



2005 Minerals Yearbook

CHINA

THE MINERAL INDUSTRY OF CHINA

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During the past two decades, China had achieved remarkable economic growth. The gross domestic product (GDP) increased by 9.9% to \$2.26 trillion, and the per capita GDP rose to \$1,728 in 2005. The 2005 economic growth rate was 0.2% lower than that of the revised 2004 economic growth rate. Most of the upward adjustment of the GDP to 10.1% for 2004 was the result of the omission of millions of mostly private service companies. The 2004 economic census indicated that these services were more important to the country's economy than previously thought. During the past 5 years, China's economy grew by more than 9% per year. The strong economic growth was aided by increased domestic investment and export-oriented industrial production. By the end of 2005, China's foreign exchange reserves reached \$818.9 billion. The output of the industrial sector increased by 11.4% compared with the previous year. Fixed asset investment grew by 25.7% to \$1.09 trillion. Of the total investment, state-owned and state-holding enterprises accounted for 45.5%, or \$496 billion. Investments in the coal and the oil sectors increased by 65.6% and 29.7%, respectively. Despite strong economic expansion, consumer inflation increased by only 1.8% in 2005. Food prices rose only slightly, and productivity improvements helped to offset the rising costs of production of materials and labor. In 2005, average global oil prices increased by 40%. Owing to Government price controls, however, the prices of petroleum products in China increased by only between 10% and 15%. Oil refiners in China posted heavy losses, and the Government paid China Petrochemical Corp. (Sinopec) \$1.2 billion in compensation (State Statistics Bureau, 2006).

Government Policies and Programs

The Millennium Development Goals for China was established to develop a "Xiaokang" (the all-around moderately prosperous society) with emphasis on a "Harmonious Socialist Society." The Government's outline of the Eleventh 5-Year Plan (2006-2010) describes plans for more-balanced growth in urban and rural areas and more-equitable income distribution. It introduces two basic policies for saving natural resources and protecting the environment. In the plan, the Government expects the per capita GDP to be double that of 2000 by 2010. The plan also focuses on improving agricultural productivity, infrastructure, and service delivery. Other important objectives noted in the plan include reducing production and transportation costs; upgrading technological processes; improving energy development; and adjusting the raw material supply infrastructure in China. The plan also describes the Government's plans to merge and/or take over small coal mines to form big mining companies during the next several years to improve production efficiency and safety. It stresses the importance of upgrading the iron and steel sector through mergers, improving the quality of steel products, and controlling the production capacities of 13 commodities, including

aluminum, cement, copper, iron and steel, lead, and zinc (Zhonghua Reminn Gongheguo Guowuyuan Gongbao, 2006).

In 2005, the National Development and Reform Commission (NDRC) urged the consolidation of the aluminum, automotive, cement, and iron and steel sectors where capacity growth appeared excessive and encouraged companies to explore for and develop facilities to produce copper, lead, manganese, and zinc in China and overseas. The Government continued to control strictly the development of antimony, rare earths, tin, and tungsten, and foreign investors were not allowed to participate in the exploration and exploitation of these commodities (China Nonferrous Metals News, 2005b; Zhonghua Reminn Gongheguo Guowuyuan Gongbao, 2006).

Even though the Government took steps to "cool down" the strong growth sectors that the Government considered to be "overheated," such as aluminum, automobiles, cement, real estate, and steel, China's economy continued to expand at a rapid pace. Fixed asset investments in large public works projects, factory construction, and commercial real estate development, especially in the urban areas, increased by more than 20%. The Government was concerned that the new waves of investment in the production capacities of the automobile, cement, and steel sectors could diminish prices. During the past decade, the Government had tried gradually to restrain its economy without jeopardizing the creation of jobs for millions of farmers and the younger generation. During the past 2 years, the rising prices of such commodities as coal and iron ore in the world markets led to financial losses for many domestic ferrous and nonferrous metal producers. In response, the Government ordered banks and local governments once again to tighten financing for construction projects. To cool real estate speculation, the People's Bank of China (Central Bank) raised the minimum required downpayment for the purchase of an apartment, increased the interest rate to 5.85%, and introduced a new capital gains tax on properties sold within 5 years of purchase. These measures were designed to contain the desire of local governments to invest in more infrastructure and to prevent banks from over-lending and thereby avoid medium- and long-term bad debts (Citigroup Global Market Inc., 2006; Goodman, 2006b).

During the past two decades, China's economic growth has been led by investment and export growth. The next engine for China's economic growth was expected to be domestic consumption growth. The high saving rate of China's households was associated with a weak social security system and absence of investment opportunities. The relatively low consumption ratio was one of the factors in the country's widening trade surplus and increasing foreign exchange reserves. The Eleventh 5-Year Plan proposes to rebalance consumption and investment, and domestic and external demand. The Central Bank revealed that a futures trading act would be introduced to protect investors in the commodity futures and financial derivatives markets. During the past

several years, the Government has spent more than \$600 billion to cover nonperforming loans created by domestic financial institutions. Private economists estimated that as much as \$500 billion in nonperforming loans remained in the current accounts of China's banks. The Government planned to establish a mechanism to close loss-making institutions and halt buyouts by the Government, but regulations covering the obligations and rights of shareholders were vague. Because the liquidation procedure for banks was difficult to implement, the Central Bank also submitted a proposal to the State Council to establish a deposit insurance system in China (Asian Development Bank, 2006, p. 118; China Nonferrous Metals News, 2006; Goodman, 2006a).

China's mineral resources law was enacted in 1986 and amended in 1996. The Government believed that the law needed to be amended again to attract foreign investment in mineral development and production in China. The proposed changes may redefine mineral rights. In the 1986 and 1996 versions, all minerals above and under the surface belonged to and were controlled by the State. In 2000, the State Council issued a decree to allow foreign investors to establish wholly-owned mining companies to prospect for and exploit minerals in China; owing to the lack of clarity in regulations and legal definitions, however, exploration companies were reluctant to invest large amounts in China. Under the current law as amended in 1996, prospectors have mining rights, but the law does not explain clearly how such rights can be guaranteed. In 2003, the Ministry of Land and Resources (MLR) established a mineral-resources law consultation committee to seek recommendations from domestic and overseas mining law experts. In 2005, a multinational mining consortium that included BHP Billiton plc and Rio Tinto Group began working with the Chinese Government to revise the country's mineral resources law for foreign investors (Interfax Information Services, 2006f).

The Government established an energy law leadership group composed of representatives from 15 Government agencies to draft a new energy law. The proposed new law would close legislative gaps among existing regulations and laws, such as the Coal Law, the Electric Power Law, the Energy Conservation Law, and the Renewable Energy Law and would stress energy efficiency and environmental protection. It also would strengthen implementation of the country's energy strategy and energy security. The group planned to finish drafting the new law within the next 2 years (Interfax Information Services, 2006b).

The MLR planned to build as many as 10 strategic mineral reserves, including reserves of aluminum, copper, manganese, uranium, and other minerals that the country urgently needed. The Government began to build four crude oil strategic reserve sites; the first one was expected to be completed in 2006. The Government did not review the reserve levels and who might manage them. The State Reserve Bureau handled the country's commodity stockpile and lost millions of dollars on copper trading in the global markets in 2005. The initial review indicated that the Government would hold 200 million metric tons (Mt) of bauxite and copper metal each, 100 billion metric tons (Gt) of coal, and 5 Gt of crude oil (Washington Post, The, 2006).

Production

Since the country's opening to the world in 1978, China's rapid economic growth has resulted in strong demand for a wide variety of mineral commodities. During the same period, China's mineral production increased sharply. China's increased mineral production and demand affected the worldwide availability of minerals and metals, the market prices, and trade. The rapid increases in production capacities within China have outstripped China's domestic demand for such commodities as aluminum and iron and steel. To sustain development of such commodities as chromium, cobalt, copper, iron, lead, nickel and zinc, in which China was deficient, the Government urged Chinese companies to invest through joint ventures in such areas as Africa, Latin America, the Pacific region, and Southeast Asia, which are rich in mineral resources.

Despite the Government's macroeconomic policy to control overheated commodities, the output of aluminum metal continued to increase rapidly. Since 2003, the Government has not approved any new projects, and 43 smelters were shut down during the past 2 years. The country's installed aluminum output capacity increased to about 10.7 Mt at yearend 2005 from about 9.4 Mt at yearend 2004 because many new or expansion projects were approved by the Government before 2003. In September 2005, the State Council issued a development policy in principle for the aluminum sector and assigned NDRC to work with relevant agencies to prepare a sustainable aluminum development plan. According to the NDRC report, the utilization rate of China's aluminum smelters was between 75% and 78% in 2005. In 2005, 11 aluminum projects were under construction with a total designed output capacity of 1.12 Mt. An additional 10 aluminum projects were in feasibility study stage with a total designed output capacity of 1.40 Mt (China Nonferrous Metals News, 2005c; State Council, 2005; National Development and Reform Commission, 2006a).

With the rapid increase of aluminum production, the ability of producers of domestic bauxite and alumina to meet demand will be much more difficult. The Government set as a priority the development of alumina refineries and fabricating products for the aerospace, construction, packaging, power, and transportation sectors. During the past several years, companies submitted 11 alumina expansion and greenfield plans to the Government for approval with a total output capacity of 12.15 Mt and a total investment of \$6.8 billion. About one-half of the submitted output capacity was under construction by such companies as Chongqing Bosai Minerals Group Co. Ltd., Guixi Huayin Aluminum Co. Ltd., Henan Zhongmei Aluminum Co. Ltd., Luneng Jinbei Aluminum Co. Ltd., Shandong Nanshan Group, and Shanxi Wusheng Aluminum Co. Ltd. China's total alumina output capacity was expected to increase to 14 Mt in 2010 from 10.7 Mt in 2005. Domestic analysts believed that the alumina output capacity could be higher than the Government's report in 2010 (China Nonferrous Metals News, 2005c; National Development and Reform Commission, 2006a).

China was the leading antimony producer in the world and accounted for more than 70% of the world total. Antimony resources in the Provinces of Gansu, Guangxi, Guizhou, Hunan, Jiangxi, and Yunnan accounted for more than 80% of China's

total. Before 2001, Guangxi Zhuang Autonomous Region was the country's leading antimony producing province. Owing to excess extraction during the past decade, antimony resources in Guangxi Zhuang Autonomous Region declined sharply, and Hunan Province became the leading antimony producing province. The quantity of antimony output and export from China affected the price of antimony in world markets. During the past 3 years, the output of China's antimony metal was more than 100,000 metric tons per year (t/yr); according to statistical data, however, the output of antimony mines was much lower than antimony metal output. China imported 21,924 metric tons (t) of antimony concentrates in 2005 compared with 17,984 t in 2004. Antimony concentrates were imported mainly from, in descending order, Russia, Kazakhstan, Tajikistan, Burma, and Bolivia. Even if imports of antimony concentrates are included, the total supply of antimony concentrates was still less than the quantity that was required to produce the estimated antimony metal output. Thus, although some antimony metal may be produced from scrap, some illegal antimony mining activity probably still takes place in China. Antimony concentrates output from the Provinces of Hunan and Guangxi accounted for 54% and 34%, respectively, of the country's total. Hunan Province was the leading antimony metal producing province followed by Guangxi Zhuang Autonomous Region and Yunnan Province; they accounted for 59%, 20% and 10%, respectively, of the country's total (China Metal Bulletin, 2006c).

Owing to domestic smelter and refinery expansions, China's copper output increased sharply during the past several years. China's leading copper producers planned to continue their output capacity expansions in the next several years. At yearend 2004, China's copper smelting capacity was 1.63 Mt, and its refining capacity was 2.20 Mt. According to the NDRC survey, 18 copper smelting projects were under construction or in planning stages for a total design output capacity of 2.06 Mt in 2005. The country's refined copper output was expected to reach 3.70 Mt in 2007. During the past several years, copper consumption in China increased by an average of more than 10% per year. The increase in copper consumption was caused by increased demand from the construction, electrical appliance, and power sectors. The power sector accounted for about 50% of the total copper consumption, and the demand was expected to continue to increase in the next several years because of the expansion of electricity supply throughout the country. In 2005, China's refined copper consumption was estimated to be 3.80 Mt and was expected to increase to more than 4.50 Mt in 2010 (China Metal Bulletin, 2006d).

The Asia and the Pacific region produced and consumed more than 50% of the world's total crude steel production in 2005, and China was the major driver. In 2005, the world's crude steel production increased by 5.9% compared with that of 2004. Excluding China, the world crude steel output decreased by 0.1%. During each of the past 3 years, China's crude steel output increased by more than 10%. The continuous expansion in the iron and steel sector was generated mainly by strong domestic demand. The demand for steel products from such sectors as automobile, infrastructure, real estate, and shipbuilding has increased rapidly during the past several years. Steel producers were not only expanding the iron and steel output from their old

facilities, but also building new plants in other locations; Anshan Iron and Steel (Group) Co. (Angang) and Shoudu Iron and Steel (Group) Co. (Shougang), for example, relocated their plants to coastal areas to gain easy access to iron ore imports. NDRC stated that China had a crude steel output capacity of 470 Mt in 2005, that 70 Mt of new capacity was being built, and that 80 Mt was planned. According to the iron and steel restructuring plan approved by the State Council, steel companies will retire all blast furnaces smaller than 300 cubic meters and converters less than 20 t. Blast furnaces that do not meet environmental and power consumption standards were to be banned. Companies were not allowed to import obsolete used steel equipment. During the Eleventh 5-Year Plan period, China will retire a total of 100 million metric tons per year (Mt/yr) of pig iron and 55 Mt/yr of crude steel output capacities (China Economic News, 2005b; Mining Journal, 2006).

China was the world's leading producer of lead and zinc, and its production of both lead and zinc metal continued to increase in 2005. The shortage of concentrates in China forced lead and zinc metal producers to increase their reliance on imported raw materials and was expected to continue in the future. China's lead concentrate imports increased to 1,030,160 t in 2005 from 830,560 t in 2004. In 2005, China's apparent consumption increased to about 1.90 Mt of refined lead, of which consumption by the battery sector accounted for about 78%. Lead battery demand was expected to continue in the future because the Beijing City government removed the restriction on the use of electric bicycles in the city in January 2006 and because of the increase in automotive production in China. Because production exceeded consumption, China was a net refined lead exporting country. In 2005, the country exported 455,041 t of refined lead mainly to the Republic of Korea and Taiwan. According to the State Council guidelines, the Government would not approve any lead smelting project with a designed output capacity of less than 50,000 t/yr and any secondary refined lead project of less than 10,000 t/yr. Owing to the increase in domestic consumption, the export volume of refined lead from China was expected to decline in the future (National Development and Reform Commission, 2005b; Lead, Zinc, and Tin Monthly, 2006b).

Owing to the shortage of concentrates and power supply, environmental issues, and transportation problems, the production rate for zinc metal increased only slightly in 2005 compared with larger increases during the previous several years. Even though prices of zinc metal increased in the domestic and international markets, zinc smelters in Guangxi Zhuangzu Autonomous Region reduced their output because of the low treatment charge/refining charge (TC/RC) on imported concentrates and a shortage of electricity in the area. Other provinces, such as Henan, Shanxi, and Yunnan, increased their output because of smelter expansion and a reliable supply of domestic concentrates. About 380,000 t/yr of additional zinc metal output capacity was put into operation, which gave China a zinc metal output capacity of more than 3 Mt at yearend 2005. Domestic analysts expected that an additional 160,000 t/yr of zinc smelting capacity would be put into operation in 2006. In 2005, owing to low TC/RC, imports of zinc concentrates decreased by 7.8% to 567,752 t; companies turned to imported

zinc metal and, as a result, imports of refined zinc increased by 63.8% to 392,221 t. Besides increasing domestic demand, the price difference between the domestic and international markets was another reason for increased imports. Also, the Government reduced the export value-added-tax (VAT) rebate to 8% in 2005 from 11% in 2004 and 15% in 2003. Imports of zinc concentrates were mainly from Australia, India, and Iran. China consumed about 3.0 Mt of zinc in 2005, and the demand for zinc was expected to increase in 2006 because of the construction of power-generating facilities and the expansion of galvanized steel production (Lead, Zinc, and Tin Monthly, 2006c).

Trade

According to the customs statistics, total trade was valued at \$1.42 trillion in 2005; this was an increase of 23.2% compared with that of 2004. Exports posted an increase of 28.4% to \$762.0 billion, and imports went up by 28.4% to \$660.1 billion. The United States remained the leading destination for China's exports followed by the European Union (EU), Hong Kong, and Japan. Japan was China's leading source of imports followed by the Republic of Korea and the EU. Owing to rising incomes, the spur in demand for foreign goods—especially in the technology sector—and the depreciation of its currency against the United States dollar, China's trade surplus gap was expected to be narrower in the coming years. Imports of raw materials, such as alumina, chromium ore, copper concentrates, iron ore, manganese ore, potassium fertilizer, and oil, increased sharply. Owing to increased domestic demand and transportation bottlenecks, imports of coke, coal, and steel products increased. In 2005, the total trade of minerals and metals increased to more than \$300 billion (General Administration of Customs of the People's Republic of China, 2005, p. 2-63).

The Ministry of Commerce (MOC) issued circular No. 50, which included a list of commodities that were banned for processing trade. Mineral commodities that were on the Government's monitor list were ammonium paratungstate; bauxite and refractory clay; coal; coke; concentrates of antimony, tin, tungsten, and zinc; fluor spar; oxides of antimony, magnesium, and tungsten; platinum; rare earths; silicon carbide; silver; talc; and unwrought and alloys of antimony, tin, and zinc. Beginning on January 1, 2006, copper concentrate and scrap tolling trade were to be subject to a 13% and 17% VAT, respectively. All antimony products would be required to be registered and exported through the Ports of Beihai in Guangxi Zhuangzu Autonomous Region, Huangpo in Guangdong Province, and Tianjin City. The Port of Dalian in Liaoning Province was designated as the port to issue export licenses for magnesia, which could be exported through the Ports of Changchun in Jilin Province, Dalian, Manshouli in Heilongjiang Province, and Qingdao in Shandong Province. The Government adjusted the 2006 export quota for coal to 80 Mt; coke, 14 Mt; oil products, 9 Mt; magnesia, 1.36 Mt; crude oil, 1 Mt; fluor spar, 710,000 t; talc, 635,000 t; zinc and zinc products (metal content), 520,000 t; silicon carbide, 223,000 t; antimony and antimony products (metal content), 63,700 t; tin and tin products (metal content), 53,000 t; rare earths (rare-earth oxide equivalent), 45,000 t; tungsten and tungsten products

(metal content), 15,800 t; and silver, 4,000 t. MOC also issued guidelines for enterprises that had the right to supply and export antimony, coke, rare earths, silver, and tungsten. The import quota for ammonium phosphoric acid was set at 6.90 Mt; complex fertilizer, 3.45 Mt, and urea, 3.30 Mt. Within the quota quantity, the import tariff rate would be 4%; otherwise, the import tariff rate would be 50%. Of the total imported volume, 4.49 Mt of ammonium phosphoric acid, 2.24 Mt of complex fertilizer, and 2.97 Mt of urea were assigned to state-owned enterprises (Ministry of Commerce, 2005a-f).

With the approval of the State Council, the Ministry of Finance revoked the VAT export rebate on aluminum and aluminum alloys, ferroalloys, nickel, phosphorus, and silicon carbide and imposed a 5% export tax on aluminum metal and refined copper and a 2% export tax on refined nickel beginning on January 1, 2005. The tariff rate for aluminum scrap and waste, and copper anode, scrap, and waste was levied at 10%. Beginning on April 1, 2006, the export tax on copper and copper alloy was to be increased to 10% from 5%, and on copper fabricated products, to 10% from 0%. Starting on May 1, 2005, the VAT export rebate on products of antimony, coal, tin, tungsten, and zinc was reduced to 8%. In the future, the VAT export rebate on fluor spar, magnesia, molybdenum concentrates, rare-earth products, silicon metal, and talc would be reduced to zero. The VAT export rebate on magnesium would be decreased to 5% from 13% and that on products of antimony, coal, tin, tungsten, and zinc would be reduced further to 5% beginning on January 1, 2006. The export tax rate on yellow phosphorus would be increased to 20% from 10%, and ferrosilicon, to 5% from 0% (Ministry of Finance, 2005; China Nonferrous Metals Monthly, 2006d).

Commodity Review

Metals

Aluminum.—During the past decade, owing to an increase in consumption and a high metal price, China's aluminum producers expanded their aluminum output at a rapid pace. The ability of domestic aluminum refineries to meet the domestic demand for alumina by aluminum smelters became more difficult in recent years and affected domestic and international market prices of alumina. China's sole metallurgical-grade alumina producer, Aluminum Corporation of China (Chinalco), increased the alumina price to 5,200 yuan per metric ton (\$650 per metric ton) in December from 4,300 yuan per metric ton (\$537 per metric ton) in January. Owing to increased prices for alumina and fuel, many aluminum producers faced financial loss. At the end of November 2005, 43 aluminum smelters were closed, and 23 domestic aluminum producers announced a reduction of aluminum output by 10% for December 2005. Prices of alumina and aluminum were expected to affect the implementation of the production reduction plan for these smelters. In 2005, China imported about 7.0 Mt of alumina mainly from Australia and India. In 2006, China's alumina imports were expected to be about the same or less than that of 2005 because several aluminum refineries were expected to be put into operation and because the Government was

continuing its effort to control the expansion of output capacity at domestic aluminum smelters. China's alumina demand was predicted to reach 18.5 Mt and domestic alumina supply, about 12 Mt, in 2006. The slowdown of the country's alumina imports would have some impact on the alumina prices in domestic and international markets (Alumina and Aluminum Monthly, 2006c).

Before 2004, the consumption and production of bauxite was nearly balanced. China's bauxite resources were located mainly in the Provinces of Guangxi, Guizhou, Henan, and Shanxi. With limited bauxite resources in Shandong Province, such aluminum refineries as Shandong Aluminum Plant and Shandong Chiping Xinfu Aluminum and Electricity Group needed to import bauxite from overseas. In 2005, China imported 2.17 Mt of bauxite mainly from Australia and Indonesia (Alumina and Aluminum Monthly, 2006b, c).

During the past 2 years, with Government support, Chinalco's subsidiary Aluminum Corporation of China Ltd. (Chalco), which was listed on the Hong Kong Stock Exchange, actively acquired local aluminum producers. Chalco acquired major shares of Baotou Aluminum Plant in Nei Mongol Autonomous Region; Fushun Aluminum Plant in Liaoning Province; Guangyuan Qimingxing Aluminum Co. Ltd. in Sichuan Province; Shanxi Guanlu Co. Ltd.'s Huasheng Aluminum Plant in Shanxi Province; Jiaozuo Wanfang Aluminum Co. Ltd. and Henan Zhongmai Aluminum Co. Ltd. in Henan Province; Baiyin Honglu Aluminum Co., Lanzhou Aluminum Plant, and Liancheng Aluminum Plant in Gansu Province; and Zunyi Aluminum Co. in Guizhou Province. Chalco was also interested in purchasing shares of Baihe Aluminum Co. and Qinghai West Mining Co. Ltd. in Qinghai Province, Huamao Aluminum Plant and Qin'ao Aluminum Co. in Henan Province, and Shandong Huashen Jiangquan Aluminum Co. Ltd. in Shandong Province. Chalco proposed issuing up to 5 billion yuan (\$625 million) of short-term corporate bonds in 2006 to finance its aluminum projects in the Provinces of Guizhou, Henan, and Shanxi. Chinalco diversified its business into other sectors and formed a joint venture with Luoyang Copper Co. Ltd. in 2005 and acquired Daye Nonferrous Metals Co. Ltd. from the Hebei Provincial government. Chalco signed a memorandum of understanding with Charcoal Group of Vietnam to jointly develop bauxite resources and to build an integrated power-aluminum project in Dak Nong, Vietnam, and submitted a bid to the government of Queensland to develop a bauxite mine in Aurukun, Australia. Chinalco signed an initial agreement with the state-owned Assets Supervision and Management Committee of Shanghai to acquire the assets of the Shanghai Nonferrous Group, which was the leading copper semimanufacturing company in Shanghai. Chinalco planned to have total output capacities of 12 Mt/yr of alumina and 5 Mt/yr of aluminum from its subsidiaries by 2010 (China Nonferrous Metals News, 2005a; China Metals 2006a; China Nonferrous Metals Monthly, 2006a).

Yunnan Metallurgy Corp., a parent company of Yunnan Aluminum Plant, signed a cooperation agreement with the government of Wenshan Zhuang and Miao Autonomous Prefecture to jointly develop bauxite resources in Wenshan, Yunnan Province, where 33.85 Mt of high-grade aluminum

oxide was located. The plan was to build a bauxite mine and a greenfield aluminum refinery with a designed output capacity of 800,000 t/yr of alumina. The construction of the refinery was scheduled to begin in the second-half of 2006 and to be completed in 2008 (Alumina and Aluminum Monthly, 2006d).

China was one of the major aluminum scrap importing countries in the world. During the past several years, China's aluminum scrap imports grew by more than 10%. China imported 1.69 Mt of aluminum scrap in 2005 compared with 1.2 Mt in 2004, mainly from the United States. During 2004-05, prices of domestic primary aluminum were higher than aluminum scrap; therefore, aluminum fabricating producers increased their imports of scrap. Because the Government imposed a 5% export tax on aluminum and reduced the VAT rebate to zero, the volume of aluminum exports decreased to 427,473 t in 2005 from 698,039 t in 2004. Also, the exchange rate of the renminbi against the United States dollar appreciated in July 2005. This led to aluminum fabricating producers using more domestic aluminum. If this trend continues, China is expected to import less aluminum scrap in the future (Alumina and Aluminum Monthly, 2006a).

Cobalt.—Despite having limited cobalt resources, China—which was one of the leading mobile phone producers in the world—continued to expand its refined cobalt output capacity during the past several years. The demand for cobalt batteries has been the driving force behind the rapid expansion of cobalt-refining facilities in China. The Jinchuan Nonferrous Group expanded its refined cobalt products output capacity to 6,000 t/yr at yearend 2005 and planned to increase it to 8,000 t/yr in 2010.

In 2005, the country produced about 16,000 t of cobalt products from its total output capacity of 25,000 t/yr. The Jinchuan Nonferrous Group produced about 4,500 t (metal content) of cobalt products, of which refined cobalt and tricobalt tetraoxide were two main products. The country consumed about 10,000 t of cobalt. The battery sector accounted for 50% of this total, followed by the glazing sector, 13%; cemented carbide, 10%; magnetic, 9%; and others, 18%. Owing to increased demand from cobalt salt producers, China cobalt concentrates imports increased to 199,146 t in 2005 from 143,594 t in 2004; the Democratic Republic of the Congo accounted for 90% of the total imports.

Future consumption of cobalt by the battery sector is expected to increase moderately compared with previous years. Consumption by the glazing sector is expected to grow even faster. China cobalt producers are planning to invest in cobalt production facilities in the Democratic Republic of the Congo to secure raw materials for their production facilities in China (Precious and Minor Metals Monthly, 2006).

Copper.—During the past decade, the demand for copper in China increased rapidly and copper producers expanded their output capacities to meet the needs. China has limited copper resources and depended on imports to meet the gap between production and consumption. In 2005, China imported 4.06 Mt of copper concentrates, which was an increase of 41% from the previous year. Imports of blister copper also increased by 13% to 129,245 t, and those of copper scrap rose by 22% to 4.82 Mt. During the past 5 years, imports of refined copper grew at

an average rate of 17% per year. Because of the expansion of output capacity, imports of refined copper grew by only 1.8% to 1.22 Mt in 2005 compared with that of 2004. During the next 3 years, more than 1 Mt/yr of copper smelting and refining output capacity will be added to the existing facilities of China's leading copper producers—Baiyin Nonferrous Metals Co., Daye Nonferrous Metals Co., Huludao Copper Smelter, Jiangxi Copper Co. Ltd., Tongling Nonferrous Metals Co., and Yunnan Copper Co. Ltd. Fujian Zijin Mining and Shandong Yanggu Xiangguang Copper Co. Ltd will put their greenfield plants into operation in the next 3 years.

According to the NDRC report, the country's total copper smelting capacity will reach 5 Mt/yr by 2010. The rapid expansion of copper output capacity led the Government to issue guidelines strictly controlling investment in copper smelting and refining capacity. According to the regulation, all greenfield or brownfield projects must have a larger than 100,000-t/yr output capacity, and each enterprise is required to supply at least 25% of its total required copper concentrates from its own mines. The regulation requires each enterprise to provide at least 35% of the total investment from its own capital funds. The plant must adopt advanced and energy-saving technology. The regulation bans coal-fired reverberatory furnaces and blast furnaces for new projects. Existing reverberatory furnaces and electric arc furnaces are to be phased out by 2006 and blast furnaces will be shut down completely by 2007. NDRC will monitor the development closely (China Nonferrous Metals Monthly, 2006b).

Yunnan Copper Industry Group Co. announced its 5-year plan (2006-10). The company planned to expand its copper refining output capacity to 600,000 t/yr by 2010 from 350,000 t/yr in 2005. Between 2006 and 2008, the company intended to increase its existing refining capacity to 500,000 t/yr in Yunnan and to build a new 100,000-t/yr plant in Chifeng, Nei Mongol Autonomous Region. The company's smelting capacity will increase to 250,000 t/yr by 2010 from 200,000 t/yr in 2005. By 2010, Yunnan Copper will have an annual output capacity of 750,000 t of sulfuric acid, 600,000 t of copper, 850 t of silver, and 12 t of gold. The total investment was estimated to be about \$400 million, of which about \$275 million came from the company's capital fund, and the remaining, from bonds. Yunnan Copper also planned to invest \$950 million in the next 5 years to explore for and exploit copper resources in China and overseas. The company's goal was to produce between 300,000 t and 400,000 t of copper in concentrates by 2010 to support the downstream operations. Several exploration and exploitation projects, such as Pulang, Simao Dapinzhang, and Yangla, were underway in China (China Metals, 2006f).

The NDRC approved the signing of a letter of intent by the joint venture of Norddeutsche Affinerie of Germany, Shandong Fengxiang Corp., and Shandong Yanggu Xiangguang Co. Ltd. to build a greenfield copper plant at Yanggu County, Shandong Province. The project was designed to produce 400,000 t/yr of copper cathode and 200,000 t/yr of copper wire. The first-phase construction of the plant, which used the Outokumpu smelting and refining technology, started in 2005 and was scheduled to be completed at the end of 2006. After the first phase is completed, the plant will have output capacities of 200,000 t/yr of copper cathode, 670,000 t/yr of sulfuric acid, 195 t/yr of silver, and

6.5 t/yr of gold. The plant was designed to use imported copper concentrates, and the company had secured long-term supply contracts with BHP Billiton and Minmetals Corp. The total investment for the project was to be \$360 million, of which \$180 million was a bank loan (Copper and Nickel Monthly, 2006).

Fujian Zijin Mining Group Co., Heilongjiang Provincial Mining Group Co., and Western Mining Co. Ltd. reached an agreement to form a company, Heilongjiang Duobaoshan Copper Mine Co., to develop the Duobaoshan copper deposit in Nenjiang County, Heilongjiang Province. The deposit had proven reserves of 2.97 Mt of copper and 110,000 t of molybdenum. Construction of the mine and dressing plant was scheduled to begin in May 2006, and total investment was to be \$475 million (China Metals, 2005c).

Gold and Silver.—China was one of the leading producers of gold in the world. In 2005, the China Gold Association (CGA) reported that the country produced 224.05 t of gold and that gold mine producers produced 178.86 t; the National Statistics Bureau (NSB) indicated that gold output reached 325.30 t in 2005. The CGA might collect only production data on gold producers and large nonferrous metal producers, which could account for the difference between the CGA and the NSB data. China's gold ingot was produced from domestic and imported ore. Previously, gold output from gold mines accounted for about 80% of the total, and nonferrous metal mines accounted for 20%. In recent years, the production of nonferrous metal mines, such as copper, lead, and zinc, gradually increased; therefore, the share of gold production from these mines may have increased slightly. In the past several years, imports of copper, lead, and zinc concentrates increased. During the past decade, gold production in China increased gradually, and the trend toward increased output was expected to continue in the future. Shandong Province remained the leading gold producing province in China followed by the Provinces of Henan, Fujian, Liaoning, Shaanxi, and Hebei. During the past several years, the World Gold Council reported that China consumed between 200 and 250 t/yr of gold; domestic gold analysts, however, estimated that China consumed more than 300 t/yr. Owing to rapid economic development in China, demand for gold jewelry increased by more than 15% in 2005 compared with that of 2004. The gold production target for 2006 was 240 t. China's gold production was controlled by the Government and must be sold to the Government. Since 2002, gold producers could sell their gold through the Shanghai Gold Exchange (SGE), but exports and imports of gold ingot remained under Government control. The Government planned to set guidelines to allow selected metal producers to trade gold in the overseas markets. In 2005, SGE allowed individuals to participate in gold trading through the Industrial and Commercial Bank of China, and 906.42 t of gold was traded in the SGE. Gold trading at night was added in November. The SGE planned to add silver trading in 2006 (China Economic News, 2005a; China Metal Bulletin, 2006e).

The construction of the Lannigou gold mine was underway in 2005. The mine was operated by Sino Guizhou Jinfeng Mining Ltd., which was a subsidiary of Sino Gold Mining Ltd. The Lannigou gold mine is part of the Jinfeng gold prospect in the village of Niluo, which is located 34 km southeast of Mingou

Township, Zhefeng County, Qianxianan Prefecture, Guizhou Province. The Jinfeng gold deposit was estimated to have 16.4 Mt of ore at a grade of 5.6 grams per metric ton (g/t) gold. About two-thirds of the total ore was proven reserves. The open pit Lannigou mine has proven reserves of 5.3 Mt of ore at a grade of 5.7 g/t gold. The mine was designed to have an output capacity of 1.8 Mt/yr of ore and to produce 9.6 t/yr of gold when it reached full capacity. The mine was scheduled to be completed in September 2006, with first gold production in December 2006 (Sino Gold Mining Ltd., 2006).

The leading gold producer in China, China Gold Group, signed an agreement with Jiangxi Geology Survey Bureau to acquire 50% of the Shiwu Gold Mine and the prospecting rights for the Zhulinxi deposit in the Jinshan gold prospecting area in Dexing City, Jiangxi Province. China Gold also discussed with the local government for China Gold to be the sole gold developer in the 60-square-kilometer Jinshan gold prospecting area. Currently, a local government-owned company, Damaoshan Mining Co. Ltd., processed 1,200 metric tons per day (t/d) of ore and produced about 1 t/yr of gold. Another local company, Huaqiao Mining Co., processed 700 t/d of ore and produced about 500 kilogram per year. About 200 t of gold reserves was estimated to be located in the Jinshan area. China Gold also signed an agreement with Jiangxi Copper and Jiangxi Provincial Mineral Resources Bureau to develop the Jinjiwo copper and silver deposit in Ruichang, Jiangxi Province. The joint-venture company Jiujiang Jinjiwo Mining Co. Ltd. was established. China Gold and Jiangxi Copper each held a 42.5% share in the joint-venture company. The construction of the mine was scheduled to start in 2006 and was expected to be completed in 2008 (Interfax Information Services, 2006e).

China's silver output was from silver mines; gold and silver mines; copper, lead, and zinc (polymetallic) mines; and scrap and waste. Silver from copper, lead, and zinc mines accounted for between 60% and 70% of the total. In 2003, when the Government decided to include secondary silver production in its industrial survey, silver output increased to 4,305 t in 2003, 6,087 t in 2004, and 7,196 t in 2005. Silver output from mines in China was estimated to be about 2,500 t in 2005. The Provinces of Hunan, Henan, Jiangxi, and Yunnan accounted for 67% of the total output. Yunnan Copper was the leading silver metal producer followed by Yugang Gold-Lead Co. Ltd., Yubei Metal Co., Jiangxi Copper, Ningxia Tianma Chemical Smelting Co. Ltd., Hunan Chenzhou Precious Metals Co., and Zhuzhou Nonferrous Metals Co. China's silver consumption increased to 2,600 t in 2005 from 2,300 t in 2004. Electronics accounted for 35% of the total consumption followed by photosensitive material, 20%; jewelry, 10%; and others, 15%. During the past 2 years, China became one of the leading silver exporting countries in the world. Unwrought silver accounted for more than 80% of total exports. Hong Kong was the leading destination followed by Thailand, India, and Australia (China Economic News, 2006b).

Iron and Steel.—To curb rolled-steel expansion and investment, the Government planned to abolish the export VAT rebate on slab and billet on April 1, 2005, and to reduce the export VAT rebate on other steel products to 11%; it planned to eliminate all steel product rebates in 2006. Output from

the more than 300 integrated iron and steel enterprises and 1,500 steel producers in China and some of the steel products did not match the current demand. Only a small portion of China's steel products met the international standards. In July 2005, with the State Council approval, NDRC and eight other Government agencies published a new policy and guidelines on the development of the steel sector by 2010. The new policy encouraged iron and steel enterprises to consolidate through mergers and acquisitions so that two or three enterprises would have an output capacity of more than 30 Mt/yr. Only two steel producers had output capacities of more than 10 Mt/yr in 2003, but in 2005, eight steel producers had output capacities of more than 10 Mt/yr. Capacity expansion through technical renovation of existing facilities or relocation was encouraged. In 2005, China's 10 leading steel producers produced about 36.89% of the country's total steel output, and the Government set a target that these companies would produce more than 50% of the steel output by 2010 and 70% by 2020. The Government does not allow foreign investors to hold majority interests in steel companies in China. Local governments and departments were ordered to approve land use and financial loans only to those iron and steel enterprises that met the energy, environmental, technology, and water supply guidelines. The Government had approved the construction of several steel bases in the coastal Provinces in the east and south. The new guidelines will have a significant impact on global raw material markets in the future (China Metals, 2005b; National Development and Reform Commission, 2005a, 2006d).

China's steel was produced through two main processing routes—integrated and steel scrap. The integrated route accounted for about 85% of the country's total steel output. During the past 5 years, China's steel production increased by more than 10%; domestic iron ore production, however, could not meet internal demand. China depended on iron ore imports to fill the gap. In 2005, China imported more than 275 Mt of iron ore mainly from, in descending order of amount imported, Australia, India, Brazil, South Africa, and Russia. During the past 4 years, domestic iron ore output increased sharply; owing to low iron content in the ore, however, the iron ore supply by domestic producers decreased to about 50% of the demand in 2005 from 75% in the 1990s. The Government planned to close down 100 Mt/yr of steel output capacity in the next 5 years, but major iron and steel producers planned to expand their outputs, and several greenfield integrated plants were under construction. China's steel output capacity was projected to reach more than 500 Mt/yr by 2010. The percentage rate of iron ore supply from domestic producers was expected to decline, and iron ore imports to China were expected to increase in the future (Tse, 2006).

Steel producers, which produced high-value-added steel products, such as automotive sheets, preferred imported ore. With the Government's encouragement and approval, China's iron and steel producers looked overseas to secure iron ore supplies. China's state-owned iron and steel producers, such as Angang, the Baoshan Iron and Steel Group (Baogang), Shagang, Shougang, and Wuhan Iron and Steel Group (Wugang), signed joint-development agreements with companies in Australia and Brazil. Domestic iron and steel producers invested in iron ore projects in Kyrgyzstan, Mongolia, and Russia. Xinjiang

Nonferrous Metals Exploration Co. and its alliances explored for iron ore in Kyrgyzstan in 2004 and planned to invest \$125 million to develop the iron ore deposit. Baotou Iron and Steel Group Co. signed a 20-year iron ore contract with Mongolia's Tumurtei Iron Ore Co. Ltd., which was a joint venture between three Chinese companies and a Mongolian company. Baotou also planned to invest in a Chinese iron ore company that planned to develop an iron ore deposit in Mongolia. Mengdong Energy Co. Ltd. received approval from NDRC to develop the Berezove Iron Mine in Russia. Shandong Luneng Group obtained a 25-year mining right at Byelizovski Iron Mine, which is located about 20 km from the China-Russia border in Russia (China Metals, 2006d).

China was one of the fastest growing markets for stainless steel in the world. China consumed about 6 Mt of stainless steel in 2005. In 2005, China imported 3.14 Mt of stainless steel products, mainly from Japan, the Republic of Korea, and Taiwan and exported 467,198 t. China intended to reduce its dependence on imports and expanded stainless steel production during the past several years. In 2005, China produced more than 4.6 Mt of crude stainless steel, which was expected to increase to 5.5 Mt in 2006; China was expected to consume about 6.6 Mt in 2006. State-owned and privately owned steel producers expanded their output capacities during the past 2 years. China's leading stainless steel producer, Taiyuan Iron and Steel Group Co. (Taigang), planned to expand its stainless steel output capacity to 3 Mt by 2006. Baogang completed its hot-rolled stainless steel output capacity to 1.5 Mt/yr in 2005, and Jiuquan Iron and Steel Group Co. Ltd.'s 600,000-t/yr stainless steel mill was scheduled to be put into operation in 2006. Zhangjiagang Pohang Iron and Steel Co.'s 600,000-t/yr stainless steel mill was expected to be put into operation in 2006, and Alliance Steel Co. (a subsidiary of Yieh United Iron and Steel Co. of Taiwan) completed its 300,000-t/yr stainless steel mill in 2005. Southwest Stainless Steel Co., which was a privately owned enterprise, completed the installation of its 60-t electric arc furnace, which would have an output capacity of 300,000 t/yr of stainless steel in 2005. Shandong Quanxin Stainless Steel Co. planned to put its 180,000-t/yr mill into operation in 2005 and planned to expand its output capacity to 400,000 t/yr in 2006. The total stainless steel output capacity of privately owned steel enterprises would be about 5 Mt/yr by 2007. In total, China was expected to have a stainless steel output capacity of more than 10 Mt/yr by 2010. Domestic analysts estimated that China's stainless steel consumption could reach 10 Mt by 2010 (Li, 2005).

During the past decade, the Government urged iron and steel enterprises to merge or to take over other iron and steel producers in the same region. The process was slow and faced resistance from steel enterprises. Because of environmental concerns and the 2008 Beijing Olympic Games, the Central Government and the Beijing City government urged Shougang to reduce its output capacity in Shijingshan, Beijing, and to move production facilities to Hebei Province. Shougang planned to build a 15-Mt/yr greenfield iron and steel facility in Caofeidian, Hebei Province. Tangshan Iron and Steel Group Co. (Tanggang) was the leading iron and steel enterprise in Hebei Province. With the encouragement of and approval by the Government, Shougang and Tanggang (51% and 49%

equity, respectively) formed a joint-venture company, Shougang Beijing-Tangshan Iron and Steel Group Co. Ltd., in Hebei Province. The joint-venture company planned to have a 10-Mt/yr first-phase integrated iron and steel plant in operation in Caofeidian by 2007 (China Metals, 2005e).

More than 200 steel producers were located in Hebei Province, which was the leading steel producing province in China; most of them were small producers and privately owned companies. The Provincial government urged these steel producers to merge into larger groups and to upgrade their equipment. With Provincial government approval, the Hebei Provincial State Asset Supervision and Management Commission drew up a consolidation plan to merge state-owned iron and steel enterprises in Hebei Province. The northern group, which included Chengde Steel Co., Tanggang, and Xuanhua Steel Co. formed New Tanggang Group. The southern group included Handan Steel Group, Shijiazhuang Steel Co., and Xingtai Steel Co. Handan was not interested in the Government consolidation plan because Handan had established strategic cooperation agreements with Delong Steel Co. and Wengeng Steel Co. in the southern area. Baogang held more than 5% of Handan's total shares on the Shanghai Exchange Market. Handan also discussed the formation of alliances with multinational steel producers (China Metallurgical News, 2005; Interfax Information Services, 2005).

In Liaoning Province, Angang and Benxi Iron and Steel Group (Bengang) announced that the two leading integrated steel producers in the Province had merged to form a new company, Anben (Anshan-Benxi) Iron and Steel Group, in August 2005. The new company planned to increase its output capacity to 30 Mt/yr by 2010. In the 1990s, Angang and Bengang were state-owned companies; Bengang, however, was assigned to be managed by the local government and paid revenue tax to the Benxi City government when the decentralization of state-owned enterprises was completed in the late 1990s. Angang remained under the Central Government and its tax revenue was paid directly to the Central Government. The merger initially will combine the two companies' raw material purchases, technology development, and marketing strategies. Angang has a wider variety of products than Bengang. Bengang has concentrated on hot-rolled and cold-rolled products. It could take years for the merger to operate as one company. Angang planned to build a 10-Mt/yr greenfield steel facility in Bayuquan District, Yingkou City, Liaoning Province. Construction of a new plant in Yingkou will reduce transportation costs. The first-phase 5 Mt/yr of steel output capacity was scheduled to be put into operation in October 2006. Angang also planned to add 5 Mt/yr of steel output capacity to its production facility in Anshan (China Metals, 2005a).

In Jilin Province, Jianlong Iron and Steel Group, Jilin Ferroalloy Co., and Tonghua Iron and Steel Group signed a merger agreement in November. The merged entity, which was named Tonghua Iron and Steel Group Co. Ltd., had a total steel output capacity of 5 Mt/yr and planned to expand the total iron and steel output capacity to 10 Mt/yr and ferroalloy output capacity to 3 Mt/yr in the next 3 years (China Metals, 2005d).

Two leading iron and steel producers in Shandong Province, Jinan Iron and Steel Group and Laiwu Iron and Steel Group Co.

Ltd., submitted a merger plan to the Provincial government for approval. Both companies had output capacities of iron and steel of more than 10 Mt/yr. Facing a shortage of power and water supply and also the transportation bottlenecks, the consolidation was expected to reduce raw materials competition within the Province and to improve marketing strategies. Qingdao Iron and Steel Group was also considering participating in the merger. Baogang held 12% of Jinan's tradable shares and formed a joint venture with Companhia Vale do Rio Doce (CVRD) to build a 10-Mt/yr pelletizing plant in Rizhao City, Shandong Province. Initially, Arcelor Mittal Corp. intended to purchase 50% of the shares of Laiwu Group's listed company, Laiwu Steel Co. Ltd., because the Government would not allow foreign investors to hold major shares of a Chinese iron and steel company. Therefore, Arcelor settled for 37.51% of Laiwu Steel Co. Ltd.'s tradable share and Laiwu Group held 39.31%. The transaction required Government approval. Jinan and Laiwu Group planned to construct a 10-Mt/yr greenfield iron and steel plant and to expand total output capacity to more than 30 Mt/yr (China Metals, 2006e).

Wugang signed an agreement with the government of Guangxi Zhuang Autonomous Region to purchase 51% of Liuzhou Iron and Steel Plant. The share held by Guangxi Autonomous Region State Asset Supervisory and Management Commission was reduced to 49% of Liuzhou. Wugang and the government of Guangxi Zhuang Autonomous Region signed an agreement to build a 10-Mt/yr iron and steel plant, a 5-Mt/yr coke plant, and a 2.4-megawatt thermal powerplant in Fangchenggang; Fangchenggang is located on the coast and is an ideal location for importing iron ore and exporting steel products. A 200,000-deadweight-ton (dwt) iron ore berth was under construction at the Port of Fangchenggang. The Committee of the Economic and Trade Commission approved the feasibility study of the iron and steel plant, which was submitted to NRDC for final approval. Wugang also discussed a merger and restructuring with Chongqing Steel Group. Both Baogang and Panzhihua Iron and Steel Group Co. also showed interest in forming alliances with Chongqing (China Metals, 2005f).

The Guangdong Provincial government submitted a 10-Mt/yr steel project to the NDRC for approval. The steel plant would be located in Zhanjiang. The East Sea island of Zhanjiang had a 300,000-dwt ship dock and a 500,000-dwt oil tanker dock; a 200,000-dwt iron ore berth was under construction. Baogang and Shaoguan Iron and Steel Group signed an agreement to participate in the development of the project. The Zhanjiang project could be a strategic base for Baogang to expand its production and marketing base in southern China. Baogang also signed strategic alliances with Bayi Iron and Steel Group Co. in Xinjiang Uygur Autonomous Region, Ma'anshan Iron and Steel Group Co. in Anhui Province, and Taigang (Interfax Information Services, 2006d).

Lead and Zinc.—Bayannur Zijin Nonferrous Metal Co. Ltd. (BZNM) started construction of its 100,000-t/yr zinc smelter in Urad Houqi, Bayannur Meng, Nei Mongol Autonomous Region. BZNM was a joint venture of Jianxin Industry Group, Yate Investment Co. Ltd., and Zijin Mining Co. The smelter was scheduled to start operation in mid-2006, and the total investment was about \$100 million. The company had secured

zinc concentrates within the Nei Mongol Autonomous Region and planned to add another 100,000 t/yr of output capacity in the future (Interfax Information Services, 2006g).

Aerhada Mining Co. Ltd. started construction of its 100,000-t/yr zinc smelter in Dong Ujimqin Banner, Xilin Gol Meng, Nei Mongol Autonomous Region, in 2005 and was scheduled to put it into operation in 2006. Raw material would come from the Aerhada Polymetallic Mine, which was operated by Chifeng Bayanhanshan Mining Co. Ltd. The mine had a dressing plant with a 1,500-t/d output capacity of lead and zinc concentrates that was put into operation in 2005. The Dong Ujimqin Banner had proven reserves of more than 500,000 t of lead and zinc and 600 t of silver. Lead and zinc resources in the area were estimated to be more than 1 Mt. Chifeng Bayanhanshan started to build a 60,000-t/yr lead smelter in Bairin Zuoqi, Chifeng City, and was scheduled to put it into operation in July 2007 (China Metal Bulletin, 2006b).

The construction of Bairendaba Silver Polymetallic Mine was completed and began trial production in September 2005. The mine is located in Hexigten Banner, Chifeng City, Nei Mongol Autonomous Region. The mine, which was jointly developed by Chifeng Honghuagou Gold Mine Co. Ltd., Gansu Shengda Group Co. Ltd., and Nei Mongol Mining Development Co. Ltd., was designed to produce 2,000 t/d of ore. The mine had reserves of 1.05 Mt of zinc, 503,000 t of lead, 4,600 t of silver, and about 2 t of gold. The total investment was \$18 million. The processing plant had the capability to produce 20,000 t/yr of zinc, 10,000 t/yr of lead, and 98 t/yr of silver (Lead, Zinc, and Tin Monthly, 2005).

Magnesium.—China was the leading producer of magnesium in the world. Magnesium metal output accounted for more than 60% of the world total. The country exported more than two-thirds of its output. In 2005, China's magnesium consumption increased to about 105,000 t. Exports of magnesium products decreased to 353,100 t in 2005 from 383,738 t in 2004, of which 183,573 t and 228,350 t, respectively, was metal. Since 2001, when several magnesium plants in Europe and North America were shut down, China's magnesium filled in the supply gap in these two areas. China exported about 40% of its magnesium products to European countries followed by Japan, the Republic of Korea, and Taiwan. During the past 5 years, China's magnesium producers expanded their output capacities. There were 116 magnesium producers, of which 109 were privately owned and Sino-foreign joint ventures. The total output capacity of alloy, granule, and metal was about 700,000 t in 2005. During the past 2 years, the Government urged the magnesium producers to produce high-value-added products, such as alloy plates and tubes. To control further output capacity expansion, the Government restricted the construction of less-than-3,000-t/yr-output-capacity magnesium plants and reduced the export VAT rebate to 5% for metal. Owing to environmental problems, the Henan Provincial government shut down several small magnesium plants that did not meet environmental standards. The Provinces of Henan, Ningxia, and Shanxi accounted for 90% of the country's total magnesium output (China Metal Bulletin, 2006a).

Manganese.—China is the leading producer of ferroalloys in the world. During the past several years, production of

ferroalloys grew by double digits. At yearend 2005, there were 1,570 ferroalloy producers with a total output capacity of 22.13 Mt, which was more than three-fold that of 2000. In addition, about 1.61 Mt of ferroalloy output capacity was under construction, and an additional 1.23 Mt of output capacity was planned. Ferromanganese and ferrosiliconmanganese alloy accounted for about 50% of the total ferroalloy output. In 2005, China consumed about 9.3 Mt and exported 1.74 Mt of ferroalloys. Many ferroalloy producers operated at less than 50% of their output capacity. China was one of the leading manganese producers in the world. Because of increased demand for manganese by the ferroalloy sector, however, the country imported manganese ore from overseas. During the past 2 years, China imported more than 4 Mt of manganese ore from countries in Africa, and from Australia and India. High-carbon ferromanganese, which contained 65% manganese, accounted for 75% of the total ferromanganese output in 2004 and was one of China's major ferroalloy export products. In 2005, the Government prohibited tolling trading for ferromanganese and ferrosiliconmanganese. Production costs were expected to increase and forced small ferromanganese producers to shut down their operations. According to NDRC development guidelines, the Government was to tighten control of investment in the ferroalloy sector and planned to shut down small furnaces (less than 300 cubic meters) that were used mainly for ferromanganese production and less-than-5,000-kilovolt-ampere electric arc furnaces. The Government also planned to shut down those ferroalloy plants that did not meet the national environmental standards. About 69% of the ferroalloy plants in existence did not meet the standards. The country's ferroalloy output capacity was expected to be reduced to 17 Mt by 2010 (China Metals, 2006c; Yang, 2005).

China was the leading producer of unwrought manganese in the world. During the past 15 years, unwrought manganese production increased to about 57,000 t in 2005 from 14,000 t in 1991. During the past 10 years, China exported more than 50% of its total output. China's manganese resources, which are located in the Provinces of Guangxi, Guizhou, and Hunan, accounted for 60% of the total manganese resources in the country. About 80% of manganese ore was produced by locally owned and privately owned mines, and the Government had difficulty accounting for the actual output. China's electrolytic manganese was produced mainly from the reduction of low-grade manganese carbonate ore, which contained from 18% to 20% manganese. Most manganese plants had output capacities of less than 10,000 t/yr. Owing to environmental damage and high energy consumption, the Government issued regulations to control the expansion of the electrolytic manganese sector. According to the guidelines, any new electrolytic manganese plant must have a total output capacity of more than 30,000 t/yr and each production line must have an output capacity of more than 10,000 t/yr. Existing plants with production lines of less than 3,000 t/yr of output capacity were ordered to shut down. The reduction tank in plants must be larger than 250 cubic meters, and a high-pressure diaphragm filter must be installed in the plants. The tonnage energy consumption was expected to be less than 8,600 kilowatt hours for grades A and B manganese ingot (China Metals, 2006b).

Tin.—China was the leading tin producing country in the world. Because of strong domestic and international demand, tin prices increased to \$8,650 per metric ton in March 2005 and declined to less than \$7,000 per metric ton at yearend. Because domestic supply of concentrates increased, China's tin metal production increased in 2005 compared with that of 2004. Imports of tin concentrates decreased to 7,485 t in 2005 from 8,912 t in 2004, and those of refined tin increased to 19,011 t in 2005 from 9,612 t in 2004. Because the Government reduced the export VAT rebate on tin, China's refined tin exports decreased to 22,928 t in 2005 from 32,032 t in 2004, and tin alloy exports decreased to 4,085 t in 2005 from 6,993 t in 2004. Owing to the increase in domestic demand for refined tin, the volume of tin exports from China could drop to less than 20,000 t in 2006 from more than 60,000 t in the 1990s. Because of the shortage of tin concentrates, China imported about 13,000 t of crude tin from Indonesia in 2005. Indonesia also exported crude tin to Malaysia, Singapore, and Thailand for refining and became the leading crude tin supplying country in the world. Hunan Province replaced Guangxi Zhuang Autonomous Region as China's major tin ore producing province behind Yunnan Province. China's tin consumption increased to 94,000 t, of which tin solder accounted for 50%. The supply of tin concentrates from domestic mines was expected to remain tight, and imports of tin concentrates were expected to increase in 2006. China could become a net tin importer in the near future (Lead, Zinc, and Tin Monthly, 2006a).

Industrial Minerals

Cement.—China was the leading cement-producing country in the world and accounted for nearly 50% of the world's total. Even with the Government's restricted investment policy for the cement sector, cement output continued to increase. During the past 5 years, China's production increased by an average of about 12% per year. China's cement consumption was driven by infrastructure investment and residential and nonresidential construction. The Government's continued emphasis on large infrastructure projects included bridges, dams, roads, and utilities. Each year, cement producers produce more than 200 Mt of industrial wastes, which accounts for 50% of total industrial wastes. More than 6,000 cement producers produced on an average of about 200,000 t/yr each. In 2005, the State Council issued a circular urging cement producers to merge to form large groups. The Government set the target of reducing the number of cement producers to 3,500 and to increasing their average output capacity to 400,000 t/yr by 2010. Of the total cement producers, the top 10 will have an output capacity of more than 30 Mt/yr each. China was expected to produce 1.25 billion metric tons of cement, and the top 50 producers would account for 50% of the output in 2010. The Government encouraged cement producers to produce more medium- and high-grade cement to meet the demand. The Government stepped up its efforts to shut down plants that used obsolete technology and encouraged cement producers to use dry rotary kilns. Output of cement from dry rotary kilns was projected to increase to 70% of the total in 2010 from 40% in 2005. Per tonnage power consumption was expected to be reduced by 25% (State

Council, 2005; National Development and Reform Commission, 2006c).

Phosphate Rock.—China was one of the leading phosphate rock producing, consuming, and exporting countries in the world. Owing to domestic demand, phosphate rock exports decreased to 2.11 Mt in 2005, which was 32.3% lower than those of 2004. Exports of such phosphorus products as sodium triphosphate and phosphoric acid, however, increased. Nearly 90% of phosphate rock mined in China was used to produce chemical fertilizers. The Provinces of Guizhou, Hubei, Yunnan, and Sichuan, in descending order of output, accounted for 98% of the country's total output. The average ore grade of phosphate rock in China contains 16.95% P_2O_5 ; phosphate rock that contains more than 30% P_2O_5 accounts for 8.1% of the country's total reserves, which are located in the Provinces of Guizhou and Yunnan. China's phosphate fertilizer output was large, but the average producer output capacity was small. The 1,043 phosphate fertilizer producers had a total combined output capacity of 12.5 Mt/yr at yearend 2004. More than 60% of phosphate fertilizer producers have output capacities of less than 5,000 t/yr. According to the MLR report, the domestic supply of phosphate rock will not meet the demand by 2010. In 2005, the country produced 11.25 Mt (in P_2O_5 content) of phosphate fertilizer. China was projected to produce 12 Mt (in P_2O_5 content) of phosphate fertilizer and to consume about 46.5 Mt of phosphate rock in 2010. At that time, the country will be required to import 8 Mt of phosphate rock to meet its needs (China Chemical News, 2005a).

The Government planned to reform the fertilizer sector in China. Currently, the Government determines the prices of chemical fertilizer based on production costs and supply and demand in the domestic market. NDRC assigned prices to ammonium nitrate and urea, which were produced by state-owned producers, and to imported fertilizer. Regional governments determined prices of other fertilizers. Even though the quality was the same, the price of domestically produced phosphate fertilizer was from \$25 to \$50 per metric ton lower than that of imports. Owing to the separate production and marketing system in China, fertilizer producers had no incentive to reduce production costs or to introduce technological development. The Government set up a committee to study how to control the supply and demand in the domestic market without controlling the selling prices of fertilizer. Transportation bottlenecks were another problem that the Government considered. More than 16 Mt of phosphate rock was stockpiled in Guizhou Province awaiting transport to fertilizer plants in other provinces (China Chemical Reporter, 2005).

Daqing Petrochemical Co. Ltd., which was a subsidiary of China National Petroleum Corp., and Sichuan Gaoyu Group planned to build a 300,000-t/yr monoammonium phosphate (MAP) plant in Yang'an Town, Chengdu City, Sichuan Province. In addition, the joint venture also constructed a 60,000-t/yr ammonia unit and a 300,000-t/yr sulfuric acid unit at the plant site. Heat generated from the sulfuric acid unit will be used in a 3-megawatt power generating unit. Pyrite cinders from the sulfuric acid production and phosphogypsum from MAP production will be used for the cement production. Initial investment was estimated to be \$66 million, and construction

would take 3 years to complete (China Chemical Reporter, 2006a).

Rare Earths.—China was the leading rare-earth producer and exporter in the world. The country's rare-earth exports accounted for more than 70% of the world trade of rare earths. In 2005, China produced about 119,000 t of ore [in rare-earth oxide (REO) content] and 104,000 t of rare-earth products. China consumed about 52,000 t of rare earths and exported 74,276 t (or the equivalent of 55,613 t REO content) of rare-earth products, including permanent magnet products in 2005. In May 2005, the Government cancelled the export VAT rebate on rare-earth products and added rare-earth concentrates to the prohibited-for-processing-trade list. The State Council was the sole approving office for rare-earth mining and smelting projects (National Development and Reform Commission, 2005b).

China's rare-earth production exceeded the world consumption, which was about 100,000 t in 2005. There were about 100 rare-earth producers in China with a total output capacity of 200,000 t/yr of rare-earth concentrates and 160,000 t/yr of rare-earth-products processing capacity. Even though rare earths was a highly controlled sector in China, the Government had difficulty controlling the volume of output. The Government issued a mining output quota for each rare-earth producing province; the total output of rare earths, however, exceeded the Government target at yearend. The MLR assigned a rare-earth output quota of 86,620 t, including 8,320 t of heavy rare earths and 78,200 t of light rare earths in 2006, which was much lower than those of previous years. Nei Mongol Autonomous Region was assigned the production quota of 46,000 t. Sichuan Province, which produced light rare earths, was allocated 31,000 t, and Jiangxi Province, where medium and heavy rare earths were based, was allocated 7,000 t. The rest of the rare-earth-producing provinces, such as Fujian, Guangdong, and Hunan, were allocated proportionally according to their output capacities (China Nonferrous Metals Monthly, 2006c).

Although China's total output capacity was huge, the average capacity for each producer was small. As a result, the profitability was low and the product quality was inconsistent between different shipments. During the past 15 years, the Government made many attempts to consolidate the rare-earth producers into larger entities. In 2002, the State Council approved the restructuring of the domestic rare-earth sector and the establishment of two regional groups—China Northern Rare Earth Group Co. and China Southern Rare Earth Group Co. Owing to the reluctance of local governments and rare-earth producers, the establishment of two regional groups appeared unsuccessful. Once again, the Government urged rare-earth producers to merge into several large groups and to eliminate duplicate projects.

China's largest rare-earth resource was at the Baiyunobo, Nei Mongol Autonomous Region, which accounted for 80% of the country's reserves. The rare-earth concentrate, which is known as Baotou rare-earth concentrate, is a byproduct of producing iron ore. The eastern part of the ore body contained about 5% of rare earths, and the western part of the ore body contained a very low percentage of rare earths. After nearly 4 decades of exploitation, about 250 Mt of ore was mined out and produced 12.5 Mt of rare-earth slag, of which 9.30 Mt was unseparated

and stored in a big pond awaiting processing into concentrates or fully separated into rare-earth products. The eastern part of the ore body also contained about 0.032% of thorium, which was not yet separated. During the past decade, China was the major rare-earth trading country in the world. The beginning of exploitation of monazite in the Mount Weld in Western Australia will post a challenging competition for China's rare-earth producers in the future (Industrial Minerals, 2006a, b).

Salt.—China was one of the leading salt producing countries in the world. China's salt production was from marine salt and inland salt. Marine salt accounted for 70% of the total output; the major marine salt fields were located in the Bohai region. Inland salt was from lakes and wells mainly from central and northwest China and the Nei Mongol Autonomous Region, which accounted for 30% of the total. China had about 800 registered salt producers, and the average output capacity was 50,000 t/yr. Salt producers continued to use 1980s technology for salt recovery, and such valuable elements as iodine and potassium (which China was required to import) were not recovered during the process. Domestic analysts estimated that about 5 Mt of magnesium, 500,000 t of potassium, and 50,000 t of iodine were discarded each year. About 90% of China's salt was used by the soda ash and caustic soda sectors. The development of the salt sector was hampered by the existence of monopolies and high taxation. During the past 5 years, salt production increased by an average of about 8% per year; soda ash and caustic soda production, however, increased by more than 10% per year. In 2004, China imported more than 2 Mt of salt to meet its needs. At yearend 2005, China had a total salt output capacity of 55 Mt/yr, of which marine salt accounted for 57.3%; well salt, 33.2%; and lake salt, 9.5%. The total output capacity of salt was expected to increase to 65 Mt by 2010 (China Chemical News, 2005b).

In 2005, the Government issued guidelines on how to reform the salt sector in China. The Government planned to shut down small marine salt fields in southern China and merge salt producers together by region. Marine salt producers will be expected to have output capacities of more than 300,000 t/yr, and lake and well salt producers will be required to have output capacities of more than 100,000 t/yr. The Government assigned China Salt Corp. to develop a plan for how to implement the guidelines (National Development and Reform Commission, 2005c).

Strontium.—China's strontium sector developed quite rapidly during the past decade, and the country became one of the leading producers of strontium carbonate in the world. Strontium carbonate was produced from celestite by either the carbon reduction method or the decomposition method. China's celestite resources are located in the Provinces of Hubei, Jiangsu, Qinghai, Sichuan, and Yunnan, and in Chongqing City. Compared with such countries as Mexico and Spain, the strontium sulfate content in Chinese celestite was lower. Ore from the Dafengshan Celestite Mine in Qinghai Province, which is the largest celestite mine in China, contains less than 40% strontium sulfate. Some of China's celestite deposits contain strontium sulfate content of up to 90%, but they are small in terms of quantity. Most of the salable celestite ore contained less than 70% strontium sulfate. The Government urged celestite

producers to mine low- and high-grade ore together and to increase ore grade through the dressing process. Numerous strontium carbonate producers in China have a total combined output capacity of 350,000 t/yr, but the combined production of celestite was about 500,000 t/yr. The gap between supply and demand was met by imports. The leading strontium carbonate producer was Chongqing Tongliang Redbutterfly Strontium Co., which was a Sino-Japanese joint venture located in Chongqing City. China's television cathode ray tube (CRT) glass sector was the leading consumer of strontium carbonate and accounted for 60% of the total domestic consumption (China was the leading CRT producer in the world). The permanent ceramic magnet sector was the second ranked consumer followed by the chemical and metallurgy sectors (China Chemical News, 2005c; Zhang and others, 2005).

Mineral Fuels

Coal.—During the past three decades, China has undergone significant economic reform and has one of the world's fastest growing economies. Coal consumption has increased to meet the demand for industrial production and power generation. From 1996 through 2005, China's coal production increased to more than 2 Gt. Owing to an increase in demand and transport capacity constraints, domestic coal prices and coal imports to southern China increased during the past 3 years. As a result of an insufficient supply of coal, electricity from coal-fired powerplants was disrupted in many parts of the country. Powerplants accounted for 50% of the country's coal consumption. To secure an adequate supply of coal, a number of coal and power generation companies formed alliances by investing in each other's publicly listed shares in domestic and international stock exchange markets. The Government remained in control of substantial shares in the coal and power sectors (Interfax Information Services, 2006c).

China was not only a large coal producer and consumer but also one of the world's leading coal exporters. Coal exports increased to 94 Mt in 2003 from 55 Mt in 2000, mainly to Japan, the Republic of Korea, and Taiwan. Owing to transport constraints and increased domestic demand, however, the Government reduced its coal export quota to 80 Mt in 2004, 2005, and 2006. The Government allocated the majority of coal export licenses to four state-owned companies—China Coal Group Corp., Minmetals Group, Shanxi Import and Export Group Corp., and Shenhua Group Corp. Coal imports to China accounted for approximately 1% of China's coal consumption. Australia, Indonesia, and Vietnam were the leading coal suppliers to China (Interfax Information Services, 2006a).

During the past 5 years, fixed asset investment in the coal sector totaled \$31.1 billion and the total output capacity of regulated coal mines increased to 2.26 Gt at yearend 2005. More than 600 Mt/yr of coal mine output capacity was under construction. By 2010, China will have a total coal output capacity of about 2.9 Gt; the Government's coal production target for 2010 is 2.45 Gt. NDRC issued coal development guidelines to reform the coal sector in China. The Government established 13 large-scale coal regions, which included 45 coal bases that have total coal reserves of more than 700 Gt.

The purpose of establishing of these regions was to match coal resources with the development of the chemical, metallurgical, and power sectors. The Provinces of Shaanxi and Shanxi and the Nei Mongol Autonomous Region accounted for 64% of China's coal resources. New shafts at coalmines in these Provinces are required to have an output capacity of more than 300,000 t/yr. The minimum output per shaft at coal mines in the country's north, northeast, and northwest regions and in Henan Province is 150,000 t/yr; in other parts of China, it is 90,000 t/yr. The increased output capacity of each shaft in coal mines was intended to encourage the construction of larger and more-efficient coal mines. The Government planned to establish between five and seven coal enterprises, which would have output capacities of more than 100 Mt/yr each. Large- and medium-sized coal producers would account for 75% of the total output capacity, and mechanical mining would increase to 95%. Coal mines must meet environmental and safety regulations. During the first 3 years of new mine operation, the Government will not approve any expansion plans. Any developing coal mine that does not meet the above guidelines will be shut down. China had more than 28,000 coal producers; many coal mine shafts had output capacities of less than 30,000 t/yr, and about 3,500 coal mines had output capacities of less than 100,000 t/yr. Many mine accidents happened in these small-sized coal mines each year. The Government planned to shut down 8,000 small-sized coal mines during the next 2 years (State Council, 2005; Coal News, 2006; National Development and Reform Commission, 2006b).

Natural Gas and Petroleum.—Owing to the sustained expansion of the economy, China's dependence on oil imports increased to 44% of the country's total demand in 2005. The Government had developed plans to secure the oil supply in the future. NDRC estimated that the growth of proven oil reserves and production capacity of large oilfields in China would be limited and that China would produce 180 to 200 Mt/yr during the next 5 years. Oil production in the eastern region gradually decreased to 59% in 2005 from 72.2% in 2000, and the output of oil from the western region and offshore gradually increased to 24.6% and 16.4%, respectively, in 2005 from 16.6% and 11.2%, respectively, in 2000. The Government planned a second west-east pipeline to transport oil and gas from the production center in Xinjiang Uygur Autonomous Region to consumption centers in the coastal areas in the next 5 years (China Chemical Reporter, 2006b; China Economic News, 2006a).

NDRC estimated that oil consumption in China would reach 500 Mt by 2020, of which 300 Mt would be imported. The Government encouraged China's oil and gas enterprises to intensify their efforts in exploration and development of oil resources to control the volume of tradable oil reserves in other countries. More than 80% of oil was used by the chemical sector; this sector accounted for about 20% of industrial output and that percentage was expected to increase in the future. To sustain development of the chemical and chemical fiber sectors, the Government planned to build four oil import projects—China-Kazakhstan, China-Russia, the Strait of Malacca, and Sino-Burma offshore oil transport to increase oil delivery to China (China Economic News, 2006c).

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TABLE 1
CHINA: ESTIMATED PRODUCTION OF MINERAL COMMODITIES^{1,2}

(Metric tons unless otherwise specified)

Commodity ³	2001	2002	2003	2004	2005	
METALS						
Aluminum:						
Bauxite, gross weight	thousand metric tons	9,800	11,000	13,000	15,000	18,000
Alumina	do.	4,650	5,450	6,110	6,990	8,610
Metal, refined, primary and secondary	do.	3,570	4,510	5,970	6,900	7,800
Antimony:						
Mine, Sb content		140,000	100,000	100,000	125,000 ^r	120,000
Metal		148,000	124,000	90,000	115,000 ^r	124,000
Bismuth:						
Mine output, Bi content		2,000	2,000	2,500 ^r	3,000 ^r	3,000
Metal		2,000	3,500 ^r	5,000 ^r	11,700 ^r	8,500
Cadmium, smelter		2,510	2,440	2,700	4,530 ^r	5,000
Chromite, gross weight	thousand metric tons	182	180	200	200	200
Cobalt:						
Mine output, Co content		150	1,000	700	1,260 ^r	1,300
Metal		680	980	990	5,600 ^r	6,000
Copper:						
Mine output, Cu content		587,000	568,000	610,000	742,000	762,000
Metal:						
Smelter, primary	thousand metric tons	1,150	1,180	1,380	1,500 ^r	1,700
Refined:						
Primary	do.	1,220	1,300	1,420	1,580 ^r	1,850
Secondary	do.	300	350	430	620 ^r	750
Total	do.	1,520	1,650	1,850	2,200	2,600
Gold, mine output, Au content		185	192	205	215	225
Indium		190	160	180	200	300
Iron and steel:						
Iron ore, gross weight	thousand metric tons	220,000	231,000	261,000	320,000 ^r	420,000
Pig iron	do.	155,540 ⁴	170,850 ⁴	213,670 ⁴	251,850 ⁴	343,750 ⁴
Ferroalloys	do.	4,500	4,840	6,340	8,670	10,700
Steel, crude	do.	151,630 ⁴	182,370 ⁴	222,340 ⁴	272,800 ⁴	353,240 ⁴
Steel, rolled	do.	160,680 ⁴	192,520 ⁴	241,080 ⁴	297,230 ⁴	377,710 ⁴
Lead:						
Mine output, Pb content		676,000	641,000	955,000	998,000 ^r	1,000,000
Metal:						
Smelter, primary		840,000	916,000	1,280,000 ^r	1,460,000 ^r	1,700,000
Refined						
Primary		984,000	1,100,000	1,290,000	1,510,000 ^r	1,870,000
Secondary		211,000	230,000	290,000	430,000 ^r	520,000
Total		1,200,000	1,330,000	1,580,000	1,940,000 ^r	2,390,000
Magnesium metal and alloy		200,000	230,000	342,000	442,000 ^r	470,000
Manganese:						
Ore, Mn content	thousand metric tons	860	900	920	1,100 ^r	1,200
Metal		150,000	190,000	320,000	492,000 ^r	566,000
Mercury, mine output, Hg content		190	495	610	1,140 ^r	1,100
Molybdenum, mine output, Mo content		28,200	29,300	31,000	38,500 ^r	40,000
Nickel:						
Mine output, Ni content		51,500	53,700	61,000	75,600 ^r	77,000
Matte		59,000	59,200	69,300	74,000 ^r	75,000
Smelter		49,500	52,400	64,700	75,800 ^r	95,000
Silicon, metal		500,000	580,000	680,000	750,000 ^r	840,000
Silver, mine output, Ag content		1,910	2,200	2,400	2,450	2,500
Tin:						
Mine output, Sn content		95,000	62,000	102,000	118,000 ^r	120,000
Metal		105,000	82,000	98,000	115,000	125,000

See footnotes at end of table.

TABLE 1--Continued
CHINA: ESTIMATED PRODUCTION OF MINERAL COMMODITIES^{1,2}

(Metric tons unless otherwise specified)

Commodity ³	2001	2002	2003	2004	2005	
METALS--Continued						
Titanium:						
Ilmenite, TiO ₂ equivalent	150,000	375,000	400,000	420,000	450,000	
Sponge	2,470	3,650	4,120	4,810 ^r	9,280	
Tungsten, mine output, W content	42,100	55,100	55,500	60,000 ^r	61,000	
Vanadium, in vanadiferous slag product	30,000	33,000	35,000	40,000	42,500	
Zinc:						
Mine output, Zn content	thousand metric tons	1,700	1,550	2,030	2,390 ^r	2,450
Refined, primary and secondary	do.	2,040	2,100	2,320	2,720 ^r	2,800
INDUSTRIAL MINERALS						
Asbestos	310,000	562,000	500,000	400,000 ^r	350,000	
Barite	thousand metric tons	3,600	3,100	3,600	3,900	4,200
Boron, mine, B ₂ O ₃ equivalent	150,000	145,000	130,000	135,000	140,000	
Bromine	40,000	42,000	42,000	4,300	4,350	
Cement, hydraulic	thousand metric tons	661,040 ⁴	725,000 ⁴	862,080 ⁴	970,000 ⁴	1,068,850 ⁴
Diatomite	350,000	370,000	380,000	390,000	410,000	
Dolomite	thousand metric tons	6,700	7,000	7,300	7,500	7,800
Fluorspar	do.	2,450	2,450	2,650	2,700	2,700
Graphite	450,000	629,000	710,000	700,000	720,000	
Gypsum	thousand metric tons	6,800	6,850	6,850	7,000	7,300
Kaolin	do.	3,500	3,600	3,700	3,750	3,800
Lithium minerals, all types	16,000	16,000	17,000	18,000	19,000	
Magnesite	thousand metric tons	3,580	4,560	4,600	4,650	4,700
Nitrogen, N content of ammonia	do.	28,200 ⁴	30,300 ⁴	31,500 ⁴	34,770 ⁴	37,850 ⁴
Phosphate rock, P ₂ O ₅ equivalent	do.	6,300	6,900	7,550	7,650	9,130
Potash, marketable, potassium oxide equivalent	do.	385	450	500	550	600
Rare earths, rare-earth oxide equivalent	81,000	88,000	92,000	98,000	119,000	
Salt	thousand metric tons	34,105 ⁴	36,024 ⁴	34,377 ⁴	37,100 ⁴	46,610 ⁴
Sodium compounds:						
Mirabilite	do.	4,200	5,000	5,800	6,300	6,300
Soda ash, natural and synthetic	do.	9,144 ⁴	10,330 ⁴	11,336 ⁴	13,024 ⁴	14,211 ⁴
Strontium carbonate	50,000	100,000	130,000	150,000	180,000	
Sulfur:						
Native	do.	420 ^r	540 ^r	700 ^r	820 ^r	900
Content of pyrite	do.	3,090	3,240	3,400	3,730	4,010
Byproduct, all sources	do.	2,000	2,200	2,400	2,600	2,800
Total	do.	5,510 ^r	5,980 ^r	6,500 ^r	7,150 ^r	7,710
Talc and related materials	do.	3,500	2,500	3,000	3,000	3,050
MINERAL FUELS AND RELATED MATERIALS						
Coal:						
Anthracite	do.	190,000	250,000	218,000	220,000	245,000
Bituminous	do.	965,000	1,110,000	1,470,000	1,690,000	1,850,000
Lignite	do.	47,800	53,000	52,000	50,000	55,000
Total	do.	1,200,000	1,410,000	1,740,000	1,960,000	2,150,000
Coke, all types	do.	131,310 ⁴	142,800 ⁴	138,800 ⁴	177,480 ⁴	232,820 ⁴
Gas, natural:						
Gross	billion cubic meters	30	33	35	41	50
Marketed	do.	24	26	28	34	42
Petroleum:						
Crude, including crude from oil shale	million 42-gallon barrels	1,210	1,240	1,260	1,300	1,350
Refinery products	do.	1,460	1,530	1,600	1,650	1,700

^rRevised.

¹Estimated data are rounded to no more than three significant digits; may not add to totals shown.

²Table includes data available through September 30, 2006.

³China also produces diamond, gallium, germanium, platinum-group metals, stone, and uranium, but available information is inadequate to make estimates of output.

⁴Reported by China's State Statistical Bureau.

TABLE 2
CHINA: STRUCTURE OF THE MINERAL INDUSTRY IN 2005

(Thousand metric tons unless otherwise specified)

Commodity	Major operating companies ¹	Location of main facilities	Annual capacity ^e	
Aluminum:				
Alumina	Pingguo Aluminum Co. (Aluminum Corporation of China)	Guangxi, Pingguo	1,200	
Do.	Guizhou Aluminum Plant (Aluminum Corporation of China)	Guizhou, Guiyang	1,200	
Do.	Coalmine Aluminum (Sanmenxia) Co. Ltd.	Henan, Sanmenxia	400	
Do.	East Hope (Sanmenxia) Aluminum Co. Ltd.	do.	400	
Do.	Zhengzhou Aluminum Plant (Aluminum Corporation of China)	Henan, Zhengzhou	2,300	
Do.	Zhongzhou Aluminum Plant (Aluminum Corporation of China)	Hunan, Zhongzhou	1,500	
Do.	Bingzhou Weiqiao Aluminum Co.	Shandong, Zouping	1,000	
Do.	Shandong Huayu Alumina Co. Ltd. (Shandong Chiping Xinfu Aluminum and Electricity Group)	Shandong, Chiping	800	
Do.	Shandong Aluminum Plant (Aluminum Corporation of China)	Shandong, Zibo	1,500	
Do.	Shanxi Aluminum Plant (Aluminum Corporation of China)	Shanxi, Hejin	2,200	
Do.	Shanxi Luneng Jinbei Aluminum Co. Ltd.	Shanxi, Yuanping	1,000	
Metal	Baiyin Aluminum Plant	Gansu, Baiyin	150	
Do.	East Hope Aluminum Plant	Gansu, Baotou	250	
Do.	Lanzhou Aluminum Plant	Gansu, Lanzhou	210	
Do.	Liancheng Aluminum Plant	do.	235	
Do.	Pingguo Aluminum Co. (Aluminum Corporation of China)	Guangxi, Pingguo	380	
Do.	Guizhou Aluminum Plant (Aluminum Corporation of China)	Guizhou, Guiyang	400	
Do.	Henan Zong Industry Co. Ltd.	Henan, Gongyi	180	
Do.	Jiaozuo Wanfang Aluminum Co. Ltd.	Henan, Jiaozuo	300	
Do.	Henan Wanji Aluminum Co. Ltd.	Henan, Luoyang	180	
Do.	Henan Huanghe Mianchi Aluminum Plant	Henan, Mianchi	115	
Do.	Sanmenxia Tianyuan Aluminum Co. Ltd.	Henan, Sanmenxia	110	
Do.	Shangqiu Aluminum Smelter	Henan, Shangqiu	180	
Do.	Yichuan Yugang Longquan Aluminum Co.	Henan, Yichuan	400	
Do.	Henan Shenhuo Aluminum-Electricity Co. Ltd.	Henan, Yongcheng	200	
Do.	Hanjiang Danjiangkou Aluminum Co. Ltd.	Hubei, Danjiangkou	73	
Do.	Zhengzhou Aluminum Plant (Aluminum Corporation of China)	Hunan, Zhengzhou	60	
Do.	Fushun Aluminum Plant	Liaoning, Fushun	190	
Do.	Baotou Aluminum Plant	Nei Mongol, Baotou	250	
Do.	Qingtongxia Aluminum Plant	Ningxia, Qingtongxia	400	
Do.	Qinghai Aluminum Smelter (Aluminum Corporation of China)	Qinghai, Xining	360	
Do.	Tongchuan Xingguang Aluminum Co. Ltd.	Shaanxi, Tongchuan	80	
Do.	Shandong Chiping Xinfu Aluminum and Power Group	Shandong, Chiping	360	
Do.	Taishan Aluminum-Power Co. Ltd.	Shandong, Fecheng	125	
Do.	Shandong Nanshan Industry Co. Ltd.	Shandong, Longkou	160	
Do.	Shandong Aluminum Plant (Aluminum Corporation of China)	Shandong, Zibo	120	
Do.	Bingzhou Weiqiao Aluminum Co.	Shandong, Zouping	100	
Do.	Huaze Aluminum and Power Co. Ltd.	Shanxi, Hejin	280	
Do.	Taiyuan Oriental Aluminum Co.	Shanxi, Taiyuan	75	
Do.	Shanxi Guanlu Aluminum Co. Ltd.	Shanxi, Yuncheng	210	
Do.	Yunnan Aluminum Plant	Yunnan, Kunming	400	
Antimony	Huaxi (China Tin) Group Industrial Co.	Guangxi, Hechi	25	
Do.	Xikuangshan Twinkling Star Co. Ltd.	Hunan, Lengshuijiang	37	
Asbestos	China National Nonmetallic Industry Corp.	Nei Mongol, Baotou; Shanxi, Lai Yuan and Lu Liang	130	
Barite	do.	Guizhou, Xiangshou	NA	
Bismuth	metric tons	Guangzhou Smelter	Guangdong, Guangzhou	300
Do.	do.	Shizhuyuan Nonferrous Metals Co. Ltd.	Hunan, Shizhuyuan	1,000
Do.	do.	Zhuzhou Smelter (Zhuye Torch Metals Co. Ltd.)	Hunan, Zhuzhou	350
Do.	do.	Yunnan Copper Group Co. Ltd.	Nei Mongol, Chifeng	300
Cadmium		Zhuzhou Smelter (Zhuye Torch Metals Co. Ltd.)	Hunan, Zhuzhou	1

See footnotes at end of table.

TABLE 2--Continued
CHINA: STRUCTURE OF THE MINERAL INDUSTRY IN 2005

(Thousand metric tons unless otherwise specified)

Commodity		Major operating companies ¹	Location of main facilities	Annual capacity ²
Coal		Hebei Provincial Government	Hebei	70,000
Do.		Heilongjiang Provincial Government	Heilongjiang	100,000
Do.		Henan Provincial Government	Henan	100,000
Do.		Liaoning Provincial Government	Liaoning	70,000
Do.		Nei Mongol Provincial Government	Nei Mongol	90,000
Do.		Shandong Provincial Government	Shandong	60,000
Do.		Shanxi Provincial Government	Shanxi	400,000
Do.		Sichuan Provincial Government	Sichuan	80,000
Do.		Shenhua Coal Corp.	Ningxia, Nei Mongol, and Shaanx	150,000
Cobalt	metric tons	Jinchuan Nonferrous Metals Corp.	Gansu, Jinchang	1,200
Copper, refined		Jinchang Smelter (Tongling Nonferrous Metals Co.)	Anhui, Tongling	170
Do.		Jinlong Smelter (Tongling Nonferrous Metals Co.)	do.	210
Do.		Wuhu Smelter (Hengxin Copper Industry Group Co.)	Anhui, Wuhu	60
Do.		Baiyin Nonferrous Metals Co.	Gansu, Baiyin	50
Do.		Jinchuan Nonferrous Metals Corp.	Gansu, Jinchuan	120
Do.		Luoyang Copper Processing Factory	Henan, Luoyang	50
Do.		Daye Nonferrous Metals Co.	Hubei, Daye	160
Do.		Zhangjiagang United Copper Co. (Tongling Nonferrous Metals Co.)	Jiangsu, Zhangjiagang	150
Do.		Guixi Smelter (Jiangxi Copper Co. Ltd.)	Jiangxi, Guixi	400
Do.		Dongfang Copper Co. (Huludao Nonferrous Metals Group)	Liaoning, Huludao	100
Do.		Dongying Fangyuan Nonferrous Metals Co. Ltd.	Shandong, Dongying	100
Do.		Shandong Jinsheng Nonferrous Metals Corp.	Shandong, Linyi	100
Do.		Taiyuan Copper Industry Co.	Shanxi, Taiyuan	30
Do.		Zhongtiaoshan Nonferrous Metals Co.	Shanxi, Yuangu	85
Do.		Tianjin Copper Electrolysis Factory	Tianjin	25
Do.		Yunnan Smelter (Yunnan Copper Group Co. Ltd.)	Yunnan, Kunming	250
Gallium	metric tons	Shandong Aluminum Plant	Shandong, Zibo	10
Gas, natural	billion cubic meters	China National Petroleum Corp.	Sichuan	10
Germanium	metric tons	Yunnan Chihong Zinc and Germanium Co. Ltd.	Yunnan, Qujing	10
Gold, refined	do.	China National Gold Corp.	Henan, Lingbao	10
Do.	do.	Zhongyan Gold Smelter (Zhongjin Gold Co. Ltd.)	Henan, Sanmenxia	30
Do.	do.	Jiangxi Copper Co. Ltd.	Jiangxi, Guixi	12
Do.	do.	Laizhou Gold Co.	Shandong, Laizhou	15
Do.	do.	Zhaoyuan Gold Co.	Shandong, Zhaoyuan	15
Do.	do.	Great Wall Gold Silver Refinery	Sichuan, Chengdu	100
Graphite		Jixi Aoyu Graphite Co. Ltd.	Heilongjiang, Jixi and Luo	60
Do.		Nei Mongol Xinghe Jingxin Graphite Co. Ltd.	Nei Mongol, Xinghe	10
Indium	metric tons	Laibin Smelter [Liuzhou Huaxi (China Tin) Group Co.]	Guangxi, Laibin	60
Do.	do.	Liuzhou Zinc Products Co.	Guangxi, Liuzhou	20
Do.	do.	Zhuzhou Smelter	Hunan, Zhuzhou	60
Do.	do.	Huludao Nonferrous Metals Group Co.	Liaoning, Huludao	30
Iron and steel:				
Iron ore		Ma'anshan Iron and Steel Co.	Anhui, Maanshan	10,000
Do.		Shoudu (Capital) Mining Co.	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 (Group) Co. (Wugang)	Hubei, Wuhan	5,100
Do.		Banshigou Iron Mine Mining Co.	Jilin, Hunjiang	1,400
Do.		Anshan Mining Co.	Liaoning, Anshan	30,000
Do.		Benxi Iron and Steel Co.	Liaoning, Benxi	13,700

See footnotes at end of table.

TABLE 2--Continued
CHINA: STRUCTURE OF THE MINERAL INDUSTRY IN 2005

(Thousand metric tons unless otherwise specified)

Commodity	Major operating companies ¹	Location of main facilities	Annual capacity ⁶
Iron and steel--Continued:			
Iron ore--Continued:	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, Panzhihua	13,000
Do.	Kunming Iron and Steel Co.	Yunnan, Kunming	1,400
Ferroalloys	Shoudu (Capital) Iron and Steel (Group) Co.	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 Iron and Steel Co. Ltd.	Shanghai	180
Do.	Emei Ferroalloy Co.	Sichuan, Emei	70
Do.	Hengshan Ferroalloy Co.	Zhejiang, Jiande	70
Crude steel	Ma'anshan Iron and Steel Co.	Anhui, Maanshan	10,000
Do.	Shoudu (Capital) Iron and Steel (Group) Co. (Shougang)	Beijing and Hebei, Caofeidian	10,000
Do.	Liuzhou Iron and Steel Group	Guangxi, Liuzhou	6,000
Do.	Handan Iron and Steel General Work (Handan)	Hebei, Handan	10,000
Do.	Tangshan Iron and Steel Co. (Taigang)	Hebei, Tangshan	2,300
Do.	Wuhan Iron and Steel (Group) Co. (Wugang)	Hubei, Wuhan	12,000
Do.	Shagang Group Co. Ltd.	Jiangsu, Zhangjiagang	13,000
Do.	Anshan Iron and Steel (Group) Co. (Angang)	Liaoning, Anshan	16,000
Do.	Benxi Iron and Steel Co. (Bengang)	Liaoning, Benxi	6,000
Do.	Baotou Iron and Steel and Rare Earth Co.	Nei Mongol, Baotou	10,000
Do.	Baoshan Iron and Steel (Group) Corp. (Baosteel)	Shanghai	19,000
Do.	Shanghai Iron and Steel Co. Ltd.	do.	6,000
Do.	Shandong Jinan Iron and Steel Group Co.	Shandong, Jinan	10,000
Do.	Shandong Laiwu Iron and Steel Group Co.	Shandong, Laiwu	10,000
Do.	Taiyuan Iron and Steel Co. (Taigang)	Shanxi, Taiyuan	5,000
Do.	Panzhuhua Iron and Steel (Group) Co. (Pangang)	Sichuan, Panzhihua	6,000
Lead	Baiyin Nonferrous Metals Co. Ltd.	Gansu, Baiyin	80
Do.	Shaoguan Smelter (Shenzhen Nonfemet Co.)	Guangdong, Shaoguan	100
Do.	Hechi South Nonferrous Metals Smelting Co. Ltd.	Guangxi, Hechi	60
Do.	Anyang Smelter (Yubei Metal Co.)	Henan, Anyang	160
Do.	Jiyuan Wangyang Nonferrous Smelter	Henan, Jiaozuo	100
Do.	Jiyuan Smelter (Yuguang Gold-Lead Co. Ltd.)	Henan, Jiyuan	300
Do.	Henan Lingye Co. Ltd.	Henan, Lingbao	100
Do.	Hanjiang Smelter	Hubei, Luhekou	50
Do.	Shuikoushan Nonferrous Metals Co. Ltd.	Hunan, Hengyang	100
Do.	Zhuzhou Smelter (Zhuye Torch Metals Co. Ltd.)	Hunan, Zhuzhou	100
Do.	Xuzhou Chunxing Alloy Co. Ltd.	Jiangsu, Xuzhou	150
Do.	Kunming Smelter	Yunnan, Kunming	100
Lithium, LiCO ₃	Sichuan Shehong Lithium Co. Ltd.	Sichuan, Shehong	2
Do.	Xinjiang Lithium Co.	Xinjiang, Urumqi	5
Magnesium	Fushun Aluminum Plant	Liaoning, Fushun	5
Do.	Ningxia Huayuan Magnesium Group	Ningxia, Yinchuan	15
Do.	Huayu Interprises (Group) Ltd.	Shanxi, Jishan	35
Do.	Taiyuan Tongxiang Magnesium Metal Co. Ltd.	Shanxi, Taiyuan	45
Do.	Taiyuan Yiwei Magnesium Co. Ltd.	do.	21
Do.	Wenxi Biyun Magnesium Co. Ltd.	Shanxi, Wenxi	30
Do.	Wenxi Yinguang Magnesium Group	do.	40
Do.	Minhe Magnesium Plant	Qinghai, Minhe	7
Manganese, metal	Chongqing Tycoon Manganese Co. Ltd.	Chongqing	23
Do.	Guangxi Dameng Manganese Industry Co. Ltd.	Guangxi, Nanning	70

See footnotes at end of table.

TABLE 2--Continued
CHINA: STRUCTURE OF THE MINERAL INDUSTRY IN 2005

(Thousand metric tons unless otherwise specified)

Commodity	Major operating companies ¹	Location of main facilities	Annual capacity ^e	
Molybdenum, concentrate	Luoyang Luanchuan Molybdenum Industry Group Co., Ltd.	Henan, Luanchuan	13	
Do.	Jinduichang Mining Corp.	Shaanxi, Huaxian	9	
Nickel, refined	Jinchuan Nonferrous Metals Corp.	Gansu, Jinchuan	100	
Do.	Chengdu Electro-Metallurgy Factory	Sichuan, Chengdu	5	
Petroleum, crude	Shengli Bureau	Hebei, Shengli	33,500	
Do.	Daqing Bureau	Heilongjiang, Daqing	55,000	
Do.	Liaohe Bureau	Liaoning, Liaohe	15,000	
Do.	Bohai Offshore Oil Corp.	Bohai	4,000	
Do.	Nanhai East Corp.	Nanhai	5,000	
Potash	Qinghai Yanhu Industry Group Co. Ltd.	Qinghai	40	
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	Shandong Haihua Group Co. Ltd.	Shandong, Weifang	1,400	
Do.	Zigong Zhangjiaba Salt Chemical Plant	Sichuan, Zigong	250	
Silver	metric tons	Daye Nonferrous Metals Co.	Hubei, Daye	100
Do.	do.	Jiangxi Copper Co. Ltd.	Jiangxi, Guixi	400
Do.	do.	Great Wall Gold Silver Refinery	Sichuan, Chengdu	300
Do.	do.	Yunnan Smelter (Yunnan Copper Group Co. Ltd.)	Yunnan, Kunming	450
Strontium, carbonate	Chongqing Chonglong Strontium Co. Ltd.	Chongqing	20	
Do.	Chongqing Tongliang Redbutterfly Strontium Co.	do.	120	
Do.	Hebei Xinji Chemical Group	Hebei, Xinji	35	
Do.	Nanjing Jinyan Strontium Co. Ltd.	Jiangsu, Lishui	20	
Talc	China National Nonmetallic Industry Corp.	Guangxi, Longshen	130	
Do.	do.	Liaoning, Haicheng	50	
Do.	do.	Shandong, Qixia	5	
Tin, smelter	Laibin Smelter [Huaxi (China Tin) Group Co.]	Guangxi, Laibin	25	
Do.	Pinggui Mining Bureau	Guangxi, Zhongshan	8	
Do.	Yunnan Tin Industry Co.	Yunnan, Gejiu	55	
Titanium, sponge	Zunyi Titanium Plant	Guizhou, Zunyi	10	
Do.	Fushun Aluminum Plant	Liaoning, Fushun	3	
Tungsten, concentrate	Shizhuyuan Nonferrous Metals Co.	Hunan, Chenzhou	5	
Do.	Yaogangxian Tungsten Mine	Hunan, Yizhang	3	
Do.	Nanchang Co.	Jiangxi, Nanchang	15	
Zinc	Northwest China Lead-Zinc Smelter (Baiyin Nonferrous Metals Co. Ltd.)	Gansu, Baiyin	150	
Do.	Shaoguan Smelter (Shenzhen Nonfemet Co.)	Guangdong, Shaoguan	170	
Do.	Liuzhou Zinc Products Factory	Guangxi, Liuzhou	100	
Do.	Yugang Gold-Lead Co. Ltd.	Henan, Jiyuan	100	
Do.	Shuikoushan Nonferrous Metals Co. Ltd.	Hunan, Hengyan	60	
Do.	Zhuzhou Smelter (Zhuye Torch Metals Co. Ltd.)	Hunan, Zhuzhou	300	
Do.	Huludao Zinc Smelting Co.	Liaoning, Huludao	390	
Do.	Laibin Smelter	Yunnan, Laibin	60	
Do.	Yunnan Jinding Zinc Co. Ltd. (Sichuan Hongda Group)	Yunnan, Lanping	100	
Do.	Yunnan Chihong Zinc and Germanium Co. Ltd.	Yunnan, Qujing	100	

^eEstimated; estimated data are rounded to no more than three significant digits. NA Not available.

¹Companies are owned by either a State government or a Provincial government.

TABLE 3
CHINA: EXPORTS OF SELECTED MINERAL COMMODITIES IN 2005

	Quantity (metric tons)	Value (thousands)
METALS		
Aluminum:		
Alumina	20,000	\$13,861
Metal and alloys:		
Unwrought	1,318,599	2,379,523
Semimanufactures	711,484	1,950,894
Antimony metal, unwrought	29,833	82,922
Barium sulfate	3,080,000	106,954
Bismuth, includes powder, unwrought, and waste	6,840	50,194
Copper, metal and alloys:		
Unwrought	144,671	549,823
Semimanufactures	463,560	2,073,660
Iron and steel:		
Ferrosilicon	940,000	614,018
Pig iron and cast iron	2,230,000	666,508
Steel:		
Bars and rods	6,100,000	2,769,382
Shapes and sections	900,000	446,751
Sheets and plates	8,450,000	5,223,095
Tube and pipe	840,000	1,150,353
Magnesium metal, unwrought	181,925	295,867
Manganese, unwrought	285,019	424,333
Tin, metal and alloys, unwrought	27,014	198,648
Tungsten, tungstates	8,012	135,566
Zinc:		
Metal and alloys, unwrought	146,845	195,826
Oxide and peroxide	62,205	69,202
INDUSTRIAL MINERALS		
Cement	22,160,000	684,600
Fluorspar	730,000	128,785
Granite	5,250,094	1,276,414
Graphite, natural	493,747	85,447
Magnesia, fused	361,094	133,182
Talc	560,000	70,513
MINERAL FUELS AND RELATED MATERIALS		
Coal	71,680,000	4,272,138
Coke, semicoke	12,760,000	2,340,584
Petroleum:		
Crude oil	8,070,000	2,696,013
Refinery products	14,010,000	6,410,828

Source: General Administration of Customs of the People's Republic of China, 2005, China monthly exports and imports, no. 12.

TABLE 4
CHINA: IMPORTS OF SELECTED MINERAL COMMODITIES IN 2005

(Metric tons unless otherwise specified)

	Quantity	Value (thousands)
METALS		
Aluminum:		
Alumina	7,020,000	\$2,597,174
Metal and alloys, unwrought	636,951	1,018,491
Semimanufactures	647,589	2,251,015
Scrap	1,687,210	1,368,589
Chromium, chromite	3,020,000	595,569
Cobalt, ore and concentrates	119,146	282,911
Copper:		
Ore and concentrates	4,060,000	3,706,722
Anode	129,244	463,056
Metal and alloys, unwrought	1,415,029	4,949,672
Semimanufactures	1,118,729	4,378,236
Scrap	4,821,214	3,179,905
Iron and steel:		
Iron ore	275,260,000	18,372,783
Steel:		
Bars and rods	1,090,000	1,015,102
Scrap	10,140,000	2,610,486
Seamless pipe	1,090,000	2,291,909
Shapes and sections	640,000	332,227
Sheets and plates	22,430,000	20,114,588
Manganese ore	4,580,000	683,483
Nickel:		
Ore and concentrates	483,888	176,292
Metal	89,684	1,321,974
Titanium dioxide	227,655	417,775
INDUSTRIAL MINERALS		
Diamond	kilograms 3,229	1,944,430
Fertilizers:		
Compound fertilizers	4,100,000	1,039,048
Diammonium phosphate	1,750,000	497,375
Potassium chloride	8,830,000	1,824,137
Potassium sulfate	190,000	43,311
Urea	70,000	12,715
Sodium carbonate	70,549	12,761
MINERAL FUELS AND RELATED MATERIALS		
Coal	26,170,000	1,383,686
Petroleum:		
Crude oil	126,820,000	47,722,927
Refinery products	31,430,000	10,434,649

Source: General Administration of Customs of the People's Republic of China, 2005, China monthly exports and imports, no. 12.