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The Mineral Industry of New Zealand

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New Zealand had more than 600 identified mineral occurrences in 25 different types of mineral deposits. New Zealand's mineral production included gold, iron sand, and silver; such industrial minerals as aggregate (crushed stone and gravel), building and dimension stone, clay, diatomite, feldspar, lime and limestone for agricultural and industrial uses, magnesite, marble, phosphate rock, salt, sulfur, and zeolite; and mineral fuels.

The Crown Minerals Act 1991 and the Crown Minerals Amendment Act 2003 set the broad legislative policy for the prospecting and exploring for and the mining of Crown-owned (meaning Government-owned on behalf of all New Zealanders) minerals in New Zealand. The Ministry of Economic Development, through the Crown Minerals Group, is responsible for the overall management of all state-owned minerals in New Zealand. The Crown Minerals Group also advises on policy and operational regulation and promotes investment in the mineral estate. The Crown Minerals Act 1991 requires the Ministry of Energy to prepare minerals programs (a type of statutory document) that set out the requirements and procedures for explorers and miners. In 1996, the minerals program for minerals other than petroleum and coal and the minerals program for coal were published. In 2007, the Crown Minerals (Minerals and Coal) Regulations 2007 were enacted to specify the reporting requirements for permit changes and for prospecting and exploration. The regulation was to take effect on February 1, 2008. The published Crown Minerals (Petroleum) Regulation 2007 provides information for permit and license holders, including how to apply for and transfer permits; it also includes information regarding surrounding permits (Ministry of Economic Development, 2007b, c).

In 2007, New Zealand's total exports were valued at $NZ36.6 billion ($25.8 billion); and its total imports were valued at $NZ41.9 billion ($29.3 billion). Australia continued to be New Zealand's main import and export trading partner. The United States and Japan were New Zealand's second and third ranked export markets, respectively. China and the United States were New Zealand's second and third ranked sources of imports, respectively. Aluminum and its products accounted for 4.32% of the country's total export value; mineral fuels, 4.16%; and iron and steel, 1.64%. Petroleum and its products were New Zealand's most valuable imported commodities and together accounted for 14.4% of the country's total import value (Statistics New Zealand, 2008).

Minerals in the National Economy

New Zealand's mineral resources were dominated by aggregate and gold, which, combined, accounted for 80% of the total value of New Zealand's mineral resources. Gold, iron sand, and silver were major metallic commodities that made a significant contribution to New Zealand's economy. Production of other metallic minerals, such as bauxite, copper, lead, and zinc, could potentially be economically feasible if technologies and prices become favorable. Excluding the petroleum industry, the value of New Zealand's mineral production of coal, metals, and industrial minerals accounted for about 1% of the gross domestic product (GDP). The total value of New Zealand's minerals and mineral fuel production accounted for about 2% of the GDP. During the fiscal year from July 2006 to June 2007, New Zealand's total exploration expenditure on minerals and mineral fuels was $NZ732.3 million ($512.5 million), of which petroleum accounted for 95% of the total (Ministry of Economic Development, 2007a, p. 14).

Production

In 2007, production of such commodities as bentonite, clay, natural gas, petroleum, pumice, and silica sand increased by more than 10% compared with that of 2006. Data on mineral production are provided in table 1.

Structure of the Mineral Industry

Table 2 is a list of major mineral industry facilities in New Zealand.

Commodity Review

Metals

Aluminum.—New Zealand Aluminium Smelters Ltd.'s Tiwai Point smelter, which was located at Tiwai Point of Invercargill, was the sole primary aluminum producer in New Zealand. Power for the smelter was supplied from the Manapouri hydroelectric powerplant. Alumina was sourced from Rio Tinto Alcan's refinery at Gladstone in Queensland, Australia. During the past several years, owing to both the high price and availability of electricity, New Zealand Aluminium started producing high-purity aluminum instead of standard aluminum to avoid the competition with those aluminum products from China and the Middle East. The volume of aluminum output from the Tiwai Point smelter was affected by the water level in the hydroelectric power system. Aluminum output was for domestic and overseas markets. About 86% of the metal was exported to Japan and Asian countries (New Zealand Aluminium Smelters Ltd., 2008).

Gold.—New Zealand's gold production was mainly from two hard-rock gold fields—the Macraes and the Martha—and a large number of alluvial mines. The Martha gold field is located in Waihi and is owned by Newmont Waihi Gold, which was a subsidiary of Newmont Mining Corp. of the United States. The Martha open pit mine had been scheduled to close in 2007 but Newmont was evaluating ways to extend mining at the open pit to 2010 and was actively exploring in another part of the region. An underground ore body (the Favona deposit) at the

processing plant site was put into operation in late 2006. In 2007, Newmont's Waihi operation produced 2.9 metric tons (t) (92,900 troy ounces) of gold (Newmont Mining Corp., 2008, p. 21).

OceanaGold Corp.'s Macraes gold project consisted of the Macraes open pit mine and the Frasers underground mine, the processing plant, and a pressure oxidation facility. The open pit mine had been in operation since 1990, and the underground mine began operation in 2007. In 2007, the Macraes operation produced a total of 4.5 t (145,312 troy ounces) of gold. Owing to a lower grade of ore from the open pit mine in the first three quarters of 2007, gold output was 25% lower than that of 2006. OceanaGold planned to produce about 6.2 metric tons per year (t/yr) (200,000 troy ounces per year) for a mine life of 6 more years. OceanaGold's Reefton gold project was located about 7 kilometers (km) from Reefton on the west coast of South Island; the project began operating in 2007. The Reefton project included four open pits—the Empress, the General Gordon, the Globe Progress, and the Souvenir—and a 1-million-metric-ton-per-year (Mt/yr) processing plant. The concentrate was sent by rail to the Macraes pressure oxidation facility for final processing. In 2007, most of the mining took place in the General Gordon and the Globe Progress pits. The company planned to produce 2.2 t/yr (70,000 troy ounces per year) of gold for 6 years. The company continued to explore for metals in the Nelson area on the north coast of the South Island (OceanaGold Corp., 2008, p. 6-15).

Iron and Steel.—New Zealand's iron ore is mainly titanomagnetite iron sand deposits that extend along 480 km of coastline from Kaipara Harbour south to Wanganui on the west coast of the North Island. Deposits at Taharoa and Waikato North Head were being mined. Iron sand from Waikato North Head was used by New Zealand Steel Ltd., a subsidiary of BlueScope Steel Ltd. of Australia, which was located at Glenbrook. New Zealand Steel was an integrated steel producer that had a steel output capacity of 650,000 t/yr; the steel was then transferred to a continuous caster and then to a rolling mill to produce flat-rolled steel products. Iron sand from Taharoa was exported to China and Japan. BlueScope planned to sell its Taharoa operation to Hong Kong-based Cheung Kong Infrastructure Holdings Ltd. (BlueScope Ltd., 2008).

Industrial Minerals

Cement.—New Zealand's cement industry was dominated by two producers—Golden Bay Cement and Holcim New Zealand Ltd. The Golden Bay cement plant was located at Portland, 8 km south of Whangarei on North Island; Holcim's cement plant was located at Cape Foulwind, Westport, on South Island. Golden Bay exported about 20% of its output to the Pacific Island markets. The Auckland City Council and Golden Bay agreed to move Golden Bay's cement plant at the Wynyard Point to the eastern port of Auckland by 2010. Construction of the new site would begin in May 2008. During the past year, demand for cement in New Zealand led the country to import cement to meet the gap between its domestic production and consumption. To meet the expected long-term growth in demand for cement in New Zealand, Holcim was considering either replacing the existing cement plant with a dry process cement plant at Westport or building a new cement plant at Weston near Oamaru on the South Island. Holcim considered that the Weston site would be more favorable for resourcing raw materials from the surrounding areas. Holcim sought resource consents for the Ngaparea, the Weston, and the Windsor sites under the Resource Management Act. These consents would need to be submitted to the Government before the company could apply for construction and operation of the plant and funding for the construction of a new plant from its parent company (Holcim New Zealand Ltd., 2008; Ports of Auckland, 2008).

Mineral Fuels

Coal.—New Zealand's coal resources were estimated to be 15 billion metric tons (Gt), of which about 8.6 Gt was economically recoverable. About 45 coal mines were in operation in New Zealand. Bituminous coal resources are located in the West Coast region; subbituminous coal resources are found mainly in the Waikato region, as well as in the Otago, the Southland, and the West Coast regions. Lignite resources are found in the Otago and the Southland regions. New Zealand consumed more than 4 million metric tons (Mt) of coal during the past several years and exported its coal surplus to India (which received 40% of New Zealand's coal exports), Japan (24%), South Africa (21%), China (6%), and others (8%) in 2007. The power sector accounted for about 40% of domestic coal consumption followed by the steel sector, 30%; dairy, 11%; industrial processing, 3%; cement, 2%; and others (14%) (Solid Energy New Zealand Ltd., 2008, p. 23).

Pike River Coal Ltd. started the construction of its Pike River coal mine at about 50 km northeast of Greymouth in the west coast of the South Island in 2006. The construction of the underground mine was expected to take 2 years to complete. A 2,300-meter (m) adit was built to reach the estimated recoverable resource of 18 Mt of low-ash coking coal, which was located under Department of Conservation-administered land, with part of it under Paparoa National Park. The mine was designed to produce 1 Mt/yr in 2010 for 18 years. The company estimated that the area contained 58.5 Mt of coking coal. The coal seam thickness was 4 m to 9 m. Coal would be transported from the underground mine by a 10.6-km-long slurry pipeline to a preparation plant for dewatering and electronic grading; it would be stockpiled and eventually trucked to rail-loading facilities for transport across the Southern Alps to Lyttelton, and then exported (Pike River Coal Ltd., 2008).

Natural Gas and Oil.—New Zealand's natural gas and oil were produced from a total of 21 fields, which were located in the Taranaki Basin. Natural gas was produced from 16 fields. In 2007 the Pohokura field, which started producing in 2006, accounted for 39% of the country's natural gas output followed by the Maui field, 31%; Kapuni field, 14%; KcKee field, 4%, and others, 12%. Shell NZ Ltd. and Todd Energy Ltd. owned subsidiaries that controlled the majority of the market. The Tui field, which was owned by Australian Worldwide Exploration Ltd. (AWE), Mitsui E&P New Zealand Ltd., Natural Gas Corp. Ltd., and Pan Pacific Petroleum and was operated by AWE, was put into operation in 2007. The Tui field was predominately

an oilfield; it accounted for 45% of the country's total oil output in 2007, followed by the Pohokura field, 31%; the Maui field, 14%; the Kapuni field, 3%, and others, 7%. The Maari project, which is located 80 km off the South Taranaki coast south of the Maui field and in which OMV New Zealand Ltd. (the operator) held a 69% equity interest, was scheduled to come onstream in 2009. In 2007, the Government granted three permits to consortia that were led by ExxonMobil New Zealand (Exploration) Ltd., Greymouth Petroleum Holdings Ltd., and OMV New Zealand, to explore the Great South Basin in the southeast portion of South Island. The Marsden Point Oil Refinery was the country's only oil refinery, which was operated by the New Zealand Refinery Co.

Outlook

The economy of New Zealand is expected to slow down noticeably in the next several years, following prolonged economic expansion driven by commodity and housing booms. Most mineral production is consumed locally with the exception of aluminum, coal, and amorphous silica. The development of the mining sector in New Zealand is constrained by the environmental awareness and sensitivity of the country and its location far from major industrial markets. Consistent with these trends, New Zealand's mineral development is expected to continue to increase only gradually.

References Cited

BlueScope Ltd., 2008, BlueScope announces the divestment of the Taharoa iron sand business for NZ$250 million: Melbourne, Australia, BlueScope Ltd. press release, August 26, 2 p.

Holcim New Zealand Ltd., 2008, Evaluating sites for a new cement plant: Christchurch, New Zealand, Holcim New Zealand Ltd. press release, 1 p.

Ministry of Economic Development, 2007a, Annual report 2006/2007: Wellington, New Zealand, Ministry of Economic Development, 28 p.

Ministry of Economic Development, 2007b, Crown Minerals (minerals and coal) regulations 2007: Wellington, New Zealand, Ministry of Economic Development, December 17, 74 p.

Ministry of Economic Development, 2007c, Crown Minerals (petroleum) regulation 2007: Wellington, New Zealand, Ministry of Economic Development, May 28, 84 p.

Newmont Mining Corp., 2008, 2007 annual report: Denver, Colorado, Newmont Mining Corp., 187 p.

New Zealand Aluminium Smelters Ltd., 2008, New Zealand Aluminium Smelter to temporarily reduce production at Tiwai Point smelter due to electricity market conditions: Southland, New Zealand, New Zealand Aluminium Smelters Ltd. media release, May 2, 1 p.

OceanaGold Corp., 2008, OceanaGold annual report 2007: Melbourne, Victoria, Australia, OceanaGold Corp., 68 p.

Pike River Coal Ltd., 2008, Annual review 2008: Wellington, New Zealand, Pike River Coal Ltd., 18 p.

Ports of Auckland, 2008, Golden Bay Cement moves to enable first stage of Wynyard quarter vision: Auckland, New Zealand, Ports of Auckland press release, April 18, 2 p.

Solid Energy New Zealand Ltd., 2008, Annual report 2007, Christchurch, New Zealand, Solid Energy New Zealand Ltd., 116 p.

Statistics New Zealand, 2008: New Zealand external trade statistics—December 2007: Wellington, New Zealand, Statistics New Zealand, various pages.

TABLE 1

NEW ZEALAND: PRODUCTION OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity		2003	2004	2005	2006	2007
METALS						
Aluminum metal, smelter:						
Primary		334,400	342,000	351,449	337,264	353,000
Secondary[e]		21,500	21,500	21,500	22,000	22,000
Total		355,900	363,500	372,949	359,264	375,000
Gold, mine output, Au content	kilograms	9,300	10,151	10,583	10,618	10,762
Iron and steel:						
Iron sand, titaniferous magnetite, gross weight	thousand metric tons	1,947	2,329	2,207	2,146	1,723
Pig iron[e]	do.	600	650	652	664	679
Steel, crude[e]	do.	800	850	889	810 [r]	845
Lead, refinery output, secondary[e]		10,000	10,000	10,000	10,000	10,000
Silver, mine output, Ag content	kilograms	29,920	30,084	43,003	27,221	10,568
INDUSTRIAL MINERALS						
Cement, hydraulic	thousand metric tons	1,080	1,100	1,050	1,120	1,200 [e]
Clays:						
Bentonite		10,940	10,050	7,590	3,028	6,154
Kaolin, pottery		14,770	15,500	15,750	14,864	14,130
For brick and tile		56,550	57,350	41,170	46,667	55,645
Diatomaceous earth		320	240	20	142	14
Lime[e]		20,000	20,000	20,000	20,000	20,000
Marble[e]		15,000	15,000	15,000	15,000	15,000
Nitrogen, N content of ammonia[e]		127,000 [r]	124,000 [r]	120,000 [r]	120,000 [r]	125,000
Perlite		5,000	5,600	7,310	3,552	7,873
Pumice		173,400	280,950	245,080	303,659	354,903
Salt[e]		70,000	70,000	100,000	100,000	100,000
Sand and gravel:						
Silica sand, glass sand		48,400	60,080	65,350	58,705	86,461
Other industrial sand		2,207,190	1,753,140	1,574,050	2,433,165	1,896,343
For roads and ballast	thousand metric tons	18,500	21,720	24,712	23,981	23,782
For building aggregate	do.	9,267	11,362	10,921	8,518	9,601
Stone:						
Dolomite		21,920	12,000	--	1,626	91,633
Limestone and marl:						
For agriculture	thousand metric tons	2,557	1,913	2,594	2,326	2,180
For cement	do.	1,652	1,839	1,741	1,762	1,965
For other industrial uses	do.	731	561	891	944	947
Serpentine		68,960	60,880	62,320	41,000	45,648
Dimension		37,300	26,110	29,270	22,880	22,934
Zeolite		4,850	11,440	18,790	9,041	17,039
MINERAL FUELS AND RELATED MATERIALS						
Coal, all grades	thousand metric tons	5,180	5,154	5,267	5,768	4,835
Liquefied petroleum gas	thousand 42-gallon barrels	1,701	1,710	1,946	1,786 [r]	654
Natural gas:						
Gross production	million cubic meters	4,892	4,500	4,223	4,100	4,712
Marketed production	do.	4,492	4,114	3,911	3,900	4,310
Petroleum:						
Crude	thousand 42-gallon barrels	8,712	7,625	7,032	6,808 [r]	14,873
Refinery products[e]	do.	34,000	34,000	34,000	34,000	34,000

[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 15, 2008.

TABLE 2
NEW ZEALAND: STRUCTURE OF THE MINERAL INDUSTRY IN 2007

(Thousand metric tons unless otherwise specified)

Commodity		Facilities, major operating companies, and major equity owners	Location of main facilities	Annual capacity[e]
Aluminum		Tiwai Point smelter [New Zealand Aluminium Smelters Ltd. (Rio Tinto Alcan, 79.36%, and Sumitomo Chemical Co., 20.64%)]	Southland, Invercargill	350
Cement		Golden Bay Cement (Fletcher Building Ltd.)	Portland	900
Do.		Holcim New Zealand Ltd.	Cape Foulwind, Westport	500
Coal		Pike River underground mine (Pike River Coal Ltd.)	50 kilometers northeast of Graymouth	1,000
Do.		Spring Creek underground mine (Solid Energy New Zealand Ltd.)	Greymouth	1,000
Do.		Rotowaro open pit mine (Solid Energy New Zealand Ltd.)	Huntly	1,500
Do.		Huntly East underground mine (Solid Energy New Zealand Ltd.)	do.	500
Do.		Ohai open pit mine (Solid Energy New Zealand Ltd.)	Ohai	200
Do.		Terrace underground mine (Solid Energy New Zealand Ltd.)	Reefton	100
Do.		Stockton open pit mine (Solid Energy New Zealand Ltd., 51%, and Cargill Inc., 49%)	Westport	2,500
Gold	metric tons	Newmont Waihi Gold (subsidiary of Newmont Mining Corp.)	Waihi	5
Do.	do.	Macraes gold project (OceanaGold Corp.)	Otago	6
Do.	do.	Reefton gold project (OceanaGold Corp.)	Reefton	2
Iron and steel:				
Iron ore		Cheung Kong Infrastructure Holdings Ltd.	Taharoa, 150 kilometers south of Auckland	1,300
Do.		New Zealand Steel Ltd. (BlueScope Steel Ltd.)	Waikato North Head, 30 kilometers south of Auckland	1,000
Steel		do.	Glenbrook	650
Do.		Otahuhu Mill [Pacific Steel Group (Fletcher Building Ltd.)]	Auckland	300
Petroleum refinery	barrels per day	Marsden Point Oil Refinery (New Zealand Refinery Co., operator)	Marsden Point	95,000
Silver	metric tons	Newmont Waihi Gold (subsidiary of Newmont Mining Corp.)	Waihi	30
Do.	do.	OceanaGold Corp.	Otago	1

[e]Estimated. Do., do. Ditto.