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2007 Minerals Yearbook

JAPAN [ADVANCE RELEASE]

U.S. Department of the Interior
U.S. Geological Survey

April 2009

The Mineral Industry of Japan

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Japan is the largest industrialized free-market economy in the world after the United States. The real gross domestic product (GDP) growth rate was 1.9% in 2007. Japan has relatively few mineral resources and depends heavily on imported minerals and mineral fuels to meet its demand. Its only substantial indigenous mineral resources are dolomite, iodine, limestone, pyrophyllite, silica sand, and silica stone. Although the country's deposits of gold, magnesium, and silver have been sufficient to meet its industrial demand, it must import bauxite, coke, copper, iron ore, and other raw materials. Japan uses petroleum, as well as coal, hydropower, liquefied natural gas (LNG), and nuclear power to meet its energy needs. The country was a major importer of minerals in the world mining community. Japan was one of the world's major producers and exporters of cement, ceramics, chemicals, fertilizers, glass, iodine, iron and steel, several nonferrous metals, and metal products. To sustain its industrial activities, Japan has implemented various measures to ensure a stable supply of mineral resources from overseas.

Minerals in the National Economy

In 2007, the mining industry contributed only 0.1% to Japan's real GDP whereas the mineral processing industry accounted for 5.1% of the real GDP. The mineral industry played an important role in supplying the industrial raw materials to the country's manufacturing and construction industries. Employment in the mining industry continued to decline. For example, the cement industry, which comprised 18 companies, had only 3,400 workers at 32 plants. Japan's industries relied on imported minerals for its economic growth and used a large amount of nonferrous metals. The country imported 99.9% of its copper concentrate requirement and 92% of zinc concentrate requirement.

Government Policies and Programs

To secure a stable supply of raw materials, the Government established incentives to promote exploration and development of new mines; assist in the development of exploration technologies, including physical survey and remote sensing, and of recycling technologies for nonferrous metals; and assist in corporate exploration investment and financing in Japan and abroad. In addition, a mine exploration reserve fund was to be established through the tax collection system. The Government also engaged in the research and development of recovery technologies (to obtain valuable metals) and in technologies for recycling slag (Metalworld, 2006).

Japan's former asbestos control law stipulated that natural materials that contained less than 1% chrysotile were permitted to be used. Beginning in September 2006, the new asbestos control law banned any product imported, produced, or delivered that contained asbestos minerals in concentrations of more than 0.1%. Asbestos minerals were contained in such mineral-based materials as brucite, caustic calcined magnesite, dead-burned magnesite, sepiolite, talc, and vermiculite. However, there was no reliable and economically acceptable asbestos analysis method available that could measure asbestos content at 0.1% or lower because the detection limitations of X-ray fluorescence were 0.8% for chrysotile and 0.5% for tremolite. The Government exempted the analysis of serpentine under the new control law (Industrial Minerals, 2007).

In 2007, Japan Oil, Gas and Metals National Corp. (JOGMEC) and Petrovietnam signed a memorandum of understanding to establish comprehensive cooperation in oil and gas activities, including exploration and production, feasibility studies, and research and development. JOGMEC also signed a memorandum of understanding with PTT Public Co. Ltd. of Thailand to begin a feasibility study for applying gas to liquid (GTL) technology to PTT's natural gas resources with the aim of commercializing its liquid fuel products (Japan Oil, Gas and Metals National Corp., 2007a, b).

Production

Japan produced a variety of metals and industrial minerals in addition to its processed mineral products, including cement, fertilizers, and crude steel. Cement production (both hydraulic and portland) decreased by 3.2% compared with that of 2006. Owing to strong domestic demand and increased exports, the output of crude steel and pig iron increased by 3.4% and 3%, respectively, compared with that of 2006. Output of primary refined gold decreased by 18%. Production of titanium dioxide increased by 2.5% in 2007. The industrial minerals that were mined included mainly dolomite, feldspar, fire clay, limestone, pyrophyllite, silica sand, and silica stones. Production of dolomite and limestone decreased only slightly whereas that of silica sand and silica stones decreased by 6% and 5.2%, respectively. Japan produced small amounts of natural gas and crude petroleum, production of which increased by 12.3% and 7%, respectively, in 2007 (table 1).

Structure of the Mineral Industry

Japan's mineral industry is made up of a nonferrous metals sector, a nonmetals (industrial minerals) sector, and a quarrying (construction materials) sector. The Agency for Natural Resources and Energy under the Ministry of Economy, Trade and Industry is responsible for formulating Japan's mineral policies, which are implemented by JOGMEC. The objective of the country's overall mineral policy is to secure a stable supply of mineral resources and mineral fuels from abroad for the country to sustain continuous economic growth. The mineral commodities involved in supply were nonferrous metals, oil, and natural gas. The developed and developing countries involved in supply were Australia, Canada, Chile, China, Indonesia, Mexico, Peru, the Philippines, and the United States.

In Japan, the mining of coal and nonferrous metals was a small industry but the quarrying of industrial minerals and the processing of ferrous and nonferrous metals were large industries. Only a few metal mines were still in operation, including the Hishikari gold mine in Kagoshima Prefecture. The Toyoha copper and lead mine in Hokkaido Prefecture was closed in March 2006. The country's mineral industry was primarily owned and operated by private companies (table 2).

Mineral Trade

Japan's total exports and total imports were valued at $803 billion and $699 billion, respectively, in 2007, which were increases of 11.5% and 8.6%, respectively, compared with those of 2006. Of its major mineral commodities, the country exported 36.49 million metric tons (Mt) of iron and steel products and 1.97 Mt of nonferrous metals, which represented increases of 4.7% and 69.7%, respectively. Japan relied on imported raw materials for its industrial manufacturing as well as mineral fuels for its energy needs. Imports of nonferrous ore and iron ore and concentrate at 14.5 Mt and 138.88 Mt, increased by 5.9% to 14.5 Mt and by 3.4% to 138.88 Mt, respectively. Imports of petroleum and its products decreased by 2.9% to 1.69 billion barrels. Imports of LNG and coal increased by 7.4% to 66.82 Mt and by 5.2% to 186.49 Mt, respectively.

In the past 3 years, Japan's production of refined copper was consumed mostly by the domestic industries, although output, imports, and exports gradually increased during this period. For refined lead, the apparent consumption was steady at about 236,000 metric tons per year (t/yr) from 2005 to 2007; the reported consumption was low at 142,000 metric tons (t) in 2005 owing to unreported uses and applications. Output of refined zinc declined slightly. The reported consumption of refined zinc trended upward but the apparent consumption trended downward owing to yearly adjustment of stocks (table 3).

Commodity Review

Metals

Japan classified the following seven mineral commodities as rare metals and was building national reserves and stockpiles of them: chromium, cobalt, manganese, molybdenum, nickel, tungsten, and vanadium. These rare metals are used in the electronics industry to make magnetic materials and electronics parts for information and environmental technologies. Gold, platinum, and nickel were also considered to be "electric materials" and were used in processing electric- and information technology-related products.

Copper.—Sumitomo Metal Mining Co. Ltd. (Sumitomo Mining) planned to expand its Toyo copper smelter in Ehime Prefecture by 10% to 450,000 t/yr in early 2008. The company, which together with Sumitomo Corp. held a 21% interest in the Cerro Verde copper mine in Chile, expected ore output from the mine to be 300,000 t/yr and secured 50% of copper concentrates from the mine for the next 10 years. The first shipment of 9,500 t of copper concentrate was made in January 2007. In the future, Sumitomo Mining planned to increase the amount of copper ore sourced from foreign mines to 40% from 20% (Mining Journal, 2007).

To secure stable supplies of copper concentrate, Pan Pacific Copper Co. Ltd., which was jointly owned by Nippon Mining & Metals Co. Ltd. (66%) and Mitsui Mining & Smelting Co. Ltd. (34%), was engaged in the development of the Quechua copper deposit in Peru. The 5,732-hectare deposit is located 700 kilometers (km) southeast of Lima in the Espinar District in Cuzco Province and was estimated to have a reserve of 260 Mt grading 0.61% copper. A feasibility study for the project would be conducted from 2007 to 2010 and would be followed by the construction of the mine and production facilities from 2011 to 2012. Mine operations were expected to begin in the second half of 2013. Parent company Mitsui Mining & Smelting also operated the Huanzala zinc mine and the Palka zinc mine in Peru (Pan Pacific Copper Co. Ltd., 2007).

A year earlier, in 2006, Pan Pacific Copper had acquired the Regalito copper property in Chile from Regalito Copper Corp. of Canada for $137 million. The property is located 115 km southeast of Copiapo and 15 km from the border with Argentina. There were 6 mining concessions and 158 exploration concessions on the property. According to a 2004 estimate, the property had a mineral resource of 628 Mt grading 0.43% copper. The company expected that the mined ore would be heap leached and the solution processed at a newly constructed electrolytic copper plant using solvent extraction-electrowinning technology. Construction of the mine and production facilities would begin in 2009. The mine was expected to produce 100,000 t/yr to 150,000 t/yr of copper cathode beginning in 2011 and the projected life of the mine life was 19 years (Nippon Mining & Metals Co., Ltd., 2006).

Mitsubishi Materials Corp. and Sambo Copper Alloy Co., Ltd. signed a share-exchange agreement to make Sambo Copper Alloy a wholly owned subsidiary of Mitsubishi Materials. The effective date of the share-exchange agreement was December 28, 2007. In addition, Mitsubishi Materials signed a similar share-exchange agreement to make Mitsubishi Shindoh Co., Ltd. a wholly owned subsidiary effective February 1, 2008. The expanded company would be the leading player in the domestic copper processing and alloy industry. Mitsubishi Materials had integrated operations for the mining, smelting, fabricating, and recycling of copper and copper products. The two subsidiaries in collaboration with Mitsubishi Materials produced high-value-added copper products, such as Eco Brass. This new lead-free copper alloy was expected to have expanded sales in the automobile, information technology, and electronics markets (Mitsubishi Materials Corp., 2007b).

Dowa Holdings Co., Ltd. and its wholly owned subsidiary Dowa Metaltech Co., Ltd. acquired 90% of Yamaha Metanix Corp. and 50% of Yamaha-Olin Metal Corp., which were subsidiaries of Yamaha Corp. Yamaha Metanix was a leading manufacturer of high-quality advanced-functionality copper alloys and copper-titanium alloys. Yamaha-Olin Metal was a copper alloy material sale and marketing company established as a joint venture between Yamaha and Olin Corp. of the United States. Dowa Metaltech supplied connector materials for automobiles to its manufacturing company, Dowa Metal Co., Ltd., in Japan. The acquisition would enable Dowa Metaltech to

become a leading global supplier of copper alloy materials for automobiles, semiconductors, and electronic components (Dowa Holdings Co., Ltd., 2007b).

Ferroalloys.—Production of high-carbon ferromanganese and medium- and low-carbon ferromanganese in Japan increased by 5.1% and 9.5%, respectively, in 2007, and that of all ferromanganese combined increased by 6.2%. Ferromanganese output was increased because major steel companies were tending to produce more high-quality steel and consumed more ferromanganese. Imports of ferromanganese also increased by 65.8%. To meet the country's requirements for ferrochrome, production of low-carbon ferrochrome by JFE Materials Co. Ltd. at its Toyama plant was supplemented with imports from Kazakhstan, Russia, and South Africa. In 2007, the requirements for ferromolybdenum and ferrovanadium were fulfilled by domestic production and imports, which decreased by 24.5% for ferromolybdenum and 4% for ferrovanadium compared with imports in 2006 (TEX Report, The, 2008c).

Nippon Denko Co. Ltd. planned to boost its production capacity of super-low-phosphorous ferromanganese by 30,000 t/yr by the end of 2008 to meet increasing domestic demand. Its Tokushima plant currently produced 18,000 t/yr, which was the designed capacity. Total investment by Nippon Denko in the expansion was $17.5 million. Nippon Denko's total production capacity for manganese alloy was 200,000 t/yr (Metal-pages.com, 2007).

Japan produced 68,346 t of nickel in ferronickel in 2007, which was an increase of 3.5% compared with production in 2006. Owing to a decrease in the supply of nickel ore from New Caledonia, output of ferronickel was expected to decrease in 2008. New Caledonia exported 450,000 t of nickel ore to Japan in 2006. Pacific Metals Co. Ltd.'s ferronickel production decreased by 8.1% owing to an explosion in November 2007 at its No. 7 electric furnace in the 40,000-t/yr Hachinohe plant in Aomori Prefecture. However, Sumitomo Mining's output was increased by 26% to offset the loss by Pacific Metals, which was the leading producer in the country. Pacific Metals exported 60% of its ferronickel to the Republic of Korea and Taiwan and sold 40% to domestic stainless steelmakers (TEX Report, The, 2008b).

Sumitomo Mining acquired a 0.63% equity share in Sumitomo Metal Industries Ltd. (Sumitomo Metals) as of March 2007. Sumitomo Mining's core business areas were mineral resources development and metals production. Sumitomo Metals was a major buyer of electrolytic nickel and ferronickel for which Sumitomo Mining had a medium-term production target of 100,000 t/yr. Sumitomo Mining was seeking to become a major player in the nonferrous metals industry (Sumitomo Metal Mining Co., Ltd., 2007a).

Gold and Silver.—Sumitomo Mining and Sumitomo Corp. increased production at the Pogo gold mine in Alaska. The companies owned and managed the mine under a joint venture with Teck Cominco Ltd. of Canada. The mine had been in production since 2006. However, the designed throughput could not be sustained because of inadequate tailing filtration capacity; modifications to the handling system for transporting filtered tailings were required. The filter plant modifications were completed and became fully operational in March 2007. As a result, production exceeded 80% of design capacity beginning in April 2007 (Sumitomo Metal Mining Co., Ltd., 2007c).

Dowa Eco-System Co., Ltd., which was a wholly owned subsidiary of Dowa Holdings Co., Ltd., completed construction of a precious metal recovery plant in the Kosaka District of Akita Prefecture. The company recovered precious metals from plating wastes and discarded electronic parts and played a role in strengthening the preprocessing capabilities of Kosaka Smelting & Refining Co., Ltd., which had established a new type of refining facility to handle recycled materials (Dowa Holdings Co., Ltd., 2007a).

Iron and Steel.—The country produced 120 Mt of raw steel in 2007, which was an increase of 3.4% compared with that of 2006. Japan's exports of steel rose by 7.1% to 38.44 Mt valued at $42.3 billion owing to strong demand from emerging economies and increased overseas shipments. Steel exports to the Republic of Korea increased by 13.7%; Thailand, 13.3%; Taiwan, 3%; and China, 1.9%. Steel exports to the United States, however, decreased by 17.7% (Tradingmarkets.com, 2008). Japan's imports of iron and steel products increased by 7.4% to 8.64 Mt in 2007. Of the total imports, those of specialty steel products rose by 20.8%; ferroalloys, 12.4%; secondary steel products, 7.2%; pig iron, 3.4%; and ordinary steel products, 1.3% (TEX Report, The, 2008d).

Kobe Steel Ltd., Nippon Steel Corp., and Sumitomo Metals were considering measures to expand and enhance ongoing collaborative efforts. These measures included Kobe Steel and Nippon Steel supplying hot-rolled steel coils to Sumitomo Metals, the joint use of iron- and steelmaking facilities at Sumitomo Metals' Wakayama Steel Works as a source of high-grade steel, integration of some of their businesses and affiliates, and reciprocal production support among the three companies (Nippon Steel Corp., 2007d).

Nippon Steel (30%) and Pohang Iron and Steel Co. Ltd. (Posco) (70%) of the Republic of Korea agreed to establish a joint-venture company in Korea to supply direct-reduced iron to both companies and to recycle dry dust generated at Posco's steel works. The joint-venture company would construct and operate two units of Nippon Steel-type direct-reduced ironmaking and dry-dust recycling equipment—one at Kwangyang and the other at Pohang. Each unit would have a processing capacity of 200,000 t/yr of dry dust. The total projected investment cost was approximately $153 million. Commissioning was scheduled for September 2009 at Pohang and December 2009 at Kwangyang (Nippon Steel Corp., 2007c).

Sumitomo Metals decided to build a second new blast furnace to replace its No. 5 furnace (currently in operation) and reinforce its steelmaking facilities at the Wakayama Steel Works. Total capital expenditure for these projects was estimated to be $860 million. The first new blast furnace was under construction and would replace the existing No. 4 furnace in 2009. These investments would give Wakayama Steel Works a crude steel production capacity of 5 million metric tons per year (Mt/yr) in late 2012. Both new furnaces were identical in size (with inner volume of 3,700 cubic meters) and specifications. A new continuous-casting line also would be added to the steelmaking plant to produce high-quality slabs (Sumitomo Metal Industries, Ltd., 2007c).

JFE Steel Corp. started commercial operations at its No. 4 continuous galvanizing line at the West Japan Works in Fukuyama, Hiroshima Prefecture. The company invested $172 million in the line to produce galvannealed steel sheets for auto exteriors. Production capacity was expected to be 50,000 metric tons per month, with startup in January 2007 (JFE Steel Corp., 2007b).

JFE Steel also invested $143 million to increase production capacity at its Chita Works' medium-diameter seamless pipe mill to 250,000 t/yr from 160,000 t/yr, which was an increase of approximately 56%, by August 2008. The Chita Works' small- and medium-diameter seamless pipe mills, which produced high-end seamless pipes, had a combined capacity of 400,000 t/yr. Once the expansion of the medium-diameter seamless pipe mill is completed, JFE Steel's production capacity for high-end seamless pipes would be close to 500,000 t/yr. The mill used the plug mill rolling process and proprietary rolling technology developed and applied by the company (JFE Steel Corp., 2007a).

Nippon Steel and Godo Steel, Ltd. formed an alliance to enhance their competitive strengths by Nippon Steel agreeing to supply steel semimanufacturing products (billets) to Godo Steel, and Nippon Steel would, in return, use part of Godo Steel's steelmaking and rolling capacities at Funabashi, Osaka, and Himeji Works. Nippon Steel also would use part of Godo Steel's infrastructure at Himeji Works. In addition, the companies had already begun to conduct joint studies on environmental and recycling technologies (Nippon Steel Corp., 2007b).

Nippon Steel also reached agreement with Chubu Steel Plate Co., Ltd. to establish a strategic alliance. The companies agreed to collaborate on such specific measures as the use of each other's production facilities, mutual cooperation for cost reduction, and Nippon Steel's engineering of the infrastructure improvement at Chubu Steel Plate's rolling mill (Nippon Steel Corp., 2007a).

Lead and Zinc.—Apex Silver Mines Ltd. made the first shipment of 9,100 t of zinc concentrate from its silver-zinc-lead San Cristobal project in the Department of Potosi in Bolivia to Japan. The $700 million project was a joint venture of Apex Silver Mines Corp. of the United States (65%) and Sumitomo Corp. of Japan (35%). Full production was expected in the fourth quarter of 2007. A mining rate of 40,000 metric tons per day of ore by open pit was envisaged. The mine was expected to produce 550 t/yr of silver, 167,500 t/yr of zinc, and 63,500 t/yr of lead for 16 years. San Cristobal had reserves containing 14,000 t (450 million troy ounces) of silver, 4 Mt of zinc, and 1.4 Mt of lead (Reuters, 2007).

Nickel.—Japan produced 30,402 t of nickel metal in 2007 compared with 29,254 t in 2006. The country imported 49,816 t of nickel metal, which was an increase of 5%, compared with 47,450 t in the preceding year. Nickel metal was imported mainly from Brazil, China, South Africa, and Zimbabwe (TEX Report, The, 2008e). Sumitomo Mining planned to produce 100,000 t/yr of nickel in 2013 from its overseas nickel projects compared with the current 56,000 t/yr. The company's 54% owned Coral Bay project on Palawan Island in the Philippines currently produced 10,000 t/yr of nickel and 700 t/yr of cobalt. The second phase of the project would add 10,000 t/yr of nickel in 2009. A new refinery that would use the high-pressure acid leaching (HPAL) process was scheduled to produce 30,000 t/yr of nickel in 2012. Sumitomo Mining's Goro nickel project in New Caledonia, which was a joint venture with Vale Inco, also would contribute to the company's nickel production when completed (TEX Report, The, 2007b).

Sumitomo Mining and Taganito Mining Corp. of the Philippines, which was a member of the Zamora Group, signed an agreement to jointly study the feasibility of a nickel smelting project in the northeastern tip of Mindanao Island in southeastern Philippines. The project would apply the HPAL process. Plans called for production of 30,000 t/yr of nickel and 2,500 t/yr of cobalt in nickel (57%)-cobalt mixed sulfide from low-grade nickel oxide ore (laterite) at the Taganito Mine. The project's total investment was estimated to be $1 billion. Production was expected to begin in 2012 and the life of the mine was projected to be 30 years (Sumitomo Metal Mining Co., Ltd., 2007b).

Mitsui & Co. Ltd. also decided to participate in the second phase of the Coral Bay nickel project. The company planned to invest $51.3 million, which corresponded to 18% of the second-phase investment of $285 million. Raw material to be fed for nickel production was low-grade nickel ore. The HPAL process would produce nickel-cobalt mixed sulfide. In addition to Sumitomo Mining and Mitsui, other partners in the project were Sojitz Corp. of Japan (18%) and Rio Tuba Nickel Mining Corp. of the Philippines (10%) (TEX Report, The, 2007a).

Platinum-Group Metals.—Furuya Metal Co., Mitsubishi Materials Corp., and Mitsubishi Corp. planned a joint development contract to develop platinum-group metal (PGM) recycling technology using used catalyst as feed material. Mitsubishi Materials' copper smelting technologies and Furuya Metal's processing experience with PGMs would be applied. PGMs have a wide variety of applications, such as automobile catalysts, chemical catalysts, electrical parts, fuel cells, glassmaking furnaces, hard discs, and magnetic memory devices. Demand for PGMs was expected to increase for many years to come. The three companies believed that demand for secondary PGM sourced from scraps would increase, which was the basis for the joint project (Mitsubishi Materials Corp., 2007a).

Titanium.—Kobe Steel planned to invest a total of $48 million in four projects to upgrade and expand its titanium production facilities. These included a new titanium melting shop at its Takasago Works in Hyogo Prefecture, a counterblow hammer for closed die forging at Takasago, a new welded-tube line for Kobe Special Tube Co. Ltd. at Shimonoseki in Yamaguchi Prefecture, and expansion of the continuous annealing-pickling line for titanium sheet at Kakogawa Works in Hyogo Prefecture. The new $33 million titanium melting shop, which would increase production capacity by 30% to 40%, was expected to be completed in January 2008. The melt shop used the company's proprietary Kobe method (a vacuum arc remelting method) to treat titanium scrap (Kobe Steel Ltd., 2007).

Sumitomo Metals carried out organizational reforms by establishing a titanium division to promote and oversee the titanium business. The commercially pure titanium sheet and plate business, including sales and technology services, would be transferred to Sumitomo Metals (Naoetsu) Ltd. The titanium

alloy bar and billet business would be shifted from the Steel Sheet, Plate, Titanium and Structural Sheet division to the Railway, Automotive, and Machinery Parts division. Sumitomo Metals (Naoetsu) would handle the sales and technology services for customers of titanium alloy bars and billets. The timing for the restructuring was April 2008 (Sumitomo Metal Industries, Ltd., 2007b).

Industrial Minerals

Cement.—Owing to the longer time required to obtain building permits, the revised Building Standards Law, which was designed to tighten building safety, triggered a slump in demand for ready-mixed concrete. The Government's cutback of spending for public works also contributed to the decline in the construction industry. Cement demand in Japan fell by 5.9% to 55.5 Mt in 2007. Imports dropped by 8.5% to 930,000 t and exports rose by 4.4% to 10.1 Mt. Taiheiyo Cement Corp. was the leading cement producer in the country. Owing to low demand for ready-mixed concrete, the volume of its shipments of aggregates used in cement decreased in 2007. Its cement sales volume also fell by 7% to 19.28 Mt. The company's export volume rose by 2.3% to 3.77 Mt (Taiheiyo Cement Corp., 2008).

Limestone.—Japan's limestone resources were sufficient for domestic use and production of limestone was about 165 Mt/yr. Nittetsu Mining Co. Ltd. was a comprehensive resources company mainly involved with nonmetallic minerals, such as limestone. The company's Resources Division was responsible for limestone quarrying at Torigatayama in Kochi Prefecture, Shiriya in Aomori Prefecture, and Oita in Oita Prefecture. Total output was more than 20 Mt/yr. Limestone was supplied to domestic steel and cement manufacturers, and a portion of it was exported to Australia. In addition, the company operated quarries in various parts of the country and supplied about 5 Mt/yr of a variety of aggregates to users (Nittetsu Mining Co. Ltd., 2007, p. 3).

Zeolites.—Tosoh Corp. planned to double high-silica synthetic zeolite production and to increase zirconia powder output by 50% with a $70.3 million investment in two new plants. Construction of the new facilities at the Yokkaichi complex in Mie Prefecture started in December 2007 and was expected to be completed in December 2008. Tosoh had manufacturing plants at Nanyo complex in Yamaguchi Prefecture for synthetic zeolite products that included high-silica zeolite and zeolite molecular sieves. The zirconia products included powdered grades, compounds, and machined components (Industrial Minerals, 2008).

Mineral Fuels

Coal.—Coal imports by Japan reached 186 Mt in 2007, which was an increase of 5.2% compared with those of 2006. Of the total, thermal coal accounted for 54%; coking coal, 43%; and anthracite, 3%. Coking coal imports increased by only 0.4% to 80 Mt whereas thermal coal imports increased by 10.2% to 101 Mt. Imports from Australia, which accounted for 61% of the total tonnage, increased by 9.8% to 113 Mt and those from Indonesia, which accounted for 18% of the total, increased by 3.5% to 33 Mt. Imports from China, which accounted for 8% of the total, however, decreased by 26.7% to 15 Mt (TEX Report, The, 2008a).

Sumitomo Metals Kashima thermal powerplant began commercial operation in June 2007. Construction of the plant started in January 2004. The $545 million coal-fired plant had a generating capacity of 507 megawatts. Power would be supplied to Tokyo Electric Power Co., Inc. for 15 years. The plant effectively utilized the infrastructure of Kashima Steel Works. Installation of the highest-standard and proven exhaust gas treatment system, which included denitrification and desulfurization, helped greatly to reduce the nitrogen oxide, sulfur oxide, and soot dust in the sintering process at Kashima Steel Works. The powerplant generated power with high efficiency to decrease coal consumption and thereby reduced emissions of carbon dioxide and greenhouse gases. Sumitomo Metals increased the recycling of byproducts with the aim of zero emissions (Sumitomo Metal Industries, Ltd., 2007a).

Natural Gas and Petroleum.—Japan has virtually no oil or gas resources but it was a major oil and gas consuming country. Total oil consumption in the Asia and the Pacific region amounted to 24.87 million barrels per day in 2006 (the latest year for which data were available), and Japan's demand for oil accounted for 16.2% of the total. The region consumed 409 billion cubic meters of gas in 2006, of which Japan accounted for 20.66% (Ministry of Economy, Trade and Industry, 2006, p. 24, 78).

Reserves and Resources

Japan has large reserves of industrial minerals, including dolomite, iodine, limestone, pyrophyllite, silica sand, and silica stone. Its reserves of nonferrous metals such as lead, silver, and zinc are small with the exception of gold, deposits of which had been found and were being mined on a small scale in Kagoshima Prefecture on Kyushu Island. Japan's reserves of oil and gas are negligible. Some coal resources were being mined at several mines in Hokkaido Prefecture (table 4).

Outlook

Japan's mining production is expected to hold steady or decrease slightly in the next 2 to 3 years for some nonferrous metals, such as aluminum, copper, gold, lead, silver, and zinc, owing to the depletion of ore reserves. In the iron and steel sector, production of pig iron, ferroalloys, and steel is expected to increase modestly because of the continuing strong demand in the domestic market. Output of cement is expected to decline slightly owing to the Government's cutback in spending for public works.

Japan's mining and trading companies are expected to face increasing difficulties in investments overseas owing to rapid consolidation among global major miners, surges in asset prices, and the rising competition from China. Japan is likely to make forays into less developed countries with higher political and economic risks and little or no infrastructure in search of assets. The country is expected to form alliances with global mining companies and Government financial institutions to diversify its risk. The search for direct investments in joint exploration

for and development of mineral deposits in the less developed countries, particularly deposits of rare metals, is expected to continue in the future. Japan is expected to remain an important player in international mining because of the investment of its mining and trading companies, its importation of ores and concentrates for its smelting, refining, and fabricating industries and of coal for its powerplants, and the enduse of metals for its manufacturing industries.

References Cited

Dowa Holdings Co., Ltd., 2007a, Dowa Eco-System completes precious metal recovery plant in Akita, Japan: Dowa Holdings Co., Ltd. news release, November 20, 1 p.

Dowa Holdings Co., Ltd., 2007b, Dowa Metaltech acquires majority stale in copper alloy product sales and manufacturing companies: Dowa Holdings Co., Ltd. news release, March 20, 3 p.

Industrial Minerals, 2007, New asbestos ban hits Japanese market: Industrial Minerals, no. 473, February, p. 14.

Industrial Minerals, 2008, Tosoh to double zeolite/ZrO_2 output: Industrial Minerals, no. 485, February, p. 22.

Japan Oil, Gas and Metals National Corp., 2007a, JOGMEC and Petrovietnam sign the memorandum of understanding regarding comprehensive cooperation: Japan Oil, Gas and Metals National Corp. news release, November 27, 1 p.

Japan Oil, Gas and Metals National Corp., 2007b, JOGMEC and PTT Thailand sign memorandum of understanding on GTL-FS project: Japan Oil, Gas and Metals National Corp. news release, September 4, 1 p.

JFE Steel Corp., 2007a, JFE Steel to expand capacity at Chita Works' medium-diameter seamless pipe mill: JFE Steel Corp. news release, April 18. (Accessed September 3, 2008, at http://www.jfe-steel.co.jp/en/release/2007/070418.html.)

JFE Steel Corp., 2007b, West Japan Works (Fukuyama) No. 4 continuous galvanizing line begins producing high-quality GA sheets for automobile exteriors: JFE Steel Corp. news release, January 16. (Accessed September 3, 2008, at http://www.jfe-steel.co.jp/en/release/2007/070116.html.)

Kobe Steel Ltd., 2007, Kobe Steel to increase titanium production capacity: Kobe Steel Ltd. (Accessed September 3, 2008, at http://www.kobelco.co.jp/english/topics/2007/01/1178065_5353.html.)

Metal-pages.com, 2007, Japan to boost FeMn output: Metal-pages.com. (Accessed October 18, 2007, at http://www.metal-pages.com/.)

Metalworld, 2006, Japan's mineral industry: Metalworld, August, p. 15.

Mining Journal, 2007, Sumitomo to up nickel: Mining Journal, February 23, p. 7.

Ministry of Economy, Trade and Industry, 2006, Yearbook of mineral resources and petroleum products statistics: Ministry of Economy, Trade and Industry, August 31, 158 p.

Mitsubishi Materials Corp., 2007a, Commencement of R & D on PGMs recycling business: Mitsubishi Materials Corp. news release, March 8, 2 p.

Mitsubishi Materials Corp., 2007b, Regarding making Sambo Copper Alloy a wholly owned subsidiary of Mitsubishi Materials: Mitsubishi Materials Corp. news release, October 26, 10 p.

Nippon Mining & Metals Co., Ltd., 2006, Pan Pacific Copper Co., Ltd. announces friendly takeover bid for Regalito Copper Corp.: Nippon Mining & Metals Co., Ltd. news release, March 14, 7 p.

Nippon Steel Corp., 2007a, Agreement on strategic alliance between Nippon Steel and Chubu Steel Plate: Nippon Steel Corp. news release, January 30, 2 p.

Nippon Steel Corp., 2007b, Alliance between Nippon Steel and Godo Steel: Nippon Steel Corp. news release, June 13, 2 p.

Nippon Steel Corp., 2007c, Establishment of joint-venture company on supply of direct reduced iron and dry-dust recycling: Nippon Steel Corp. news release, October 22, 2 p.

Nippon Steel Corp., 2007d, Nippon Steel Corp., Sumitomo Metal Industries, Ltd., and Kobe Steel, Ltd. considering measures to further expand and enhance ongoing cooperation: Nippon Steel Corp. news release, October 30, 2 p.

Nittetsu Mining Co. Ltd., 2007, Corporate profile: Nittetsu Mining Co. Ltd., 15 p.

Pan Pacific Copper Co. Ltd., 2007, Acquisition of rights to copper deposit development project in Peru: Pan Pacific Copper Co. Ltd. news release, November 7, 1 p.

Reuters, 2007, Apex reports first zinc shipment from Bolivian mine: Reuters. (Accessed November 6, 2007, at http://www.reuters.com/article/topnews/idltan2245699220071022.)

Sumitomo Metal Industries, Ltd., 2007a, Sumitomo Metals launches IPP business: Sumitomo Metal Industries, Ltd. news release, June 1, 2 p.

Sumitomo Metal Industries, Ltd., 2007b, Sumitomo Metals reforms organizational structure, strengthens titanium business: Sumitomo Metal Industries, Ltd. news release, November 29, 2 p.

Sumitomo Metal Industries, Ltd., 2007c, Sumitomo Metals to establish crude steel capacity of 5 million tons at Wakayama Steel Works: Sumitomo Metal Industries, Ltd. news release, October 30, 2 p.

Sumitomo Metal Mining Co., Ltd., 2007a, Additional equity acquired in Sumitomo Metal Industries: Sumitomo Metal Mining Co., Ltd. news release, March 2, 1 p.

Sumitomo Metal Mining Co., Ltd., 2007b, Feasibility study contract concluded for Taganito project: Sumitomo Metal Mining Co., Ltd. news release, March 29, 9 p.

Sumitomo Metal Mining Co., Ltd., 2007c, What's new: Sumitomo Metal Mining Co., Ltd. news release, May 9, 1 p.

Taiheiyo Cement Corp., 2008, Review of operations fiscal 2008: Taiheiyo Cement Corp. annual report, September 30, p. 10.

TEX Report, The, 2007a, Mitsui & Co. participates also in second phase of nickel project/Philippines: The TEX Report, v. 39, no. 9182, February 14, p. 1.

TEX Report, The, 2007b, Sumitomo Metal Mining plans to produce 100,000 tons of nickel/year from 2013: The TEX Report, v. 39, no. 9189, February 23, p. 3.

TEX Report, The, 2008a, Coal imports by source in CY 2007: The TEX Report, v. 40, no. 9446, March 14, p. 12.

TEX Report, The, 2008b, Ferronickel production in Japan sees strong possibility to decrease in 2008: The TEX Report, v. 40, no. 9441, March 7, p. 1.

TEX Report, The, 2008c, Increased demand for ferroalloys in CY 2007 drives Japan to rely on imports: The TEX Report, v. 40, no. 9446, March 14, p. 6.

TEX Report, The, 2008d, Japan's iron and steel imports in CY 2007: The TEX Report, v. 40, no. 9418, February 4, p. 20.

TEX Report, The, 2008e, Nickel metal production in Japan increases under weak tone of nickel sales in overseas: The TEX Report, v. 40, no. 9438, March 4, p. 3.

Tradingmarkets.com, 2008, Japan's steel exports hit record high in FY 07: Tradingmarkets.com. (Accessed May 14, 2008, at http://www.tradingmarkets.com/.site/news/stock%20news/1509993.)

TABLE 1
JAPAN: PRODUCTION OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity		2003	2004	2005	2006	2007
METALS						
Aluminum:						
Alumina[e]	thousand metric tons	363 [2]	380	350	330	300
Aluminum hydroxide[e]	do.	740 [2]	750	740	720	700
Metal:						
Primary:						
Regular grades	do.	6	6	7	7	6
High-purity	do.	44	55	45	50	51
Secondary[3]	do.	1,261	1,015	1,039	1,070	1,100 [e]
Antimony:						
Oxide		8,235	8,716	7,792	7,778	7,939
Metal		121	222	253	275	270
Arsenic, trioxide[e]		40	40	40	40	40
Bismuth		513	522	463	425	408
Cadmium, refined		2,509	2,233	2,297	2,286	1,939
Chromium, metal[e]		1,500	1,600	700	700	500
Cobalt, metal		379	421	471	920	1,084
Copper, metal:						
Blister and anode:						
Primary		1,343,353	1,270,495	1,319,247	1,409,087	1,367,310
Secondary		172,724	194,927	198,516	219,203	245,208
Total		1,516,077	1,465,422	1,517,763	1,628,290	1,612,518
Refined:						
Primary		1,251,728	1,188,491	1,227,528	1,342,350	1,369,814
Secondary		178,637	191,653	167,756	189,705	207,004
Total		1,430,365	1,380,144	1,395,284	1,532,055	1,576,818
Gallium, metal:						
Primary[e]		9	9	10	8	8
Secondary		83	78	86	93	90 [e]
Germanium:						
Oxide[e]		30	50	50	50	50
Metal, polycrystal	kilograms	621	943	1,731	1,682	1,700 [e]
Gold:						
Mine output, Au content	do.	8,143	8,021	8,318	8,904	8,869
Metal:						
Primary	do.	161,399	136,616	146,182	144,164	117,529
Secondary[4]	do.	22,549	23,183	23,710	23,952	38,331
Total	do.	183,948	159,799	169,892	168,116	155,860
Indium, metal[e]	do.	70,000	70,000	70,000	70,000	70,000
Iron and steel, metal:						
Pig iron	thousand metric tons	82,091	82,974	83,058	84,270	86,771
Electric-furnace ferroalloys:						
Ferrochrome		19,427	13,472	12,367	13,056	12,016
Ferromanganese		371,831	437,389	448,616	406,162	420,151
Ferronickel		369,099	374,213	391,074	335,884	351,503
Silicomanganese		58,043	73,041	94,725	59,424	52,901
Ferromolybdenum		2,691	3,323	4,019	4,229	4,573
Ferrotungsten		12	--	--	--	--
Ferrovanadium		3,491	2,178	2,360	2,042	3,205
Unspecified		3,813	7,321	10,057	13,123	13,982
Total		828,407	910,937	963,218	833,920	858,331
Steel, crude	thousand metric tons	110,511	112,718	112,471	116,226	120,203
Semimanufactures, hot-rolled:						
Ordinary steels	do.	81,769	83,354	80,828	83,139	86,704
Special steels	do.	18,735	19,843	20,360	20,982 [r]	21,498

See footnotes at end of table.

TABLE 1—Continued
JAPAN: PRODUCTION OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity		2003	2004	2005	2006	2007
METALS—Continued						
Lead:						
Mine output, Pb content		5,660	5,512	3,437	777	--
Metal, refined:						
Primary		105,460	94,272	106,638	108,271	104,527
Secondary		189,831	188,603	167,980	171,743	171,795
Total		295,291	282,875	274,618	280,014	276,322
Magnesium, metal, secondary[e]		10,000	10,000	11,000	12,000	12,000
Manganese, oxide		49,115	45,680	45,500 [e]	45,500 [e]	45,000 [e]
Molybdenum, metal		561	812	901	1,253	1,172
Nickel metal:						
Refined		34,991	32,729	29,399	29,254	30,402
Ni content of nickel oxide sinter		52,700	60,300	56,700	53,800	54,000 [e]
Ni content of ferronickel		74,804	73,655	76,390	66,058	68,346
Ni content of chemical		2,084	2,082	2,208	2,531	2,270
Total		164,579	168,766	164,697	151,643	153,000 [e]
Platinum-group metals:[e]						
Palladium, metal	kilograms	5,500 [2]	5,300	5,400	5,400	5,300
Platinum, metal	do.	770 [2]	750	760	760	750
Rare-earth oxides[5]		5,521	6,015	6,432	8,243	8,561
Selenium, metal		734	599	625	730	806
Silicon, multicrystalline		5,045	6,135	6,923	6,987	7,364
Silver:						
Mine output, Ag content	kilograms	78,862	75,689	54,098	11,463	11,000 [e]
Metal:						
Primary	do.	2,453,204	2,208,270	2,202,794	2,253,203	2,263,009
Secondary[4]	do.	258,754	219,047	192,177	228,000	391,869
Total	do.	2,711,958	2,427,317	2,394,971	2,481,203	2,654,878
Tantalum, metal[e]		95	95	95	95	95
Tellurium, metal		33	33	23	24	20 [e]
Tin, metal, smelter		662	707	754	854	879
Titanium:						
Dioxide		253,453	253,364	259,015	239,916	245,976
Metal		18,923	23,110	31,000 [e]	39,000 [e]	42,000 [e]
Tungsten, metal		3,333	4,166	4,056	3,566 [r]	3,813
Vanadium, metal[e, 6]		1,000	1,000	1,000	1,000	1,000
Zinc:						
Mine output, Zn content		44,574	47,781	41,452	7,169	--
Oxide		75,090	75,813	74,843	77,234	77,102
Metal:						
Primary		532,704	534,830	536,768	504,532	501,135
Secondary		153,411	132,417	138,453	148,715	137,560
Total		686,115	667,247	675,221	653,247	638,695
Zirconium, oxide[e]		8,800	9,800	10,000	10,800	11,000
INDUSTRIAL MINERALS						
Bromine[e]		20,000	20,000	20,000	20,000	20,000
Cement, hydraulic	thousand metric tons	68,766	67,376	69,629	69,942	67,685
Clays:						
Bentonite		425,945	455,282	421,629	425,000 [e]	430,000 [e]
Fire clay, crude[e]		460,000	470,000	460,000	460,000	450,000
Kaolin		12,409	11,553	10,500	10,500 [e]	11,000 [e]
Diatomite		111,690	126,225	130,005	130,000 [e]	120,000 [e]
Feldspar and related materials[e]		1,010,000 [r]	900,000 [r]	800,000 [r]	800,000 [r]	750,000
Gypsum	thousand metric tons	5,764	5,865	5,913	5,796	5,850
Iodine		6,524	7,264	8,095	8,724	9,282

See footnotes at end of table.

TABLE 1—Continued
JAPAN: PRODUCTION OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity		2003	2004	2005	2006	2007
INDUSTRIAL MINERALS--Continued						
Lime, quicklime	thousand metric tons	7,953	8,507	8,879	9,014	9,359
Nitrogen, N content of ammonia	do.	1,061	1,101	1,083	1,091	1,114
Perlite[e]		250,000	240,000	240,000	240,000	230,000
Salt, all types[7]	thousand metric tons	1,263	1,225	1,227	1,166	1,100 [e]
Silica:						
Sand	do.	4,699	4,705	4,549	4,593	4,314
Stone, quartzite	do.	12,838	12,218	12,600	12,936	12,258
Sodium compounds, n.e.s.:[8]						
Soda ash[e]		400,000	400,000	400,000	400,000	400,000
Sulfate, anhydrous		132,807	130,107	138,000	138,000 [e]	140,000 [e]
Stone, crushed:						
Dolomite	thousand metric tons	3,579	3,726	3,534	3,695	3,655
Limestone	do.	163,565	161,858	165,240	166,621	165,982
Sulfur:						
Byproduct of metallurgy	do.	1,281	1,263	1,284	1,343	1,350 [e]
Byproduct of petroleum	do.	1,951	1,895	1,972	1,950	1,966
Talc and related materials:						
Talc		24,328	18,253	25,491	25,500 [e]	26,000 [e]
Pyrophyllite		408,435	405,222	351,111	350,000 [e]	345,000 [e]
Vermiculite[e]		6,200	6,200	6,200	6,200	6,200
MINERAL FUELS AND RELATED MATERIALS						
Carbon black	thousand metric tons	788	804	805	827	835
Coal, bituminous[9]	do.	1,338	1,339	1,114	1,341	1,340 [e]
Coke including breeze:						
Metallurgical	do.	38,544	38,314	38,095	38,543 [r]	38,707
Gas, natural:						
Gross[10]	million cubic meters	2,844	2,883	3,120	3,302	3,708
Marketed	do.	3,038	3,048	3,265	3,494	3,900 [e]
Petroleum:						
Crude	thousand 42-gallon barrels	5,161	5,247	5,772	5,643	6,041
Refinery products:						
Gasoline:						
Aviation[e]	do.	50	50	50	50	50
Other	do.	367,687	366,662	368,102	364,070	365,000 [e]
Asphalt and bitumen	do.	32,586	34,475	33,288	32,777	33,000 [e]
Distillate fuel oil	do.	242,311	243,425	251,729	251,311	247,000 [e]
Jet fuel	do.	60,013	64,846	69,946	76,390	80,000 [e]
Kerosene	do.	177,963	167,348	177,091	167,779	175,000 [e]
Liquefied petroleum gas	do.	53,107	50,881	56,352	55,696	57,000 [e]
Lubricants	do.	16,314	16,561	16,580	16,706	16,500 [e]
Naphtha	do.	122,355	125,252	135,792	136,140	138,000 [e]
Paraffin, wax	do.	915	902	902	824	850 [e]
Petroleum coke	do.	4,000	4,533	4,394	4,810	4,600 [e]
Refinery fuel and losses[e, 11]	do.	150,000	150,000	150,000	150,000	150,000
Residual fuel oil	do.	435,763	406,901	400,936	373,047	350,000 [e]
Unfinished oils[e]	do.	50,000	50,000	50,000	50,000	50,000
Total[12]	do.	1,710,000	1,680,000	1,720,000	1,680,000	1,670,000 [e]

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

[1]Table includes data available through November 6, 2008.

[2]Reported figure.

[3]Includes alloyed and unalloyed ingot.

[4]Includes metal recovered from scrap and waste.

[5]Includes oxide of cerium, europium, gadolinium, lanthanum, neodymium, praseodymium, samarium, terbium, and yttrium.

[6]Represents metal content of vanadium pentoxide recovered from petroleum residues, ashes, and spent catalysts.

[7]Reported figure for fiscal year, which began on April 1 and ended on March 31 of the following year.

TABLE 1—Continued
JAPAN: PRODUCTION OF MINERAL COMMODITIES[1]

[8]Not elswhere specified.
[9]All major coal mines had closed by January 2002, but eight smaller mines were still in operation in 2007.
[10]Includes output from gas wells and coal mines.
[11]May include some additional unfinished oils.
[12]Data are rounded to three significant digits; may not add to totals shown.

TABLE 2
JAPAN: STRUCTURE OF THE MINERAL INDUSTRY IN 2007

(Thousand metric tons unless otherwise specified)

Commodity		Major operating companies and major equity owners	Location of main facilities	Annual capacity
Cement		Aso Cement Co. Ltd.	Tagawa and Kanda, Fukuoka Prefecture	2,400
Do.		Daiichi Cement Co. Ltd.	Kawasaki, Kanagawa Prefecture	1,169
Do.		Denki Kagaku K.K.	Omi, Niigata Prefecture	2,762
Do.		Hachinohe Cement Co. Ltd.	Hachinohe, Aomori Prefecture	1,533
Do.		Hitachi Cement Co. Ltd.	Hitachi, Ibaraki Prefecture	941
Do.		Mitsubishi Materials Corp.	Higashidori, Shimokita-gun, Apmori Prefecture; Higashiyama, Higashiiwai-gun, Iwate Prefecture; Yokoze, Saitama Prefecture; Kurosaki, Kyushu, and Higashitani, Fukuoka Prefecture	13,467
Do.		Mitsui Mining Co. Ltd.	Togawa, Fukuoka Prefecture	2,075
Do.		Myojo Cement Co. Ltd.	Itoigawa, Niigata Prefecture	2,482
Do.		Nippon Steel Chemical Co. Ltd.	Tobata, Kitakyushu, Fukuoka Prefecture	855
Do.		Nittetsu Cement Co. Ltd.	Muroran, Hokkaido Prefecture	1,589
Do.		Ryukyu Cement Co. Ltd.	Yabu, Nago, Okinawa Prefecture	722
Do.		Sumitomo Osaka Cement Co. Ltd.	Tamura, Fukushima Prefecture; Aso, Tochigi Prefecture; Motosu, Gifu Prefecture; Sakata, Shiga Prefecture; Ako, Hyogo Prefecture; and Susaki, Kochi Prefecture	14,402
Do.		Taiheiyo Cement Corp.	Ofunato, Iwate Prefecture; Chichibu, Kumagaya, and Saitama, Saitama Prefecture; Fujiwara, Mie Prefecture; Saiki and Tsukumi, Oita Prefecture; Kamiiso, Hokkaido Prefecture; and Tosa, Kochi Prefecture	28,800
Do.		Tokuyama Cement Co. Ltd.	Nanyo, Yamaguchi Prefecture	5,936
Do.		Tosoh Corp.	Shin Nanyo, Yamaguchi Prefecture	2,869
Do.		Tsuruga Cement Co. Ltd.	Tsuruga, Fukui Prefecture	1,710
Do.		Ube Industries Ltd.	Ube and Isa, Yamaguchi Prefecture, and Kanda, Fukuoka Prefecture	10,736
Coal		Kushiro Coal Mine Co. Ltd.[1]	Kushiro, Hokkaido Prefecture	750
Cobalt, refined	metric tons	Sumitomo Metal Mining Co. Ltd.	Niihama, Ehime Prefecture	1,000
Copper, refined	do.	Mitsubishi Materials Corp.	Naoshima, Kagawa Prefecture	225,600
Do.	do.	Onahama Smelting and Refining Co. Ltd. (Mitsubishi Materials Corp., 49.29%; Dowa Mining Co. Ltd., 31.15%; Furukawa Co. Ltd., 8.31%; Furukawa Electric Co. Ltd. and Mitsubishi Cable Industries Ltd., 4.17% each; and others, 2.91%)	Onahama, Fukushima Prefecture	258,000
Do.	do.	Pan Pacific Copper Co. Ltd. (Nippon Mining & Metals Co. Ltd., 66%, and Mitsui Mining and Smelting Co. Ltd., 34%)	Saganoseki, Oita Prefecture; Hitachi, Ibaraki Prefecture; and Tamano, Okayama Prefecture[2]	710,000
Do.	do.	Sumitomo Metal Mining Co. Ltd.	Besshi/Toyo (Saijyo), Ehime Prefecture	410,000
Do.	do.	Kosaka Smelting and Refining Co. Ltd. (wholly owned subsidiary of Dowa Mining Co. Ltd.)	Kosaka, Akita Prefecture	72,000

See footnotes at end of table.

TABLE 2—Continued
JAPAN: STRUCTURE OF THE MINERAL INDUSTRY IN 2007

(Thousand metric tons unless otherwise specified)

Commodity		Major operating companies and major equity owners	Location of main facilities	Annual capacity
Gold:				
In concentrate	kilograms	Sumitomo Metal Mining Co. Ltd.	Hishikari, Kagoshima Prefecture	9,000
Refined	do.	Kosaka Smelting and Refining Co. Ltd. (wholly owned subsidiary of Dowa Mining Co. Ltd.)	Kosaka, Akita Prefecture	24,000
Do.	do.	Mitsui Mining and Smelting Co. Ltd.	Takehara, Hiroshima Prefecture	22,000
Do.	do.	Mitsubishi Materials Corp.	Naoshima, Kagawa Prefecture	60,000
Do.	do.	Nippon Mining and Metals Co. Ltd.	Hitachi, Ibaraki Prefecture	30,000
Do.	do.	Sumitomo Metal Mining Co. Ltd.	Niihama, Ehime Prefecture	36,000
Iodine, crude	metric tons	Ise Chemical Industries Co. Ltd. (Asahi Glass Co. Ltd., 52.4%, and Mitsubishi Corp., 11.2%)	Oami-Shirasato, and Ichinomya, Chiba Prefecture; and Sadowara, Miyazaki Prefecture	3,600
Do.	do.	Godo Shigen Sangyo Co. Ltd. (Kanto Natural Gas Development Co. Ltd., 11%, and Mitsui & Co. Ltd., 10%)	Chosei, Chiba Prefecture	2,400
Do.	do.	Kanto Natural Gas Development Co. Ltd. (Mitsui Chemicals, Inc., 21.9%, and Godo Shigen Sangyo Co. Ltd., 14.3%)	Mobara, Chiba Prefecture	1,200
Do.	do.	Nihon Tennen Gas Co. Ltd. (Kanto Natural Gas Development Co. Ltd., 50%, and Tomen Corp., 41%)	Shirako and Yokoshiba, Chiba Prefecture	1,200
Do.	do.	Toho Earthtech, Inc. (Itochi Corp., 34.1%; Mitsubishi Gas Chemical Co. Ltd., 32.2%; Nippon Light Metal Co. Ltd., 31.1%)	Kurosaki, Niigata Prefecture	720
Do.	do.	Nippon Chemicals Co. Ltd. (Nippon Shokubai Co. Ltd., 17%; Takeda Chemical Industries Ltd., 16.4%; Chugai Boyeki Co. Ltd., 13.6%)	Isumi, Chiba Prefecture	720
Lead, refined	metric tons	Kamioka Mining and Smelting Co. Ltd.	Kamioka, Gifu Prefecture[3]	33,600
Do.	do.	Mitsui Mining and Smelting Co. Ltd.	Takehara, Hiroshima Prefecture	43,800
Do.	do.	Toho Zinc Co. Ltd.	Chigirishima, Hiroshima Prefecture	120,000
Do.	do.	Sumitomo Metal Mining Co. Ltd.	Harima, Hyogo Prefecture	30,000
Do.	do.	Kosaka Smelting and Refining Co. Ltd.	Kosaka, Akita Prefecture	25,200
Do.	do.	Hosokura Smelting and Refining Mining Co. Ltd. (wholly owned subsidiary of Mitsubishi Materials Corp.)	Hosokura, Miyagi Prefecture[3]	22,200
Limestone		Mitsubishi Materials Corp.	Higashitani, Fukuoka Prefecture	10,000
Do.		Nittetsu Mining Co. Ltd.	Torigatayama, Kochi Prefecture; Oita, Oita Prefecture; and Shiriya, Aomori Prefecture	23,000
Do.		Sumikin Mining Co., Ltd.	Hachinohe Sekkai, Aomori Prefecture	5,500
Do.		Sumitomo-Osaka Cement Co. Ltd.	Ibuku, Shiga Prefecture, and Karazawa, Tochigi Prefecture	4,000
Do.		Shuho Mining Co., Ltd.	Sumitomo Cement Shuho, Yamaguchi Prefecture	8,200
Do.		Taiheiyo Cement Co. Ltd.	Ofunato, Iwate Prefecture; Ganji and Tsukumi, Oita Prefecture; Garo, Hokkaido Prefecture; Kawara, Fukuoka Prefecture, Tosayama, Kochi Prefecture; Taiheiyo Buko, Saitama Prefecture; and Shigeyasu, Yamaguchi Prefecture	46,000
Do.		Todaka Mining Co. Ltd.	Todaka-Tsukumi, Otia Prefecture	12,000
Do.		Ube Kosan Co. Ltd.	Ube Isa, Yamaguchi Prefecture	9,000
Manganese, electrolytic dioxide		Mitsui Mining and Smelting Co. Ltd.	Takehara, Hiroshima Prefecture	24
Do.		Tosoh Corp.	Hyuga, Miyazaki Prefecture	34

See footnotes at end of table.

TABLE 2—Continued
JAPAN: STRUCTURE OF THE MINERAL INDUSTRY IN 2007

(Thousand metric tons unless otherwise specified)

Commodity		Major operating companies and major equity owners	Location of main facilities	Annual capacity
Nickel:				
In ferronickel	metric tons	Hyuga Smelting Co. Ltd. (wholly owned subsidiary of Sumitomo Metal Mining Co. Ltd.)	Hyuga, Miyazaki Prefecture	22,000
Do.	do.	Yakin Oheyama Co. Ltd.	Oheyama, Kyoto Prefecture	12,720
Do.	do.	Pacific Metals Co. Ltd.	Hachinohe, Aomori Prefecture	40,800
In oxide	do.	Tokyo Nickel Co. Ltd.	Matsuzaka, Mie Prefecture	60,000
Refined	do.	Sumitomo Metal Mining Co. Ltd.	Niihama, Ehime Prefecture	36,000
Pyrophyllite		Goto Kozan Co. Ltd.	Goto, Nagasaki Prefecture	204
Do.		Ohira Kozan Co. Ltd.	Ohira, Okayama Prefecture	132
Do.		Sankin Kogyo Co. Ltd.	Otsue, Hiroshima Prefecture	72
Do.		Shinagawa Shirenga Co. Ltd.	Mitsuishi, Okayama Prefecture	180
Do.		Shokozan Kogyosho Co. Ltd.	Yano-Shokozan, Hiroshima Prefecture	180
Do.		Showa Kogyo Co. Ltd.	Showa-Shokozan, Hiroshima Prefecture	60
Steel, crude		JFE Steel Corp. (wholly owned subsidiary of JFE Holdings Inc.)	Chiba, Chiba Prefecture; Kawasaki (Keihin), Kanagawa Prefecture; Nishinomiya, Hyogo Prefecture; Handa Aichi Prefecture; Fukuyama, Hiroshima Prefecture; and Kurashiki, Okayama Prefecture	33,835
Do.		Kobe Steel Ltd.	Kakogawa and Kobe, Hyogo Prefecture	8,943
Do.		Nippon Steel Corp.	Oita, Oita Prefecture; Kawata, Fukuoka Prefecture; Kimitsu, Chiba Prefecture; and Nagoya, Aichi Prefecture	33,199
Do.		Sumitomo Metal Industries, Ltd.	Kashima, Ibaraki Prefecture; Kokura, Fukuoka Prefecture; and Wakayama, Wakayama Prefecture	12,820
Titanium:				
In sponge metal		Sumitomo Titanium Corp. (Sumitomo Metal Industries Ltd., 75.2%, and Kobe Steel Ltd., 24.8%)	Amagasaki, Hyogo Prefecture	24
Do.		Toho Titanium Co. Ltd. (Nippon Mining and Metals Co. Ltd., 47%; Mitsui & Co. Ltd., 20%; others, 33%)	Chigasaki, Kanagawa Prefecture	15
In dioxide	metric tons	Fuji Titanium Industry Co. Ltd. (Ishihara Sangyo Kaishia Ltd., 24.8%, and others, 75.2%)	Kobe, Hyogo Prefecture	17,400
Do.	do.	Ishihara Sangyo Kaisha Ltd.	Yokkaichi, Mie Prefecture	154,800
Do.	do.	Sakai Chemical Industries Co. Ltd.	Onahama, Fukushima Prefecture	60,000
Do.	do.	Tayca Corp.	Saidaiji, Okayama Prefecture	60,000
Do.	do.	Titan Kogyo Kabushiki Kaisha	Ube, Yamaguchi Prefecture	16,800
Zinc, refined	metric tons	Akita Smelting Co. Ltd. (Dowa Mining Co. Ltd., 57%; Nippon Mining and Metals Co. Ltd., 24%; Sumitomo Metal Mining Co. Ltd., 14%; Mitsubushi Materials Corp., 5%)	Iijima, Akita Prefecture	200,400
Do.	do.	Hachinohe Smelting Co. Ltd. (Mitsui Mining and Smelting Co. Ltd., 57.7%; Nippon Mining and Metals Co. Ltd., 27.8%; Toho Zinc Co. Ltd. and Nisso Smelting Co. Ltd., 14.5%)	Hachinohe, Aomori Prefecture	117,600
Do.	do.	Hikoshima Smelting Co. Ltd.	Hikoshima, Yamaguchi Prefecture	84,000
Do.	do.	Kamioka Mining and Smelting Co. Ltd.	Kamioka, Gifu Prefecture	72,000
Do.	do.	Toho Zinc Co. Ltd.	Annaka, Gunma Prefecture	139,200
Do.	do.	Sumitomo Metal Mining Co. Ltd.	Harima, Hyogo Prefecture	90,000

Do., do. Ditto.

[1]Coal mining operations continued following the establishment of Kushiro Coal Mining Co. Ltd. in 2002.

[2]Saganoseki Smelter and Refinery and Hitachi Refinery [450,000 metric tons per year (t/yr)] and Tamano Smelter and Refinery (260,000 t/yr).

[3]Secondary lead smelter and refinery.

TABLE 3
JAPAN: SUPPLY AND DEMAND FOR SELECT NONFERROUS METALS

(Metric tons unless otherwise specified)

	Refined copper			Refined lead		
	2005	2006	2007	2005	2006	2007
Stocks at the beginning	105,056	97,672	102,807	11,606	9,554	17,562
Production	1,395,284	1,532,055	1,576,818	219,730	219,640	219,423
Imports	74,057	75,256	102,273	19,057	34,955	24,800
Total supply	1,574,397	1,704,983	1,781,898	250,393	264,149	261,786
Exports	253,600	319,815	428,079	4,240	4,404	19,147
Reported consumption	1,199,169	1,252,185	1,241,893	141,555	240,217	229,581
Total demand	1,452,769	1,572,000	1,669,972	145,795	244,621	248,728
Stocks at the end	97,672	102,807	101,931	9,554	17,562	14,224
Apparent consumption	1,223,125	1,282,361	1,251,888	236,599	242,183	228,414
	Refined zinc			Silver (kilograms)		
	2005	2006	2007	2005	2006	2007
Stocks at the beginning	77,605	106,402	93,878	998,280	843,152	1,190,744
Production	638,352	614,331	597,650	2,202,795	2,253,203	2,263,009
Remelting	NA	NA	NA	192,177	228,498	391,869
Imports	45,860	40,649	53,145	1,288,335	1,838,845	1,540,073
Total supply	761,817	761,382	744,673	4,681,587	5,163,698	5,385,695
Exports	53,700	73,369	74,187	1,119,428	1,605,384	2,205,575
Reported consumption	457,683	469,592	487,578	2,179,476	2,241,756	2,262,457
Total demand	511,383	542,961	561,765	3,298,904	3,847,140	4,468,032
Stocks at the end	106,402	93,878	82,069	843,152	1,190,744	881,919
Apparent consumption	601,715	594,135	588,417	2,719,007	2,367,570	2,298,201

NA Not applicable.

Source: Japan Mining Industry Association.

TABLE 4
JAPAN: RESERVES OF MAJOR MINERAL COMMODITIES[1]

(Thousand metric tons unless otherwise specified)

Commodity		Exploitable reserves
Coal[2]		773,000
Dolomite		913,000
Gold ore, Au content	kilograms	159,000
Iodine		5,000 [e]
Limestone		40,400,000
Pyrophyllite		59,700
Silica sand		73,600
Silica stone, white		462,000

[e]Estimated.
[1]Reserves as of 2004.
[2]Recoverable reserves, including brown coal.

Source: Natural Resources and Fuel Department, Agency of Natural Resource and Energy.