

THE MINERAL INDUSTRY OF NORTH KOREA

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In 2001, North Korea began to emerge from its isolation by following China's example to open up its industrial sectors for foreign investments. The Government has allowed potential investors and developers to visit its chemical, metal, and mining sectors during the past 2 years. The rate of domestic growth was 3.7% in 2001. Except for the service sector, all other sectors recorded an increase in growth. The construction, manufacturing, and mining sectors grew by 7.0%, 3.5%, and 4.8%, respectively. In 2001, trade totaled \$2.27 billion; of that, \$1.62 billion was for imports, and \$650 million, for exports (Bank of Korea, 2002). Since the collapse of the Soviet Union, North Korea has faced shortages of electricity, food, and raw materials. Many of the machines in use were in need of spare parts; owing to the lack of electricity, machines were operated manually.

Korea Zinc Industrial Group (KZIG) [a ministry-level company] was established in June 2000 to oversee part of the lead and zinc industry in North Korea. The Group's function was very similar to that of the former China National Nonferrous Metals Industry Corp. in China, which involved mining, production, and trade. In North Korea, the Ministry of Mining oversees the mining and smelter operations, and the Ministry of Foreign Trade coordinates sales. The Group comprised the Danchon (Tanchon) zinc smelter in South Hamgyong Province, the Komdok mining complex in South Hamgyong Province, the Munpyong lead and zinc smelter in Kangwon Province (under the 1944 administrative districting, Munpyong was in South Hamgyong Province), a mining machinery manufacturer, and a chemical reagents plant in Danchon. KZIG was looking for international investors to provide \$300 million to modernize its Danchon, Komdok, and Munpyong facilities.

The Komdok was in the Paekdu Mountains in the northeastern part of the country. The mine was put into operation in 1946 and was designed to produce 14 million metric tons per year (Mt/yr) of ore. In the late 1990s, natural disasters damaged the mining complex and the railway system severely. Production capacity has been reduced to 7.2 Mt/yr in the past 4 years. Komdok had three dressing plants—a 10-Mt/yr plant 1,200 meters above sea level, a 3.2 Mt/yr plant on the valley floor, and a 1-Mt/yr underground plant. For the complex to be fully operational, KZIG estimated that it required an investment of about \$200 million to repair and upgrade the mining rig, drilling and flotation machinery, and wagons for transportation ore. At full capacity, Komdok could produce between 250,000 and 300,000 metric tons per year (t/yr) of concentrates, about 80% zinc and 20% lead. The mine has an estimated unmined resource of 300 million metric tons.

The Danchon smelter was 80 kilometers (km) from Komdok and about 200 km north of Hungnam port on North Korea's eastern coastline. The smelter, which began operation in 1985, had a designed output capacity of 100,000 metric tons of zinc.

Owing to shortage of concentrates and parts, the smelter operated at about 60% of its capacity. It required an investment of \$40 million to upgrade the smelter but KZIG preferred to invest \$100 million to build a brand new 100,000 t/yr plant at Danchon.

The Munpyong smelter was about 12 km northwest of the port city of Wonsan. The smelter, which was built in 1938, had a designed output capacity 100,000 t/yr of lead. Owing to shortages of raw materials, the smelter operated at less than 20% of its capacity. Munpyong sourced its raw material from Komdok and the Ministry of Mining's Songchong Mine in Sunchon City, South P'yongan Province, and the November 8 Mine in Unpa, North Hwanghae Province; each mine produced a maximum of 1,000 metric tons per month of lead and zinc concentrates. In addition to lead and zinc, per each ton lead bullion output, the Munpyong smelter also produced 30 kilograms (kg) of antimony, 2 kg of arsenic, 2.5 grams of gold, and 2.5 kg of silver. All byproducts were sold in domestic market. KZIG planned to invest \$40 million to build a brand new 50,000-t/yr smelter to replace the existing one. A 10,000-t/yr pilot plant had been installed to recover lead from slag. KZIG was searching for funds to repair/replace the zinc smelter at Munpyong.

Owing to environmental concerns and inconvenient to source raw material, KZIG closed the Namp'o smelter, which was in the western part of Pyongyang, in August 2000. The smelter, which was built in 1930, produced cadmium, copper, gold, and silver. KZIG also considered seeking a foreign partner in marketing its zinc ingot and in operating its smelter on tolling basis (Metal Bulletin, 2002a-c)

The Sangnong copper mine, which is about 48 km from Danchon, has an ore-dressing capacity of 1.5 Mt/yr. Copper concentrates were previously transported to Namp'o for smelting. Since the closure of Namp'o, copper concentrates have been smelted at Kowon, which is near Munpyong. All production was consumed domestically (Metal Bulletin, 2002b).

North Korea has limited petroleum and natural gas resources, but the Korea Bay and the northern part of the country may contain significant amounts of hydrocarbon resources. Korean Oil Exploration Corp. awarded a contract to explore oil and natural gas in the eastern part of the Korean Peninsula and southwest of Vladivostok, Russia, to Sovereign Ventures Pte. Ltd. According to the terms of the agreement, geophysical exploration will be done during the first 3 years and drilling exploration during the following 2 years. If successful, a 20-year development and production will be awarded. During the first 5 years of operation, corporate tax will be exempted. In the next 2 years, the company profits will be subjected to a 5% tax, which will escalate to 10% after that. Sovereign planned to invest \$10 million, which would include at least \$2 million in the seismic testing and drilling exploration stages. The company was seeking experienced partners to perform this

project. The 14 shallow wells drilled by North Korean explorers in the Dumungang basin indicated potential significant oil and gas resources (Oil & Gas Journal, 2002).

References Cited

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TABLE 1
NORTH KOREA: ESTIMATED PRODUCTION OF MINERAL COMMODITIES 1/ 2/

(Metric tons unless otherwise specified)

Commodity 3/	1997	1998	1999	2000	2001
METALS					
Cadmium metal, smelter	100	100	100	100	100
Copper:					
Mine output, Cu content	15,000	14,000	14,000	13,000 r/	13,000
Metal:					
Smelter, primary and secondary	16,000 r/	15,000 r/	15,000 r/	13,000 r/	13,000
Refinery, primary and secondary	18,000 r/	16,000 r/	16,000 r/	14,000 r/	14,000
Gold, mine output, Au content kilograms	5,000	4,500	2,500 r/	2,000 r/	2,000
Iron and steel:					
Iron ore and concentrate, marketable:					
Gross weight thousand tons	1,000	700	700	700	700
Fe content do.	490	300	300	300	300
Metal:					
Pig iron do.	450	250	250	250	250
Ferroalloys, unspecified do.	10	10	10	10	10
Steel, crude do.	1,000	1,000	1,000	1,000	1,000
Lead:					
Mine output, Pb content	75,000	70,000	60,000 r/	60,000 r/	60,000
Metal:					
Smelter, primary and secondary	65,000	60,000	60,000	60,000	60,000
Refinery, primary and secondary	80,000	80,000	75,000	75,000	75,000
Silver, mine output, Ag content	50	45	40	40	40
Tungsten, mine output, W content	900	800	700	700	700
Zinc:					
Mine output, Zn content	150,000 r/	100,000 r/	100,000 r/	100,000 r/	100,000
Metal, primary and secondary	150,000 r/	100,000 r/	100,000 r/	100,000 r/	100,000
INDUSTRIAL MINERALS					
Barite	120,000	100,000	70,000	70,000	70,000
Cement, hydraulic thousand tons	7,000 r/	7,000 r/	6,000 r/	6,000 r/	5,160
Fluorspar	39,000	30,000	25,000	25,000	25,000
Graphite	40,000	35,000	33,000	30,000	25,000
Magnesite, crude thousand tons	1,600	1,500	1,000	1,000	1,000
Nitrogen, N content of ammonia do.	600	550	500	450	450
Phosphate rock	520,000	450,000	350,000	350,000	350,000
Salt, all types	590,000	550,000	500,000	500,000	500,000
Sulfur thousand tons	260	250	240	240	240
Talc, soapstone, pyrophyllite	180,000	150,000	120,000	120,000	120,000
MINERAL FUELS AND RELATED MATERIALS					
Coal:					
Anthracite thousand tons	25,000 r/	20,000 r/	20,000 r/	18,000 r/	17,000
Lignite do.	15,000 r/	10,000 r/	10,000 r/	9,000 r/	7,000
Total do.	40,000 r/	30,000 r/	30,000 r/	27,000 r/	24,000
Coke do.	2,900	2,000	2,000	2,000	2,000

r/ Revised.

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

2/ Table includes data available through August 30, 2002.

3/ In addition to the commodities listed, crude construction materials, such as sand and gravel and other varieties of stone, and petroleum products presumably are produced, but available information is inadequate to make reliable estimates of output levels.