

THE MINERAL INDUSTRY OF NEW ZEALAND

By Travis Q. Lyday

The New Zealand mining industry is centered primarily on coal and gold, mineral commodities with long traditions in the country; however, natural gas, natural gas liquids, and crude petroleum dominate New Zealand's natural resource production in terms of dollar value (Mining Journal, 1995). The mineral industry in New Zealand began with the discovery of gold on the Coromandel Peninsula, North Island, in 1852. Coal mining also began in the 1850's. Since then, a wide range of other minerals has been produced, including antimony, copper, iron ore, lead and zinc, manganese, mercury, silver, and tungsten; a host of industrial minerals and rocks; and oil and gas.

New Zealand's extractive mineral industry constitutes only a small segment of the economy, contributing on the order of 1% to 2% to the country's gross domestic product (GDP). The mineral processing sector provides an estimated 4% to 5% to the GDP, based to a significant extent on imported alumina, crude oil, and fertilizer, increasing the value of the mineral industry output to about 5% to 6% of GDP.

Mining activities in New Zealand during 1996 included gold and titaniferous magnetite sand (iron sand) mining; coal extraction, both by underground and open cast methods; and quarrying of raw materials for use primarily in the domestic construction (clays, sand and gravel, and stone) and agricultural industries (limestone).

Gold production was from three large hardrock mining operations, the Golden Cross and Martha Hill Mines near Waihi at the base of the Coromandel Peninsula on North Island and the Macraes Flat Mine in the Eastern Otago region of South Island. A fourth mine continued to be under consideration for development at Reefton, Westland, in South Island. Mining occurred at several medium- and numerous small-sized alluvial operations, especially on South Island.

Coeur Gold New Zealand Ltd. was given permission at yearend by New Zealand's High Court to continue with the construction of a tailings dam crest at its Golden Cross Mine in the Waitekauri Valley near Waihi and to continue mine operations through 1997. The ruling followed a hearing on an application for a preliminary injunction on the crest-raising filed by a local environmental group. The mine had discovered a large underground slip at its tailings dam in late 1995, bringing about grassroots community groups' efforts to close the mine. The court, after the hearing, acknowledged that all parties agreed that there was no danger or risk associated with the crest raising. Coeur Gold, holding an 80% interest, is the operator of the mine, with New Zealand's Viking Mining Ltd. holding the remaining 20%. Coeur Gold is a wholly owned subsidiary of Coeur d'Alene Mines Corp. of the United States, and Viking is

a subsidiary of New Zealand's Todd Corp.

Titanomagnetite-bearing iron sand was mined and concentrated at two unique projects along the western coast of North Island by the mining division of BHP New Zealand Steel Ltd. (NZ Steel), a wholly owned subsidiary of Australia's BHP Steel Mining Ltd. Titanomagnetite concentrate was produced by dry-mining (bulldozing and bucketwheel excavation) methods at Waikato-North Head, about 50 kilometers (km) south of Auckland, and pumped as a slurry through an 18-km pipeline to NZ Steel's integrated Glenbrook Steelworks. NZ Steel used both wet- (suction dredging) and dry-mining methods to produce an iron sand concentrate at its Taharoa project, about 100 km farther south. The Taharoa concentrate, averaging about 40% titanomagnetite by weight, was exported exclusively to Japan in specially fitted slurry ore carriers loaded at a mooring buoy connected to shore by a 3-km slurry pipeline. The product was used as a steelmaking additive and as a refractory in blast furnace operations. The existence of these iron sand deposits has been known for more than a century. But only in the late 1960's, when the economic recovery of their iron content by direct reduction was established by NZ Steel, were they useable in steelmaking. The steelmaking industry in New Zealand was established with the completion of NZ Steel's Glenbrook steelworks in 1970.

At yearend, it appeared that NZ Steel had accepted a large reduction in iron sand exports to Japanese steel mills when it signed a letter of intent to supply 700,000 tons per year (t/yr) for 5 years beginning April 1, 1997, the start of the Japanese fiscal year. This was 500,000 t/yr less than the operating contract in effect, leaving exports at a level considered insufficient to sustain the economic viability of the Taharoa operation. Early in 1996, the Japanese mills had informed NZ Steel that new technology had reduced the need for iron sands in blast furnace lining protection and that future demand would be reduced to around 700,000 t/yr (Metal Bulletin, 1997).

Coal was produced from about 60 mines in more than 40 separate coalfields on both North Island and South Island. The estimated resource of almost 9 billion tons of potentially recoverable coal is 82% lignite, mainly in Southland and Otago on South Island; 14% subbituminous, mainly in Waikato, North Island; and slightly less than 4% high-value bituminous coal, mainly in Westland, South Island. Production was dominated by the state-owned Solid Energy Corp., formerly known as Coal Corp. of New Zealand Pty. Ltd.

Coal New Zealand, the export business unit of Solid Energy, and Greymouth Coal Ltd. announced at yearend that they will proceed with development of an US\$80 million underground

mine at Rapahoe, about 12 km north of Greymouth on the west coast of South Island. The project was planned to supply 2 million tons per year of export quality coal for up to 80 years. The coal was to be marketed in Japan. The coal, 80% of which is steaming with the rest of semisoft coking quality, is low in ash and sulfur content. It is the largest coal resource on the West Coast (Mining Magazine, 1997).

Serious exploration for oil and gas began in the late 1950's, resulting in the discovery of several natural gas fields to date. The Kapuni Field was discovered in 1959 and began production in 1970, supplying gas to North Island Government distribution centers and industrial customers. The much larger Maui offshore gasfield, New Zealand's largest, was discovered in 1969. Its production has been used primarily for electricity generation and as a premium fuel.

The Maui gas-condensate field off the coast of North Island remained the country's largest, supplying about one-third of the country's total energy needs. Gas production from the Maui operation was piped to the onshore Oaonui gas treatment plant where it was sold to the Crown, i.e., Government, under a long-term contract effective until 2009. The Government, in turn, sold the gas to the Electricity Corp. of New Zealand, which burned a substantial amount in the generation of electricity; Methanex NZ Ltd., which owned the synthetic gasoline and methanol manufacturing plants; and the Natural Gas Corp. Ltd., which operated the wholesale natural gas distribution system. These interests each received about one-third of Maui's gas production. Condensate production also was piped to the Oaonui plant, where it was stabilized before shipment to Port Taranaki for export to Australian refineries.

New Zealand's downstream mineral industry consisted of two steel mills; an aluminum smelter; aluminum, copper, and brass

extrusion plants; and an oil refinery, all of which primarily used imported raw materials. There were also three cement companies, each with a single plant.

New Zealand's mining industry was regulated by legislation passed in 1991 by Parliament, namely the Crown Minerals Act and the Resource Management Act. The former prescribes the granting of prospecting, exploration, and mining permits for Crown minerals, ensuring that the Government receives a return when the mineral resources are developed. The latter applies to all industries, focusing on the effects of any activity on the environment.

References Cited

- Metal Bulletin, 1997, NZ Steel accepts large cut in iron sand exports: January 13, 1997, no. 8144, p. 23.
Mining Journal (London), 1995, New Zealand—Its time has come: Mining Journal Country Supplement to Mining, July 14, 1995, 16 p.
Mining Magazine, 1997, New export mine for New Zealand: January 1997, v. 176, no. 1, p. 71.

Major Sources of Information

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TABLE 1
NEW ZEALAND: PRODUCTION OF MINERAL COMMODITIES 1/

(Metric tons unless otherwise specified)

Commodity	1992	1993	1994	1995	1996 e/
METALS					
Aluminum metal, smelter:					
Primary	242,900	277,400	270,752	273,296	294,000
Secondary	6,700	6,700	6,700	8,200 r/ e/	8,300
Total	249,600	284,100	277,452	281,496 r/ e/	302,300
Gold, mine output, Au content	10,531	11,161	10,118 r/	12,132 r/	12,500
Iron and steel:					
Iron sand (titaniferous magnetite):					
Gross weight	2,934	2,389	2,080 r/	2,362 r/	2,400
Fe content e/	1,300	1,300	600	900	900
Pig iron	625	653	563	631	650
Steel, crude	759	853	766	800 e/	900
Lead, refinery output, secondary e/	5,000	3,000	6,000	6,000	6,000
Silver, mine output, Ag content	22,413	25,797	27,589 r/	27,794 r/	30,000
INDUSTRIAL MINERALS					
Cement, hydraulic e/	579 2/	800 r/	1,000 r/	1,000 r/	1,000
Clays:					
Bentonite	--	1,613	930 r/	3,699 r/	3,500
Kaolin (pottery)	27,520	26,543	40,720 r/	13,662 r/	15,000
For brick and tile	55,871	130,004	79,080 r/	38,382 r/	35,000
Lime e/	100,000	100,000	100,000	100,000	100,000
Nitrogen: N content of ammonia	68,200	77,800	78,000 e/	80,000 e/	80,000
Perlite	2,000	814	-- r/	1,800 r/	2,000
Pumice	112,476	69,179	116,840 r/	77,054 r/	80,000
Salt e/	80,000	80,000	80,000	50,000	60,000
Sand and gravel:					
Silica sand (glass sand)	71,940	48,635	37,611 r/	31,052 r/	30,000
Other industrial sand	427,714	671,212	323,083 r/	627,671 r/	600,000
For roads and ballast	12,520	13,502	10,863 r/	16,100 r/	15,000
For building aggregate	3,838	4,942	5,219 r/	5,123 r/	5,000
Stone:					
Dolomite	12,943	9,671	12,939 r/	14,212 r/	15,000
Limestone and marl:					
For agriculture	1,310	1,689	1,564 r/	1,300 r/	1,500
For cement	1,459	1,577	1,542 r/	1,543 r/	1,500
For other industrial uses	399	379	355 r/	387 r/	500
For roads	523	597	600 e/	600 e/	600
Serpentine	23,786	22,386	8,680 r/	19,308 r/	19,000
Dimension	23,722	40,060	18,615 r/	25,080 r/	25,000
Rock for harbor work	1,514	1,680	1,075 r/	1,327 r/	1,500
Sulfur	--	6,600	2,102 r/	-- r/	--
MINERAL FUELS AND RELATED MATERIALS					
Carbon dioxide, liquefied e/	10,000	10,000	10,000	10,000	10,000
Coal:					
Bituminous	907	975	1,265 r/	1,570 r/	1,500
Subbituminous	1,897	1,932	1,516 r/	1,632 r/	1,500
Lignite	180	184	252 r/	243 r/	250
Total	2,984	3,091	3,033 r/	3,445 r/	3,250
Coke: e/					
Coke oven	1,000	1,000	1,000	1,000	1,000
Gashouse	7,000	7,000	7,000	8,000	8,000
Total	8,000	8,000	8,000	9,000	9,000
Gas:					
Manufactured (from gasworks) e/	11,350	11,350	11,350	11,500	11,500
Natural:					
Gross production	6,707	6,030	6,000 e/	6,000 e/	6,000
Marketed production	5,100	4,900	4,900 e/	4,900 e/	5,000
Natural gas liquids: e/					
Liquefied petroleum gas	1,400	1,500	1,500	1,500	1,500
Natural gasoline	400	500	500	500	500
Total	1,800	2,000	2,000	2,000	2,000

See footnotes at end of table.

TABLE 1--Continued
 NEW ZEALAND: PRODUCTION OF MINERAL COMMODITIES 1/

(Metric tons unless otherwise specified)

Commodity	1992	1993	1994	1995	1996 e/
MINERAL FUELS AND RELATED MATERIALS--Continued					
Peat cubic meters	58,647	101,476	115,488 r/	107,703 r/	115,000
Petroleum:					
Crude thousand 42-gallon barrels	13,800	14,965	16,425	16,000 e/	16,000
Refinery products: e/					
Gasoline do.	12,500	14,000	14,000	14,000	14,000
Distillate fuel oil do.	10,500	10,500	11,000	11,000	11,000
Residual fuel oil do.	2,800	2,500	3,000	3,000	3,000
Other do.	3,000	3,000	3,000	3,000	3,000
Refinery fuel and losses do.	1,800	2,000	2,000	2,000	2,000
Total do.	30,600	32,000	33,000	33,000	33,000

e/ Estimated. r/ Revised.

1/ Table includes data available through Mar. 24, 1997.

2/ Reported figure.