THE MINERAL INDUSTRY OF

NEW ZEALAND

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Mining activities in New Zealand include coal extraction by underground and open pit methods; gold and titanomagnetite sand (iron sand) mining; and quarrying of raw materials for use primarily in the domestic construction (clays, sand and gravel, and stone) and agricultural (limestone and marble) industries. Natural gas, natural gas liquids, and crude petroleum also are produced.

The extractive minerals industry (rock and minerals, coal, natural gas, and petroleum) in New Zealand constitutes a small segment of the economy, contributing 3% to 4% to the gross domestic product (GDP) of the country. The mineral processing sector, consisting chiefly of the production of primary aluminum, concrete, manufactured fertilizer, refined petroleum products, and crude steel produced mostly from imported raw materials, provides 4% to 5% to the GDP, increasing the value of the country's mineral industry to 7% to 9% of the GDP.

During 1998, gold was produced from two large hardrock mining operations, the Macraes Mine at Macraes Flat, 80 kilometers (km) north of Dunedin in the Eastern Otago region of South Island, and the Martha Mine at Martha Hill, near Waihi at the base of the Coromandel Peninsula. Small-scale alluvial mining occurred at several sites, especially on South Island. Iron sand is mined at two sites on North Island: Waikato North Head, 50 km south of Auckland, and Taharoa, on the coast south of Kawhia Harbor, 140 km south of Auckland. Bituminous and subbituminous coals and lignite are produced from underground and surface mines on North Island and South Island.

New Zealand's minerals are regulated by legislation passed by Parliament, namely the New Zealand Crown Minerals Act 1991 and The Crown Minerals Amendment Act (No. 2), passed in 1997. These acts prescribe the granting of prospecting, exploration, and mining permits for Crown-owned minerals, ensuring that the Government receives an adequate return when the mineral resources are developed.

Effective July 1, the mining and extractive industries, including petroleum and geothermal, no longer paid mining inspection levies directly. The 13 mining inspection positions around the country were integrated with the Occupational Safety and Health section within the Department of Labor and mining inspections became funded by levies paid by all employers (New Zealand Mining, 1998b).

In November, the Ministry of Commerce outlined new policy proposals aimed at improving the investment regime in the minerals sector. The new regulations would make it easier for investors by setting out clear instructions and by being performance-based rather than prescriptive. The use of newer, improved technology in respect of receiving permit applications and for paying fees and royalties also was to be considered. The Ministry emphasized that investment must meet acceptable health and safety standards, have an acceptable impact on the environment, and meet "Treaty of Waitangi" considerations. In return, the Government was offering investors clear and workable guidelines, royalties at either a 1% ad valorem or a 5% accounting profits basis, and an average 6-month turnaround for new permit applications (Mining Journal, 1998b).

In midyear, L and M Mining Ltd., a subsidiary of the privately owned Australian company Auriferous Mining Ltd., began an alluvial mining operation at Glencore, the site of New Zealand's historic 1860's gold rush. L and M established 15-meter (m) deep workings in the South Otago farmlands using a 400-metric ton floating dredge and a digger. The life of the 1.5-km-long, 150-m-wide mine is estimated to be 2 years. L and M also was seeking a permit from the Southland District Council to mine privately owned farmland at Freshford in the Waikaia Valley, 45 km northwest of Gore. The site reportedly contains about 2,000 kilograms of gold, sufficient for a small mine to viably operate for up to 6 years (New Zealand Mining, 1998c).

The Macraes Mine, owned by Gold and Resources Developments NL, has been New Zealand's dominant gold producer since 1996, following its commencement 6 years ago at the Round Hill ore body. Early in 1998, mining moved from the Innes Mill and Round Hill areas to the Frasers operation and backfilling of the old areas was begun. Late in the year, mine development stripping was advancing on the Golden Point deposits. A major recovery enhancement project, being overseen by Australia's Minproc Ltd., was advancing at yearend with the installation of a pressure oxidation plant and flotation circuit upgrade that will boost gold recovery by the fourth quarter of 1999 to 84% (Mineral Resources of New Zealand, 1999a).

Near yearend, Waihi Gold Mining Co. Ltd. was granted approval by the Environment Court for expansion of its Martha open pit gold mine. The expansion, beginning in March 1999, would increase gold production from 2,600 kilograms per year (kg/yr) to 3,400 kg/yr, as well as extend the mine's productive life for another 7 years, to about 2007. The Martha Mine is New Zealand's second largest gold mine. It is owned by Normandy Mining Ltd., 67.06% and Otter Gold Mines Ltd., 32.94% (Mining Journal, 1998a).

The Canadian explorer Anzex Resources Ltd. was conducting exploratory drilling in the Longwoods platinum property in the Bluff Layered Complex near Invercargill in

Southland, South Island. Anzex was exploring for platinum-group metals (Mining Magazine, 1999).

Titanomagnetite-bearing iron sand is mined and concentrated at two projects along the western coast of North Island by BHP New Zealand Steel Ltd. (NZ Steel), a wholly owned subsidiary of Australia's BHP Steel Mining Ltd. Titanomagnetite concentrate is produced by dry-mining (bulldozing and bucketwheel excavation) methods at Waikato-North Head, 50 km south of Auckland, and pumped as a slurry through an 18-km pipeline to NZ Steel's integrated Glenbrook Steelworks for direct-reduction steelmaking. NZ Steel uses wet- (suction dredging) and dry-mining methods to produce an iron sand concentrate at its Taharoa project, 90 km farther south. The Taharoa concentrate, averaging about 40% titanomagnetite by weight, is 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 is 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 usable in steelmaking. The steelmaking industry in New Zealand was established with the completion of NZ Steel's Glenbrook Steelworks in 1970 (Mineral Resources of New Zealand, 1999b).

Coal is produced from about 60 mines in more than 40 separate coalfields on 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 is dominated by Solid Energy New Zealand, a state-owned enterprise operated on a competitive, commercial basis (International Bulk Journal, 1997).

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

New Zealand's downstream mineral industry consists of two steel mills; an aluminum smelter; aluminum, copper, and brass extrusion plants; and an oil refinery, all of which primarily use imported raw materials. There are also three cement companies, each with a single plant.

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Major Sources of Information

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TABLE 1
NEW ZEALAND: PRODUCTION OF MINERAL COMMODITIES 1/

(Metric tons unless otherwise specified)

Commodity		1994	1995	1996	1997	1998 e/
METALS						
Aluminum metal, smelter:						
Primary		269,100	273,296	283,329 r/	310,324 r/	307,000
Secondary e/		6,700	8,200	8,300	8,000	8,600
Total e/		275,800	281,496	291,629 r/	318,324 r/	315,600
Gold, mine output, Au content	kilograms	10,118	12,132	11,879 r/	11,359 r/	11,250
Iron and steel:						
Iron sand (titaniferous magnetite), gross weight	thousand tons	2,080	2,362	2,334	2,478 r/	2,000
Pig iron	do.	563	631	650 e/	534	500
Steel, crude	do.	766	842	680 r/	680 r/	700
Lead, refinery output, secondary e/		6,000	6,000	6,000	6,000	6,000
Silver, mine output, Ag content	kilograms	27,589	27,794	29,611 r/	31,684 r/	31,500
INDUSTRIAL MINERALS						
Cement, hydraulic e/	thousand tons	900	950	974	976	950
Clays:						
Bentonite		930	3,699	13,734	12,802 r/	14,000
Kaolin (pottery)		40,720	13,662	26,325	21,874 r/	26,000
For brick and tile		79,080	38,382	27,159	33,396 r/	27,000
Diatomaceous earth 2/		XX	XX	16	20 e/	20
Lime e/		100,000	100,000	20,916 r/ 3/	20,916 r/ 3/	20,000
Marble 4/		XX	1,139	1,500	1,500 e/	1,500
Nitrogen, N content of ammonia		81,400	79,200	69,700	79,600 e/	79,500
Perlite 5/		--	1,800	1,880	4,960 r/	5,000
Pumice		116,840	77,054	90,571	196,687 r/	190,000
Salt e/		80,000	50,000	67,000	67,000	65,000
Sand and gravel:						
Silica sand (glass sand)		37,611	31,052	23,867	25,931 r/	25,000
Other industrial sand		323,083	627,671	508,950	463,438 r/	500,000
For roads and ballast	thousand tons	10,863	16,100	15,566 r/	15,000 e/	15,000
For building aggregate	do.	5,219	5,126	8,069 r/	8,000 r/ e/	8,000
Stone:						
Dolomite		12,939	14,212	21,718	20,000 r/ e/	20,000
Limestone and marl:						
For agriculture	thousand tons	1,564	1,300	1,457	1,316 r/	1,500
For cement	do.	1,542	1,543	1,520	1,623 r/	1,500
For other industrial uses	do.	355	387	461	460 r/ e/	450
For roads e/ 6/	do.	600	600	530 3/	550	550
Serpentine	do.	8,680	19,308	15,714	15,000 e/	15,000
Dimension		18,615	25,080	27,242	28,000 r/ e/	15,000
Rock for harbor work	thousand tons	1,075	1,327	1,500 e/	1,500 e/	1,500
Sulfur		2,102	--	--	--	--
MINERAL FUELS AND RELATED MATERIALS						
Carbon dioxide, liquefied e/		10,000	10,000	10,000	10,000	10,000
Coal:						
Bituminous	thousand tons	1,265	1,570	1,672 r/	1,500	1,500
Subbituminous	do.	1,516	1,632	1,559 r/	1,951 r/	2,000
Lignite	do.	252	243	249 r/	213 r/	250
Total	do.	3,033	3,445	3,480 r/	3,664 r/	3,750
Coke:						
Coke oven		1,000 e/	1,000 e/	(7/)	(7/)	--
Gashouse		7,000 e/	8,000 e/	(7/)	(7/)	--
Total		8,000 e/	9,000 e/	(7/)	(7/)	--
Gas: e/						
Manufactured (from gasworks)	thousand cubic meters	11,350	11,500	11,500	11,500	11,000
Natural:						
Gross production	million cubic meters	4,800 3/	4,900 3/	4,800 3/	4,800 e/	4,800
Marketed production	do.	3,900	4,000	3,900	3,900	3,900
Natural gas liquids: e/						
Liquefied petroleum gas	thousand 42-gallon barrels	1,500	1,500	1,500	1,500	1,500
Natural gasoline	do.	500	500	500	500	500
Total	do.	2,000	2,000	2,000	2,000	2,000
Peat		115,488	107,703	109,982	107,041 r/	110,000

See footnotes at end of table.

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

(Metric tons unless otherwise specified)

Commodity		1994	1995	1996	1997	1998 e/
MINERAL FUELS AND RELATED MATERIALS--Continued						
Petroleum:						
Crude	thousand 42-gallon barrels	14,235	11,880	15,848 r/	21,016 r/	21,000
Refinery products:						
Gasoline	do.	14,000 e/	13,505	12,634 r/	13,219 r/	14,000
Distillate fuel oil	do.	11,000 e/	11,680	10,852 r/	12,038 r/	11,000
Residual fuel oil	do.	3,000 e/	2,555	2,967 r/	3,250 r/	3,000
Other	do.	3,000 e/	2,920	6,735 r/	7,380 r/	3,000
Refinery fuel and losses e/	do.	2,000	(8/)	2,000	2,000	2,000
Total e/	do.	33,000	30,660	35,188 r/	37,887 r/	33,000

e/ Estimated. r/ Revised. XX Not applicable.
1/ Table includes data available through May 10, 1999.
2/ Not delineated prior to 1996.
3/ Reported figure.
4/ Not delineated prior to 1995.
5/ Includes zeolite beginning in 1995.
6/ Includes dolomite beginning in 1996.
7/ Revised to zero.
8/ Refinery and fuel losses for 1995, 1,825 thousand 42-gallon barrels, are included in the output of the individual petroleum products.