

THE MINERAL INDUSTRY OF PHILIPPINES

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The Philippines is an archipelago comprising about 7,100 islands. Its total land area covers approximately 300,000 square kilometers, of which probably one-third may be mineralized. The country is a significant producer of chromium, copper, and nickel and has a long history of gold production.

Agriculture was most important to the Philippine's economy; rice, fruit, and coconut were the major cash crops. The mining and quarrying sector of the minerals industry continued to decline in importance, contributing less than 1.5% to the country's gross domestic product in 1996. Although copper and gold remained the backbone of the country's mineral sector, production has been hampered for several years by the effects of an inadequate mining law, low international prices, and natural disasters, including intense volcanic activity, cyclonic storms resulting in severe flooding, and periods of extensive drought. Foreign investment was impeded by the requirement for 60% domestic equity control and high excise taxes (mineral royalties) on production. Additionally, a serious accident occurred in March in which mine tailings spilled from Marcopper Mining Corp.'s copper mining operation on the island of Marinduque. The tailings flowed into the island's coastal areas and filled the 26-kilometer long Boac River, causing all but 2 of the 70 applications from foreign mining companies for exploration licenses to be frozen (Financial Times, 1996). The Government expected to begin reissuing exploration/mining licenses and granting Financial or Technical Assistance Agreements (FTAA) early in 1997 (Mining Journal, 1996f).

The Philippine Mining Act enacted in March 1995 was designed to establish a legal framework for the mining sector, endeavoring to streamline the law to ensure that the Philippines attained the capability to compete effectively for foreign investment for the country's mineral industry. Apparently, the act was succeeding since the number of foreign mining companies represented in the country increased from 4 at yearend 1994 to more than 20 in 1996, and applications for FTAA's were filed with the Mines and Geosciences Bureau (MGB) for 70 areas (Mining Journal, 1996a).

Under the new mining act, the old leasehold system was replaced with a service contract scheme whereby the Government can grant a qualified contractor the exclusive right to conduct exploration and to develop and operate a mine in the contract area for 25 years, renewable for another 25 years.

For large-scale exploration and development under the mining act, the Government can enter into an FTAA with a 100%-owned foreign corporation. Until passage of the new mining law, foreign companies were restricted to a 40% maximum ownership interest in mineral properties; thus, most

were reluctant to invest their time and money without having the decision-making authority. FTAA's were to be negotiated with the Department of Environment and Natural Resources (DENR) and proposals were to be filed with the MGB. The DENR was the primary Government agency responsible for conservation, management, development, and proper use of the country's natural resources, including its minerals.

The Government issued at the end of December new environmental rules by revising the Implementing Rules and Regulations (IRR) of the Philippine Mining Act. The DENR announced that the revisions were designed to strengthen the mining laws with respect to environmental protection. The interests of indigenous tribes also were addressed. The revised IRR provides that mining companies must establish post-operational land management plans for open pits, waste dumps, and tailings dams. The companies must allocate 10% of their initial cost of a mine to environmental work, and set aside a sum equal to 3% to 5% of mining and milling operating costs for an environmental protection program. The fine payable for a spillage of waste material also was raised to the equivalent of approximately US\$2 per metric ton (t) (Mining Journal, 1997).

The minerals industry of the Philippines employed an estimated 400,000 people, or about 1.5% of the labor force, including an estimated 300,000 workers engaged in small-scale mining and panning activities, chiefly in artisanal gold workings. The metallic sector accounted for an estimated 75% of the industry's production value and nearly 100% of export earnings. Of the dozen or so major mining companies engaged in metal mining, six produced copper, gold, and silver from various operations; one of the six companies also produced refractory chrome ore; one additional company mined gold and silver; and two companies mined nickel ore. The industrial minerals sector was dominated by the production of limestone for cement manufacture, marble, and sand and gravel for construction uses.

Refined gold and copper continued to be the country's most important mineral products, each representing more than 30% of total mineral value.

Japan remained the primary market for the country's mineral products in 1996. Almost all of the Philippine production of chromite and nickel and more than 60% of its copper concentrates were exported to Japan. The remaining copper concentrates were smelted by the Philippine Associated Smelting and Refining Corp. into copper cathodes at Isabel, Leyte Province, for export, again primarily to Japan.

The Philippines has had one of the oldest and most active mining industries of Southeast Asia, with a strong, established mining structure. The mining industry of the Philippines was

dominated by a few large-scale private local companies mining chromite, copper, gold, nickel, and silver. Coal was mined by numerous private companies and three subsidiaries of the state-owned Philippine National Oil Co. (PNOC). One of the large Government-owned companies, the Semirara Coal Corp., produced about 65% of the country's coal. Copper, ferroalloys, and phosphate fertilizer were produced by three joint-venture firms. Cement was produced by private companies; most were Filipino owned, with only minor foreign interests.

The Philippine high carbon ferrochrome and charge chrome industries were effectively shut down during the year, with Ferrochrome Philippines Inc., Integrated Chrome Corp., and Philippine Minerals and Alloy Corp. having suspended production because of poor market conditions. Domestically produced metallurgical-grade chromite ore, mainly mined in Surigao del Norte Province, was shipped instead to China (Metal Bulletin, 1996a). Refractory-grade chromite ore production was centered in the Province of Zambales in northern Luzon where Benguet Corp. mined the world's largest single refractory chromite deposit, the Coto Mine, at its Masinloc operations.

Atlas Consolidated Mining and Development Corp. announced at yearend that a new group of investors had approved plans to rehabilitate the Carmen open pit-underground and Lutopan underground copper-gold mines in the Toledo District of central Cebu Island. Earlier in the year, Atlas Consolidated signed an agreement with Hong Kong's Resource Engineering and Finance Corp. for the lease of its copper mine after it failed to close an arrangement made in 1995 with Astron Ltd. of Australia (South-East Asia Mining Letter, 1996). The Cebu operations were closed in 1992 by a combination of depressed metal prices, high production costs, and a typhoon that triggered a mud rush into the mine (Mining Journal, 1996b).

Canada's Placer Dome Inc. announced in September that it would surrender its 40% interest in Marcopper Mining Corp., the operator of the Marcopper copper mine and mill on Marinduque Island. Operations at the mine site were suspended March 24 after a concrete plug in a drainage tunnel from the mined-out Tapian open pit containing impounded tailings failed. About 4 million tons of material was released into the Boac River system and coastal areas of the island. Although the tailings did not contain any toxic material and there was no loss of human life, the sand and silt smothered aquatic life and caused a public outcry that resulted in new environmental rules being added to the Philippine Mining Act (Mining Journal, 1996c).

Criminal charges were filed in August against three of Marcopper Mining's senior executives. The charges related to the discharge in March of the tailings from the containment pond at the Marinduque mine site. The officials were charged with violating the Mining Act, the Water Code, the Pollution Control Law, and with reckless impunity resulting in damage to property; the charges were dismissed near yearend (Mining Journal, 1996d).

Eastern Copper NL obtained in midyear the right to earn up to a 75% interest in the T'boli gold project following its

acquisition of Tibalina Pty. The deposit is a high-grade epithermal stockwork vein system in Cotabato Province on the island of Mindanao. Reportedly, the project contains between 15,000 and 62,000 kilograms (kg) of gold (Mining Journal, 1996e).

Base Metals Minerals Resources Corp. (BMMR) agreed in August to purchase Atlas Consolidated's Masbate Gold Operations (MGO) at Aroroy on the island of Masbate for US\$10 million. Atlas Consolidated ceased mining at MGO, which had annual production of about 2,600 kg each of both gold and silver, in September 1994. BMMR is a Philippine-registered company, 40% owned by Philippine Gold PLC, formerly London Fiduciary Trust PLC (Pointcast Network, 1996). Masbate was expected to produce about 2,300 kg of gold in 1997 and 3,700 kg thereafter (Mining Journal, 1996g).

Chase Minerals (Philippines) Corp. acquired 100% interest from local claim owners in the Archangel property in southeastern Batangas Province, about 120 km south of Manila. Chase may incorporate the property into its FTAA application area that covers much of Batangas, including the Taysan and El Paso properties to the northwest. The Archangel property was mined for gold in pre-Spanish colonial times and for copper by the Japanese during World War II; more recent exploration was conducted by Australia's Western Mining Corp. between 1988 and 1991 (Chase Resource Corp., 1997).

Manganese output was centered on the islands of Bohol, Busuanga, Marinduque, Masbate, and Siquijor, as well as in the Provinces of Agusan del Norte and Zamboanga del Sur on Mindanao. Many of the deposits, however, were small and unsuitable for large-scale mining operations.

The mainstay of Philippine nickel production continued to be Rio Tuba Nickel Mining Corp.'s Rio Tuba Mine in the far south of Palawan Island, Palawan Province. Hinatuan Mining Corp. and Taganito Mining Corp. both operated smaller mines in Surigao del Norte Province on Mindanao. Taganito also operated the Taganito Mine on Palawan Island. All worked lateritic nickel deposits, exporting all ore production to Japan.

Trafalgar House PLC of the United Kingdom entered into an agreement with the Australian-British-Filipino and Hong Kong consortium Pacific Nickel Holdings Ltd. to participate in the rehabilitation of the Nonoc laterite nickel mine, smelter, and refinery, previously operated by Philnico Mining and Industrial Corp., on Nonoc Island, Surigao del Norte Province, Mindanao. Pacific Nickel signed an agreement with the Government for acquisition of the refinery in September and rehabilitation started late in the year. At yearend, Arboyne NL of Australia, exercised its option, which it acquired from Pacific Nickel in July 1995, to purchase the mine and refinery. Nickel production was expected to begin in 1998. Philnico ceased mining on Nonoc Island in March 1986, and the Government's Asset Privatization Trust foreclosed on the properties because of low metal prices; a decline in the value of the Philippine peso; rising power costs; and the company's (Philnico) high debt level. Nonoc had an annual capacity of 30,000 t of nickel when production stopped. Refurnishing the Nonoc facilities was estimated to cost US\$370 million compared with a replacement cost of US\$1 billion to US\$1.5 billion. Reportedly, Arboyne

will change its name to Pacific Nickel Holdings when the acquisition of Pacific Nickel is completed (Minerals Gazette, 1996).

The Philippines does not have a fully integrated steel sector, although several rod and bar mills and galvanizing plants have been established, all since the end of World War II. Steelmaking in the Philippines involved scrap-based electric furnace steel melting operations, of which there were 17 facilities in 1996--13 in the National Capital Region; 3 in Pampanga Province to the northwest of Manila, the capital; and National Steel Corp.'s (NSC) steelworks at Iligan, Mindanao. NSC was the single largest steel company in the country, producing about one-third of total production. NSC, previously a Government-owned entity, was purchased by Malaysia's Wing Tiek Holdings in midyear (Metal Bulletin, 1996b).

The Philippine Sinter Corp., owned by Kawasaki Steel Corp. of Japan, imported iron ore fines from various overseas sources, primarily Australia, and exported iron ore sinter and pellets to Japan. The plant was opened in 1977 and has a capacity of 5 million metric tons per year (Mt/yr).

Coal in the Philippines generally is classified as lignite or subbituminous and is of poor quality for use in power generation. Thus, higher-grade imported coal was blended with indigenous coals to improve burning characteristics.

The Philippines is producing only about 2% of its crude petroleum requirements domestically, with about 95% of production coming from the West Linapacan Field in the Palawan Basin off the northwest coast of Palawan Island. Remaining domestic production was from the reopening of the Matinloc Field and the older Nido Field, both also in the Palawan Basin in the South China Sea.

Petron Corp., a Government-owned entity, was planning to expand capacity by 15,000 barrels per day (bbl/d), to 180,000 bbl/d, at its Bataan Refinery in Limay, Bataan Province, Luzon. The project is estimated to cost US\$30.8 million and is slated to be completed in 1997 (Oil and Gas Journal, 1996).

The country's only gas producer was the onshore San Antonio Field on Luzon Island operated by the PNOC.

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Major Sources of Information

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Major Publications

Central Bank of the Philippines, Manila: Statistical Bulletin and Annual Report.

Chamber of Mines of the Philippines, Manila: Newsletter and Annual Report.

Mines and Geosciences Bureau, Manila: Mineral News Service and Annual Report.

TABLE 1
PHILIPPINES: PRODUCTION OF MINERAL COMMODITIES 1/

(Metric tons unless otherwise specified)

Commodity 2/	1992	1993	1994	1995	1996 e/
METALS					
Arsenic: White (equivalent of arsenic acid) e/	5,000	2,000	2,000	2,000	2,000
Chromium: Chromite, gross weight:					
Metallurgical-grade	30,925	7,272	10,881	20,000 e/	15,000
Chemical-grade	9,988	1,600	--	--	--
Refractory-grade	39,596	49,564	64,075	75,000 e/	60,000
Total	80,509	58,436	74,956	95,000 e/	75,000
Copper:					
Mine output, Cu content	123,523	136,257	116,163 r/	108,063 r/	40,022 3/
Metal:					
Smelter	168,831	212,446	200,255 r/	158,109 r/	83,000 3/
Refined	145,674 r/	165,954	154,713	158,109 r/	82,972 3/
Gold, mine output, Au content kilograms	25,609	21,155	27,059	27,144	20,000
Iron and steel:					
Ferroalloys, electric-furnace:					
Ferrochromium	27,400	11,908	16,186	50,450	--
Ferromanganese e/	5,000	5,000	5,000	5,000	--
Ferrosilicon e/	10,000	10,000	10,000	10,000	--
Steel, crude thousand tons	497	623	473	500 e/	500
Lead: Metal, secondary refined	19,100	24,300	17,200	17,200 e/	17,200
Manganese ore and concentrate, gross weight	13,798	12,418	10,000 e/	10,000 e/	10,000
Nickel, mine output, Ni content	13,000	7,663	9,895	15,075	14,700
Silver, mine output, Ag content kilograms	32,785	28,043	29,562	26,870	20,000
INDUSTRIAL MINERALS					
Barite e/	500	500	500	500	500
Cement, hydraulic thousand tons	6,667	7,962	9,600	9,800 e/	10,000
Clays:					
Bentonite	7,428	5,050	25,000 e/	20,000 e/	20,000
Red e/	500	791 3/	800	800	800
White e/	45,000	5,557 3/	50,000	50,000	50,000
Other e/	742,074 3/	700,000	800,000	800,000	800,000
Feldspar	48,400	44,600	30,000 e/	30,000 e/	40,000
Gypsum and anhydrite, natural e/	25,000	25,000	25,000	25,000	25,000
Lime e/	10,000	10,000	10,000	10,000	10,000
Magnesite e/	700	700	700	700	700
Perlite e/	2,800	19,779 3/	20,000	20,000	20,000
Phosphate:					
Guano	326	859	5,000 e/	5,000 e/	5,000
Phosphate rock	4,834	91,779	20,000 e/	20,000 e/	20,000
Pyrite and pyrrhotite (including cuprous), gross weight e/	350,000	316,980 3/	320,000	320,000	320,000
Salt, marine	495,816	535,481	540,000 e/	540,000 e/	550,000
Sand and gravel:					
Silica sand thousand tons	744	828	800 e/	800 e/	800
Other 4/ thousand cubic meters	15,787	15,913	15,000 e/	15,000 e/	15,000
Stone:					
Dolomite	470,293	108,150	675,000 e/	675,000 e/	675,000
Limestone 5/ thousand tons	5,092	5,190	5,000 e/	5,000 e/	5,000
Marble (dimension), unfinished cubic meters	263,799	359,394	300,000 e/	300,000 e/	300,000
Volcanic cinder e/ do.	2,000	2,000	2,000	2,000	2,000
Tuff e/	50,000	3,264 3/	50,000	50,000	50,000
Quartz e/	50,000	50,000	50,000	50,000	50,000
Crushed, broken, other e/ 6/ thousand cubic meters	1,000	1,000	1,000	1,000	1,000
Sulfur: e/					
S content of pyrite	64,000	114,000	100,000	100,000	100,000
Byproduct of metallurgy	111,000	147,000	125,000	125,000	125,000
MINERAL FUELS AND RELATED MATERIALS					
Coal, all grades thousand tons	1,655	1,531	1,300 e/	1,320	1,300
Petroleum:					
Crude thousand 42-gallon barrels	2,945	3,321	1,825	1,044 r/	432 3/
Refinery products:					
Liquefied petroleum gas do.	2,914	2,607	2,806	2,800 e/	2,800
Gasoline do.	13,378	13,052	12,168	12,200 e/	12,200
Jet fuel do.	4,067	3,058	4,352	4,350 e/	4,350
Kerosene do.	4,280	4,270	3,916	3,900 e/	3,900

See footnotes at end of table.

TABLE 1--Continued
PHILIPPINES: PRODUCTION OF MINERAL COMMODITIES 1/

(Metric tons unless otherwise specified)

Commodity 2/	1992	1993	1994	1995 e/	1996 e/	
MINERAL FUELS AND RELATED MATERIALS--Continued						
Petroleum--Continued:						
Refinery products--Continued:						
Distillate fuel oil	thousand 42-gallon barrels	26,733	25,213	26,338	26,300 e/	26,300
Residual fuel oil	do.	27,474	28,431	29,582	29,600 e/	29,600
Other	do.	3,922	5,886	5,230	5,250 e/	5,250
Refinery fuel and losses	do.	3,300	3,300	3,262	3,250 e/	3,250
Total	do.	86,068	85,817	87,654	87,650 e/	87,650

e/ Estimated. r/ Revised.

1/ Table includes data through Apr. 29, 1997.

2/ In addition to the commodities listed, the Philippines produces platinum-group metals as byproducts of other metals, but output is not reported quantitatively, and no basis is available to make reliable estimates.

3/ Reported figure.

4/ Includes "pebbles" and "soil" not further described.

5/ Excludes limestone for road construction.

6/ Includes materials described as rock, crushed or broken; stones, cobbles, and boulders; rock aggregates; and broken adobe.

TABLE 2
PHILIPPINES: STRUCTURE OF THE MINERAL INDUSTRY FOR 1996

(Thousand metric tons unless otherwise specified)

Commodity	Major operating companies and major equity owners	Location of main facilities	Annual capacity e/
Cement	Davao Union Cement Corp., 100%	Davao City plant, Mindanao Island	648
Do.	Floro Cement Corp., 100%	Higait plant, Mindanao Island	450
Do.	Iligan Cement Corp., 100%	Iligan City plant, Mindanao Island	420
Do.	Northern Cement Co. Inc., 100%	Sison plant, Luzon Island	640
Do.	Republic Cement Corp., 100%	Norzagaray plant, Luzon Island	950
Do.	Rizal Cement Co. Inc., 100%	Binangonan plant, Luzon Island	964
Chromite:			
Concentrate	Acoje Mining Co. Inc., operator. (Voest Alpine AG of Austria, 75.6%; and Merlin Mining NL of Australia, 24.4%)	Santa Cruz Mine, Zambales Province, Luzon Island	100 1/
Do.	Alamag Processing Corp., operator. (Pacific Shore Mining Co., 50%; and Rio Chico Mining Corp., 50%)	Llorente, Eastern Samar Province, Samar Island	20 2/
Do.	Benguet Corp., 70%, operator; and Consolidated Mines Inc., 30%	Masinloc Chromite Operations, Zambales Province, Luzon Island	105 3/
Ferrochromium	Ferrochrome Philippines Inc., operator. (Voest Alpine AG of Austria, 100%)	Tagoloan plant, Misamis Oriental Province, Mindanao Island 4/	60
Do.	Philippine Minerals and Alloy Corp., 100%	Manticao plant, Misamis Oriental Province, Mindanao Island 4/	10
Do.	Integrated Chrome Corp., 100%	Manticao plant, Misamis Oriental Province, Mindanao Island 4/	28
Coal	Semirara Coal Corp. (Government), manager. Voest Alpine AG of Austria, 60%; National Development Corp., 36%; and Development Bank of the Philippines, 4%)	Unong Mine, Antique Province, Semirara Island	1,000
Copper, ore	Atlas Consolidated Mining and Development Corp., 100%	Cebu Copper Operations, Cebu Province, Cebu Island 5/	24,250
Do.	Benguet Corp., 50%, operator; and Dizon Copper-Silver Mines Inc., 50%	Dizon Copper-Gold Operation, Zambales Province, Luzon Island	6,000
Do.	Far Southeast Resources Inc., manager. (Lepanto Consolidated Mining Co. Inc., 60%; and CRA Ltd. of Australia, 40%)	Far South East Project, Benguet Province, Luzon Island	4,000
Do.	Lepanto Consolidated Mining Co. Inc., 100%	Mankayan Mine, Benguet Province, Luzon Island	1,100
Do.	Marcopper Mining Corp., 60%; and Placer Dome Inc. of Canada, 40%	Marcopper Mine, (Also known as San Antonio), Marinduque Province, Marinduque Island 6/	30,000
Do.	Maricalum Mining Corp., manager. [Asset Privatization Trust (Government), 100%]	Sipalay Mine, Negros Occidental Province, Negros Island	6,250
Do.	Philex Mining Corp., 100%	Sto. Tomas II (Padcal) Mine, Benguet Province, Luzon Island	10,200

See footnotes at end of table.

TABLE 2--Continued
 PHILIPPINES: STRUCTURE OF THE MINERAL INDUSTRY FOR 1996

(Thousand metric tons unless otherwise specified)

Commodity		Major operating companies and major equity owners	Location of main facilities	Annual capacity e/
Copper, metal, refined		Philippine Associated Smelting and Refining Corp., operator. [National Development Corp. (Government), 42%; Japanese consortium of companies led by Marubeni Corp., 32%; domestic copper producers led by Atlas Consolidated Mining and Development Corp., 21%; and International Finance Corp. (United Nations Agency), 5%]	Isabel, Leyte Province, Leyte Island	172
Gold	kilograms	Atlas Consolidated Mining and Development Corp., 100%	Masbate Gold Operations, Masbate Province, Masbate Island 7/	2,500 5/
Do.	do.	Benguet Corp., 100%	Benguet Gold Operations, Benguet Province, Luzon Island 7/	1,100 5/
Do.	do.	do.	Benguet Antamok Gold Operation, Benguet Province, Luzon Island	3,000
Do.	do.	Philex Mining Corp., 100%	Bulawan Mine, Negros Occidental Province, Negros Island 8/	2,800
Do.	do.	United Paragon Mining Corp., operator. (Paragon Resources of Australia, 12.5%; and public shares, 87.5%)	Longos Mine, Camarines Norte Province, Luzon Island	1,800
Iron ore, sinter		Philippine Sinter Corp., operator. (Kawasaki Steel Corp. of Japan, 100%)	Cagayan de Oro, Misamis Oriental Province, Mindanao Island	5,000 8/
Nickel, ore		Rio Tuba Nickel Mining Corp., 60%; and Japanese interests, 40%	Rio Tuba Mine, Palawan Province, Palawan Island	500
Do.		Taganito Mining Corp., 100%	Taganito Mine, Palawan Province, Palawan Island	100
Petroleum	thousand 42-gallon barrels	Caltex (Philippines) Inc., 100%	Caltex Batangas Refinery, Batangas Province, Luzon Island	68
Do.	do.	Petron Corp., operator. [Philippine National Oil Co. (Government), 100%]	Petron Bataan Refinery, Bataan Province, Luzon Island	156
Do.	do.	Pilipinas Shell Petroleum Corp., 100%	Shell Batangas Refinery, Batangas Province, Luzon Island	70
Steel		National Steel Corp., operator. [Wing Tiek Holdings of Malaysia, 100%]	Iligan, Lanao del Norte Province, Mindanao Island	350

e/ Estimated.

1/ Metallurgical-grade concentrates.

2/ Chemical-grade concentrates.

3/ Refractory-grade concentrates.

4/ Plants were closed all year because of adverse market conditions.

5/ Closed since 1992 because of typhoon damage.

6/ Operations ceased Mar. 24, 1996 because of a severe tailings discharge.

7/ On care and maintenance.

8/ In planning stage during year.

TABLE 3
PHILIPPINES: RESERVES OF MAJOR MINERAL COMMODITIES

(Thousand metric tons unless otherwise specified)

Commodity	Reserves
METALS	
Chromite:	
Chemical	2,876
Metallurgical (lump plus sand)	31,143
Refractory	9,294
Copper, primary	5,017,239
Gold, primary	202,730
Iron ore:	
Lump ore	83,077
Magnetite sand	401,620
Lead, primary	6,313
Manganese	2,517
Mercury	16,243
Molybdenum	30,608
Nickel	1,079,938
INDUSTRIAL MINERALS	
Asbestos	5,811
Barite	163
Bauxite	408,241
Clays:	
Ball clay	83,175
Bentonitic	7,544
Feldspathic	3,176
Fire clay	269,113
Kaolinitic	21,777
Siliceous	120,827
Diatomaceous earth	4,725
Feldspar	34,412
Guano	298
Gypsum	2,438
Limestone	28,044,415
Cement raw materials	19,361,674
Dolomitic	650,070
Lime raw materials	8,032,671
Marblelized	thousand cubic meters 3,574,829
Magnesite	78,715
Marble	thousand cubic meters 14,390,704
Pebbles	do. 22,557
Perlite	24,298
Pumice and pumicite	23,760
Pyrite	14,195
Rock aggregates	1,683,757
Rock phosphate	513
Sand and gravel	thousand cubic meters 84,167
Shale	2,947,545
Silica	2,766,257
Quartz-massive	thousand cubic meters 67,098
Sand	do. 649,626
Siliceous rock-massive	do. 1,471,166
Sulfur	48,877
Talc	512
Tuff	152,407

Source: Mines and Geosciences Bureau, Department of Environment and Natural Resources, 1994.