-owned enterprises went bankrupt, laid-off workers held large-scale protests (Far Eastern Economic Review, 1998; Wall Street Journal, 1997). The Heilongjiang Government hoped that one-third of the labor force in the mining and heavy machinery sectors would be transferred to the service sector in the near future.

China announced that it will issue \$32.5 billion in special bonds to recapitalize state banks. The bonds will be used to write off bad or problem debts which account for 20% to 25% of the loan portfolios of the big four banks—the Bank of China, the China Agricultural Development Bank, the Industrial and Commercial Bank of China, and the People's Construction Bank of China. Together, they account for 90% of China's bank assets. In recent years, they have been forced to lend to state enterprises that have posted losses. The bad loans totaled more than \$200 billion (Financial Times, 1998b). It was imperative to reinvigorate the banking sector to free up funds, partly to help restructure those state enterprises that post losses. The risk of a banking crisis in China is,

however, not imminent yet. Unlike banks in the Republic of Korea and Thailand, Chinese banks have a much smaller exposure to foreign debt. Therefore, banks in China will not be as easily hit by an external payment imbalance. Chinese banks funded their assets mainly through large domestic savings, which average more than 40% of the country's GDP (Financial Times, 1997b; Financial Times, 1998a). In June 1997, the Government forbade banks to finance the purchase stock in the stock markets by state enterprises.

The Government planned to overhaul its PBC, to increase its regulatory powers and to allow it to shut down hundreds of poorly capitalized non-bank financial institutions that are threatening the banking system (Asian Wall Street Journal, 1998a). Under the current system, PBC sets loan and deposit rates, and commercial banks are given a narrow band within which they can adjust loan rates. In 1998, commercial banks will be allowed to set their own deposit rates with a range straddling a PBC base rate and will be given a wider band within which to set lending rates. The Government believed that the freedom of setting rates will allow banks to attract back depositors and loaners from unregulated and nonbank financial institutions. The restructuring of state-owned enterprises and the banking system is expected to be completed in 3 years (Financial Times, 1997a).

On July 1, 1997, China resumed the exercise of sovereignty of Hong Kong, which has strengthened the country's access to capital. Hong Kong has become China's most important center for finance and commerce in Asia and the Pacific region. About 10 metal- and chemical-related companies have H-shares traded on the Hong Kong exchange. During the last two decades, Hong Kong was China's re-export center. With rapidly improving port facilities in the Shanghai area, Guangdong and Fujian Provinces, cargoes from these facilities are more likely to be shipped directly instead of via Hong Kong in the near future.

Government Policies and Programs

At the 15th Communist Party Congress (CPC) held in September 1997, the Government decided to accelerate the reform of the country's state-owned enterprises begun in the 1980's. Large- and medium-sized state-owned enterprises will be converted into joint-stock companies with shares jointly held by the Government and private investors. Small-sized state-owned enterprises will be converted into shareholding cooperatives so all shares will be held by the workers. When the reform is completed, the Government will retain control only over about 3,000 large- and medium-sized state-owned enterprises in national defense, public transport, utilities, and important raw materials production, compared with the 400,000 state-owned enterprises now controlled by the Government (China Daily, 1997a; Washington Post, 1997). To improve the efficiency of the state sector further, the Government has encouraged the

profitable state-owned enterprises to form conglomerates among themselves through mergers. The Government has also encouraged profitable state-owned enterprises to take over and revitalize those entities showing losses. Enterprises whose restructuring is unsuccessful will be asked to declare bankruptcy.

To minimize the social impact of the enterprise reform, the Government will speed up the reform of the country's social welfare system. The Government will develop an unemployment benefit system to aid 20 million state sector workers laid off owing to the restructuring and bankruptcy of state enterprises. The Government will also reform the housing market and encourage state sector workers to buy their own homes to relieve the state enterprises from the burden of providing housing for their employees (China Daily, 1998b; China Geology and Mineral Resources News, 1998b).

The 9th National People's Congress (NPC) adopted the recommendation of the CPC to restructure the State Council. NPC stated that restructuring the State Council was urgently needed to further economic reform and to promote social development. According to the Secretary General of the State Council, the existing governmental structure had been established for the planned economic system and no longer fit into the market economic system approved by NPC in 1993. Under a planned economic system, the separation between the Government function and the enterprise function is not distinct. The existing Government function established during the 1950's, was required to administer economic and social security activities. The social security activities should be administered through social intermediary organizations. The Secretary General also stated that under the existing structure, the serious overlapping and overstaffing of Government institutions have not only generated "red tape and bureaucracy," but encouraged corruption that caused financial burdens to the Government. The new Government structure, however, is based on building an efficient, coordinated, and standardized administrative management system. The functions of the Government and enterprises will be separated. The Government will shift its function to macroeconomic regulation and control, social management, and public services. Enterprise managers will have the power to control the enterprises' operation and production (Economic Daily, 1998a; General Office of the State Council of the People's Republic of China, 1998; Zhongquo Meitan Bao, 1998).

The State Council announced that the new Government structure will have 29 ministries or departments under the State Council instead of 44. The State Commission for Restructuring Economy will be the highest level of the State Council. The Premier will be the chairperson of the Commission, and relevant ministers will be members of the Commission for the discussion of government policies.

The Ministries of Foreign Affairs, Defense, Culture, Finance, Public Health, Justice, Public Security, State Security, Civil Administration, Supervision, Railway, Communications, Construction, Agriculture, Water Resources, Foreign Trade and Economic Cooperation (MOFTEC), and Personnel; the State Economic and Trade Commission (SETC); the State Family Planning Commission; the State Nationalities Affairs Commission, the Auditing Administration and PBC will be retained.

The State Planning Commission (SPC), the State Commission for Science and Technology, and the State Education Commission will be renamed the State Development and Planning Commission, the Ministry of Science and Technology, and the Ministry of Education,

respectively.

The Ministries of Coal Industry, Machine-Building Industry, Metallurgical Industry (MMI), and Internal Trade; the Federation of Light Industry; and the Federation of Textile Industry will be reorganized as the State Bureau of Coal Industry, the State Bureau for Machine-Building Industry, the State Bureau of Metallurgical Industry, the State Internal Trade Bureau, the State Bureau for Light Industry, and the State Bureau for Textile Industry, respectively, and will be placed under the management of SETC. The Ministry of Chemical Industry (MCI), the China National Petroleum and Natural Gas Corporation (CNPC), and the China Petrochemical Corporation (Sinopec) will be merged into the newly formed State Bureau for Petroleum and Chemical Industry under SETC.

The main functions of these commissions are to draft trade plans and policies, to manage trade, to guide product mix adjustments of trade under their jurisdiction, and to maintain fair trade competition. The commissions would not be involved in enterprise management. The Government will share the rights and benefits of ownership on the basis of its capital input in an enterprise and will have the right to send special inspection commissioners to the enterprise to exercise supervision over enterprise capital operations and to share its profits and losses. The Government will evaluate, appoint, and remove enterprises' managers. Enterprises will carry out operations independently according to the law, assume sole responsibility for their profits and losses, and pay taxes. The Ministry of Personnel will be responsible for the overall management of professionals and public servants and for appointing managers of large enterprises under the supervision of the State Council.

The Ministry of Power Industry will be abolished. The State Power Corporation is being formed to manage China's power sector and is placed under the management of SETC.

The China National Nonferrous Metals Industry Corp. (CNNC) was disbanded. The Government will establish the China National Nonferrous Metals Industry Trading Group Corporation. During the transition period, the newly formed State Nonferrous Metals Bureau under SETC will make policy and management decisions. The recently appointed President of CNNC has become the Bureau's Director, a ministry-level position (China Nonferrous Metals News, 1998d).

The Ministry of Geology and Mineral Resources, the State Land Management Bureau, the State Marine Bureau, and the State Surveying Bureau will jointly form the Ministry of Land Resources. The main functions include planning, management, protection, and the rational use of land, mineral, and marine resources.

The Ministry of Information Industry will be formed from the base of the Ministries of Post and Telecommunications and Electronics Industry. The Ministry of Radio, Film, and Television, the Aerospace Industrial Corporation, and the Aviation Industrial Corporation will be merged into the Ministry of Information Industry, the responsibilities of which will include revitalization of the electronics information manufacturing, communications, and software industries and management of the state's main communications network.

The new Commission of Science, Technology, and Industry for National Defense will be created to manage the functions of the former Commission of Science, Technology, and Industry for National Defense, the National Defense Department of the State Planning Commission, the State Aerospace Bureau, and the State Atomic Energy Agency. In cooperation with the Central Military

Commission, the new Commission will be in charge of production and supply of military equipment, as well as the drafting and implementation of scientific research plans. It will also be in charge of drafting rules and regulations and developing plans for the ordnance industries and will coordinate with SETC in developing plans for transferring military technology to civilian use.

The Ministry of Labor and Social Insurance will be set up as the foundation of the Ministry of Labor. A centralized agency to administer social insurance also will be set up. The functions of social insurance for urban areas under the Ministry of Personnel, the rural areas under the Ministry of Civil Administration, various trade and professional organizations and medical insurance under the Ministry of Public Health will be under the supervision of the Ministry of Labor and Social Insurance.

The State Physical Culture and Sports Commission will be abolished, and its functions will be merged into the All-China Sports Federation, which will be under the jurisdiction of the State Council.

The Government planned to establish large corporate groups that would be able to compete in international markets. In the mid-1990's, with Government approval, some nonferrous and steel producers were already being nudged to merge.

According to Government plans, the new institutional structure will be in place by the end of 1998. After completion of the "three fixed" (fixed responsibilities, fixed institutions, and fixed sizes) plan, all levels of local governments will begin to be restructured, which was expected to be completed by yearend 1999.

Production

The Chinese aluminum market is moving toward a balance between supply and demand. The country produced about 2.05 million metric tons (Mt) and consumed about 2.17 Mt of aluminum metal in 1997. During the same period, the net import of unwrought aluminum was 40,429 metric tons (t) (General Administration of Customs of the People's Republic of China, 1997). The supply and demand gap was filled by the country's stocks. Official statistics of these metal stocks are not published, but the Ministry of Internal Trade reported that national aluminum stocks increased during the first 5 months but declined during the rest of 1997. Aluminum stock fell by 27% at yearend compared with that at the start of the year. Throughout 1997, domestic market prices of aluminum A00 metal (greater than 99.70% Al) were quite stable at about 14,000 yuan per metric ton, although they were about 1,000 yuan per ton lower than those of 1996 (China Nonferrous Metals Import and Export Corp., 1997; China Nonferrous Metals News, 1997f). The depressed domestic aluminum metal prices encouraged exports. In 1997, export of unwrought and alloy aluminum was more than double that of 1996. The Government intensified infrastructure and building construction investments, which may stimulate the domestic demand for aluminum. The financial crisis in Asia and the Pacific region, however, will affect the country's exports of aluminum metal and alloy there.

China is a leading producer of bismuth. In recent years, the country produced about 1,000 metric tons per year (t/yr) of bismuth. The domestic market prices for bismuth concentrates and refined bismuth were about 38,000 yuan per ton and 67,000 yuan per ton, respectively. Consumption of bismuth is about 600 t/yr, and the remainder is exported (China Nonferrous Metals News, 1997f).

Cobalt is one of the commodities that requires imports to meet the

country's demand. China has a processing capacity of 1,500 t/yr (contained Co). Because of the shortages of raw materials, China imports raw materials for processing. Therefore, domestic cobalt market prices, which are affected by international market prices, are usually higher than the international market prices because domestic processing costs are higher (China Metallurgical News, 1997c).

In 1997, the total supply of copper in the domestic market exceeded the demand. Copper prices continued to decline in the domestic market. In January 1997, the domestic market price of No. 1 copper was more than 20,000 yuan per ton, while in December 1997, it dropped to below 19,000 yuan per ton in some major cities. Copper production and consumption were expected to increase in 1997. Preliminary statistics indicated that China produced 1.02 Mt of refined copper (primary and secondary) in 1997, which was lower than the revised 1996 figure of 1.12 Mt. Nevertheless, the revised figure is usually higher than the initial figure (1.12 Mt vs. 883,000 t in 1996) because of the many small copper-refining plants on the east coast of China for which the Government has difficulty accounting. Copper consumption in 1997 was expected to be at the 1996 level or slightly higher (China Nonferrous Metals News, 1997f).

Although China's statistical data on gold imports are not released by the Government, production falls short of the demand for gold. The Gold Council reported that China had consumed less than 300 t of gold in the past several years. These data may not, however, reflect the actual gold consumption in China (China Gold, 1998b). In 1997, gold prices in the international market were lower than domestic gold selling prices that were set by the Chinese Government. Many traders smuggled gold bullion into China from Hong Kong to capitalize on the difference between these prices. In 1997, Hong Kong imported 433 t of gold; of that, more than 300 t was re-exported, mostly to China (Asian Wall Street Journal, 1998b).

China is the world's largest iron and steel producer, but the country's steel products are deficient in quality and variety. The Government, therefore, set up a quality-control plan to improve the quality of steel products. By 2000, about 90% of China's rolled steel will meet international standards. Domestic steel enterprises will supply 95% of rolled steel and about 70% to 80% of high value-added steel products, which the country consumes. Steel enterprises will focus on the technical renovation of old equipment and improvements in producing steel products that are in short supply (Liu Qi, 1997).

The Government planned to expand the production of high-strength low-alloy steel products that have low contents of manganese, silicon, vanadium, titanium, niobium, and rare earths. About 90% of China's low-alloy steel products contain either silicon or manganese or both. China planned to produce a total of 20 million metric tons per year (Mt/yr) of low-alloy steel products by 2000, of which 18 Mt will meet international quality standards (China Metallurgical News, 1997h).

In 1996, steel produced by electric arc furnaces accounted for about 26% of the country's total steel output. The level of technology used in electric arc furnaces, however, is below the international level in terms of production efficiency, power capacity, and automation. The Government thus set the priority to develop related technologies such as oxy-fuel fluxing, top-bottom composite blasting, and secondary burning, to enhance intensity of energy input and to reduce tap-to-tap time; to adopt computerized controlling

system to improve automation; and to use steel scrap preheating to reduce power consumption (China Metallurgical News, 1997g, k).

In 1997, the demand for steel products was weak as a result of the continuation of a tight monetary policy in China. Consequently, China's steel market remained oversupplied. In the first few months of 1997, steel enterprises increased their production in the hope that the steel demand would increase. By yearend, China had produced more than 94 Mt of steel products in 1997, 6 Mt more than MMI had planned at the beginning of the year. More than 30 Mt of unsold steel products was being stored in enterprises' warehouses. The excessive supply of steel products pushed down the steel prices in the domestic market (China Metallurgical News, 1998a).

During the late 1980's, the construction sector boomed. China built fifteen 60-story steel-structured high-rise buildings in several cities, such as Beijing, Shanghai, and Shenzhen. The new landmarks are symbols of the great achievements of the country's modernization. All steel products used in these buildings were, however, imported. During the same period, China began to build its own H-section production lines. The first 100,000-t H-section production plant was built by Maanshan Iron and Steel Co. in Anhui Province in 1992. Two other similar production plants were constructed in Anshan and Qinhuangdao. These plants can, however, produce only H-sections with flange lengths of less than 200 millimeters (mm); most H-sections used for high-rise buildings require flange lengths ranging from 200 to 700 mm. By 2000, the construction sector is expected to consume about 170,000 t of H-section; the metallurgical sector, 40,000 t/yr; the petrochemical sector, 20,000 t/yr; the machinery sector, 10,000 t/yr; and the railway sector, 5,000 t/yr (China Metallurgical News, 1997f).

Weak demand in the electric appliances sector caused a decline in hot-rolled silicon sheet prices in the domestic market, especially in the southern part of the country. The per-tonnage average price of 0.5-mm hot-rolled silicon sheet in 23 major cities declined from 5,200 yuan in January to 5,016 yuan in December. In Guangzhou, local 0.5-mm hot-rolled silicon sheet sold for only 4,600 yuan per ton. During the first half of 1997, silicon sheet production increased to 486,000 t, an increase of 24% from that of 1996. In 1997, domestic demand for silicon sheet was about 580,000 t, and the country imported more than 200,000 t of silicon sheet in 1997. The oversupply of silicon sheet is not expected to be reduced soon. MMI predicted that China will need about 1.9 Mt of silicon steel sheet, including 1.4 Mt of cold-rolled silicon sheet, by 2000. Silicon steel sheet production capacity is about 700,000 t from three plants—Baoshan, Taiyuan, and Wuhan (China Metallurgical News, 1998b).

In China, the rapid development of the thermal power sector has increased the demand for high-pressure boiler pipes. By 2000, the thermal power sector will require about 300,000 t of this type of pipe. In 1996, China produced less than 100,000 t of boiler pipes, most of which were less than 114 mm in diameter. About 95% of the boiler pipes with a diameter of more than 159 mm was imported. MMI planned capital construction and technical renovations to upgrade facilities in Wuhan and Hengyang (China Metallurgical News, 1997g).

China is the largest zinc metal producer in the world. China's zinc production capacity has increased rapidly during the last 5 years. At the end of 1996, the country's refined zinc production capacity was 1.6 Mt compared with 744,000 t in 1992. During the same period, Huludao Zinc Plant's zinc production capacity increased from

150,000 to 330,000 t/yr. Zinc production capacities from Zhuzhou Smelter, Shaoguan Lead and Zinc Smelter, and Baiyin Nonferrous Corp. were doubled to 200,000, 110,000, and 130,000 t/yr, respectively. China's refined zinc production increased by twofold, to 1.4 Mt, in 1997. Zinc ore production also increased sharply between 1992 and 1996. The production rate of zinc ore, however, did not appear to keep up with that of the metal. In 1996, China's net import of zinc concentrates was 185,688 t. During the first 10 months of 1997, however, China exported 296,000 t of zinc concentrates, more than twice the total of 1996 (General Administration of Customs of the People's Republic of China, 1996). Since the reform of the Government structure in the early 1990's, many provincial and local mining enterprises have not reported to CNNC. The production share of non-CNNC zinc ore producers increased to more than 70% in 1997 from 55% in 1992. With the high international zinc prices and the elimination of the 5% export duty, China exported more than 500,000 t of zinc metal in 1997. Domestic zinc market prices also went up from 9,000 yuan per ton in January to 11,500 yuan per ton in December (China Nonferrous Metals Import and Export Corp., 1997). The increased domestic market prices reflected international market prices rather than a shortage of zinc metal in China. During the past several years, more than 400,000 t of unsold zinc metal was in the market. Domestic industrial analysts estimated that China consumed about 850,000 t of zinc in 1997 (China Metallurgical News, 1997d).

MCI was in charge of production of fertilizer and agricultural material enterprises under the National Supply and Sales Corp., which had jurisdiction over the purchase and sale of fertilizer. MCI appealed to the Government to grant chemical fertilizer enterprises the freedom to sell their own products and proposed to set fertilizer price ceilings in order for enterprises to have a reasonable profit margin. Overproduction and excess imports caused domestic fertilizer market prices to drop. At yearend 1997, 7.26 Mt of fertilizer was unsold. The gap between production cost and retail prices has widened. Nearly half of the enterprises under MCI supervision were reported to be in the red, and many small plants were idled (China Chemical News, 1998a; China Chemical Reporter, 1998a; Nitrogen, 1997).

According to an official from the Rare Earth Office of SPC, the Government will not approve any new rare earth projects except under special conditions during the next 10 to 15 years because it believes that this sector requires restructuring (China Economic News, 1997b; China Nonferrous Metals News, 1997u). About 100 rare earth enterprises in China produced a total of about 53,000 t of rare earth oxides in 1997. Domestic consumption accounts for 15,000 t of rare earth products (rare earth oxide content). The Government estimated that rare-earth enterprises will require only 66,000 t of rare earth oxide in 2000. Most of the rare earth enterprises are under the supervision of CNNC, MMI, or the China National Nuclear Corp. The lack of communication among enterprises creates unnecessary competition among them. The Government planned to divide them into regional divisions and to restructure them into large groups—Baotou Steel and Rare Earth Corp., Gansu Rare Earth Co., and the Guangdong, the Jiangsu, the Jiangxi, and the Shanghai Groups—so that each could compete better in the international market. The country has a total output capacity of 80,000 t of rare-earth oxides—smelting, 65,000 t, and ionic separation, 15,000 t (China Chemical Reporter, 1998b; China Nonferrous Metals News, 1997d).

Trade

According to the Customs General Administration of China, total foreign trade reached \$289.9 billion in 1997. The values of imports and exports were \$138.8 billion and \$151.1 billion, respectively. The percentage values of imports and exports of minerals, metals, and their products were 39.4% and 25.5%, respectively. In 1997, the value of China's exports of metals and nonmetallic minerals increased by more than 25% from that of the previous year, and the value of imports was up by 5% (General Administration of Customs of the People's Republic of China, 1997).

Beginning in October 1997, the Government reduced the average import and export tariff rate from 23% to 17%. The average tariff rate for minerals, metals, and their products was 10.5%. The Government believed that a lower tariff rate will further improve China's investment environment (China Metallurgical News, 1997a; Financial Times, 1997c). The Government also revised its April 1, 1996, taxation policies on imported equipment for foreign investors.

Beginning on January 1, 1998, tariffs and the value-added tax on equipment imported for state-encouraged and state-supported projects funded by foreign and domestic investors would be lowered (Chemical Week, 1997). The revised policy will reduce the production costs of foreign-funded enterprises, especially high-tech companies that need to import equipment. The Government abolished import licenses and quotas for steel. This move is to ensure the normal need of enterprises and to prevent random imports (China Daily, 1997e).

The Government planned to merge four trade companies—China National Technology Import and Export Corp., China National Machinery Import and Export Corp., China National Instrument Import and Export Corp., and China National Corp. for Overseas Economic Cooperation—as a trade group. This action is part of the Government's plan to reorganize and streamline its structure so that it can eliminate duplication and fiefdoms.

Commodity Review

Metals

Antimony.—At the meeting held on December 3, 1997, at Guilin, Guangxi Province, the Chinese Antimony Producers Association reached the consensus that the total antimony output should be 60,000 t/yr. Enterprises were strictly forbidden to sell their materials below set prices. All association members and nonmembers were encouraged to stop antimony production for 2 months during China's New Year period. In Changsa, Hunan Province, the market price of No. 1 antimony dropped from 18,000 yuan per ton in January to 16,500 yuan per ton in November, which was close to the production cost. The Association also urged the Government to enforce illegal export activities by some traders (Metal Bulletin, 1997a).

Aluminum.—China National Nonferrous Metals Import and Export Corp., a subsidiary of CNNC, established the Aluminum Trade Co. to unify CNNC smelters' imports and exports of aluminum products, including 400,000 t/yr of alumina that is to be imported under the agreement between CNNC and Alcoa of Australia beginning on January 1, 1998 (China Nonferrous Metals News, 1997q). According to CNNC, the purposes of this policy are to avoid trade risk, to eliminate internal competition, and to rectify

China's domestic alumina market. China imports more than 1 Mt/yr of alumina, mostly by CNNC and Minmetals, a trade company under MOFTEC.

Shanghe Aluminum Co. Ltd. in Yuncheng, Shanxi Province, completed the first phase construction of its aluminum smelter. The smelter is equipped with eighty-eight 60-kiloampere (kA) Soderberg cells, which have a total designed capacity to produce 15,000 t/yr of aluminum. The company planned to expand its output capacity to 50,000 t/yr in 2000 (China Metals, 1997a; China Nonferrous Metals News, 1997i).

The first phase of construction at the Xingfu Aluminum Complex was completed in June 1997. The complex is owned by the Xingfu Group, owned by township in Qiangjiang City, Hubei Province. This phase included a 30,000-t/yr aluminum smelter, a 15,000-t/yr aluminum section plant, and a thermal powerplant with an installed capacity of 150 megawatts (MW). The Xingfu Group is planning to expand aluminum metal output capacity to 60,000 t/yr and to build a 10,000-t/yr aluminum alloy foundry plant and a 40,000-t/yr aluminum plate and foil plant (China Nonferrous Metals News, 1997p; Economic Daily, 1997a).

Qingtongxia Aluminum Smelter planned to begin its third-phase construction plan to increase its output of aluminum to 200,000 t/yr from 100,000 t/yr. This phase will cost more than \$241 million and is expected to be completed in 3 years. The smelter will be equipped with 200 180-kA prebaked electrolytic cells. The expansion project was approved by the State Council 2 years ago, but the construction was delayed because the cost of electricity was continuously rising in China. In July 1997, CNNC and the Government of the Ningxia Autonomous Region signed an agreement to develop jointly Qingtongxia's 100,000-t expansion project and a 300-MW generating capacity hydropower station at Daba. In August 1997, a 900,000-t/yr coal mine to secure energy sources for the smelter was added to the agreement (China Nonferrous Metals News, 1997x).

The second phase of construction at the Zhunyi Aluminum Smelter in Guizhou Province was begun in 1997. The investment cost is \$25 million, and the output of aluminum will increase to 31,000 t/yr (China Metals, 1997y).

The Yunnan Aluminum Smelter of the Yunnan Metallurgical Group Co. invested \$181 million to build 192 180-kA prebaked electrolytic cells with an output capacity of 95,000 t/yr. After completion in 1999, the smelter will have a total aluminum output capacity of 120,000 t/yr (25,000 t/yr from its present 60-kA Soderberg cells). A 60,000-t/yr carbon plant is scheduled to be completed in April 1998. The electrolysis technology is similar to that of the No. 1 smelter of the Guizhou Aluminum Plant; part of the system will be imported from MR Co. of Germany. The key equipment of the carbon plant will be imported from Svedala and B & P of the United States, Schenck of Germany, and FOB and Syprim of France. The smelter is being financially restructured and will be under the Yunnan Aluminum Stock Co. Ltd. The China Security Regulatory Commission is considering allowing the company to be listed in the domestic stock market (China Metals, 1997x).

Directors and managers of 12 major aluminum smelters in China urged the Government to control the cost of electricity in the country. The Chinese aluminum producers are hardly able to compete in the international market because the electricity rates doubled during the last several years. Most of the producers are in the red. The country has more than 50 power rates. For example, Fushun Aluminum Smelter in Liaoning Province pays bills for more than 20 different

rates. The Jiangsu Aluminum Smelter was forced to close 42 electrolytic cells because the cost of power increased to 0.5 yuan per kilowatt-hour. The State Council is planning to unify national power prices in 1998 (China Nonferrous Metals News, 1998a).

With Government approval, Lanzhou Aluminum Smelter (Lanzhou) took over the Northwest Aluminum Fabrication Plant in 1997. According to an official from the smelter, Lanzhou is planning to upgrade the smelter into a group company that will encompass power generating, aluminum smelting, and aluminum fabrication. Lanzhou and the Yongchang Power Plant will form a joint venture to build a 600-MW powerplant in Gansu Province. Lanzhou will invest \$6.2 million to build a continuous casting line to produce aluminum coil for its fabrication plant. The State Security Regulatory Commission approved the listing of the smelter in the domestic stock market. The Government also approved the dissolution of Huang He (Yellow River) Aluminum Co. Ltd., a joint venture between Lanzhou and Kaiser Aluminum and Chemicals Corp. of the United States. Lanzhou will be responsible for any future financial burdens from the joint venture (China Nonferrous Metals News, 1998b).

The renovation of No. 1 Aluminum Smelter in Guizhou Aluminum Plant in Guiyang, Guizhou Province, will be completed in 1998. The renovation project began in December 1995 to replace the Soderburg cells with 180-kA prebaked cells. The first 46 cells began trial runs in 1997. After completion, the smelter will have output capacity of 60,000 t/yr, and the total aluminum output capacity of the three smelters at the Guizhou Aluminum Plant will be 240,000 t/yr (China Nonferrous Metals News, 1997j, o).

Copper.—Fujiawu Copper Industry Co. Ltd., a joint venture of three local companies, was established in Dexing Qi, Jiangxi Province. The company is now able to mine and process 5,000 tons per day (t/d) of copper ore and plans to expand to 10,000 t/d. The company also plans to build a 10,000-t/yr copper smelter in next 3 years (China Nonferrous Metals News, 1997c).

Xinsheng Copper Smelter, a joint venture of two local companies, began construction of its copper smelter in Lianyungang, Jiangsu Province. The \$18 million smelter is designed to produce 30,000 t/yr of blister copper (China Nonferrous Metals News, 1997l).

In Chuxiong, Yunnan Province, Sanjiang Chemistry and Metallurgy Ltd. built a solvent-extraction electrowinning (SX-EW) copper plant, designed to produce 2,500 t/yr of copper for the Yunxin Copper Fabricating Plant. The project is funded by the State Science and Technology Commission. Raw materials will be supplied from the Muding Copper Mine. The smelter produced about 200 t of copper in trial runs in 1997. There are about 20 SX-EW facilities in central Yunnan and each has an output capacity of less than 1,000 t/yr (China Metals, 1997e).

CNNC received approval from SPC to develop the Saishitang copper deposit in Haixing County, Qinghai Province. The deposit has proven reserves of 1.44 Mt of copper, with an average ore grade of 1.13% Cu. The deposit also contains gold and silver. CNNC and the Qinghai Provincial Government plan to invest \$27 million to design a processing plant to produce 6,320 t/yr of copper concentrates. They have to raise at least 30% of the investment funds; the remainder will come from SPC-assigned state-bank loans (China Metals, 1997o; China Nonferrous Metals News, 1997s).

Guangzhou Zhujiang Copper Smelter, a joint venture among Guangzhou Copper Fabricating Plant, Conghua Taiping Industrial Zone Co., and a Hong Kong company, began trial production in

1997. The smelter, which is the largest scrap-fed copper smelter in southern China, is designed to produce 35,000 t/yr of blister and 20,000 t/yr of refined copper (China Metallurgical News, 1997e).

Liwu Copper Mine in Ganzi, Sichuan Province, started production in 1997. It has a designed capacity to mine 500 t/d of copper ore and to process 4,000 t/yr of copper. Most of its copper concentrates are being sold to Yunnan Smelter in Kunming, Yunnan Province, and Kangxi Smelter in Liangshan, Sichuan Province. The cost of the first phase of construction, including building a small hydropower station and a 180-kilometer (km) road to Lugu Station on the Chengdu-Kunming Railway, was \$17 million. CNNC accounted for \$4.6 million of the total investment, and the rest was funded by the local government. A plan has been approved to expand the output capacity of the mine to 800 t/d. The mine life is expected to be 48 years (China Metals, 1997o).

Daye Nonferrous Metals Co. completed its 4-year construction of a 100,000-t/yr smelter that was put into operation in 1997. The furnace was imported from Noranda of Canada. The company expected that the furnace will reach its full capacity within 2 years. The designed capacity was based on the use of domestic copper concentrates, that generally contain about 20% of copper. If the furnace is fed with imported copper concentrates that range from 28% to 40% Cu, then the output capacity may increase to 130,000 t/yr. Daye and Broken Hill Proprietary Co. Ltd. are discussing a long-term contract to supply copper concentrates to feed its furnaces. Mines owned by the company can supply only about 20,000 t of copper content for its smelter; therefore, the company increasingly depends on the tolling operations of domestic and foreign clients (China Nonferrous Metals News, 1997e, r).

Fujian Geological and Mining Technology Development Co. and Zen (Fujian) Ltd., a subsidiary of Zen International Resources Co. Ltd. of Canada, established a joint venture, Fujian Fusheng Mining Co. Ltd., to develop the Zhijinshan copper deposit in Zhijinshan and Shanghang, Fujian Province. The partners agreed to invest \$12 million for further geologic prospecting and a feasibility study within the next 2 years and another \$370 million to build a mine that will be able to mine and mill from 50,000 to 100,000 t/d of ore. Proven reserves are 1.29 Mt of Cu, but the deposit has a high arsenic content (China Metals, 1997s).

The State Council approved the feasibility study of the development of the Donguashan Copper Mine, which is owned by the Tongling Nonferrous Metals Co., and is located about 7 km southeast of Tongling City, Anhui Province. The 1,000-m-deep deposit, to be mined by underground methods, has proven copper reserves of 937,000 t of contained copper. The average copper content is 1.01%. The \$210 million project is designed to mine and mill 10,000 t/d. The mine life is expected to be 28 years (China Nonferrous Metals News, 1998c). The company has six mines that together produce 30,000 t/yr of copper concentrates and has two smelters, including Jinlong Copper Co. Ltd., a joint venture of Tongling, Sumitomo Corp. and Itochu of Japan, and the Hong Kong-based Jinguang International Co., that have an output capacity of 80,000 t/yr of blister and 150,000 t/yr of copper cathode.

The first phase of construction at the Dahongshan Copper Mine in Xiping, Yunnan Province, was completed in 1997. The mine has a designed mining capacity of 2,750 t/d and can process 8,000 t/yr of copper concentrates. It also produces 138,000 t/yr of iron concentrates and some gold and silver. The cost of this was \$57 million. The mine has an average copper ore grade of 0.81% and

contains a total of 792,000 t of copper. It also contains 10.4 Mt of iron, 7.7 t of gold, and 55.3 t of silver. The second phase of construction, which will expand the mine output to 14,000 t/yr of copper, is under study (China Nonferrous Metals News, 1997h).

Xinxing Copper Co., a joint venture of Shenyang Construction Investment Co., Shenyang Smelter, and a Hong Kong-based subsidiary of the Shenyang local government, completed construction of its \$35 million copper refinery in 1997. The electrolytic equipment was imported from Sumitomo of Japan, and the refinery has a designed capacity to produce 100,000 t/yr of grade A copper according to London Metals Exchange (LME) standards. Because it has no refining furnace, Xinxing contracted with three smelters to produce copper anode for its refinery. Shortages of raw materials for producing anodes in these smelters, however, caused Xinxing to scramble for copper concentrates and scrap for these smelters. Xinxing is planning to build its own smelter to produce copper anode for its refinery (China Metals, 1997n).

Gold.—China's foreign debt is about \$110 billion with principal and interest payments reaching about \$20 billion per year. China's annual gold output has been continuously increasing in the past several years, but is also a big gold consumer. PBC lowered its purchasing price per gram of gold in January and July 1997 (China Gold, 1998a). The price reductions prompted some gold-producing enterprises to raise production in order to sell gold before the deadlines. The reduction in gold prices, however, dampened the profits of gold enterprises because all gold mined in China is purchased by PBC at a fixed price. Because of the two price reductions, the gold producers lost more than \$90.4 million in revenues than they expected to receive at the beginning of the year. About one-third of the 1,200 gold enterprises are losing money (China Geology and Mineral Resources News, 1998a).

The Gold Bureau of MMI is looking for investors to develop the Lannigou gold deposit in Guizhou Province. Lannigou has a proven gold reserves of 60.8 t, with an average ore grade of 7.03 grams per ton (g/t) of gold (Au). The ore is a sedimentary-rock-hosted disseminated gold type that contains arsenic and carbon. The Gold Bureau hopes that investors will introduce advanced technology to build a facility to process 4,000 t/d of ore (China Metals, 1997j; Mining Magazine, 1997a).

Huangshi Gold-Copper Mining Co. Ltd., in which the state-owned China Gold Corp. held a majority share, completed the expansion of the Jiguanzui Mine, Hubei Province. The mining capacity was increased from 200 to 800 t/d. China Gold Corp. planned to list Huangshi in the domestic stock market to raise funds that will be used for developing the nearby Jinjinzhu and Taohuazui Mines (China Metals, 1997g).

The construction of the Paishanlou Gold Mine in Fuxin, Liaoning Province, was completed in 1997. The mine is designed to process 1,800 t/d of ore and to produce 1.3 t/yr of Au. The mine has proven reserves of 44 t of Au, with an average grade of 4 g/t. The gold is produced by a leaching-desorption-electrolysis process (Mining Journal, 1997).

After years of patient effort, Asia Mineral Corp. (AMP) of Canada was the first company to receive approval from the State Council in 1996 to form a joint venture with Shandong Zhaoyuan City Gold Corp. to develop a gold mine in China. In October 1997, the Government issued a business licence to the joint venture to develop the Yingezhuang Mine in Zhaoyuan City, Shandong Province. The

partners were each to invest \$36 million during 3 years to earn a 50% interest in the joint venture (China Metals, 1997t). In January 1998, however, AMP issued a notice of intent to terminate the Yingezhuang gold mining project, stating that Zhaoyuan breached numerous principles and provisions of the joint-venture contract. Also, the joint venture was unable to secure the mining licence or the preferential tax policies that had been originally offered. The joint-venture contract required that the two partners begin negotiation within 30 days of the issuance of the Notice of Intent to Terminate for the sole purpose of resolving the reasons for the notification of termination (Mining Magazine, 1997b; Mining Journal, 1998; Northern Miner, 1998). An application will be submitted to MOFTEC to terminate the joint venture legally if the negotiations have not been successful by March 13, 1998.

Xinjiang Sankung Mining Co. Ltd., a joint venture between Xinjiang Nonferrous Prospecting Bureau, a subsidiary of CNNC, and Sankung Trading Co. Ltd. of the Sankung Group of the United Kingdom, was established in Urumqi, Xinjiang Uygur Autonomous Region. The company will explore for gold in a designated area in North Xinjiang. Under the terms of the joint-venture agreement, the Chinese partner will provide geologic data and prospecting and mining rights, and Sankung will invest \$2.8 million in cash for exploration. Sankung will receive 70% interest if any reserves are discovered (China Metals, 1997r).

SPC approved the exploration of the Gaolong Mine in Guangxi Zhuangzu Autonomous Region. Exploration will be undertaken by Guangxi Gold Corp. and Bowland Resource Inc. of Canada. Guangxi Gold Corp. will have 75% of the project shares, which come in the form of mining rights, land use rights, and geologic exploitation results. The Canadian partner will contribute its 25% of the shares from cash and equipment. The mine has verified reserves of 7.15 t of Au, with an average grade of 3.7 g/t. Geologic prospecting indicated that more gold reserves may be in the area, which the joint venture is entitled to develop. Initial design is to produce 990 kilograms of gold per year (China Metals, 1997g).

China National Gold Corp. invested \$72 million in expanding the mining capacity of the Jinshan Gold Mine in Jiangxi Province. After completion, the mining capacity will increase to 3,000 t/d from 280 t/d. The mine has a proven reserves of 62 t of Au (China Metals, 1997f).

Iron and Steel.—SPC announced that the state steel production plans will be abolished in 1998 and that steel enterprises will be allowed to plan their own production in accordance with market demands. SPC, however, will retain its right to obtain a maximum 5 Mt of steel products for the defense sector and other key projects. SPC authorized the Ministry of Domestic Trade and MMI to produce a nationwide purchasing plan. All steel products are to be purchased at market prices. The Government also retains the right to demand steel enterprises to produce varieties of products (China Metals, 1997v).

In November 1997, the Government approved the merging of Wuhan Iron and Steel Corp. (Wugang), Daye Steel Plant, and Echeng Iron and Steel Works, all of which are located in Hebei Province. Under the agreement, the three companies will form a new steel group with Wugang as its flagship. The Government ordered Handan Iron and Steel General Work in Henan Province to take over a local financially troubled steel company, Wuyang Iron and Steel Works. To alleviate the financial burden that will be borne by

Handan after the takeover Wuyang, the Government will arrange for Handan to be listed in the domestic stock market. The Hunan Provincial Government decided to merge three local steel producers—Hengyang, Lianyuan, and Xiangtan. A shareholding company based on the core business of the new group will be set up. The new group will be listed in the domestic stock market. Other mergers being planned include Baoshan Iron and Steel Corp. (Baogang) with a number of steel works in Shanghai, Anshan Iron and Steel Corp. (Angang) with Benxi Iron and Steel Co. in Liaoning Province, and Beiman Iron and Steel Co. with Xilin Iron and Steel Co. in Heilongjiang Province. MMI planned to establish several large steel groups in the near future by merging existing steel works according to either their geographical proximity or their business (China Metals, 1997m).

MMI planned to reduce the total number of people involved in iron and steel production from 3.33 million in 1996 to 2.6 million in 2000 to increase productivity. The number of workers directly engaged in iron and steel production will be downsized from 1.3 million in 1996 to 800,000 by 2000. MMI hopes that by 2000, steel output per worker will reach 800 t/yr in large steel enterprises (China Daily, 1997h).

Haiyu Tinplate Plant, a joint venture of Daewoo Corp. and Dong Yang Tinplate Industrial Co. Ltd. both of the Republic of Korea and CNNC Hainan Co., began trial production on July 1, 1997. The \$66.6 million plant is located in Haikou City, Hainan Province. The plant has five electroplating lines with an output of 100,000 t/yr of tinplates. Because Haiyu itself does not produce blackplate, the plant reached an agreement with Posco of the Republic of Korea to supply half of this material (China Metals, 1997u).

MMI approved a two-phase modernization proposal for Xiangtan Iron and Steel Co. in Hunan Province. In the first phase, the company will build two 50-t converters and accompanying ladle refining furnace to replace the 3,300-t open-hearth furnaces. It will renovate the No. 2 blast furnace, including expanding its capacity from 750 to 880 cubic meters (m³). A 105-m³ sintering machine will be added. The second phase will focus on a thin-slab continuous casting and rolling. After completion, Xiangtan will have an output capacity of 1.85 Mt/yr of iron, 2 Mt/yr of crude steel, and 1.85 Mt/yr of rolling steel (China Metals, 1997w).

Angang invested \$20 million to replace its five open hearth furnaces with three 90-t converters in its No. 1 steel plant. The first two converters are expected to be installed by May 1998, and the third will come on-stream in October 1998. After completion, the total output capacity of three converters will be 2.3 Mt/yr, about the same capacity of the five open-hearth furnaces. Angang produces about 8.6 Mt/yr of crude steel, about 5 Mt of which is from open-hearth furnaces. Angang planned to replace all its open-hearth furnaces by 2000 (Metal Bulletin Monthly, 1997).

Angang completed installation of its 300,000 t/yr H-shape rolling mill at its No. 1 steel rolling plant. A used H-shape rolling mill was obtained from Inland Steel of the United States, and the electronic control system was imported from Siemens of Germany (China Metals, 1997i).

Hangzhou Iron and Steel Plant in Zhejiang Province invested \$84 million to relocate its steel plant. The company will import an 80-t direct current (DC) furnace from France to replace its three 5-t furnaces, which were built in 1958. A high-efficiency continuous casting mill from Voest-Alpine of Austria will be installed at the new site. The plant will have output capacity of 420,000 t/yr of steel

when it begins production in early 1999 (China Metals, 1997h).

Wugang decided to reduce its fixed asset investment plan from \$3.5 billion to \$2.9 billion and planned to increase the company's steel output to 10 Mt/yr by 2000. The target has been changed to 8.5 Mt/yr of steel, and the company will focus on projects to reduce energy consumption, to improve product quality, and to enhance efficiency. Priority projects will include the replacement of six open-hearth furnaces in its No. 1 steel plant with two converters equipped with continuous casting. Wugang will build its No. 8 coke furnace and No. 4 sintering mill and will renovate the No. 1 cold-rolling, silicon steel, and hot-rolling plants. The company also wants to improve the efficiency of the coal jet firing into its blast furnaces (China Metallurgical News, 1997l).

Baogang completed construction of its electric furnace-billet continuous casting mill in June 1997. The \$190 million project included a 150-t ultra-high-power DC furnace designed by Clecim of France, a ladle refining furnace, and a six-flow arc continuous casting mill from Danieli of Italy. The electric furnace is able to produce 1 Mt/yr of molten steel, and the continuous casting mill will cast 960,000 t/yr of round and square billets. The billet will be used for Baogang's plant to produce boiler tubes (China Metallurgical News, 1997b).

MMI approved the proposal of Lianyuan Iron and Steel Co. Ltd. in Hunan Province to invest \$600 million in its expansion plan. After completion in 2005, the company will have an output capacity of 1.4 Mt/yr of iron, 2 Mt/yr of steel (1.1 Mt/yr from converter and 900,000 t/yr from electric arc furnace), and 1.9 Mt/yr of rolled steel. The plant will be 100% continuous casting, and energy consumption will be reduced below 717 kg of standard coal per ton of steel (China Metals, 1997l).

Baotou Iron and Steel Co. completed the installment of two continuous casting mills with capacities of 520,000 and 680,000 t/yr in 1997. The main equipment was imported from Schloemann-Siemag AG (SMS) and Siemens AG, both of Germany. To finance this project, company issued \$24 million in bonds, which are repayable in 3 years; the annual interest rate is 11.592% (China Metals, 1997b).

The first phase of construction of the 100,000-t/yr cold-rolled silicon sheet project at Taiyuan Iron and Steel Plant in Shanxi was completed. The construction cost was \$72.5 million, including \$25 million for importing a 20-high roll mill from SMS and a used annealing line from France. Taiyuan is planning to add another cold-rolled silicon sheet line before 2000 (China Metals, 1997p).

Handan Iron and Steel General Works started construction of a \$435 million thin slab casting mill. It will use compact strip production (CSP) technology to produce high-quality steel products. SMS, Siemens, and Loi signed a package agreement with China International Iron and Steel Corp. to supply equipment for the plant in 1996. Funds for foreign procurement will be borrowed via the Bank of China from five German banks; the loan will be repaid within 12 years starting from 1999. In the package agreement, China Metallurgical Construction Group will set up two joint-venture companies with SMS and Siemens to make parts for CSP components, and the German companies are expected to transfer some of their manufacturing technology to their Chinese partner (China Metals, 1997c).

Panzhuhua Iron and Steel Corp. (Pangang) paid \$2.9 million to GFE of Germany to acquire the company's vanadium equipment and to install it in China by September 1998. The GFE equipment is able

to produce 5,000 t/yr of V_2O_5 and 4,000 t/yr of ferrovanadium. Pangang has an output capacity of 110,000 t/yr of vanadium slag, 2,000 t/yr of V_2O_5 , and 2,000 t/yr of high-grade ferrovanadium. In recent years, Pangang has exported about 4,000 t/yr of processed vanadium products. Pangang's iron mines in Sichuan Province contain about 20 Mt of vanadium. In the early 1990's, Pangang began to extract vanadium from its slag cast and sold vanadium to foreign processors (China Metallurgical News, 1997i).

Pangang set up a subsidiary, Titanium Co., to be in charge of its titanium-related business. Titanium White Plant, Titanium Processing Plant, and Titanium Products Plant will be merged into the new company. The company will have an output capacity of processing 300,000 t/yr of titanium concentrates and 40,000 t/yr of titanium white powder. Pangang also created Panzhihua Ferrovanadium Holding Co. to handle its international transactions (China Metallurgical News, 1997j).

The Government empowered Shoudu Iron and Steel Corp. (Shougang) to conduct foreign trade. A Shougang subsidiary, China Shougang International Trade and Engineering Corp., will handle any imports and exports except those under the country's unified arrangements. The company was previously restricted to import materials for its own production and to export its own products (China Daily, 1997f).

Beginning on September 17, the European Union Commission decided to levy a 19.6% interim antidumping duty on silicon-manganese from China. The imported silicon-manganese from China had increased more than six times in the past 3 years. China exported more than 260,000 t of silicon manganese in the first 8 months of 1997 (China Metals, 1997d).

Beginning in February 1998, Japan will abolish its 4% dumping duty on silicon-manganese imports from China. In return, China promised to control its 1998 silicon-manganese exports to Japan to within 90,000 t. This is 20,000 t more than when the 4% dumping duty was imposed (China Metals, 1997q).

Lead and Zinc.—In May 1997, Zhuzhou Smelter, a subsidiary of CNNC, sold short 170,000 t of zinc at prices below \$1,300 per ton to the LME, via Torch Co. Ltd., a subsidiary in Hong Kong, through 16 agent companies. When zinc prices continued to rise in the international market, Zhuzhou hedged another 280,000 t. The smelter has a registered production capacity of 100,000 t/yr at LME. Zhuzhou had lost the ability how to deliver zinc to LME. The Bank of China issued letters of guarantee in the hedging. After 3 days of meetings in Beijing, CNNC, on behalf of the Government, took over the responsibility of the Zhuzhou Smelter's zinc-hedging action at LME. The State Reserve Bureau released 40,000 t of zinc to CNNC and the State Economic and Trade Commission increased the 1997 zinc export quota by an additional 200,000 t. CNNC delivered 20,000 t of zinc from stock and mobilized Huludao and Shaoguan to deliver 40,000 t of zinc to LME in August and September. CNNC decided to rollover more than 110,000 t of zinc of a LME contract to 1998. China shipped 218,000 t of zinc to LME's Singapore warehouse in 1997 (China Daily, 1997j; China Economic News, 1997d; China Nonferrous Metals News, 1997b).

Shuikoushan Mining Bureau in Hunan Province is expanding its lead smelters' output capacity to 45,000 t/yr. After renovation, the No. 3 Lead Smelter will have an output capacity of 36,000 t/yr of refined lead. The Bureau plans to build a greenfield 80,000-t lead smelter in the next century (China Nonferrous Metals News, 1997t).

The government of Longhua County of Hebei Province and Hebei Geological Prospecting Bureau signed an agreement to form a joint venture, Chengde Zinc Co. Ltd., to develop a lead-zinc mine in Beichagoumen. The mine contains proven reserves of 1.92 Mt of lead and zinc, with lead-zinc content of 8%, and a significant amount of silver. The company plans to design a mine and mill facility to process 100,000 t/yr of ore (China Metals, 1997k).

SPC approved the \$23 million expansion plan of Bayu Nur Lead and Zinc Mine in Bairin Left Banner, Nei Mongol Autonomous Region. The mine, which is operated by Chifeng Nonferrous Metals Group Co., was built in 1979 and has a mining capacity of 500 t/d to produce 6,480 t of lead and 17,050 t of zinc in concentrates. The mine has proven reserves of 470,000 t of lead and 1.42 Mt of zinc, with a combined grade of 8.5%. The company plans to triple the mining output capacity to 1,500 t/d to produce 7,940 t of 70% lead concentrates, 33,700 t of 52% zinc concentrates, and a significant amount of silver. About 70% of the total investment is expected to be financed from State Development Bank loans (China Metals, 1998).

Tantalum-Niobium.—Fujian Minbei Geological Prospecting Party, Nanping Mining Development Corp., and Ningxia Nonferrous Metals Smelter established a joint venture, Ninning Tantalum-Niobium Mining Co. Ltd., to oversee the development of the Nanping tantalum-niobium deposit in Fujian Province. The deposit has proven reserves of 4,230 t of tantalum oxide, with an average grade of 0.03% TaO_2 . The initial development of the deposit, which will cost about \$6.7 million, has been designed to process 180,000 t/yr of ore and to produce 116 t/yr of tantalum oxide concentrates. It is expected to start production in the second half of 1999. The concentrates will be shipped to Ningxia Nonferrous Metals Smelter in Ningxia Huizu Autonomous Region to produce tantalum powder. The Smelter has been expanded since the early 1990's. The smelter's production of powder and wires has grown from 12 t/yr to several hundred tons per year. The production, however, is falling short of the designed capacity because adequate supplies of raw materials cannot be obtained. Raw materials are imported mainly from Russia and Southeast Asia (China Nonferrous Metals News, 1997n, v).

Tungsten.—The plant of Huaxing Tungsten Products Co. Ltd., a joint venture of Nanchang Corp., a subsidiary of CNNC, and the Hong Kong-based China Tungsten Co., started producing ammonium paratungstate (APT) in 1997. The greenfield plant uses ionic exchange technology to produce 3,000 t/yr of APT. Only one of three production lines is in operation. The company plans to wait for the price of APT to increase to a more profitable margin before the other two production lines are to be put into operation (China Nonferrous Metals News, 1997k).

Industrial Minerals

Fertilizer.—MCI plans to accelerate the development of phosphate fertilizer production within next several years, and the Government intends to add 1 Mt/yr of phosphate fertilizer capacity before 2000. China imported about 5 Mt of diammonium phosphate in 1996, mainly from the United States. To be self-sufficient in phosphate fertilizers in the next century, the Government plans to build four more large ammonium phosphate plants, which will be

located at Fuling, Lubei, Xuanhua, and Yunnan, in addition to phosphate plants that are under construction in Dayukou, Luzai, Wengfu, and Yunnan (Fertilizer International, 1997).

The Fanshan Phosphate Mine in Hebei Province began production in July 1997. The mine, which cost more than \$80 million, is the biggest underground phosphosiderite mining and dressing project in China. The mine has proven reserves of 63 Mt of phosphorus oxide and a designed output capacity of 1.2 Mt/yr of mining and dressing to produce 34% of phosphorus concentrates and 62% of powdered iron pellets (China Chemical Reporter, 1997a).

MCI intends to attain self-sufficiency in urea by 2000, and the Government also plans to build several ammonia-urea plants before 2000. China National Offshore Oil Corp. and Yangpu Land Development Co. will invest \$1.9 billion for an ammonia-urea complex in Yangpu Special Development Zone, Hainan Province. It is designed to produce 460,000 t/yr of ammonia and 800,000 t/yr of urea. The complex will use gas from the Yinggehai Dongfang Field in the South China Sea as raw material. The complex is expected to come onstream by 2000. A second ammonia-urea project is under construction in Ningxia Huizu Autonomous Region. The project is being jointly developed by the Government of Ningxia and the Daqing Oil Exploration Bureau. Natural gas produced after the completion of the first-phase construction at the Shaanxi-Gansu-Ningxia Gas Field will be transmitted through a 313-m-long pipeline to Ningxia Chemical Plant as raw material to produce 300,000 t of ammonia and 500,000 t of urea. It is planned that production of ammonia and urea will begin before 2000 (China Chemical Reporter, 1997e).

In China, 97% of the potash resources are in the northwestern part of the country. Potassium-rich brine accounts for more than 95% of the total. The Mengyejing Potash Mine in Jiangcheng, Yunnan Province, is the only potash deposit in the southwestern part of the country. Eight potash deposits are being considered for exploitation and utilization. The Charham potash deposit in the Qaidam Basin, jointly developed by China and Israel, and the Mengyejing Potash Mine are being developed. Other deposits that are being planned for exploitation are located at Mahai, Kunteyi Salt Lake, and Lenghu in the Qaidam Basin of the Qinghai Province, and Sichuan and Yunnan Provinces. These deposits account for 35% of the country's total proven reserves. Because of the location, about 50% of total proven reserves is difficult to exploit and develop (China Chemical News, 1998c; China Economic News, 1997c). The Government hopes to discover some large potash deposits in the next century, otherwise the shortage of potash will remain unchanged.

The Ministry of Geology and Mineral Resources discovered a large potassium-rich brine in Luobei at Luobupo, Xinjiang Uygur Autonomous Region. Two deep and nine shallow holes were drilled and brine was evaporated in small salt fields. The 1,300-square-kilometer (km²) area contains more than 250 Mt of potassium resources on the basis of an initial determination (China Chemical Reporter, 1997c).

Lithium.—Aba Prefectural Chemical Plant and Maerkang County Development and Investment Co. in Sichuan Province began construction of their Aba Lithium Salt Plant. The plant was designed by Urumqi Nonferrous Metals Design and Research Institute in Xinjiang. After completion, it will have an output capacity of 2,000 t/yr of lithium carbonate, 2,000 t/yr of lithium hydroxide, and 4,000 t of sodium sulfate (China Chemical Reporter, 1997b).

Magnesium.—Minhe Magnesium Smelter, a subsidiary of CNNC, in Qinghai Province completed its 3,000-t/yr magnesium expansion project. Minhe and Qinghai Investment Co. formed a joint venture, Kaiyuan Magnesium Industry Co., to take charge of the new plant. The facility, which was fully commissioned in October 1997, will use carnallite from nearby Chaerhan Salt Lake as the raw material to produce magnesium. By using carnallite instead of magnetite as raw material to produce magnesium, the production cost is about 17% cheaper (China Nonferrous Metals News, 1997m, w).

In 1997, Pechiney of France via Euroalliages filed a magnesium dumping case against 80 Chinese companies at the European Union Commission. The Government assigned the China Chamber of Commerce of Metals, Minerals, and Chemicals Importers and Exporters to coordinate the efforts to respond to the dumping charge. Chinese magnesium companies have already been subject to a similar charge by the United States. China's magnesium exports increased to 67,074 t in 1997 from 2,985 t in 1992 (China Nonferrous Metals News, 1997g; Metal Bulletin, 1997b).

Rare Earths.—The Government reaffirmed its position at the national rare earth conference, which was held in Changsha, Hunan Province, in 1997. All projects for ionic rare earth mining and smelting, whatever their size, required approval from SPC. Foreign fund projects have to be approved by SPC and MOFTEC. Export and business licenses will be issued by MOFTEC. According to the guidelines issued by the State Council in 1995, rare earth mining and smelting projects are under Class B whereby foreign investment is restricted (China Chemical Reporter, 1997d).

After Government approval, Rhone Poulenc of France acquired 41% of 60% of the equity owned by West Lake Co. of the United States in a rare earth company in Baotou, Nei Mongol Autonomous Region; the remaining 40% is held by Baotou Rare Earth Smelter. West Lake is owned by American Chinese in the United States. The original company separated ore and produced rare earth products. The new joint venture, Baotou Luxi Rhone Rare Earths Co., will shift to the production of high-value rare earth chemicals because the Government would not approve the participation of any foreign joint-venture company in rare earth separation (China Nonferrous Metals News, 1997a; Industrial Minerals, 1998).

Titanium.—More than 100 titanium dioxide producers in China have an estimated total output capacity of 100,000 t. Compared with western producers, they are small and production is based mainly on the sulfuric acid process. In 1996, China produced about 87,000 t of titanium dioxide and consumed about 150,000 t. The gap was filled by imports, mainly from Japan, the United States, and Taiwan. The coating sector accounts for about 60% of total titanium dioxide consumption in China, followed by enamelware, electrodes, and plastics. The Government projected that the demand of titanium dioxide in the plastics and paper sectors will increase as people's living standards improve. The demand for titanium dioxide is projected to be 200,000 t/yr in 2000. Several titanium dioxide plants are under construction—Chengde Titanium Dioxide Plant, Hainan Titanium Dioxide Plant, Jinzhou Ferroalloys Plant, Nanning Chemical Plant, Shanghai Titanium Dioxide Plant, and Zigong Titanium Dioxide Plant. These new titanium dioxide production units will use the chlorination process. The titanium dioxide output capacity for each plant will be 15,000 t/yr except for Hainan Titanium Dioxide Plant, which is designed to produce 30,000 t/yr.

In addition, 4042 Plant of Nuclear Industrial Corp., Chongqing Chemical Plant, and Jinan Yuxing Chemical Plant are being planned to build 15,000 t/yr each and will use the sulfuric acid process. By 2000, the total titanium dioxide output capacity will be 250,000 t/yr (China Chemical News, 1998b).

Mineral Fuels

In the past, the bottleneck in energy resources restricted the country's economic development. In 1997, the overall supply and demand for the country's energy was being balanced. At the end of 1997, the country's installed generating capacity had reached 250,000 MW, and the electricity output had reached 1,135 billion kilowatt hours per year. The serious shortage of power in the eastern coastal areas of the country has been eased. In some areas, the supply is outstripping demand (U.S. Embassy, Beijing, China, 1998).

The country's main energy-production bases are in the economically undeveloped interior and western regions where more than 70% of the country's energy resources are located. The main energy-consuming areas are concentrated in the economically developed eastern coastal areas where the volume of energy needs for economic development exceeds the available supply. Therefore, energy resources are brought in from the central and western regions. The disconnection between economic and energy resources centers has a distinct impact on the overall pattern of regional production strength and economic development.

China has 12 large grids at the regional and provincial levels. The six regional grids are located in the northeast, north, northwest, central, east, and south of the country; and the six provincial grids are located in Fujian, Hainan, Shandong, Sichuan, Xinjiang, and Xizang. The Government is considering the integration of the northeast and north grids. By 2010, China is expected to possess three large grids in northern, central, and southern China, and by 2020, all power grids will be interconnected. The integrated transmission network is expected

to create a united market for power supply and demand in the country (U.S. Embassy, Beijing, China, 1997).

Coal.—In 1997, China's coal production was down slightly as shown in table 1, although the consumption of coal by powerplants was flat or even declining in the second half of the year. A weak coal market resulted in large stockpiles at yearend. The demand from leading consumers, including powerplants, heavy industry, and the transport service sector, declined. The sales of coal from state-owned mines were down nearly 9% in the first three quarters.

Coal accounts for about 40% of the cargo carried on China's railways. The percentage is not likely to change in the future because coal production is concentrated in the north and northwest and most industrial and residential consumers are in the east and southeast. Coal prices in coastal provinces are much higher than those in the inland provinces. The price of coal in the Provinces of Guangdong and Fujian for 1 t of standard coal brought by train from Shanxi Province was about 300 yuan, similar to the cost of 1 t of imported coal.

The Government encourages coal production at all levels—from large state-owned to village and township mines. The Government also urges the small mines to adopt more-scientific methods and better safety and environmental procedures. Local mines account for

more than 45% of national coal output. Many of them, however, have no environmental protection or safety standards. In the first 8 months of 1997, local mines accounted for the death of more than 1,000 miners, and the Government shut down more than 2,000 illegal mines (Journal of Commerce, 1997b).

After 10 years, the first phase of construction of the Jungar Coal Mine of the Jungar Coal Industry Corp., in Jungar Qi, Nei Mongol Autonomous Region, received approval from the Government to start production in October 1997. According to the first-phase design, coal production at the open-pit mine will be 3 Mt/yr and then will be expanded to 12 Mt/yr by 2010. The average coal-bed thickness is 32 m, and the mine has a total reserve of 26 billion metric tons of coal. A 264-km railway line linking between Jungar and Datong, Shanxi Province, and then to Qinhuangdao, Hebei Province, was completed a year ago (China Daily, 1997b; China Economic News, 1997a; Economic Daily, 1997b).

Texaco of the United States and China United Coalbed Methane Co. Ltd. signed a contract to explore for coal-bed methane in Anhui Province. The program will be carried out in the two prospective blocks, totaling 2,663 km², in the Huaibei coal mining area in the northern part of the Province. Huaibei, the fourth largest coal mining area in China, produces 16 Mt/yr. According to estimates, the peak coalbed methane production from these two blocks could exceed 1.5 billion cubic meters per year (China Daily, 1998a; Economic Daily, 1998b).

Oil and Gas.—In the early 1990's, China implemented a strategy of exploiting oil resources and markets at home and abroad. In 1997, China produced 160 Mt of crude oil and became one of the largest petroleum-consuming countries in the world. By 2010, China is expected to produce 200 Mt of crude oil, and its oil demand will reach 265 Mt. China will rely mainly on its own petroleum resources and assimilate foreign capital to accelerate the pace of prospecting for and exploiting oil resources in the western part and offshore of the country. In the last several years, China has increased the pace of developing its domestic oil resources and establishing bases for production of oil in foreign countries.

To secure an oil supply that would meet its increasing oil demands, China tendered bids to develop foreign oilfields. By 2000, upon the completion of foreign petroleum-development projects that had been signed, China will acquire a share of 12 Mt of oil. The next target will be to acquire more than 50 Mt of oil from foreign countries. China is undertaking petroleum development and natural gas transmission pipeline construction projects in Thailand, developing petroleum and natural gas drilling projects in Bangladesh, and building oil refineries in Malaysia. The country is implementing a plan for cooperatively developing petroleum resources in Azerbaijan and Kazakstan, including the construction of two transnational oil transmission pipelines. China is discussing with Sudan and Kuwait the joint development of several projects in these countries, hoping to acquire 21 Mt of oil there by 2010. In June, China won the bidding in Venezuela for developing the Kalekeer Oilfield and gained the right to manage the area of No. 7 well at Peru's Talala Oilfield on a leasing basis (Journal of Commerce, 1998a; Financial Times, 1997d, f).

Although China has 223 Mt of refining capacity, the national use rate stands at about 71%. Of the total, 173 Mt is owned by Sinopec, 28.4 Mt by CNPC, 17.5 Mt by MCI, and the remainder by local enterprises. The Government intends to modernize and expand

existing refineries and is unlikely to approve new construction. China's new foreign investment guidelines indicate that foreign investment for the purpose of expanding the existing refinery output capacity from 2.5 Mt to 5 Mt is welcome (U.S. Embassy, Beijing, China, 1998).

Xinjiang Tuha Oil Prospecting and Development Co. announced that a 100-Mt-reserve oilfield was discovered in Lukexin on the north side of the Aiding Lake in the Turpan Basin, Xinjiang Uygur Autonomous Region. A thick oil reservoir was detected 70 m below the surface. A 20-t/d oil stream was produced by four wells in the area (China Daily, 1997d).

The State Council gave the final approval for the construction of a multi-billion-dollar petrochemical complex in Guangdong Province. Royal Dutch Shell Oil Co. of the Netherlands signed a joint-venture agreement with its Chinese partners represented by China National Offshore Oil Corp. (CNOOC). Shell will hold a 50% stake in the \$4.5 billion venture; CNOOC, 25%; China Merchant, 20%; and Guangdong Investment and Development Corp., 5%. Construction of the project is expected to begin in 1998 at Huizhou, Guangdong Province. The project is designed to produce 800,000 t/yr of ethylene, 450,000 t/yr of polyethylene, and 320,000 t/yr of ethylene glycol by 2003. Shell, which had been pursuing this project for several years, submitted a detailed feasibility study to the State Council in 1994 to invest \$6 billion to build an oil refinery, a petrochemical complex, and a network of gas stations. The proposal was turned down by the Chinese Government. A revised proposal in which the refinery was postponed until an unscheduled second phase and that focused on an ethylene plant was submitted in May 1997 (Chemical and Engineering News, 1997; Journal of Commerce, 1997c, 1998b).

The State Council approved the plan by BASF of Germany and Yangzi Petrochemical Corp. to build a 600,000-t/yr ethylene complex in Nanjing, Jiangsu Province. The capacities of the complex's units may change as the feasibility study proceeds.

In 1997, the Government approved several mergers of petrochemical companies—Yihua Group Corp., Yangzi Petrochemical Corp., Jinling Petrochemical Corp., Nanjing Chemical Industrial Group, and Jiangsu Provincial Petroleum Group Co. Ltd. as China Eastern United Petrochemical Group Co. Ltd.; Beijing Yanshan Petrochemical Co. and Tianjin Hangu Petrochemical Plant as Beijing Yanshan Petrochemical Group. Co. Ltd.; Weifang Soda Ash Plant and Yangkou Salt Plant merged with Shandong Marine Chemical Industrial Group; Zibo Chemical Fibre Plant and Zibo Petrochemical Plant merged with Qilu Petrochemical Corp. The Government expects that these mergers and others that might follow could help China's petrochemical sectors in the long run. China has an overcapacity problem in the production of several chemical products that are made by a large number of small, inefficient plants. Many companies have ambitions to expand production by investing in the construction of efficient, large-scale facilities that could lead to more serious overcapacity. The merger will help some plants to secure raw materials that are needed for downstream production (Asian Chemical News, 1997; China Daily, 1997c).

ACT OG, a group of Apip (Overseas) Ltd. of Italy, Chevron Overseas Petroleum Ltd., and Texaco Petroleum Maatschappij B.V. of the United States, and China Offshore Oil Nan Hai East Corp. (CONHE), a subsidiary of CNOOC, discovered oil in a 139-km² area southeast of Hong Kong in the South China Sea. A 3,350-m-deep drilled well, Huizhou 26-2-1, produced about 1,000 t/d of crude oil.

After a detailed appraisal, the partners are planning joint development of the new oilfield. CONHE accounts for 51% of the investment, and the remaining is shared equally by ACT OC. Since 1983, CONHE and its foreign investors have discovered 24 wells and oil-containing structures in the eastern section of the South China Sea. Eight oilfields, producing more than 12 Mt of oil and accounting for 80% of China's total offshore oil output, are active. Huizhou 26-1, China's first commercial offshore oilfield, began production in 1989; Huizhou 32-2 and 32-3, in 1995; and Huizhou 32-5, in 1997. Huizhou oilfield is operated by ACT OC and CONHE. Other oilfields that have begun pumping oil include those in Xijiang and Lufeng (China Daily, 1997i).

Chevron Corp. of the United States signed an agreement with CNPC to explore for crude oil in a 1,800-km² area of the Shengli Field. The Shengli Field is China's second largest onshore oilfield, with an output of about 650,000 barrels per day. Chevron will explore deeper pre-Tertiary geologic zones that lie beneath the existing production area. Chevron will be the operator for the new Shengli tract and hold 100% interest during the exploration phase (Journal of Commerce, 1997a).

References Cited

- Asian Chemical News, 1997, China finalises first megaconglomerate: Asian Chemical News, November 10, p. 4.
- Asian Wall Street Journal, 1998a, Beijing plans to shutler some 150 trust companies: Asian Wall Street Journal, January 12, p. 11.
- 1998b, City regains its luster: Asian Wall Street Journal, February 23, p. 6.
- Chemical and Engineering News, 1997, Shell plan \$4.5 billion China chemical complex: Chemical and Engineering News, May 12, p. 18.
- Chemical Week, 1997, Capital goods could be tariff-free: Chemical Week, October 1, p. 24.
- China Chemical News, 1998a, Chemical economic development: China Chemical News, no. 7, February 23, p. 5.
- 1998b, Domestic titanium oxide development: China Chemical News, no. 16, April 27, p. 6.
- 1998c, Potash resources in China: China Chemical News, no. 7, February 23, p. 8.
- China Chemical Reporter, 1997a, Fanshan phosphate mine start production in Hebei: China Chemical Reporter, no. 26, July 26, p. 16.
- 1997b, Lithium salt plant construction in Sichuan Aba: China Chemical Reporter, no. 17, June 6, p. 13.
- 1997c, Potash reserve in Luobupo: China Chemical Reporter, no. 16, May 26, p. 5.
- 1997d, Rare earth mining and smelting projects strictly controlled: China Chemical Reporter, no. 20, June 20, p. 4.
- 1997e, Second large chemical fertilizer unit to be put up in Ningxia: China Chemical Reporter, no. 7-8, March 15, p. 17.
- 1998a, Projection of the chemical fertilizer market in 1998: China Chemical Reporter, no. 6, p. 9.
- 1998b, South and north production system formed in rare earths sector: China Chemical Reporter, no. 16, p. 4.
- China Daily, 1997a, Economic development sound: China Daily, December 12, p. 1.
- 1997b, Inner Mongolian coal mine stands ready to open: China Daily, July 14, p. 5.
- 1997c, Merger to foster petrochemical competition: China Daily, September 15, p. 1.
- 1997d, Petroleum found in Xinjiang: China Daily, December 22, p. 5.
- 1997e, Preferential tariffs for companies to increase: China Daily, December 31, p. 1.
- 1997f, Shougang fully empowered to do foreign trade: China Daily, October 25, p. 3.
- 1997g, State enterprises face market challenge: China Daily, September 27, p. 4.
- 1997h, Steel sector set for streamlining: China Daily, December 8, p. 1.
- 1997i, Two big oilfields found offshore: China Daily, October 14, p. 5.
- 1997j, Zinc prices to rise as shortages continue: China Daily, July 21, p. 8.

- 1998a, National turns to coalbed methane for new energy: China Daily, March 9, p. 5.
- 1998b, Report on implementation of the 1997 plan for national economic and social development and the draft 1998 plan for national economic and social development: China Daily, March 24, p. 5.
- 1998c, Statistical communique of the State Statistical Bureau of the People's Republic of China on the 1997 national economic and social development: China Daily, March 24, p. 5.
- China Economic News, 1997a, China largest open-pit to go to production in October: China Economic News, August 11, p.15.
- 1997b, No more new rare-earth metals projects: China Economic News, August 18, p. 17.
- 1997c, Qinghai—An ideal place for the development of potassium resources: China Economic News, November 3, p. 9.
- 1997d, Zinc in short supply in China market: China Economic News, December 29, p. 7.
- China Geology and Mineral Resources News, 1998a, China gold enterprises lost in revenues: China Geology and Mineral Resources News, January 17, p. 2.
- 1998b, Report on work of government: China Geology and Mineral Resources News, March 26, p. 1.
- China Gold, 1998a, China gold prices: China Gold, February 12, p. 2.
- 1998b, Last year China gold production increased to 160 tons: China Gold, January 8, p. 1.
- China Metallurgical News, 1997a, Average metals import tax decreases to 10.5%: China Metallurgical News, September 25, p. 2.
- 1997b, Baogang electric arc furnace: China Metallurgical News, July 8, p. 1.
- 1997c, Cobalt: China Metallurgical News, April 27, p. 2.
- 1997d, Domestic zinc market: China Metallurgical News, November 8, p. 2.
- 1997e, Guangzhou Zhujiang copper smelter: China Metallurgical News, April 6, p. 1.
- 1997f, H-section steel: China Metallurgical News, September 27, p. 1.
- 1997g, Iron and steel quality outline: China Metallurgical News, May 21, p. 2.
- 1997h, Market needs low-alloy steel products: China Metallurgical News, October 30, p. 6.
- 1997i, Pangang: China Metallurgical News, December 21, p. 2.
- 1997j, Pangang set up titanium company: China Metallurgical News, June 19, p. 2.
- 1997k, The Government announced iron and steel investment information: China Metallurgical News, October 28, p. 2.
- 1997l, Wugang improves its technology: China Metallurgical News, November 20, p. 2.
- 1998a, This year's steel prices: China Metallurgical News, January 3, p. 2.
- 1998b, 1997 steel review: China Metallurgical News, January 10, p. 2.
- China Metals, 1997a, Aluminium smelter: China Metals, v. 3, no. 56, August 17, p. 12.
- 1997b, Continuous casting: China Metals, v. 3, no. 57, September 3, p. 11.
- 1997c, CSP plant in Handan: China Metals, v. 3, no. 59, October 3, p. 10.
- 1997d, EU levies antidumping duty on Chinese silicon-manganese: China Metals, v. 3, no. 60, October 17, p. 11.
- 1997e, EXW copper plant in operation: China Metals, v. 3, no. 51, June 3, p. 9.
- 1997f, Gold mine: China Metals, v. 3, no. 55, August 3, p. 10.
- 1997g, Gold mining company: China Metals, v. 3, no. 53, July 3, p. 11.
- 1997h, Hangsteel relocates: China Metals, v. 3, no. 47, April 1, p. 8.
- 1997i, H-shape rolling mill commissioned: China Metals, v. 3, no. 55, August 3, p. 7.
- 1997j, Large but difficult gold deposit offered: China Metals, v. 3, no. 53, July 3, p. 7.
- 1997k, Large lead/zinc mine developed: China Metals, v. 3, no. 62, November 17, p. 10.
- 1997l, Lianyuan development plan approved: China Metals, v. 3, no. 54, July 17, p. 6.
- 1997m, Merger wave hitting steel sector: China Metals, v. 3, no. 63, December 3, p. 2.
- 1997n, Saishitang copper mine to be developed: China Metals, v. 3, no. 53, July 3, p. 7.
- 1997o, Sichuan copper mine starts up: China Metals, v. 3, no. 54, July 17, p. 7.
- 1997p, Silicon sheet project in Taisteel: China Metals, v. 3, no. 59, October 3, p. 9.
- 1997q, Silicon-manganese export: China Metals, v. 3, no. 64, December 17, p. 11.
- 1997r, Sino-British jv opened in Xinjiang: China Metals, v. 3, no. 51, June 3, p. 8.
- 1997s, Sino-Canadian jv on copper mine: China Metals, v. 3, no. 60, October 17, p. 6.
- 1997t, Sino-Canadian jv on gold mining: China Metals, v. 3, no. 45, March 1, p. 5.
- 1997u, Sino-Korean jv on CR and galvanized sheets: China Metals, v. 3, no. 47, April 1, p. 8.
- 1997v, Steel production plan to be abolished: China Metals, v. 3, no. 68, December 17, p. 10.
- 1997w, Xiang steel programme approved: China Metals, v. 3, no. 53, July 3, p. 5.
- 1997x, Yunnan Builds 120,000 tpy aluminium smelter: China Metals, v. 3, no. 62, November 17, p. 10.
- 1997y, Zhunyi aluminium smelter: China Metals, v. 3, no. 61, November 3, p. 10.
- 1997z, 100,000 tpy Cu refinery starts up: China Metals, v. 3, no. 58, September 17, p. 6.
- 1998, Expansion of lead/zinc mine okeyed: China Metals, v. 4, no. 66, January 17, p. 2.
- China Nonferrous Metals Import and Export Corp., 1997, China nonferrous metals monthly: China Nonferrous Metals Import and Export Corp., various issues.
- China Nonferrous Metals News, 1997a, Baotou Luxi Rhone established: China Nonferrous Metals News, June 15, p. 2.
- 1997b, Central control lead and zinc trade: China Nonferrous Metals News, November 6, p. 1.
- 1997c, China largest local mine: China Nonferrous Metals News, March 20, p. 2.
- 1997d, China rare-earth enterprises reform: China Nonferrous Metals News, November 6, p. 2.
- 1997e, Daye's Noranda completed: China Nonferrous Metals News, October 9, p. 1.
- 1997f, Domestic aluminum prices: China Nonferrous Metals News, various issues.
- 1997g, EC antidumping notice: China Nonferrous Metals News, September 18, p. 2.
- 1997h, First phase construction of Dahongshan completed: China Nonferrous Metals News, July 13, p. 2.
- 1997i, First phase construction of Shenghe completed: China Nonferrous Metals News, July 27, p. 2.
- 1997j, Guizhou aluminum no. 1 started production: China Nonferrous Metals News, October 12, p. 1.
- 1997k, Huaxing tungsten: China Nonferrous Metals News, October 9, p. 2.
- 1997l, Lianyuangang planned to build copper smelter: China Nonferrous Metals News, February 27, p. 2.
- 1997m, Minhe expansion completed: China Nonferrous Metals News, April 17, p. 2.
- 1997n, Ningxia smelter: China Nonferrous Metals News, February 20, p. 2.
- 1997o, No. 1 aluminum smelter: China Nonferrous Metals News, July 24, p. 2.
- 1997p, No. 7 constructed four aluminum smelters in one year: China Nonferrous Metals News, November 2, p. 1.
- 1997q, Nonferrous trading group aluminum center established: China Nonferrous Metals News, August 10, p. 2.
- 1997r, Progress in Daye's Noranda: China Nonferrous Metals News, April 3, p. 2.
- 1997s, Saishitang copper mine: China Nonferrous Metals News, August 7, p. 2.
- 1997t, Shuikuoshan no. 3 lead smelter: China Nonferrous Metals News, September 25, p. 2.
- 1997u, SPC on rare earths plan: China Nonferrous Metals News, July 17, p. 1.
- 1997v, Tantalum-niobium company established: China Nonferrous Metals News, December 11, p. 2.
- 1997w, Qinghai Kaiyuan opened: China Nonferrous Metals News, August 24, p. 1.
- 1997x, Qingtongxia third phase construction: China Nonferrous Metals News, December 28, 1997.
- 1998a, Jiangsu closed 42 cells: China Nonferrous Metals News, January 2, p. 2.
- 1998b, Lanzhou aluminum map: China Nonferrous Metals News, January 10, p. 2.
- 1998c, State Council approved Dongguashan construction: China Nonferrous Metals News, January 20, p. 2.
- 1998d, State Council decided to for State Nonferrous Metals Bureau: China Nonferrous Metals News, April 28, p. 1.

- China Statistical Information and Consultancy Service Center, 1998, China monthly statistics, main indicators of the national economy 1997: State Statistical Bureau, no. 1, [unpaginated].
- Chinese Science News, 1998, Layoff: Chinese Science News—Overseas Edition, February 25, p. 3.
- Economic Daily, 1997a, Aluminum merged into Hubei environmental group: Economic Daily, August 10, p. 5.
- 1997b, Jungar coal mine: Economic Daily, October 21, p. 2.
- 1998a, Explanation of the reform of the State Council organization structure: Economic Daily, March 7, p. 2.
- 1998b, Sino-US jv to develop Huabei coalbed methane: Economic Daily, January 9, p. 1.
- Far Eastern Economic Review, 1998, Paper confirms riot suppression in Sichuan: Far Eastern Economic Review, February 25, p. 55.
- Fertilizer International, 1997, China targets P₂O₅ expansion: Fertilizer International, no. 358, May-June, p. 33.
- Financial Times, 1997a, Beijing gives state sector three years to halt losses: Financial Times, September 23, p. 1.
- 1997b, China abolished state bank lending quota: Financial Times, December 28, p. 2.
- 1997c, China set to restore import tax break: Financial Times, November 20, p. 8.
- 1997d, China to cut rates in bid to boost growth: Financial Times, October 23, p. 5.
- 1997e, China to pay \$4.3 bn for Kazakh oil stake: Financial Times, June 5, p. 1.
- 1997f, Sino-Russian fuel deal close: Financial Times, June 6, p. 1.
- 1998a, Beijing may ease bank debt: Financial Times, February 25, p. 4.
- 1998b, China wakes to need for banking reform: Financial Times, January 19, p. 4.
- General Administration of Customs of the People's Republic of China, 1996, China customs statistics yearbook: General Administration of Customs of the People's Republic of China, 1,047 p.
- 1997, China monthly exports and imports: General Administration of Customs of the People's Republic of China, no. 12, 71 p.
- General Office of the State Council of the People's Republic of China, 1998, Zhonghua Renmin Gonghequo Guowuyuan Gonggao—Decree No. 2 of President of the People's of Republic of China: General Office of the State Council of the People's Republic of China, no. 8, p. 399.
- Industrial Minerals, 1998, New Rhodia RE plant for batteries market: Industrial Minerals, no. 365, February, p. 11.
- Journal of Commerce, 1997a, Chevron in onshore deal with China: Journal of Commerce, June 11, p. 6B.
- 1997b, China target coal mine safety: Journal of Commerce, December 16, p. 8A.
- 1997c, Shell, China plan to revamp joint venture: Journal of Commerce, May 9, p. 7B.
- 1998a, China emerges as big buyer of W. Africa: Journal of Commerce, March 4, p. 9A.
- 1998b, Shell closer to joint-venture deal for refinery in China: Journal of Commerce, February 4, p. 9A.
- Liu Qi, 1997, 21st century China iron and steel industry: Beijing, China Metallurgy, no. 6, p. 1-7.
- Metal Bulletin, 1997a, China urges producers to cut production: Metal Bulletin, no. 8236, December 11, p. 7.
- 1997b, EC initiates antidumping proceeding on Chinese imports: Metal Bulletin, no. 8206, August 26, p. 5.
- Metal Bulletin Monthly, 1997, China closes more open hearths: Metal Bulletin Monthly, September, p. 74.
- Mining Journal, 1997, Modern gold mine for China: Mining Journal [London], v. 329, no. 8451, October 17, p. 323.
- 1998, Asia Minerals serves notice to quit: Mining Journal [London], v. 330, no. 8464, January 23, p. 58.
- Mining Magazine, 1997a, Guizhou seeks investors: Mining Magazine, v. 176, no. 4, April, p. 266.
- 1997b, Maiden jv gold mining licence in China: Mining Magazine, v. 177, no. 6, December, p. 377.
- Nitrogen, 1997, The fertilizer industry in China: Nitrogen, no. 227, May-June, p. 19.
- Northern Miner, 1998, Asia Minerals drops Yingezhuang: Northern Miner, v. 83, no. 48, January 26, p. 3.
- State Statistical Bureau, 1997, China statistical yearbook 1997: State Statistical Bureau, table 12-1, p. 411.
- U.S. Embassy, Beijing, China, 1997, China electric power grid development: U.S. Department of State Telegram 043794, December 16, 7 p.
- 1998, China 1997 energy wrap-up—Production, imports, and exports: U.S. Department of State Telegram 002267, February 3, 9 p.
- Wall Street Journal, 1997, Slowing growth and layoffs are stirring unrest—Slide in currencies hurt, too: Wall Street Journal, December 25, p. A1.
- Washington Post, 1997, China to cut number of state firms: Washington Post, September 15, p. A20.
- Zhongquo Meitan Bao, 1998, Reform of the State Council: Zhongquo Meitan Bao, March 10, p. 1.

Major Sources of Information

- China National Offshore Oil Corp.
1A Sidaskou Lu, Dazhongshi Nau, Haidianqu, Beijing 100086
- China Non-metallic Minerals Industry Corp.
Bai Wan Zhuang, Beijing
Ministry of Foreign Trade and Economic Corp.
2 Dong Chang'anjie, Dongcheng District, Beijing 100731
- Ministry of Land Resources
64 Funei Dajie, Beijing 100812
- National Environmental Protection Agency
115 Xizhimennei Nanxiaojie, Xicheng District, Beijing 100035
- People's Bank of China
410 Fuchengmen Dajie, Beijing 100034
- State Bureau of Coal Industry
21 Hepingli Bei Lu, Beijing 100713
- State Bureau of Metallurgical Industry
46 Dongsu Xi Dajie, Beijing 100711
- State Nonferrous Metals Bureau
12B Fuxing Lu, Beijing 100814
- The Power Corp.
137 Fuyoujie, Xicheng District, Beijing 100031

Major Publications

- Almanac of China's Economy, annual.
- China's Customs Statistics, Economic Information and Agency,
Hong Kong, 342 Hennessy Road 10/F, Wanchai, Hong Kong.
- China Coal Industry Yearbook, annual, The Ministry of Coal Industry, Beijing, China.
- China Chemical Industry, annual, Research Institute of the Ministry of Chemical Industry of China, Beijing, China.
- China Daily, 15 Huixin Dongjie, Chaoyang District, Beijing, China.
- China Metallurgical News, Beijing, China.
- China Nonferrous Metals News, Beijing, China.
- China Metals, China Features and Information Service, 57,
Xuanwumen Xidajie, P.O. Box 522, Beijing 100803, China.
- Economic Daily, Baizhifang, Xuanwuqu, Beijing, China.
- Far Eastern Economic Review, 181 Gloucester Road, Hong Kong.
- Journal of Commerce, Journal of Commerce Inc., Two World Trade Center, 27/F, New York, NY.
- Statistical Yearbook of China, State Statistical Bureau, Beijing, China.
- The Yearbook of Iron and Steel Industry of China, annual, The Metallurgical Industry Press, Beijing, China.

TABLE 1
CHINA: ESTIMATED PRODUCTION OF MINERAL COMMODITIES 1/

(Metric tons unless otherwise specified)

Commodity	1993	1994	1995	1996	1997	
METALS						
Aluminum:						
Bauxite, gross weight	thousand tons	3,500	3,700	5,000	6,200	8,000
Alumina, gross weight	do.	1,820	1,850	2,200	2,550 r/	3,000
Metal, refined, primary and secondary	do.	1,260	1,500	1,870	1,900 r/	2,050
Antimony:						
Mine, Sb content		60,000	91,000	125,000	129,000 r/	102,000
Metal		81,300	101,200	130,000	128,000 r/	101,000
Bismuth:						
Mine output, Bi content		740	610	740	610 r/	600
Metal		1,050	850	800	800	840
Cadmium, smelter		1,160	1,280	1,450	1,570 r/	1,600
Cobalt:						
Mine output, Co content		240	270	980	190 r/	250
Metal		190	200	240	230 r/	200
Copper:						
Mine output, Cu content		345,000	395,600	445,000	439,000 r/	414,000
Metal:						
Smelter, primary		443,000	482,400	538,000	615,600 r/	763,000
Refined, primary and secondary		730,300	736,100	1,080,000	1,120,000 r/	1,180,000
Gold, mine output, Au content		130	132	140	145	175
Iron and steel:						
Iron ore, gross weight	thousand tons	234,660	240,170	249,350	249,550	245,000
Pig iron 2/	do.	8,740	97,410	105,300	107,200 r/	115,440
Ferrous alloys 2/	do.	3,000	3,360	4,320	4,180 r/	3,640
Steel, crude 2/	do.	89,560	92,610	95,360	101,240 r/	107,600
Steel, rolled 2/	do.	77,160	84,280	89,800	93,380 r/	94,900
Lead:						
Mine output, Pb content		338,100	461,900	520,000	643,000 r/	650,000
Metal:						
Smelter, primary		326,000	366,000	360,000	363,000 r/	370,000
Refined, primary and secondary		412,000	467,900	608,000	706,000 r/	646,000
Magnesium metal, primary		11,800	24,000	93,600	73,100 r/	92,000
Manganese ore, gross weight	thousand tons	5,860	3,570	6,900	7,600 r/	7,000
Mercury, mine output, Hg content		520	470	780	510 r/	500
Molybdenum, mine output, Mo content		18,300	21,400	33,000	29,600 r/	32,700
Nickel:						
Mine output, Ni content		30,700	36,900	41,800	43,800 r/	44,000
Matte		34,600	37,200	42,600	46,400 r/	46,000
Smelter		30,500	31,300	38,900	44,600 r/	40,000
Silver, mine output, Ag content		840	810	910	1,140	1,300
Tin:						
Mine output, Sn content		49,100	54,100	61,900	69,600 r/	65,000
Metal, smelter		52,100	67,800	67,700	71,500 r/	61,300
Titanium, sponge		1,490	850	1,720	2,130 r/	2,290
Tungsten, mine output, W content		21,600	27,000	27,400 r/	26,500 r/	25,000
Vanadium (in vanadiferrous slag product)		5,000	5,400	13,700 r/	14,000 r/	15,000
Zinc:						
Mine output, Zn content		775,000	990,300	1,011,000	1,120,000 r/	1,200,000
Refined, primary and secondary		857,000	1,012,000	1,077,000	1,184,000 r/	1,400,000
INDUSTRIAL MINERALS						
Asbestos		242,600	303,100	263,000	293,000 r/	245,000
Barite	thousand tons	1,500	1,500	1,800 r/	2,500 r/	3,500
Boron, mine, B ₂ O ₃ equivalent		155,400	188,200	294,600	157,000 r/	140,000
Bromine		24,600	31,400	32,700 r/	41,400 r/	31,000
Cement, hydraulic	thousand tons	367,880	421,180	475,910	491,190 r/	492,600

See footnotes at end of table.

TABLE 1--Continued
CHINA: ESTIMATED PRODUCTION OF MINERAL COMMODITIES 1/

(Metric tons unless otherwise specified)

Commodity	1993	1994	1995	1996	1997	
INDUSTRIAL MINERALS--Continued						
Dolomite	thousand tons	4,950	4,150	8,090	5,520 r/	6,500
Fluorspar	do.	2,050	900	2,000	2,000	2,400
Graphite		310,000	183,000	204,000	185,000 r/	190,000
Gypsum	thousand tons	10,600	6,820	7,340	7,780 r/	7,800
Kyanite and related materials		2,500	2,500	2,500	2,500	3,000
Lithium minerals, all types		15,500	16,000	16,000	16,500	17,000
Magnesite	thousand tons	1,230	990	2,050 r/	2,100 r/	2,000
Nitrogen: N content of ammonia	do.	18,000	20,100	22,600	23,000	25,300
Phosphate rock and apatite, P ₂ O ₅ equivalent	do.	6,350	7,430	7,960	6,350	7,400
Potash, marketable, K ₂ O equivalent	do.	25	74	80	110	115
Rare earths, rare-earth oxide equivalent		22,100	30,700	48,000	55,000	53,000
Salt 2/	thousand tons	29,530	29,746	29,780	29,035 r/	29,280
Sodium compounds: Soda ash, natural and synthetic 2/	do.	5,350	5,810	5,980	6,690 r/	7,030
Sulfur:						
Native	do.	330	330	160	170	170
Content of pyrite	do.	5,330	5,870	5,930 r/	5,990 r/	5,880
Byproduct, all sources	do.	700	700	700	700	700
Total	do.	6,360	6,900	6,790 r/	6,860 r/	6,750
Talc and related materials	do.	2,300	2,400	2,400	2,400	2,350
MINERAL FUELS AND RELATED MATERIALS						
Coal:						
Anthracite	do.	220,000	248,000	260,000	270,000	270,000
Bituminous and lignite	do.	920,000	992,000	1,101,000	1,104,000	1,086,000
Total	do.	1,140,000	1,240,000	1,361,000	1,374,000	1,356,000
Coke, all types	do.	93,200	114,770	135,010	136,400 r/	1,319,400
Gas, natural:						
Gross	billion cubic meters	17	17	18	20	24
Marketed	do.	15	15	16	17	18
Petroleum:						
Crude (including crude from oil shale)	million 42-gallon barrels	1,060	1,080	1,100	1,170	1,180
Refinery products	do.	860	950	950	980	980

r/ Revised.

1/ Table includes data available through July 8, 1998.

2/ Reported by China's State Statistical Bureau.

TABLE 2
CHINA: STRUCTURE OF THE MINERAL INDUSTRY IN 1997

(Thousand metric tons unless otherwise specified)

Commodity		Major operating companies 1/	Location of main facilities	Annual capacity e/
Aluminum:				
Alumina		Pingguo Aluminum Industry Co.	Guangxi, Pingguo	300
Do.		Guizhou Aluminum Plant	Guizhou, Guiyang	400
Do.		Changcheng (Great Wall) Aluminum Corp.	Henan, Zhongzhou	200
Do.		do.	Hunan, Zhengzhou	640
Do.		Shandong Aluminum Plant	Shandong, Zibo	650
Do.		Shanxi Aluminum Plant	Shanxi, Hejin	1,200
Metal		Baiyin Aluminum Plant	Gansu, Baiyin	50
Do.		Lanzhou Aluminum Plant	Gansu, Lanzhou	82
Do.		Liancheng Aluminum Plant	do.	85
Do.		Pingguo Aluminum Industry Co.	Guangxi, Pingguo	100
Do.		Guizhou Aluminum Plant	Guizhou, Guiyang	240
Do.		Changcheng (Great Wall) Aluminum Corp.	Hunan, Zhengzhou	50
Do.		Fushun Aluminum Plant	Liaoning, Fushun	100
Do.		Qingtongxia Aluminum Plant	Ningxia, Qingtongxia	100
Do.		Qinghai Aluminum Smelter	Qinghai, Xining	200
Do.		Shandong Aluminum Plant	Shandong, Zibo	60
Do.		Jiaozuo Aluminum Plant	Henan, Jiaozuo	53
Do.		Sanmenxia Aluminum Plant	Henan, Sanmenxia	30
Do.		Yanji Aluminum Plant	Jilin, Yanji	15
Do.		Baotou Aluminum Plant	Nei Mongol, Baotou	120
Do.		Tongchuan Aluminum Plant	Shaanxi, Tongchuan	50
Do.		Taiyuan Aluminum Plant	Shanxi, Taiyuan	30
Do.		Yunnan Aluminum Plant	Yunnan, Kunming	40
Asbestos		China National Nonmetallic Industry Corp.	Nei Mongol, Baotou; Shanxi, Lai Yuan and Lu Liang	130
Barite		do.	Guizhou, Xiangshou	NA
Coal		Ministry of Coal Industry	Hebei	70,000
Do.		do.	Heilongjiang	100,000
Do.		do.	Henan	100,000
Do.		do.	Liaoning	70,000
Do.		do.	Nei Mongol	90,000
Do.		do.	Shandong	60,000
Do.		do.	Shanxi	400,000
Do.		do.	Sichuan	80,000
Cobalt	tons	Jinchuan Nonferrous Metals Corp.	Gansu, Jinchang	400
Copper, refined		Tongling Nonferrous Metals Co.	Anhui, Tongling	100
Do.		Wuhu Smelter	Anhui, Wuhu	60
Do.		Baiyin Nonferrous Metals Co.	Gansu, Baiyin	50
Do.		Jinchuan Nonferrous Metals Corp.	Gansu, Jinchuan	20
Do.		Luoyang Copper Processing Factory	Henan, Luoyang	50
Do.		Daye Nonferrous Metals Co.	Hubei, Daye	20
Do.		Guixi Smelter (Jiangxi Copper Metals Co.)	Jiangxi, Guixi	100
Do.		Shenyang Smelter	Liaoning, Shenyang	100
Do.		Shanghai Smelter	Shanghai	80
Do.		Taiyuan Copper Industry Co.	Shanxi, Taiyuan	30
Do.		Tianjin Copper Electrolysis Factory	Tianjin	25
Do.		Yunnan Smelter	Yunnan, Kunming	100
Gas, natural	billion cubic meters	China National Petroleum Corp.	Sichuan	10
Gold, refined	thousand kilograms	China National Gold Corp.	Henan, Lingbao	10
Do.		Laizhou Gold Co.	Shandong, Laizhou	15
Do.		Zhaoyuan Gold Co.	Shandong, Zhaoyuan	15
Graphite		China National Nonmetallic Industry Corp.	Shandong, Laixi and Pingdu	190

See footnotes at end of table.

TABLE 2--Continued
CHINA: STRUCTURE OF THE MINERAL INDUSTRY IN 1997

(Thousand metric tons unless otherwise specified)

Commodity	Major operating companies 1/	Location of main facilities	Annual capacity e/
Iron and steel:			
Iron ore	Maanshan Iron and Steel Co.	Anhui, Maanshan	10,000
Do.	Shoudu Iron and Steel Corp.	Beijing	20,000
Do.	Meishan Metallurgical Co.	Shanghai	2,000
Do.	Jiuquan Iron and Steel Co.	Gansu, Jiayuguan	4,000
Do.	Hainan Iron Mine	Hainan, Changjiang	4,600
Do.	Handan Xingtai Metallurgical Bureau	Hebei, Handan	3,800
Do.	Tangshan Iron and Steel Co.	Hebei, Tangshan	3,000
Do.	Wuhan Iron and Steel Corp.	Hubei, Wuhan	5,100
Do.	Banshigou Iron Mine Mining Co.	Jilin, Hunjiang	1,400
Do.	Anshan Iron and Steel Corp.	Liaoning, Anshan	30,000
Do.	Benxi Iron and Steel Co.	Liaoning, Benxi	13,700
Do.	Baotou Iron and Steel and Rare Earth Co.	Nei Mongol, Baotou	10,000
Do.	Taiyuan Iron and Steel Co.	Shanxi, Taiyuan	4,000
Do.	Dabaoshan Mining Co.	Guangdong, Qujiang	1,670
Do.	Panzhuhua Mining Co.	Sichuan, Panzhuhua	13,000
Do.	Kuming Iron and Steel Co.	Yunnan, Kuming	1,400
Ferroalloy	Shoudu Iron and Steel Corp.	Beijing	35
Do.	Northwest Ferroalloy Co.	Gansu, Yongdeng	60
Do.	Zunyi Ferroalloy Co.	Guizhou, Zunhi	100
Do.	Jilin Ferroalloy Co.	Jilin, Jilin	250
Do.	Jinzhou Ferroalloy Co.	Liaoning, Jinzhou	90
Do.	Liaoyang Ferroalloy Co.	Liaoning, Liaoyang	70
Do.	Shanghai Steel Co.	Shanghai	180
Do.	Emi Ferroalloy Co.	Sichuan, Emei	70
Do.	Hengshan Ferroalloy Co.	Zhejiang, Jiande	70
Crude steel	Maanshan Iron and Steel Co.	Anhui, Maanshan	3,000
Do.	Shoudu Iron and Steel Corp.	Beijing	10,000
Do.	Handan Iron and Steel General Work	Hebei, Handan	2,400
Do.	Tangshan Iron and Steel Co.	Hebei, Tangshan	2,300
Do.	Wuhan Iron and Steel Corp.	Hubei, Wuhan	8,000
Do.	Anshan Iron and Steel Corp.	Liaoning, Anshan	10,000
Do.	Benxi Iron and Steel Co.	Liaoning, Benxi	2,700
Do.	Baotou Iron and Steel and Rare Earth Co.	Nei Monggol, Baotou	3,500
Do.	Baoshan Iron and Steel Corp.	Shanghai	10,000
Do.	Shanghai Iron and Steel Co. Ltd.	do.	6,000
Do.	Taiyuan Iron and Steel Co.	Shanxi, Taiyuan	2,500
Do.	Panzhuhua Iron and Steel Corp.	Sichuan, Panzhuhua	3,000
Lead	Baiyin Nonferrous Metals Co.	Gansu, Baiyin	50
Do.	Shaoguan Smelter	Guangdong, Shaoguan	35
Do.	Shuikoushan Mining Bureau	Hunan, Hengyang	30
Do.	Zhuzhou Smelter	Hunan, Zhuzhou	80
Do.	Shenyang Smelter	Liaoning, Shenyang	70
Do.	Kunming Smelter	Yunnan, Kunming	20
Magnesium	Fushun Aluminum Plant	Liaoning, Fushun	5
Do.	Minhe Magnesium Plant	Qinghai, Minhe	7
Nickel, refined	Jinchuan Nonferrous Metals Corp.	Gansu, Jinchuan	40
Do.	Chengdu Electro-Metallurgy Factory	Sichuan, Chengdu	5
Petroleum, crude	Shengli Bureau	Hebei, Shengli	33,350
Do.	Daqing Bureau	Heilongjiang, Daqing	55,000
Do.	Liaohe Bureau	Liaoning, Liaohe	15,000
Do.	Bohai Offshore Oil Corp.	Bohai	4,000
Do.	Nanghai East Corp.	Nanghai	5,000
Potash	Ministry of Chemical Industry	Qinghai	40

See footnotes at end of table.

TABLE 2--Continued
CHINA: STRUCTURE OF THE MINERAL INDUSTRY IN 1997

(Thousand metric tons unless otherwise specified)

Commodity	Major operating companies 1/	Location of main facilities	Annual capacity e/
Rare earths	Gansu Rare Earths Co.	Gansu, Baiyin	32
Do.	Jiangxi Rare Earths Co.	Jiangxi, Nanchang	1
Do.	Zhujiang Smelter	Guangdong, Guangzhou	5
Do.	Baotou Iron and Steel and Rare Earths Corp.	Nei Mongol, Baotou	25
Do.	Shanghai Yaolong Nonferrous Metals Co.	Shanghai	2
Salt	Ministry of Chemical Industry	Anhui	200
Do.	do.	Qinghai	320
Talc	China National Nonmetallic Industry Corp.	Guangxi, Longshen	130
Do.	do.	Liaoning, Haicheng	50
Do.	do.	Shandong, Qixia	5
Tin, smelter	Dachang Mining Administration	Guangxi, Dachang	5
Do.	Yunnan Tin Industry Co.	Yunnan, Gejiu	20
Do.	Laibin Smelter	Yunnan, Laibin	12
Titanium	Zunyi Titanium Plant	Guizhou, Zunyi	5
Do.	Fushun Aluminum Plant	Liaoning, Fushun	1
Tungsten, concentrate	China National Nonferrous Metals Industry Corp.	Guangdong, Guangxi, Hunan, Jiangxi, and Zhejiang	60
Zinc	Northwest China Lead-Zinc Smelter	Gansu, Baiyan	130
Do.	Shaoquan Smelter	Guangdong, Shaoquan	160
Do.	Liuzhou Zinc Products Factory	Guangxi, Liuzhou	32
Do.	Shuikoushan Mining Bureau	Hunan, Hengyan	28
Do.	Zhuzhou Smelter	Hunan, Zhuzhou	250
Do.	Huludao Zinc Smelting Co.	Liaoning, Huludao	320
Do.	Shenyang Smelter	Liaoning, Shenyang	20
Do.	Laibin Smelter	Yunnan, Laibin	50

e/ Estimated. NA Not available.

1/ Companies are owned by either the State Government or Provincial Government.

TABLE 3
CHINA: EXPORTS OF SELECTED MINERAL COMMODITIES IN 1997

(Metric tons)

	Quantity	Value (thousands)
METALS		
Aluminum:		
Bauxite	160,000	\$13,878
Alumina	10,000	4,714
Metal and alloys:		
Unwrought	248,462	368,826
Semimanufactures	100,328	220,215
Antimony metal, unwrought	28,952	53,201
Barium sulfate	2,930,000	98,326
Copper, metal and alloys:		
Unwrought	84,265	188,335
Semimanufactures	99,440	320,532
Iron and steel:		
Ferrosilicon	210,000	129,239
Pig iron and cast iron	5,540,000	813,647
Steel:		
Bars and rods	580,000	182,758
Shapes and sections	440,000	134,672
Sheets and plates	2,580,000	879,131
Tube and pipe	320,000	324,525
Magnesium carbonate and oxide	2,290,000	289,892
Manganese, unwrought	60,143	71,568
Tin, metal and alloys, unwrought	41,087	205,210
Tungsten:		
Tungstates	14,596	74,117
Ore	751	1,802
Zinc:		
Metal and alloys, unwrought	557,008	651,772
Oxide and peroxide	55,743	47,638
INDUSTRIAL MINERALS		
Cement	11,680,000	445,715
Fluorspar	1,290,000	129,643
Graphite, natural	170,022	43,134
Talc	980,000	76,698
MINERAL FUELS		
Coal	30,720,000	1,132,534
Coke, semicoke	10,580,000	790,964
Petroleum:		
Crude oil	19,830,000	2,734,132
Refinery products	5,590,000	1,201,361

Source: China's Customs Statistics (1997.12).

TABLE 4
CHINA: IMPORTS OF SELECTED MINERAL COMMODITIES IN 1997

(Metric tons)

	Quantity	Value (thousands)
METALS		
Aluminum:		
Alumina	1,090,000	\$238,659
Metal and alloys, unwrought	288,891	365,361
Semimanufactures	312,099	789,402
Scrap	335,898	172,268
Chromium: Chromite	890,000	110,776
Copper:		
Ore	940,000	421,164
Metal and alloys, unwrought	210,825	433,652
Semimanufactures	484,679	1,273,820
Scrap	796,841	342,136
Iron and steel:		
Iron ore	55,110,000	1,614,840
Pig iron and cast iron	20,000	3,764
Steel:		
Bars and rods	3,120,000	884,070
Seamless pipe	710,000	709,661
Shapes and sections	330,000	174,115
Sheets and plates	8,850,000	4,491,656
Manganese ore	1,320,000	123,745
INDUSTRIAL MINERALS		
Diamond kilograms	910	262,458
Fertilizers:		
Compound fertilizers	7,490,000	1,677,824
Potassium chloride	4,630,000	532,161
Potassium sulfate	630,000	127,112
Urea	3,420,000	618,541
Sodium carbonate	110,730	17,957
Titanium dioxide	91,790	94,752
MINERAL FUELS		
Coal	2,000,000	95,617
Petroleum:		
Crude oil	35,470,000	5,456,211
Refinery products	23,790,000	3,682,055

Source: China's Customs Statistics (1997.12).

TABLE 5
CHINA: EXPORTS AND REEXPORTS OF MINERAL COMMODITIES IN 1996 1/

(Metric tons unless otherwise specified)

Commodity	Total	Destinations	
		United States	Other (principal)
METALS			
Alkali and alkaline-earth metals:	3,387	486	Japan 861; Canada 632; Netherlands 455.
Aluminum:			
Ore and concentrates	thousand tons 201	90	Netherlands 32; France 25; India 10.
Oxides and hydroxides	46,059	8,724	Thailand 17,445; Philippines 3,698; Pakistan 4,170.
Ash and residue containing aluminum	170	--	Japan 80; Singapore 70; Philippines 20.
Metal including alloys:			
Scrap	6,162	188	Hong Kong 2,170; Japan 1,977; Taiwan 1,551.
Unwrought (not alloyed)	72,137	43	Hong Kong 48,984; Japan 11,133; Republic of Korea 6,390.
Semimanufactures	59,118	1,765	Hong Kong 36,149; Vietnam 5,795; Singapore 4,389.
Antimony:			
Ore and concentrate	2,257	701	Hong Kong 854; Japan 307; Thailand 143.
Oxides and acids	20,040	7,488	Japan 9,018; Netherlands 2,091; Hong Kong 669.
Metal including alloys, all forms	34,539	8,057	Hong Kong 13,764; Japan 5,565; Netherlands 2,888.
Arsenic: Metal including alloys, all forms	1,368	256	Netherlands 461; Iran 249; Hong Kong 111.
Beryllium: Metal including alloys, all forms	1	--	North Korea 1.
Bismuth: Metal including alloys, all forms	1,198	89	Hong Kong 545; Netherlands 265; Taiwan 100.
Cadmium: Metal including alloys, all forms	241	5	Hong Kong 226; Netherlands 7; North Korea 2.
Chromium:			
Ore and concentrate	4,712	--	Japan 3,452; Poland 1,035; Republic of Korea 225.
Oxides and hydroxides 3/	1,720	522	Taiwan 308; Belgium 189; Japan 126.
Metal including alloys, all forms:	2,952	1,544	Japan 831; Netherlands 342; United Kingdom 157.
Cobalt:			
Ore and concentrate	24	--	All to Russia.
Oxides and hydroxides	114	--	Hong Kong 84; Netherlands 6; Brazil 5.
Metal including alloys, all forms:	171	90	Hong Kong 28; Vietnam 23; Japan 17.
Columbium and tantalum: Tantalum metal including alloys, all forms	73	54	Japan 12; Taiwan 4; Republic of Korea 1.
Copper:			
Ore and concentrate	5	--	All to Hong Kong.
Matte	7	--	All to Republic of Korea.
Oxides and hydroxides	102	--	New Zealand 65; Hong Kong 29; Indonesia 8.
Sulfate	516	--	Malaysia 200; Canada 156; Hong Kong 68.
Ash and residue containing copper	3,617	--	Hong Kong 1,836; Russia 1,500; Taiwan 260.
Metal including alloys:			
Scrap	8,024	1,401	Hong Kong 3,757; Taiwan 1,776; Japan 1,049.
Unwrought	53,003	58	Republic of Korea 23,790; Hong Kong 15,288; Singapore 9,127.
Semimanufactures	80,705	2,208	Hong Kong 53,998; Singapore 6,895; Taiwan 4,023.
Iron and steel:			
Iron ore and concentrate: Pyrite, roasted	46	--	Republic of Korea 37; Thailand 9.
Metal:			
Scrap	32,633	309	Republic of Korea 13,780; Hong Kong 11,837; Japan 4,394.
Pig iron, cast iron, related materials	thousand tons 3,589	24	Republic of Korea 1,744; Japan 804; Taiwan 251.
Ferrous alloys:			
Ferrochromium	130,847	11,805	Japan 46,323; Republic of Korea 38,344; Netherlands 27,309.
Ferromanganese	171,907	14,027	Japan 42,555; Republic of Korea 41,128; Netherlands 19,017.
Ferromolybdenum	12,188	898	Netherlands 7,904; Republic of Korea 846; Japan 771.
Ferronickel	3	--	Hong Kong 2; India 1.
Ferrosilicochromium	31,079	5,193	Republic of Korea 13,021; Japan 6,725; Netherlands 5,802.
Ferrosilicomanganese	363,007	--	Republic of Korea 108,422; Netherlands 67,359; Japan 44,952.
Ferrosilicon	254,619	3,177	Japan 185,575; Republic of Korea 38,532; Thailand 5,575.
Unspecified	66,964	10,537	Japan 12,175; Netherlands 11,680; Hong Kong 11,554.
Steel, primary forms	7,209,295	8,160	Republic of Korea 3,131,134; Japan 771,575; Thailand 738,780.
Semimanufactures:			
Bars, rods, angles, shapes, sections	1,135,815	8,852	Hong Kong 414,115; Thailand 183,751; Malaysia 132,727.
Rails and accessories	25,409	62	Burmar 4,092; Thailand 3,185; Singapore 1,569.
Tubes, pipes, fittings	744,445	139,605	Hong Kong 87,661; Republic of Korea 65,812; Indonesia 37,270.
Wire	138,292	20,013	Hong Kong 26,621; United Arab Emirates 10,929; Singapore 10,802.

See footnotes at end of table.

TABLE 5--Continued
CHINA: EXPORTS AND REEXPORTS OF MINERAL COMMODITIES IN 1996 1/

(Metric tons unless otherwise specified)

Commodity	Total	Destinations	
		United States	Other (principal)
METALS--Continued			
Lead:			
Ore and concentrate	14,572	--	Japan 8,065; Republic of Korea 5,546; North Korea 920.
Oxides	13,231	40	Japan 10,861; Indonesia 561; Bangladesh 422.
Metal including alloys:			
Scrap	152	--	Republic of Korea 100; Japan 9; Taiwan 8.
Unwrought	260,514	995	Republic of Korea 77,578; Hong Kong 50,825; Indonesia 30,328.
Semimanufactures	2,092	9	Republic of Korea 390; Hong Kong 65; Mongolia 52.
Magnesium: Metal including alloys:			
Scrap	509	63	Japan 319; United Kingdom 82; Netherlands 45.
Unwrought	43,366	478	Japan 16,059; Netherlands 9,321; Canada 2,638.
Semimanufactures	5,252	2,061	Japan 1,535; Netherlands 463; Hong Kong 212.
Manganese:			
Ore and concentrate	4,191	--	Japan 3,172; North Korea 486; Republic of Korea 238.
Oxides and dioxides	15,651	74	Singapore 2,418; Indonesia 2,341; Japan 2,114.
Metal including alloys, all forms	49,934	1,411	Japan 20,219; Netherlands 17,451; United Kingdom 3,896.
Mercury	6	--	North Korea 5; Thailand 1.
Molybdenum:			
Ore and concentrate	1,441	54	United Kingdom 422; Netherlands 377; Republic of Korea 274.
Oxides and hydroxides	13,933	153	Netherlands 6,515; United Kingdom 3,962; Republic of Korea 1,959.
Metal including alloys, all forms	454	183	Japan 106; Singapore 45; Netherlands 39.
Nickel:			
Matte and speiss	79	--	All to Canada.
Oxides and hydroxides	146	16	Hong Kong 55; Ireland 17; Indonesia 15.
Metal including alloys:			
Scrap	77	--	Japan 61; Taiwan 16.
Unwrought	309	--	Japan 300; Germany 9; India 1.
Semimanufactures	493	5	Hong Kong 224; Japan 204; Republic of Korea 26.
Platinum-group metals:			
Metal including alloys, unwrought and partly wrought:			
Palladium kilograms	1,508	1,266	Japan 113; United Kingdom 40.
Platinum do.	98	20	United Kingdom 38; Japan 32; Hong Kong 4.
Rhodium do.	4,119	--	All to the United Kingdom.
Rare-earth metals including alloys, all forms	5,054	332	Taiwan 360; Republic of Korea 320; Japan 308.
Selenium: Elemental	27	--	Philippines 12; Singapore 10; Japan 2.
Silicon:			
Containing by weight less than 99.99% of silicon	273,917	6,290	Japan 143,056; Republic of Korea 25,381; Hong Kong 25,012.
Other, containing by weight greater than 99.99% of silicon	2,373	(2/)	Japan 985; India 443; Hong Kong 403.
Silver: Metal including alloys, unwrought and partly wrought kilograms			
	8,647	10	Hong Kong 6,290; Japan 2,249; Malaysia 50.
Tin: Metal including alloys:			
Scrap	21	--	Mainly to Germany.
Unwrought	36,128	752	Netherlands 13,766; Hong Kong 10,946; Japan 7,232.
Semimanufactures	2,604	81	Hong Kong 1,343; Netherlands 904; Spain 100.
Titanium:			
Ore and concentrate	24,912	500	Japan 15,205; Malaysia 8,281; Hong Kong 565.
Oxides	2,351	470	Japan 886; Hong Kong 248; United Kingdom 96.
Metal including alloys: Semimanufactures	752	349	United Kingdom 116; Hong Kong 40; Indonesia 35.
Tungsten:			
Ore and concentrate	140	--	Japan 100; India 40.
Metal including alloys: Semimanufactures	160	35	Japan 29; Singapore 26; Republic of Korea 21.
Uranium and thorium: Metal including alloys, all forms kilograms			
	351,466	--	Canada 350,000; United Kingdom 1,466.
Vanadium:			
Oxides and hydroxides	41	--	India 36; New Zealand 5.
Ash and residue containing vanadium	11,018	--	India 3,000; Turkey 2,000; Republic of Korea 1,500.
Metal including alloys, all forms value, thousands	\$50	\$10	Italy \$40.

See footnotes at end of table.

TABLE 5--Continued
CHINA: EXPORTS AND REEXPORTS OF MINERAL COMMODITIES IN 1996 1/

(Metric tons unless otherwise specified)

Commodity	Total	Destinations	
		United States	Other (principal)
METALS--Continued			
Zinc:			
Ore and concentrate	109,391	--	Republic of Korea 48,264; North Korea 45,530; Thailand 5,458.
Oxides	26,695	80	Japan 5,079; Hong Kong 4,640; Thailand 3,536.
Blue powder	7,721	--	Hong Kong 4,795; Japan 2,016; Taiwan 797.
Metal including alloys:			
Scrap	2,105	38	Taiwan 1,498; Hong Kong 301; Japan 225.
Unwrought	226,777	563	Japan 62,470; Taiwan 36,709; Singapore 33,055.
Semimanufactures	12,834	1,974	United Kingdom 6,821; Japan 2,014; Vietnam 714.
Zirconium:			
Ore and concentrate	8,341	--	Italy 3,272; Netherlands 2,800; Hong Kong 818.
Metal including alloys: Semimanufactures	34	3	India 20; France 7; Pakistan 1.
Other: Ores and concentrates	172,409	1,258	Republic of Korea 55,674; North Korea 47,160; Malaysia 8,282.
INDUSTRIAL MINERALS			
Abrasives, n.e.s.:			
Natural: Corundum, emery, pumice, etc. 4/ value, thousands	\$8,988	\$667	Japan \$2,598; Republic of Korea \$2,470; Taiwan \$305.
Artificial: Corundum			
Corundum	292,517	72,056	Japan 82,601; Republic of Korea 28,004; Belgium 15,462.
Silicon carbide	284,693	136,592	Japan 59,789; Republic of Korea 13,322; Netherlands 6,460.
Dust and powder of precious and semiprecious stones			
including diamond value, thousands	\$34,733	\$1,496	Japan \$8,564; Hong Kong \$3,392; Macau \$61.
Grinding and polishing wheels and stones	26,678	1,023	Thailand 4,117; Hong Kong 3,828; Japan 3,183.
Asbestos, crude	9,392	--	Vietnam 7,759; Thailand 600; Malaysia 483.
Barite and witherite thousand tons	1,860	1,314	Netherlands 174; Japan 128; Republic of Korea 74.
Boron:			
Crude natural borates	9	--	All to North Korea.
Oxides and acids	288	12	Japan 107; Hong Kong 72; North Korea 59.
Cement thousand tons	11,796	390	Bangladesh 2,754; Republic of Korea 1,247; Vietnam 1,191.
Clays, crude:			
Bentonite	73,169	87	Japan 46,551; Taiwan 10,764; Republic of Korea 9,776.
Chamotte or dinas earths	6,854	--	Japan 1,665; Taiwan 1,363; Australia 960.
Fire clay	916,732	41,465	Japan 151,903; Netherlands 146,510; United Kingdom 53,137.
Fuller's earth	1,182	--	Iran 466; Pakistan 240; Bangladesh 150.
Kaolin 5/	882,146	2,995	Hong Kong 529,353; Taiwan 227,837; Japan 43,692.
Cryolite and chiolite	443	--	Japan 343; North Korea 60; Hong Kong 29.
Diamond, natural:			
Gem, not set or strung value, thousands	\$145,590	\$2,316	Belgium \$66,739; Hong Kong \$60,391; Thailand \$6,857.
Industrial stones do.	\$632	--	Belgium \$390; Japan \$182; Hong Kong \$36.
Dust and powder kilograms	3,922	1,657	Japan 1,089; Hong Kong 873; Macau 140.
Diatomite and other infusorial earth	132,872	40	Taiwan 53,612; Japan 15,933; Hong Kong 15,699.
Feldspar, fluorspar, related materials	1,692,790	290,261	Japan 414,974; Taiwan 343,683; Hong Kong 196,317.
Fertilizer materials:			
Crude, n.e.s.	27,594	--	Japan 22,710; Republic of Korea 1,853; Malaysia 1,152.
Manufactured:			
Ammonia	2,605	--	Hong Kong 2,437; Vietnam 102; Macau 53.
Nitrogenous	271,312	4,000	Vietnam 162,527; Malaysia 20,624; North Korea 15,478.
Phosphatic	365,695	204	Bangladesh 129,350; Japan 77,093; Burma 49,213.
Potassic	536,100	--	Hong Kong 126,450; Vietnam 111,342; Bangladesh 107,370.
Unspecified and mixed	174,443	350	Indonesia 85,764; Vietnam 20,185; Thailand 16,352.
Graphite, natural	158,368	13,688	Japan 55,348; Republic of Korea 33,510; Netherlands 11,760.
Gypsum and plaster	79,318	18	Vietnam 20,542; Macau 18,708; Malaysia 15,925.
Iodine value, thousands	\$43	--	Mainly to India.
Kaynite: Mullite	3,199	--	Japan 2,960; Republic of Korea 239.
Lime	94,268	8	Hong Kong 77,982; Macau 8,437; Singapore 5,949.
Magnesium compounds:			
Magnesite, crude	206,576	--	Canada 203,415; Taiwan 3,000; Japan 95.
Oxides and hydroxides	1,724,195	250,092	Japan 438,556; Netherlands 228,617; Republic of Korea 123,351.
Sulfate	73,840	120	Malaysia 42,311; Indonesia 21,982; Thailand 2,388.

See footnotes at end of table.

TABLE 5--Continued
CHINA: EXPORTS AND REEXPORTS OF MINERAL COMMODITIES IN 1996 1/

(Metric tons unless otherwise specified)

Commodity	Total	Destinations	
		United States	Other (principal)
INDUSTRIAL MINERALS--Continued			
Mica:			
Crude including splittings and waste	42,222	--	Japan 28,800; Netherlands 8,064; United Kingdom 1,478.
Worked including agglomerated splittings value, thousands	\$5,011	\$398	Hong Kong \$525; Japan \$273; Netherlands \$64.
Nitrates, crude	5,754	--	Vietnam 2,249; Pakistan 1,047; Republic of Korea 649.
Phosphates, crude	1,368,667	--	Republic of Korea 411,082; Japan 289,124; Philippines 272,288.
Phosphorus, elemental	70,745	345	Australia 14,110; Japan 13,842; India 7,595.
Pigments, mineral: Iron oxides and hydroxides, processed	102,958	16,188	United Kingdom 22,521; Netherlands 9,650; Japan 8,366.
Potassium salts, crude	132,440	--	Vietnam 56,040; Philippines 21,700; Bangladesh 21,000.
Precious and semiprecious stones other than diamond:			
Natural value, thousands	\$38,202	\$2,943	Hong Kong \$31,922; Japan \$695; Thailand \$551.
Synthetic do.	\$19,004	\$2,507	Hong Kong \$6,808; Republic of Korea \$3,359; Thailand \$3,015.
Pyrite, unroasted	30,317	--	Republic of Korea 20,532; Japan 9,763; Canada 18.
Quartz crystal, piezoelectric value, thousands	\$3,516	\$224	Hong Kong \$2,279; Thailand \$460; Republic of Korea \$377.
Salt and brine thousand tons	365	(2/)	North Korea 136; Philippines 80; Hong Kong 63.
Stone, sand and gravel:			
Dimension stone:			
Crude and partly worked value, thousands	\$75,520	\$2,844	Japan \$30,670; Hong Kong \$13,943; Republic of Korea \$7,433.
Worked do.	\$634,505	\$16,434	Japan \$487,642; Hong Kong \$36,716; Republic of Korea \$26,046.
Dolomite, chiefly refractory-grade	338,331	3,085	Japan 300,495; Republic of Korea 15,709; Taiwan 9,674.
Gravel and crushed rock thousand tons	7,234	(2/)	Hong Kong 6,655; Macau 311; Japan 132.
Limestone flux and calcareous stone	12,654	--	Taiwan 6,203; Republic of Korea 3,319; Vietnam 2,911.
Quartz and quartzite	38,864	1	Japan 18,345; Taiwan 15,902; Hong Kong 2,058.
Sand and gravel and other metal-bearing thousand tons	10,599	6	Hong Kong 7,662; Japan 1,798; Macau 624.
Sulfur:			
Elemental:			
Crude including native and byproduct	1,380	32	North Korea 1,088; Vietnam 85; Japan 65.
Colloidal, precipitated, sublimed	503	140	North Korea 150; Thailand 33; Japan 32.
Dioxide	156	15	Japan 73; Philippines 23; United Kingdom 16.
Sulfuric acid	6,524	--	Hong Kong 6,318; Macau 61; Russia 49.
Talc, steatite, soapstone, pyrophyllite thousand tons	1,024	79	Japan 422; Republic of Korea 216; Indonesia 87.
Other: Slag and dross, not metal-bearing	158,835	108	Hong Kong 54,116; Singapore 39,509; Macau 21,971.
MINERAL FUELS AND RELATED MATERIALS			
Asphalt and bitumen, natural	1,194	--	Japan 1,151; Hong Kong 37; Macau 7.
Carbon black	26,587	261	Hong Kong 8,050; Thailand 4,520; Indonesia 3,443.
Coal:			
Anthracite thousand tons	1,729	--	Japan 658; Republic of Korea 597; France 326.
Bituminous do.	27,268	--	Japan 10,913; Republic of Korea 8,324; Taiwan 4,418.
Briquets of anthracite and bituminous coal	559	365	Germany 95; Turkey 46; Japan 35.
Lignite including briquets	387	--	Japan 227; North Korea 100; Netherlands 60.
Coke and semicoke thousand tons	7,687	1,051	India 1,080; Japan 575; United Kingdom 555.
Gas, manufactured million cubic meters	17,800	--	All to Vietnam.
Peat including briquets and litter	4,210	--	Japan 2,291; Republic of Korea 1,426; Taiwan 292.
Petroleum:			
Crude thousand 42-gallon barrels	150,038	19,463	Japan 85,739; Republic of Korea 23,059; Singapore 2,887.
Refinery products:			
Liquefied petroleum gas do.	3,945	2	Hong Kong 3,663; Macau 73; India 59.
Mineral jelly and wax do.	2,295	68	India 210; Philippines 178; Indonesia 168.
Kerosene and jet fuel do.	5,836	210	Japan 1,916; Republic of Korea 1,530; Hong Kong 385.
Distillate fuel oil do.	11,695	--	Hong Kong 8,132; Republic of Korea 1,588; Taiwan 466.
Lubricants do.	1,903	1	Hong Kong 610; Thailand 373; Singapore 291.
Residual fuel oil do.	1,858	--	Hong Kong 542; Japan 404; Panama 374.
Bitumen and other residues, not including asphalt do.	1,388	--	Japan 1,368; Macau 6; Vietnam 6.
Bituminous mixtures 6/ do.	22	--	Taiwan 11; Malaysia 3; Republic of Korea 3.
Petroleum coke do.	2,388	358	Japan 1,294; Russia 406; India 328.

1/ Data presented in this table are from China's Custom Yearbook, 1996. Table prepared by Regina R. Coleman, International Data Unit.

2/ Less than 1/2 unit.

3/ Excluding chromium trioxide.

4/ Includes garnet and other natural abrasives.

5/ Includes other kaolinic clays.

6/ Mixtures based on natural asphalt, bitumen, etc.

TABLE 6
CHINA: IMPORTS OF MINERAL COMMODITIES IN 1996 1/

(Metric tons unless otherwise specified)

Commodity	Total	Sources	
		United States	Other (principal)
METALS			
Alkali and alkaline-earth metals	859	5	Finland 651; Russia 112; Japan 34.
Aluminum:			
Ore and concentrates	213,090	--	Indonesia 152,844; Australia 59,824; North Korea 208.
Oxides and hydroxides	1,155,545	328	Australia 1,082,810; India 36,719; Russia 30,900.
Ash and residue containing aluminum	1,438	16	Russia 1,029; Japan 222; Germany 91.
Metal including alloys:			
Scrap	299,914	151,606	Australia 28,781; Kazakhstan 24,329; Russia 23,236.
Unwrought	366,733	5,254	Russia 209,076; Australia 33,520; Hong Kong 23,744.
Semimanufactures	267,785	55,275	Japan 69,175; Taiwan 36,666; Republic of Korea 33,604.
Antimony:			
Ore and concentrate	7,691	--	Mexico 1,964; Bolivia 1,762; Vietnam 1,688.
Oxides	544	213	Japan 171; Taiwan 136; Republic of Korea 16.
Metal including alloys, all forms	3,020	173	Japan 1,328; Hong Kong 391.
Arsenic: Metal including alloys, all forms kilograms	153	32	Russia 110; Japan 10.
Beryllium: Metal including alloys, all forms	102	(2/)	Kazakhstan 100; Japan 2.
Bismuth: Metal including alloys, all forms kilograms	237	--	Mainly from Japan.
Cadmium: Metal including alloys, all forms	1,151	7	Canada 475; Japan 197; Belgium 131.
Chromium:			
Ore and concentrate	764,377	24,246	India 296,878; South Africa 139,292; Turkey 92,947.
Oxides and hydroxides 3/	1,143	27	Germany 433; Thailand 220; Taiwan 126.
Metal including alloys, all forms:	1,327	30	Germany 326; Japan 264; India 230.
Cobalt:			
Ore and concentrate	4,913	--	Morocco 4,623; Cuba 200; South Africa 38.
Oxides and hydroxides	108	1	Germany 69; Taiwan 9.
Metal including alloys, all forms:	427	10	Russia 79; South Africa 79; Zaire 56.
Columbium and tantalum: Tantalum metal including alloys, all forms kilograms			
	137,909	126,442	Japan 8,260; Hong Kong 2,800; Germany 3,100.
Copper:			
Ore and concentrate	824,810	83,458	Chile 195,885; Australia 149,168; Mongolia 149,099.
Matte	1,846	--	Russia 570; Philippines 555; Chile 493.
Oxides and hydroxides	2,153	440	Hong Kong 638; Taiwan 632; Singapore 116.
Sulfate	22,100	197	Russia 15,941; Uzbekistan 2,051; Japan 766.
Ash and residue containing copper	117	--	Malaysia 107; Kazakhstan 9; Taiwan 1.
Metal including alloys:			
Scrap	710,983	324,234	Japan 145,306; Netherlands 39,278; Russia 34,172.
Unwrought	290,940	23,598	Chile 70,257; Philippines 28,640; Japan 27,038.
Semimanufactures	423,303	9,796	Taiwan 151,144; Japan 98,206; Republic of Korea 41,197.
Germanium: Metal including alloys, all forms kilograms	3,743	3,309	Israel 262; Switzerland 159.
Iron and steel:			
Iron ore and concentrate: Pyrite, roasted	937	--	France 671; Italy 192; Malaysia 74.
Metal:			
Scrap	1,283,322	221,587	Japan 415,896; Russia 371,984; Mongolia 83,764.
Pig iron, cast iron, related materials	58,266	241	India 19,681; North Korea 18,304; Republic of Korea.
Ferroalloys:			
Ferchromium	254	11	North Korea 182; Hong Kong 2; Taiwan 19.
Ferromanganese	16	--	Taiwan 13; Japan 2; Hong Kong 1.
Ferromolybdenum	66	--	Kazakhstan 63; Taiwan 2.
Ferronickel	52	2	Japan 46; Taiwan 3.
Ferrosilicochromium	820	--	Netherlands 683; Japan 137.
Ferrosilicomanganese	17	--	Brazil 16; Germany 1; Taiwan 1.
Ferrosilicon	3,914	90	North Korea 2,777; Japan 572; Republic of Korea 385.
Unspecified	6,234	14	North Korea 2,959; Republic of Korea 946; Japan 862.
Steel, primary forms	398,382	175	Japan 153,384; Russia 143,606; North Korea 18,747.
Semimanufactures:			
Bars, rods, angles, shapes, sections	4,850,378	17,354	Russia 2,469,523; Ukraine 786,225; Japan 380,809.
Rails and accessories	10,926	33	Russia 9,186; Japan 461; Republic of Korea 316.
Wire	155,041	2,979	Taiwan 46,573; Japan 43,132; Republic of Korea 17,703.
Tubes, pipes, fittings	532,796	46,079	Japan 193,950; Taiwan 95,694; Germany 42,366.

See footnotes at end of table.

TABLE 6--Continued
CHINA: IMPORTS OF MINERAL COMMODITIES IN 1996 1/

(Metric tons unless otherwise specified)

Commodity	Total	Sources	
		United States	Other (principal)
METALS--Continued			
Lead:			
Ore and concentrate	69,958	--	Australia 41,420; Peru 6,106; North Korea 5,498.
Oxides	kilograms 298,522	143,937	Taiwan 101,185; Hong Kong 30,648; Japan 12,941.
Ash and residue containing lead	14	--	Mainly from Burma.
Metal including alloys:			
Scrap	820	13	North Korea 236; Russia 231; Mongolia 159.
Unwrought	7,039	15	Australia 2,850; North Korea 2,208; Taiwan 413.
Semimanufactures	5,505	62	Taiwan 1,548; Russia 1,101; Republic of Korea 788.
Lithium: Oxides and hydroxides	87	86	
Magnesium: Metal including alloys:			
Scrap	4	--	All from Russia.
Unwrought	34	(2/)	Kazakhstan 24; Taiwan 9; Germany 1.
Semimanufactures	348	109	Japan 155; Taiwan 64; Hong Kong 10.
Manganese: Ore and concentrate			
Metallurgical-grade	1,585,287	(2/)	Australia 558,834; Burma 408,516; Gibon 318,202.
Oxides	4,028	1	Japan 1,373; Singapore 1,186; Hong Kong 301.
Metal including alloys, all forms	278	2	Singapore 150; Japan 68; Taiwan 48.
Mercury	kilograms 25,061	6	Kyrgyzstan 20,286; Germany 2,061; Taiwan 1,160.
Molybdenum:			
Ore and concentrate	7,689	2,033	Mongolia 4,290; Iran 753; Netherlands 187.
Oxides and hydroxides	182	39	South Africa 120; Netherlands 21; Germany 1.
Metal including alloys, all forms:			
Semimanufactures	17	5	Taiwan 6; Kazakhstan 2; Hungary 1.
Nickel:			
Ore and concentrate	237	51	Netherlands 100; Burma 85; Taiwan 1.
Matte	kilograms 488,735	4,000	Cuba 237,540; Netherlands 231,000; Taiwan 6,055.
Oxides and hydroxides	1,701	133	Japan 637; Canada 412; Hong Kong 172.
Metal including alloys:			
Scrap	43	8	Kazakhstan 21; Canada 5; Germany 4.
Unwrought	916	5	Russia 492; United Kingdom 155; Canada 107.
Semimanufactures	6,306	153	Kazakhstan 1,794; Japan 1,096; Canada 863.
Platinum-group metals:			
Waste and sweepings	grams 13,300	--	All from United Kingdom.
Metal including alloys, unwrought and partly wrought:			
Palladium	do. 125,768	2,300	Japan 69,958; United Kingdom 50,000; Hong Kong 3,510.
Platinum	do. 481,981	432,275	United Kingdom 34,639; Germany 5,587; Singapore 5,147.
Rhodium	do. 17,900	--	Hong Kong 16,000; United Kingdom 1,980.
Iridium, osmium, ruthenium	do. 321,993	13,225	United Kingdom 196,000; South Africa 45,140; Germany 42,628.
Rare-earth metals including alloys, all forms	24	3	Republic of Korea 13; Japan 5; Taiwan 2.
Selenium: Elemental	212	6	Japan 87; Belgium 54; Hong Kong 2.
Silicon:			
Other, containing by weight greater than 99.99% of silicon	153	98	Japan 46; Germany 5; Republic of Korea 4.
Containing by weight less than 99.99% of silicon	206	61	Taiwan 38; Germany 32; United Kingdom 20.
Silver:			
Ore and concentrate	kilograms 59,000	--	All from Tajikistan.
Metal including alloys, unwrought and partly wrought	87,086	17,489	Japan 12,193; Taiwan 10,770; South Africa 9,160.
Tin:			
Ore and concentrate	434	--	Burma 414; Nigeria 20.
Metal including alloys:			
Scrap	612	--	Singapore 509; Taiwan 70; Japan 33.
Unwrought	2,060	168	Taiwan 385; Malaysia 357.
Semimanufactures	9,761	372	Taiwan 2,633; Japan 1,975; Hong Kong 1,675.
Titanium:			
Ore and concentrate	56,622	(2/)	Canada 44,094; Australia 11,257; South Africa 550.
Oxides	8,138	704	Japan 1,761; Germany 1,311; Taiwan 1,026.
Metal including alloys: Semimanufactures	1,359	127	Kazakhstan 467; Kyrgyzstan 326; Japan 125.

See footnotes at end of table.

TABLE 6--Continued
CHINA: IMPORTS OF MINERAL COMMODITIES IN 1996 1/

(Metric tons unless otherwise specified)

Commodity	Total	Sources	
		United States	Other (principal)
METALS--Continued			
Tungsten:			
Ore and concentrate	2,693	165	Burma 695; North Korea 349; Russia 296.
Metal including alloys: Semimanufactures	123	10	Taiwan 46; Japan 36; Hong Kong 10.
Uranium and thorium: Ore and concentrate	1,486	--	Malaysia 1,286; Thailand 200.
Vanadium:			
Oxides and hydroxides	(2/)	--	All from Japan.
Ash and residue containing vanadium	2,001	--	All from New Zealand.
Metal including alloys, all forms value, thousands	\$855	\$380	New Zealand \$475.
Zinc:			
Ore and concentrate	295,079	60,613	Australia 149,619; Canada 49,008; India 18,182.
Oxides	7,166	96	Taiwan 5,393; Republic of Korea 503; Japan 349.
Blue powder	1,707	3	Japan 1,375; Taiwan 105; Republic of Korea 96.
Ash and residue containing zinc	260	--	North Korea 160; Taiwan 100.
Metal including alloys:			
Scrap	20,374	12,855	Japan 4,283; France 771; United Kingdom 545.
Unwrought	69,512	1,292	Australia 22,349; Peru 9,493; Belgium 6,764.
Semimanufactures	45,075	400	Australia 13,124; Belgium 6,027; Taiwan 5,616.
Zirconium:			
Ore and concentrate	118,848	1,342	Australia 49,387; South Africa 46,005; Italy 8,585.
Metal including alloys: Semimanufactures	52	10	Japan 18; France 8; Sweden 6.
INDUSTRIAL MINERALS			
Abrasives, n.e.s.:			
Natural: Corundum, emery, pumice, etc.	35,441	473	Indonesia 25,343; Taiwan 1,617; Turkey 1,445.
Artificial:			
Corundum	2,125	1,018	Netherlands 761; Japan 128; Taiwan 75.
Silicon carbide	145	51	Germany 42; Taiwan 24; Italy 8.
Dust and powder of precious and semiprecious stones including diamond	1,943	887	Ireland 709; Burma 214; Republic of Korea 60.
Grinding and polishing wheels and stones	4,215	279	Taiwan 1,294; Japan 820; Austria 605.
Asbestos, crude	77,958	21	Russia 77,091; Zimbabwe 450; Canada 278.
Barite and witherite	50	2	Canada 28; Taiwan 7; Republic of Korea 4.
Boron materials:			
Crude natural borates	8,136	8,098	Taiwan 241; Japan 7.
Oxides and acids	36,400	258	Russia 35,138; Taiwan 262; Hong Kong 31.
Cement thousand tons	52	1	Japan 12; Malaysia 10.
Chalk	81	--	France 30; Germany 21; Malaysia 15.
Clays, crude:			
Bentonite	2,007	620	Taiwan 763; Republic of Korea 459; Japan 90.
Chamotte or dinas earths	1,539	386	United Kingdom 879; Australia 189; Hong Kong 58.
Fire clay	3,813	819	Taiwan 1,271; Japan 780; Republic of Korea 231.
Fuller's earth	2,273	928	Malaysia 561; Singapore 323; Indonesia 220.
Kaolin	37,211	16,680	Taiwan 10,060; Japan 4,465; United Kingdom 2,534.
Cryolite and chiolite	84	--	Brazil 43; Egypt 22; Taiwan 15.
Diamond, natural:			
Gem, not set or strung value, thousands	\$175,393	\$6,357	Belgium \$80,866; South Africa \$50,610; Hong Kong \$14,427.
Industrial stones do.	\$2,060	\$949	Ireland \$389; Belgium \$308; Australia \$135.
Dust and powder do.	\$2,357	\$1,364	Ireland \$904; Taiwan \$30; Canada \$15.
Diatomite and other infusorial earth	3,149	2,185	Taiwan 192; United Kingdom 190; France 150.
Feldspar, fluorspar, related materials:			
Feldspar	3,919	--	Taiwan 2,928; Japan 559; Spain 150.
Fluorspar	254	(2/)	Taiwan 133; Thailand 120.
Fertilizer materials:			
Crude, n.e.s.	4,048	192	Taiwan 2,825; Hong Kong 744; Japan 83.
Manufactured:			
Ammonia	359	59	Taiwan 99; Japan 65; Hong Kong 44.

See footnotes at end of table.

TABLE 6--Continued
CHINA: IMPORTS OF MINERAL COMMODITIES IN 1996 1/

(Metric tons unless otherwise specified)

Commodity	Total	Sources		
		United States	Other (principal)	
INDUSTRIAL MINERALS--Continued				
Fertilizer materials--Continued:				
Manufactured--Continued:				
Nitrogenous	thousand tons	7,253	327	Russia 4,414; Ukraine 702; Saudi Arabia 261.
Phosphatic	do.	14	9	Turkmenistan 4.
Potassic	do.	3,855	88	Russia 1,976; Canada 1,240; Jordan 135.
Unspecified and mixed	do.	7,243	4,424	Russia 1,274; Norway 352; Kazakhstan 306.
Graphite, natural		368	39	Japan 109; Russia 60; Hong Kong 49.
Gypsum and plaster 4/		19,431	3,471	Taiwan 10,295; United Kingdom 1,743; Japan 1,112.
Iodine	value, thousands	\$196	\$4	Japan \$145; United Kingdom \$21; Taiwan \$20.
Kaynite: Mullite		122	--	North Korea 120; Italy 2.
Lime		329	58	Republic of Korea 102; Taiwan 53; Hong Kong 48.
Mica:				
Crude including splittings and waste		398	7	Taiwan 179; Japan 133; Hong Kong 46.
Worked including agglomerated splittings	value, thousands	\$2,008	\$40	Japan \$691; Hong Kong \$506; Belgium \$155.
Nitrates, crude		26,739	--	Chile 25,090; Germany 700.
Phosphates, crude		419	1	France 225; Japan 58; Taiwan 44.
Phosphorus, elemental		34	30	Japan 3.
Pigments, mineral: Iron oxides and hydroxides, processed		16,015	1,028	Japan 8,057; Taiwan 3,690.
Potassium salts, crude 5/		172,548	--	Mainly from Russia.
Precious and semiprecious stones other than diamond:				
Natural	value, thousands	\$87,108	\$3,661	Burma \$41,423; Thailand \$16,652; South Africa \$8,996.
Synthetic	do.	\$12,155	\$2,036	Taiwan \$2,799; Hong Kong \$1,398; Republic of Korea \$787.
Pyrite, unroasted		202	--	Italy 192; Taiwan 10.
Quartz crystal, piezoelectric	value, thousands	\$4,926	\$105	Hong Kong \$2,175; Japan \$1,223; Malaysia \$1,022.
Salt and brine	thousand tons	4	(2/)	Republic of Korea 1.
Stone, sand and gravel:				
Dimension stone:				
Crude and partly worked	value, thousands	\$37,238	\$345	Italy \$20,359; India \$5,567; Taiwan \$3,405.
Worked	do.	\$120,797	\$1,833	Italy \$76,186; Spain \$13,821; Taiwan \$5,846.
Dolomite, chiefly refractory-grade		2,306	(2/)	Italy 731; Pakistan 654; Taiwan 567.
Gravel and crushed rock	thousand tons	4	1	France 1; Philippines 1; Taiwan 1.
Limestone flux and calcareous stone		488	--	Japan 15; North Korea 450.
Quartz and quartzite		731	96	Canada 82; Japan 45; Brazil 42.
Sand and gravel and other metal-bearing	thousand tons	10,599	6	Hong Kong 7,662; Japan 1,798; Macau 624.
Sulfur:				
Elemental:				
Crude including native and byproduct		467,293	43,089	Canada 263,995; Japan 121,652; Republic of Korea 23,500.
Colloidal, precipitated, sublimed		342,994	5,987	Canada 189,280; Japan 110,440; Republic of Korea 14,470.
Dioxide		4	(2/)	Japan 1; North Korea 1.
Sulfuric acid		75,483	276	Japan 73,842; Taiwan 781.
Talc, steatite, soapstone, pyrophyllite		5,362	739	Taiwan 2,086; Netherlands 322.
Vermiculite, perlite, chlorite		188	3	Greece 80; North Korea 50; Japan 37.
Other: Slag and dross, not metal-bearing		30,883	101	Hong Kong 21,874; North Korea 7,763; New Zealand 1,000.
MINERAL FUELS AND RELATED MATERIALS				
Asphalt and bitumen, natural 6/		104,180	762	Venezuela 51,907; Singapore 25,290; Japan 12,427.
Carbon black		12,423	507	Taiwan 6,357; Republic of Korea 2,479.
Coal:				
Anthracite	thousand tons	381	--	South Africa 175; Australia 99; Vietnam 73.
Bituminous	do.	2,824	--	Australia 1,740; Russia 418; South Africa 225.
Lignite including briquets	do.	13	(2/)	Vietnam 8; Russia 5.
Coke and semicoke		1,448	21	Japan 1,403; Taiwan 22; Canada 2.
Gas, manufactured		621	35	Taiwan 497; Japan 89.
Gas, natural:				
Liquefied	thousand cubic meters	168,990	25	Malaysia 117,971; Republic of Korea 29,613; Philippines 5,130.
Peat including briquets and litter		7,162	13	Vietnam 6,892; Netherlands 252; Taiwan 4.
Petroleum:				
Crude	thousand 42-gallon barrels	165,556	833	Indonesia 46,087; Oman 41,392; Yemen 27,565.

See footnotes at end of table.

TABLE 6--Continued
CHINA: IMPORTS OF MINERAL COMMODITIES IN 1996 1/

(Metric tons unless otherwise specified)

Commodity	Total	Destination:		Sources
		United States		Other (principal)
MINERAL FUELS AND RELATED MATERIALS--Continued				
Petroleum--Continued (thousand 42-gallon barrels)				
Refinery products:	do.			
Liquefied petroleum gas	do. 41,378	292		Saudi Arabia 26,548; Republic of Korea 19,035; Australia 823.
Mineral jelly and wax	do. 142,603	15,209		Taiwan 33,200; Japan 11,211; Hong Kong 6,988.
Kerosene and jet fuel	do. 6,329	11		Singapore 2,207; Republic of Korea 1,862; Kuwait 891.
Distillate fuel oil	do. 34,502	396		Singapore 25,905; Russia 3,196; Republic of Korea 2,328.
Lubricants	do. 8,744	790		Singapore 2,827; Russia 2,326; Malaysia 1,082.
Residual fuel oil	do. 56,888	325		Singapore 32,252; Republic of Korea 12,637; Russia 3,116.
Bitumen and other residues	do. 45,103	15		Singapore 18,063; Japan 14,722; Taiwan 2,942.
Bituminous mixtures	do. 33	8		Singapore 9; Japan 7; Republic of Korea 4.
Petroleum coke	do. 137	--		Indonesia 116; Japan 21; United Kingdom 1.

1/ Data presented in this table are from China's Custom Yearbook, 1996. Table prepared by Regina R. Coleman, International Data Unit.

2/ Less than 1/2 unit.

3/ Excluding chromium trioxide.

4/ Including anhydrite.

5/ Including carnallite, sylvite, and other.

6/ Not including tar sands.