THE MINERAL INDUSTRY OF

THAILAND

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After 2 years of financial turmoil, Thailand's economy began to show a definite recovery in the second half of 1999. Output of semimanufacturing products, industrial exports, and construction materials increased sharply. The private investment index reached its lowest point in October 1998 and improved by 12% in October 1999; overall investment, however, remained well below precrisis levels. On March 10, the Government announced a $1.3 billion program to stimulate the economy through job development programs that were to be funded through Japan's Miyazawa Fund. In August, the Finance Ministry unveiled a $2.5 billion plan to spur new investment, to cut production costs, and to promote growth in the real estate sector. The high level of nonperforming loans within the financial sector, however, remained too unstable for Thailand to sustain long-term recovery. The International Monetary Fund noted that Thailand's recovery was being driven mainly by consumer demand, not by implementing a healthy banking system (Far Eastern Economic Review, 1999). Owing to economic uncertainties, capital constraints, and fears of new nonperforming loans, local banks were cautious of new loans. In addition, the recovery was very uneven. Exports of electronics and automobiles were doing well. The output of steel and cement, however, remained below precrisis levels.

The Thai mining industry has gone through structural changes in recent years. Minerals have been considered to be a major source of foreign earnings; in the past several years, however, they have become an important part of domestic industrial development, too. Mineral exports accounted only for about 30% of the total production. Major export minerals were feldspar, gypsum, tin, and zinc. Declining prices in world markets and exhausting domestic reserves in major metallic minerals were the reasons for the drop in production (table 1).

Government Policies and Programs

The Government's investment promotion policy was to increase the standard of living of the Thai people through decentralization of economic activity into regional and rural areas. In 2000, the policy was expected to face challenges in complying with obligations under the World Trade Organization (WTO)agreement. Under the WTO regulations, members were allowed to offer investment incentives only in poverty- stricken areas. The Board of Investment (BOI) has been working to adjust its investment promotion package on the basis of the World Bank study. Under the new proposal, companies owned wholly or in part by foreign investors would enjoy the same investment incentives as Thai companies. Under the existing policy, foreign-owned companies were required to meet certain requirements, which included a provision to export at least 80% of total production in special zones, to be eligible for the BOI's incentives (Board of Investment, [undated], Executive summary, accessed May 26, 2000, at URL http://www.boi.go.th/english/execsummary/f20.html). The new investment policy was designed to increase decentralization of investment areas outside greater Bangkok and other wealthier provinces and would be more generous than existing policies.

In October 1999, the Thai parliament enacted the new Alien Business Act, which establishes the overall framework to govern foreign investment and employment in Thailand; the act was scheduled to take effect in early March 2000. Although it will eliminate existing prohibitions and liberalize restrictions on foreign participation in many sectors, it will not affect BOI-sponsored projects or export activities that were authorized under the Industrial Estate Authority of Thailand nor will it supersede provisions of bilateral treaties (Bangkok Post, 1999 Economic review—Investment, accessed February 23, 2000, at URL http://www.bangkokpost.net/99year-end/investment.htm).

In 1999, the Thai Parliament also approved the Corporatization Act, which allows state enterprises to be transformed into limited or public companies, in an effort to boost economic efficiency and to improve public services at lower costs. Independent regulatory agencies would be established in major sectors, such as energy, transportation, and water, to manage and regulate each sector. Many state-owned enterprises were waiting for the formal implementation plans under the Corporatization Act. The Electricity Generating Authority of Thailand (EGAT) had completed its assets valuation and planned to offer shares on its Ratchaburi Power Plant in 2000. The privatization study of the Thai Airways was completed in 1999 (Bangkok Post, 1999 Economic review—Investment, accessed February 23, 2000, at URL http://www.bangkokpost.net/99year-end/investment.htm).

The Thai Government was considering waiving antitrust laws on such sectors as paper, steel, and petrochemicals so that companies could merge to reduce production costs and to become more efficient. The steel subsidiaries of NTS Steel Group Public Co. Ltd., Namheng Steel Co. Ltd., Bangkok Steel Industry Public Co. Ltd., and Siam Cement were negotiating a merger to form a new company. This merger would enable them to pool their resources, to improve efficiency, and to eliminate price competition. The merger, however, could violate the Trade Competition Law (Bangkok Post, January 22, 2000, Eased rules likely in some mergers, accessed February 23, 2000, at URL http://www.bangkokpost.net/220100/220100_Business01.html).

Thailand's tariff structure was divided into a number of tariff rate categories. The total number of these categories was being reduced from 39 to 6. Tariff rates for medical equipment and fertilizer were 0%; raw materials and electronic components, 1%; finished products, 20%; and goods such as fabrics, clothing, refrigerators, and air conditioners, which were under special protection, 30%. Owing to the regional economic crisis and the sensitivity to the domestic sector, plans to reduce tariffs on petrochemicals and plastic products had been delayed several times. In 1999, the rates for petrochemical products were reduced to 20% and for plastic pellets, to 30%. In October 1997, the Thai Government temporarily raised tariffs on passenger cars and sport utility vehicles to 80% from 42% and 68%, respectively. These increases were scheduled to be lifted on January 1, 2000 (Asian Chemical News, 1999).

Commodity Review

Industrial Minerals

In 1999, the decline in the domestic demand for cement indicated that the recovery of the construction sector remained slow. Domestic cement consumption dropped to about 18.8 million metric tons (Mt) in 1999 from 21.5 Mt in 1998, but cement exports increased. The Government partially set cement prices in the domestic market. Since the financial crisis in 1997, cement prices had increased six times, to about 35% higher compared with precrisis levels, to compensate for escalating production costs. The domestic cement market was dominated by Siam Cement Co. Ltd., Siam City Cement Plc., and TPI Polene which accounted for about 86% of the country's total 55-Mt output capacity. About 80% of production capacity was in the Saraburi area where limestone was abundant (Bangkok Post, February 8, 2000, Siam cement, accessed February 23, 2000, at URL http://www.bangkokpost.net/080200/080200_Business13.html).

Metals

Copper.— In August 1999, the Thai Government reduced the import tariff on copper cathode to 1% from 6% for 18 months and assisted domestic electrical appliance manufacturers in reducing their production costs for the same period. A 165,000-metric- ton-per-year (t/yr) copper smelter was scheduled to start production in mid-2001. Until then, local copper semimanufacturers must import copper metal for manufacturing their products (Metal Bulletin, 1999b). Thailand consumed about 120,000 t/yr cathode and the demand for copper metal was expected to increase within the next several years.

Pan Australian Resources N.L. of Australia signed a memorandum of understanding with Padaeng Industry Co. Ltd. (PDI) on the Puthep copper project in Thailand. The Puthep copper project is located near Loei in northeastern Thailand. It comprised two copper deposits 12 kilometers (km) apart. The two deposits had a combined resource of 116 Mt of ore grading 0.4% of copper. The main deposit, PUT 1, was mainly chalcocite ore and had a proven reserve of 46 Mt of ore grading 0.5% of copper and an inferred resource of 35 Mt of ore grading 0.3% of copper. PUT 1 could be developed as an open pit mine, the ore might be processed by heap leaching, and then 20,000 metric tons (t) of copper cathode could be recovered by solvent extraction-electrowinning process. Pan Australian had the right to earn a 51 % flow-through interest through shares in Puthep Co. Ltd., a subsidiary of PDI, by completing a creditable feasibility study. Pan Australian had an additional right to acquire up to 70% interest of the total project value. (Pan Australian Resources N.L., [updated], Announcements—1999, accessed September 3, 1999, URL http://www.panaustralian.com.au /Announcements.html).

Gold.—Gold prospecting in Thailand was quite active in the past several years; owing to financial crisis in the country, however, mining companies had difficulties acquiring loans from financial institutions to develop their projects. The Department of Mineral Resources (DMR) announced the discovery of four gold-rich tracts in Natchasima-Phetchabun-Sa Kaew, Chiang Rai-Phrae-Tak, Chon Buri-Rayong, and Narathiwat. The Office of Environmental Policy and Planning approved the environmental impact assessment study of the Chatree gold project that was submitted by Akara Mining Ltd. The Chatree gold deposit, which is in the area of Phichit, Phetchabun, and Phitsanulok, contains 5.15 Mt of ore grading 3.2 grams per ton gold. The company was waiting for the DMR to approve the lease (Asian Journal of Mining, 2000).

Iron, Steel, and Tin.—In 1999, the Thai iron and steel sector was rebounding. Domestic output of steel products and imports of pig iron and semimanufactured steel products showed gains compared with those of 1998. Domestic analysts predicted that the iron and steel sector could take a decade to recover from losses and return to profitability. Local steel producers were expected to continue to export at a loss to keep mills running. About two- thirds of the country's 150 steelworks were forced to close since the recession began in 1997. In 1999, demand for steel increased to 8.5 Mt from 6.5 Mt in 1998, which is lower than the 14.6 Mt in 1996.

Thailand's Iron and Steel Development Institute recommended that the Government take measures, such as adjusting tariff rates for the protection of domestic iron and steel producers without adversly affecting industrial users, requiring state enterprises and agencies to use local steel products for their infrastructure construction projects, establishing standards on steel production and providing incentives for steel producers using high technology for steel production, and encouraging steel companies to merge to reduce production costs. Before the financial crisis in 1997, steel products were targeted mainly towards the construction sector. The Institute urged steel producers to produce a variety of steel products for other sectors and to reduce their dependence on imported raw materials or semimanufactured materials.

Owing to the increase of canned food exports, domestic demand for tinplate increased sharply to about 400,000 t. This sharp rise allowed two domestic producers, Siam Tinplate

Manufacturing (STP) and Thai Tinplate Manufacturing (TTP), to produce at about 80% and 70% of their 120,000-t/yr and 360,000-t/yr output capacities, respectively. Imports of tinplate more than doubled from those of 1998. Tinplate from the Republic of Korea and Taiwan accounted for more than 50% (88,697 t), of total imports. Domestic tinplate producers faced a price war from imported tinplate, which cost about 20% to 30% less. Thailand's tinplate producers imported more than 50% of their raw materials. Domestic tinplate producers were concerned that even with the increase in domestic demand, however, benefit would go to tinplate importers. In 1999, the market share of imported tinplate increased to about 20%, up from 5% in 1995 (Department of Mineral Resources, 2000).

Siam United Steel (SUS), the joint venture between Japanese investors (53%) [Nippon Steel Corp., Kawasaki Steel Corp., Sumitomo Metal, and Kobe Steel Ltd.], Thai investors (44%) [Siam Cement Group, Siam Industrial Corp., TTP and STP], and Pohang Iron and Steel Corp. (3%) of the Republic of Korea, began operating in 1999. The plant is located in the Map Ta Phut industrial zone at Rayong. The 1-million-metric-ton-per- year (Mt/yr) plant was designed to produce 500,000 t/yr of uncoated cold-rolled coil and 250,000 t/yr each of blackplate and substrate for galvanizing. The 250,000-t/yr blackplate line was designed to produce 0.20- to 0.39-millimeter (mm) thick and 700- to 1,100-mm wide strips. SUS was Thailand's first blackplate producer and its output was shipped to two local tinplate producers. Nippon Steel and Kawaski Steel supplied the majority of the blackplate for Thai tinplate producers. The volume of imported blackplate from Japan was expected to be reduced gradually when local product specification was accepted by the local tinplate producers. SUS was the second galvanized steel substrate producer in Thailand after Thai Cold Rolled Steel Sheet Plc. The final product, which was galvanized corrugated sheet, was an important roofing material in the country, especially popular for farmers (Steel Times International, 1999).

The Siam Strip Mill Plc. commissioned its hot-rolled coil plant at Rayong. The plant was designed to produce 1.8 Mt/yr of coil. The plant had three 130-t electric arc furnaces and produced a variety of standard- and special-quality 1.0- to 12.0-mm thick and 900- to 1,550-mm wide hot-rolled coil. The company planned to export 50% of its output to Southeast Asian countries (Metal Bulletin, 1999a).

The Government approved the environmental impact assessment study for the Somboon potash project submitted by Asia Pacific Resources Ltd. (APR) and granted the promotion privileges awarded under the Thai Investment Promotion Act to APR. Under the act, APR received 8-years of tax exempt status beginning at the start of production, followed by an additional 5-year period at 50% of the normal corporate tax rate. Imported equipment and machinery were exempted from or had reduced import duties for the project construction and operation. APR planned to begin the 2-Mt/yr Somboon project in the second half of 2002 (Mining Journal, 2000).

In 1999, PDI was still waiting the approval of a licence from DMR that would allow it to mine zinc ore on a new tract adjacent to its existing one in Mae Sot, Tak Province. The zinc content in the existing mine had dwindled to 15%, the new concession's 35% zinc content, however, would help PDI reduce its dependence on imported zinc ore (Bangkok Post, January 27, 2000, Zinc mining, accessed February 23, 2000, at URL http://www.bangkokpost.net/270100/270100Business09.html). PDI planned to expand its zinc production capacity during the next couple of years. The company predicted that domestic demand for zinc would increase to 120,000 t in the next few years. The PDI zinc smelter in Tak operated at its full capacity, zinc ingot accounting for 70% of the output, and zinc alloy, 30%. PDI exported about 40% of its zinc products.

Mineral Fuels

Coal.—Thailand's coal resources were mainly in northern Thailand. Lampang Province accounted for about 90% of the country's total coal reserves. Mines in Mea Mo and Li in Lampang were the main production areas. Mines in Mea Mo and Li that were owned by EGAT accounted for 80% of the total coal output. The remaining 20% was produced from private companies throughout the north.

Since the financial crisis of 1997, the demand for electricity and fuel has decreased; consequently, the demand for coal has dropped by 10%. Despite the decrease in demand for electricity, it remained the major consumer of coal and accounted for about 75% of consumption. Most coal produced in Thailand was lignite or sub bituminous, which was used in powerplants. Each year, Thailand is required to import a large quantity of high-quality and heating-value bituminous coal, mainly from Indonesia, to meet the demand of the industrial sector and small powerplants. For the next couple of years, the annual growth rate was expected to be about 2%. After that, the demand for coal would increase at a rate of 7% per year. Environmental concerns might force powerplants to use high heating value and low sulfur coal to generate electricity in the next decade (Bangkok Post, January 12, 2000, Energy, accessed February 23, 2000, at URL http://www.bangkokpost.net/130100/130100_Business12.html).

Banpu Plc., a private coal producer, planned to issue 232.16 million new shares at 10 baht per share to finance its coal exploration and powerplant projects in Thailand and neighboring countries.

DMR discovered coal resources in Songkla Province. According to the Cabinet's resolution, the reserves in Ngao and Sin Pun were reserved for EGAT, and the rest would be set for public bidding in 2001 (Bangkok Post, September 24, 1999, Energy, accessed November 16, 1999, at URL http://www.bangkokpost.net/240999/240999_Business07.html).

Natural Gas and Oil. —In 1999, the increase in world oil prices had a major impact on Thailand because the country relied on imports for about 70% of its petroleum supplies. Oil imports grew by 2.4% to about 745,150 barrels per day (bbl/d), and consumption, excluding that of the petrochemical sector, was about 895,600 bbl/d. The Thai Government decided to reduce the excise tax on diesel oil and to delay lifting price controls on liquefied petroleum gas (LPG) until April 2000. In 1999, the retail LPG price was about 50% higher than the Government set price. To control LPG prices, the Government

used the oil fund to subsidize it. The Government also agreed to delay enforcement of tougher regulations on local LPG production and trade until April 2000 (Bangkok Post, September 25, 1999, Energy, accessed November 16, 1999, at URL http://www.bangkokpost.net/250999/250999Business08.html).

In 1999, two of Unocal Thailand Ltd.'s natural gasfields, Pailin and Trat, began production. Pailin, which was Thailand's largest and most complex gas development project, produced about 4.6 million cubic meters per day (Mm^3/d) of natural gas. In the second phase, an additional 4.6 Mm^3/d was projected to come on-stream in 2002. The company estimated that the recoverable natural gas in Pailin was about 71 billion cubic meter (Gm^3). The Pailin gasfield is located 160 km of Nakhon Si Thammarat Province on the southern coast. Gas from Pailin was sold to the Petroleum Authority of Thailand (PTT) under a 30- year gas sale agreement signed in 1996. Trat produced about 2/Mm^3/d of natural gas and 2,100 bbl/d of condensate from five wells. Unocal intended to install three additional well platforms in the central Trat production area. Recoverable natural gas resources were about 6.8 Gm^3. Trat was situated in block 11, northeast of Erawan. Unocal, which was the operator of the Trat field, held a 71% working interest; the remaining shares were held by Mitsui Oil Exploration Co. Ltd. and PTT Exploration and Production Plc. In 1999, Unocal produced an average of 28.3 Mm^3/d of natural gas and 34,600 bbl/d of condensate. Production from Unocal-operated fields in the Gulf of Thailand accounted for about 60% of Thailand's total natural gas output (Unocal Corporation, December 22, 1999, Unocal ends 1999 with gas sales, condensate production records in Thailand, accessed December 27, 1999, at URL http://biz.yahoo .com/prnew/991222/ca_unocal_1.html).

In 1999, Chevron Offshore (Thailand) Ltd. doubled oil production from its fields in the Gulf of Thailand to about 30,000 bbl/d, as a result of starting production at Benchamas field in the third quarter of the year. Chevron expected that Benchamas would contribute about 75% of targeted oil production, and 25% would come from Tantawan. The two fields were located in block B8/32 about 200 km offshore. In 1999, Chevron had acquired interest in block B8/32 from Rutherford Moran Oil Corp.; the block contained three known fields: Benchamas, Maliwan, and Tantawan. Chevron also discovered potentially significant hydrocarbon deposits in the Jarmjuree area of block B8/32 and planned further drilling tests in 2000 (Chevron Corp. December 28, 1999, Chevron offshore Thailand announces promising oil & gas discovery in Jarmjuree area of block 8/32, accessed January 3, 2000, at URL htpp:// biz.yahoo.com/prnew/991228/bangkok_ch_1.html).

In October 1999, Malaysia and Thailand signed the gas sale agreement in the Malaysia-Thailand joint development area (A-18) on the once disputed Malay-Thai continental shelf. The two countries shared the natural gas output from A-18 equally. Under the terms of agreement, all initial natural gas would go to Malaysia beginning in 2002. Owing to limited domestic demand, Thailand decided to defer taking its share from A-18 until 2005. In the next 5 years, Thailand's natural gas supply would mainly come from gasfields in the Gulf of Thailand and the Yadana and Yetagun fields in Burma (Triton Energy Ltd., November 1, 1999, Triton Energy announces signing of block A-18 natural gas sales agreement, accessed November 1, 1999, at URL http://biz.yahoo.com/prnew/991101/tx_triton_1.html).

The Yadana Group which was led by Total of France, agreed to accept $50.47 million from PTT as settlement for the disputes over natural gas payments under the "take-or-pay" contract. Owing to the delay in the construction of EGAT's Ratcharburi powerplant, PTT was unable to accept the contracted volume of natural gas from the Yadana field, which is located in the Gulf of Martaban, beginning in July 1998. Initially, PTT insisted on paying for the amount of gas actually received through the offshore/onshore cross-country pipeline. Under the terms of the contract, PTT was scheduled to receive 9.2 Mm^3/d of Yandana gas in the second contract year beginning in March 1999 and the amount would rise to 15.5 Mm^3/d in subsequent years. As part of the agreement, the Yadana consortium agreed to reduce the gas price for a period of 15 months from July 1, 1998 (Bangkok Post, August 6, 1999, Yadana gas, accessed November 16, 1999, at URL http://www.bangkokpost.net/060899/060899_Business03.html).

Santa Fe Energy Resource (Thailand) Ltd. signed an agreement with the Thai Government to survey and produce petroleum in block B7/38 in the Gulf of Thailand. Santa Fe planned to spend $9 million on reprocessing existing seismic data. The block, which is situated about 321 km south-southwest of Bangkok, covers an area of 9,238 square kilometers. The company committed to work in this area for 3 years and held 100% of the working interest (Bangkok Post, 1999 mid-year economic review: Petroleum, accessed September 14, 1999, at URL http://www.bangkokpost.net/99mideco/99mye19.html).

Infrastructure

Thailand's power sector has been gradually changed in the past couple of years. Electricity demand dropped compared with that of 1998. Sluggish demand and expansion of generating facilities had resulted in excessive generating capacity in Thailand. The National Energy Policy Office, which is the defacto energy regulatory agency, planned to submit a power structure reform bill to the cabinet for final approval in 2000. The bill will create a competitive power supply sector, drive the electricity price down, and improve services by breaking the monopoly of state power utilities. The Government's revamping of the electricity tariff structure would force the state electricity-generating utility to assume more of the cost risk. The adjusted tariffs would reflect the real costs directly. The power bills of the big energy consumer groups, such as commerce and industries, would drop significantly, but those of residential users were expected to increase.

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52 Charan Sanit Wong Rd., Bang Kruai, Nonthaburi 11000 Thailand

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TABLE 1
THAILAND: PRODUCTION OF MINERAL COMMODITIES 1/ 2/

(Metric tons unless otherwise specified)

Commodity		1995	1996	1997	1998	1999
METALS						
Antimony:						
Ore and concentrate:						
Gross weight		522	149	125	442	350
Sb content e/		230	70	60	200	110
Metal, smelter		577	949	782	242 r/	40
Cadmium		365	385	238	300 e/	100 e/
Gold	kilograms	103	32	--	--	--
Iron and steel:						
Iron ore:						
Gross weight		34,480	85,880	43,840	90,700	122,633
Fe content e/		17,000	43,000	22,000	45,000	61,000
Crude steel	thousand tons	2,134	2,143	2,101 r/	1,619 r/	1,474
Lead:						
Mine output, Pb content of 42.5% Pb concentrate		9,680	21,000	5,280	7,860 r/	8,290
Metal, ingot						
Primary		7,965	4,922	4,112 r/	3,219 r/	2,967
Secondary		11,150	12,789	14,968 r/	18,906 r/	23,741
Total		19,115	17,711	19,080	22,125 r/	26,708
Manganese ore:						
Battery- and chemical-grade, 75% MnO_2		815	707	208	--	--
Metallurgical-grade, 46% to 50% MnO_2		2,663	2,388	291	52	46
Total, gross weight		3,478	3,095	499	52	46
Total Mn content e/		1,600	1,550	260	25	23
Rare-earth mineral, monazite concentrate, gross weight		--	--	12	--	--
Tin:						
Mine output, Sn content		2,201	1,457	756	2,028 r/	3,400
Metal, smelter, primary		8,243	10,981	11,986 r/	15,353 r/	17,306
Titanium, leucoxene concentrate, gross weight		33	--	--	--	--
Tungsten concentrate:						
Mine output, gross weight		92	67	54	61 r/	54
Mine output, W content e/		52 r/	37 r/	30 r/	35 r/	30
Zinc:						
Mine output, gross weight		135,198	181,233	91,132	195,122	185,800
Mine output, Zn content		28,787	11,375	8,894	19,563	27,148
Metal, primary		46,398	59,738	72,036	75,904	75,639
Alloy		10,509	12,643	12,018	15,078	21,653
Zirconium concentrate, gross weight		--	5	--	--	--
INDUSTRIAL MINERALS						
Barite		35,883	48,074	54,817	96,421 r/	68,012
Cement, hydraulic e/	thousand tons	34,900	35,000	35,000	28,800 r/	29,500
Clays:						
Ball clay		308,001	386,334	288,406	206,172	200,000 e/
Kaolin, marketable:						
Beneficiated		460,629	553,770	366,563	255,152	113,005
Nonbeneficiated		138,594	134,972	132,028	150,380	243,213
Filler		10,856	22,564	18,197	14,633	14,765
Diatomite		5,991	1,576	91	--	--
Feldspar		677,852	684,983	611,789	429,693	398,558
Fluorspar, crude, metallurgical-grade		24,114	17,247	7,826	3,473 r/	13,005
Gemstones	thousand carats	1,036	677	962	1,010	1,310
Gypsum	thousand tons	8,533	8,934	8,858	4,334	5,005

See footnotes at end of table.

TABLE 1--Continued
THAILAND: PRODUCTION OF MINERAL COMMODITIES 1/ 2/

(Metric tons unless otherwise specified)

Commodity		1995	1996	1997	1998	1999
INDUSTRIAL MINERALS--Continued						
Phosphate rock, crude		9,301	3,528	3,818	3,029	3,880
Salt:						
Rock		380,544	529,674	554,891	546,096	550,000 e/
Other e/		100,000	100,000	100,000	100,000	100,000
Sand, silica		325,492	447,050	515,859	323,937	350,000 e/
Stone:						
Calcite		37,700	32,700	29,550	12,250	72,130
Dolomite		668,795	1,064,699	803,511	520,826 r/	485,393
Limestone for cement manufacture only	thousand tons	45,559	50,058	58,796	9,200 r/	40,000 e/
Marble	cubic meters	96,992 3/	261,051	332,839	398,132	400,000 e/
Marl for cement manufacture only		610,600	566,500	9,543	6,995	7,000 e/
Quartz, not further described		11,288	9,831	5,133	3,101	3,223
Shale for cement manufacture only	thousand tons	4,357	4,605	5,387	2,824	3,000 e/
Talc and related materials:						
Pyrophyllite		76,189	64,330	304,524	40,241	45,000 e/
Talc		4,252	7,238	7,139	1,972	2,000 e/
MINERAL FUELS AND RELATED MATERIALS						
Coal:						
Anthracite		5,000	3,000	--	--	--
Lignite	thousand tons	18,419	21,685	23,443	20,162	18,266
Natural gas (gross production)	million cubic meters	11,389	13,123	16,159	17,545	19,333
Petroleum:						
Crude	thousand 42-gallon barrels	8,674	9,669	10,024	10,738	12,412
Natural gas condensate	do.	10,937	13,044	14,883 r/	15,395 r/	16,487
Refinery products:						
Liquefied petroleum gas	do.	17,940	21,970	26,610	25,970	28,850
Gasoline	do.	38,750	48,410	59,250	56,240	53,030
Jet fuel	do.	19,740	22,460	23,970	22,800	25,910
Kerosene	do.	710	1,190	771	734	2,180
Distillate fuel oil	do.	37,740	52,540	54,740	50,140	49,240
Residual fuel oil e/	do.	22,500	23,000	24,000	22,000	22,000
Unspecified e/ 4/	do.	3,400	3,500	3,500	3,500	3,500
Total e/	do.	141,000 r/	173,000 r/	193,000 r/	181,000 r/	185,000

e/ Estimated. r/ Revised. -- Zero.

1/ Includes data available through October 30, 2000.

2/ Data are rounded to no more than three significant digits; may not add to totals shown.

3/ Metric tons.

4/ Includes refinery fuel and refinery gains or losses.

TABLE 2
THAILAND: STRUCTURE OF THE MINERAL INDUSTRY IN 1999

(Thousand metric tons unless otherwise specified)

Commodity	Major operating companies	Location of main facilities	Annual capacity e/
Antimony, concentrate	Associated Minerals Co. Ltd.	Bo Thang, 130 kilometers southeast of Bangkok, temporarily inactive	6
Do.	Parasit Mining Co.	Doi Ngoem, 100 kilometers southeast of Chiang Mai	2
Barite	American Thai Barite Co. Ltd.	Siam Mine, 200 kilometers southeast of Phuket	25
Do.	P&S Mining Co. Ltd.	Loei Mine, 10 kilometers northwest of Loei	70
Do.	STA Mining Co. Ltd.	STA Mine, 105 kilometers southeast of Chiang Mai	100
Cement	Siam Cement Co. Ltd.	Kaeng Khoi, 90 kilometers north of Bangkok	3,300
Do.	do.	Tambol Tabkwang, Kaeng Khoi District of 90 kilometers northeast of Bangkok	2,800
Do.	do.	Tha Luang, 90 kilometers northeast of Phuket	3,200
Do.	do.	Thung Song, 130 kilometers east of Phuket	900
Do.	Siam City Cement Plc.	Saraburi Province	12,350
Do.	Jalaprathan Cement Co. Ltd.	Takli-Nakon Sawan Province and Cha-Am-Phetchburi Province	1,600
Do.	TPI Polene	Saraburi Province	9,000
Fluorspar, concentrate	Phanom Thuan Mining Co. Ltd.	Phanom Thuan, 45 kilometers north of Kanchanaburi	60
Do.	Skt Minerals Co. Ltd.	Mine, 47 kilometers southeast of Krabi	65
Do.	Thai Fluorite Processing Co. Ltd.	Ban Lad, Phet Buri	120
Do.	United Fluorite Co. Ltd.	Salak Pra, 80 kilometers northwest of Kanchanaburi	26
Do.	Universal Mining Co. Ltd.	Mae la Luang, 120 kilometers west of Chiang Mai	35
Lead, concentrate	Kanchanaburi Exploration and Mining Co. Ltd.	Song Toh, 250 kilometers northwest of Bangkok	45
Steel, rolled	Bangkok Iron and Steel Works Co. Ltd.	Phrapradaeng, Samut Prakarn Province	120
Do.	Bangkok Steel Industry Public Co. Ltd.	do.	180
Do.	NTS Steel Groups Public Co. Ltd.	Chon Buri Province	408
Do.	Siam Construction Steel Co. Ltd.	Bangkok	500
Do.	Siam Iron and Steel Co. Ltd.	Ban Moh, Sara Buri Province	400
Do.	Sahaviriya Group Corp. Ltd.	Bang Saphan, Prachuap Khiri Khan Province	2,400
Do.	Siam United Steel	Rayong	1,000
Tantalum and niobium in tin slag	Thai Tantalum Co. Ltd.	do.	500
Tin:			
Concentrate	Numerous small companies	Offshore Andaman Sea from southern tip of Burma to south of Phuket	NA
Do.	do.	Mostly southern Thailand and along southern Burma border	NA
Refined	Thailand Smelting and Refining Co. Ltd.	Phuket	38
Tungsten, concentrate	Parasit Mining Co.	Doi Ngeom, 100 kilometers southeast of Chiang Mai	0.1
Do.	Siamerican Mining Enterprise Co. Ltd.	Khao Soon, 185 kilometers east of Phuket, temporarily inactive	1
Do.	Sirithai Scheelite Thailand Co. Ltd.	Doi Mok, 120 kilometers northeast of Chiang Mai, temporarily inactive	0.4
Zinc:			
Ore	Padaeng Industry Co. Ltd.	Mae Sot, Tak Province	350
Refined	do.	Tak, Tak Province	105

e/ Estimated. NA Not available.