

THE MINERAL INDUSTRY OF

THAILAND

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During the past decade, the Thai economy has grown at a moderate rate. Because of expected strong economic growth in the early 1990's, foreign investors and lenders were pouring money into Thailand. Thai banks and financial institutions lent heavily to their customers, some of whom borrowed in U.S. dollars for their projects. In 1996, however, domestic and foreign investors confidence in the Thais ability to repay the loans had weakened and foreign investors began to withdraw their money from Thailand. The Thai stock market continued to fall in 1997 after falling more than 30% in 1996. Because of concern that the economic situation should decrease the demand for and the value of the Thai baht, foreign investors and Thai companies converted the baht to U.S. dollars. In early 1997, the Thai central bank responded by buying up baht with its dollar reserves, hoping to stabilize the currency's value, and by raising interest rates to discourage the sale of baht. As the result of increasing interest rates, prices for stock and land were driven down even more. It became more expensive for companies to borrow money to repay their loans, especially those companies whose loans were in U.S. dollars. In July, the Thai central bank decided to stop defending the fixed value of the baht against U.S. dollar. By yearend, the value dropped more than 40%. The country's foreign currency reserves were severely depleted. Thailand's external debt was about \$99 billion, or about 55% of the gross domestic product (GDP) (accessed April 8, 1998, at URL <http://www.bangkokpost.net/ecoreview97/review9701.html>). To avoid default on loan payments, the Government requested that the International Monetary Fund (IMF) lend \$17.2 billion in August. In exchange, the Government promised to restructure the country's financial system and to reform the economy.

In November 1997, the Government used about 1 trillion baht in public funds to close 56 financial institutions. In order to attract foreign funds, the Government decided to allow foreigners to have the right to take unlimited stakes in commercial banks and finance institutions for at least 10 years. In spite of the Thai currency crisis, the GDP declined by only 0.4% from that of 1996 (Asian Wall Street Journal, 1998; Bank of Thailand, 1998; Thai Board of Investment, July 4, 1998, Thailand's economy at a glance, BOI Investment Review, v. 7, no. 2, accessed August 4, 1998, at URL <http://www.boi.go.th/investreview/r070214.html>). Thailand's domestic commercial banks were struggling to recapitalize. The cash shortage in the financial sector will continue into 1998.

Thailand's economic development is based upon an export-oriented free market philosophy. Thailand's economy has changed from one based on agriculture and some light industries to one based on manufacturing and services. Although about 52% of the Thai labor force is still engaged in agriculture, at least

on a part-time basis, the growing service, manufacturing, and wholesale and retail trades account for two-thirds of Thailand's GDP.

Thai taxation codes have undergone several revisions since 1992, when a 7% value-added tax (VAT) system was introduced. In September 1997, the Thai Government increased the VAT to 10% from 7%, except for most basic foodstuffs, to increase revenue and meet IMF rescue package requirements. Exporters must file for VAT rebates in order to receive "zero rate". The corporate tax rate was set at 30% of net profits for all firms. The Government has submitted a tax credit for the VAT rebate to the Parliament for approval. A new tax treaty between Thailand and the United States was signed in November 1996 and ratified by the U.S. Senate in October 1997. The new treaty would eliminate double taxation for U.S. companies (U.S. Department of State, January 1998, Thailand—Key economic indicators, 1997 Country Reports on Economic Policy and Trade Practices, accessed May 27, 1998, at URL http://www.state.gov/www/issues/economic/trade_reports/eastasia97/thailand97.htm).

Under the Alien Business Law (ABL) of 1972 (National Executive Council Announcement no. 281), non-Thais were permitted to have a maximum ownership stake of 49% in the agriculture, exploitation of natural resources, manufacturing, and services sectors. In 1997, the Government approved amendments to the ABL that would reduce the number of businesses reserved for Thai nationals and ease restrictions on foreign ownership. The proposed changes in legislation are pending final approval by the Parliament (U.S. Embassy, Bangkok, Thailand, 1997, 1997 investment climate statement for Thailand, accessed May 4, 1998, at URL <http://usa.or.th/embassy/invcl97.htm>).

Thailand continued with its tariff reform to conform with the World Trade Organization obligation. Because of the shortfall of Government revenue, progress was impeded in 1997. The total number of tariff rate bands had been reduced from 39 to 6. During 1997, Thailand increased tariffs, surcharges, and excise taxes on automobiles and certain agricultural products. Tariffs on petrochemical products had been gradually reduced. In January 1998, the tax rates for petrochemicals will decrease from 27% to 23.5%; plastic pellets, from 40.5% to 30%; and other plastic products, from 40.5% to 35.25%. The Government planned to reduce tariffs on petrochemicals again in mid-1998. Thailand required import licenses for 42 categories of items, including raw materials and petroleum, industrial, textile, and agricultural products (U.S. Embassy, Bangkok, Thailand, 1998, 1998 national trade estimate—Thailand, accessed May 4, 1998, at URL <http://usa.or.th/embassy/nte-98.htm>).

Owing to the financial crisis and the slow down of domestic demand, manufacturing production declined in 1997. Major

consumers of metals, the construction sector was suffering from liquidity problems resulting from an industry downturn and overbuilding. The automobile industry was scaling back operations as consumer demand weakened. The demands for copper, lead, steel, and zinc were also affected. The sluggish demand for metals was expected to continue through 1998. The output of petroleum products, however, grew by more than 20% in first three quarters of 1997 because of the opening of two new refineries in 1996. Mining and quarrying sectors accounted for fewer than 1.5% of the GDP and employed less than 30,000 workers. Based on value, lignite, limestone, and gypsum were the highest among 40 minerals produced in Thailand. About 90% of mineral production was consumed domestically. The Government planned to promote Thailand as an international center for gem and jewelry manufacturing and trading. Jewelry and precious metal manufacturing and refining companies will receive income tax exemption for 8 years regardless of their location in the country if projects are submitted before December 31, 1999.

Owing to the financial crisis, Thai Copper Industries' (TCI) 165,000-metric-ton-per-year (t/yr) copper smelter-refinery project was 9 months behind schedule. The initial estimated investment cost of the project was \$636 million, of which \$556 million was to be spent on land, equipment, and infrastructure, the remaining \$80 million was to be used as working capital. The devaluation of the baht forced TCI to raise additional capital to cover the financing shortfall. TCI signed a copper concentrates supply agreement with Glencore International to secure copper concentrates from Codelco and Collahuasi in Chile and Freeport in Indonesia. TCI planned to produce 100,000 metric tons (t) of refined copper in 1999. In Thailand, copper consumption was about 160,000 t in 1997 and was expected to decrease to 140,000 t in 1998 (Metal Bulletin, 1998b).

Thailand steel producers lobbied the Government to impose higher tax rates on steel imports under the Ministries of Finance and Industry and the Board of Investment (BOI) tax restructuring program. The study by the Ministry of Finance recommended 1% tariffs on iron ore, sponge iron, and scrap iron; 5%, on ingot, billet, slab, and bloom; 10%, on hot rolled steel, steel bar, and structure steel; 12%, on cold-rolled steel; 15%, on coated steel sheets; and 20%, on finished steel products. Steel producers claimed that the proposed steel tariffs were too low to protect local steel manufacturing and would encourage foreign dumping (Asia One, December 8, 1997, Steel producers worried S. Korea may cut prices, accessed February 25, 1998, at URL <http://bday.net/dec01/b-015.html>).

Thailand is one of the largest steel-consuming countries in Southeast Asia. The demand for steel had shifted toward a more-diverse and specialized range of products. In Thailand, steel producers concentrated on downstream products that were used in the construction industry. Imported scrap iron was used for forging into billets, which were then rolled into steel bars. The resulting steel products were low in quality. Consequently, some steel producers also imported billets and converted them into rolled products. Steel imports have increased in the past several years. Since the floating of the baht in 1997, imported raw materials have become more expensive. Combined with the increase in transport and utilities costs, steel production costs were increased by more than 20%. In addition, an increase in

VAT on construction materials caused many undergoing construction projects to be put on hold. The financial crisis also caused construction of upstream steel projects to be delayed because machinery and technology had to be imported.

At the end of 1996, more than 70 long-product producers had a total output capacity of about 10 million metric tons per year (Mt/yr). The development of upstream products—pig iron and sponge iron and intermediate products, such as billets, blooms, and slabs—started slowly in past 2 years. Six proposed projects, with a total investment of 61.4 billion baht, had been submitted to BOI for approval in the past several years. Of these proposed projects, only the Thai Special Steel Industry Plc's (TSSI) integrated blast furnace steel mill project was projected to come on-stream in 2000. This steel mill had a design output capacity of 3.8 Mt/yr of pig iron and 3 Mt/yr of crude steel, but because of the currency crisis, it had been put on hold. The company renegotiated new loans with banks. The proposed share listing to raise funds in the domestic stock market for the mill had been deferred until the financial situation in Thailand improves. TSSI, however, was proceeding with its plan to build a 500,000-t/yr wire rod mill in Rayong. The mill was rescheduled to begin production in early 1998.

Thailand consumed about 13 Mt/yr of crude steel, but the country had an output capacity of only 2.3 Mt/yr from its electric arc furnaces. The balance was met by imports. In 1996, Thailand imported 11.1 million metric tons (Mt) of steel products mainly from Russia, China, Japan, Brazil, and Turkey. About 40% of the imports were semimanufactured steel products (Department of Mineral Resources, 1997).

Thailand's first cold-rolled strip mill, Thai Cold Rolled Steel Sheet (TCRSS), began operation in July 1997. The 1.2-Mt/yr mill is located in Bang Saphan, southwest of Bangkok. The Sahaviriya Steel Group owned majority shares of the mill. Because of the financial crisis, the mill was recapitalized at the end of 1997. Sahaviriya reduced its shares in TCRSS to 48% from 70%, and the Japanese consortium, including NKK, Marubeni, and Nichimen, increased its shares to 52% (Metal Bulletin, 1998a). Output in the first year was projected to be 500,000 t and was expected to reach its full capacity within 3 years. Its output was targeted at the domestic market. One company official projected that the demand for cold-rolled sheets would reach 2 Mt/yr in 2000 (Metal Bulletin Monthly, 1997). With the economic crisis in Thailand, however, domestic demand for cold-rolled steel may lessened in the next several years.

The Government decided to close down the Offshore Mining Organisation, a state enterprise under the Ministry of Industry, on January 1, 1997. It had been setup in 1974 to operate offshore tin mining. With the decrease in international tin prices during the past several years, the Organisation ran into financial trouble. The accumulated losses reached more than 50 million baht in mid-1996, and the Government did not foresee any upturn in tin prices in the near future.

Tongkah Harbour plc signed two agreements with two local miners for tin mining on Phuket. Tongkah held the mining concessions on the offshore of Phuket. In the first agreement, Tongkah would receive 18 metric tons per month of ore, containing 74% tin. According to the lease, which started on December 1, 1997, and will end on November 30, 1998, the

mining area is 2,714 acres. In the second agreement, a local miner agreed to supply 36 metric tons per month of ore containing 74% tin. According to this lease, which will begin on January 1, 1998, and end on October 31, 1998, the mining area is 2,251 acres. Tongkah planned to sell its tin ore to Thailand Smelting and Refining Co. Ltd. (Metal Bulletin, 1997).

Padaeng Industry signed a memorandum of understanding with Tak Mining Co. Ltd. to develop a jointly zinc deposit on adjacent concession areas of both companies at Mae Sot in northern Tak Province. Under the terms of the agreement, Tak would prepare the mined raw material that would be fed to Padaeng's zinc smelter, and Padaeng would provide technical support and buy the output for next 20 years. The agreement was part of Padaeng's efforts to secure enough raw materials for its smelter. Padaeng had successfully mixed zinc silicate with zinc sulfide for its zinc refining process. Zinc silicate, accounting for 30% of the blended ore, would be used as feed for Padaeng's smelter in 1998. With the success of the blended ore, Padaeng was expected to use more local raw material during the next decade. In 1997, Padaeng imported about 140,000 t of zinc sulfide from China and other countries and expanded its zinc smelter output capacity to 105,000 t/yr from 72,000 t/yr in 1997 (Mining Journal, 1998; Mining Magazine, 1998).

In June, the Ministry of Industry announced that the ban on gypsum mining in Thailand was being revoked. The ban had been imposed in 1996 to prevent unorganized gypsum exports and to encourage exports of gypsum value-added products. Under the new guidelines, gypsum from new mines must supply the domestic market. Thai enterprises with gypsum value-added product investments in other countries would be allowed to export gypsum for their plants. The Government also set the minimum export price for gypsum to eliminate fierce competition and to prevent excessive mining (Bangkok Post, June 4, 1997, Ministry lifts ban on gypsum mining, accessed April 9, 1998, at URL http://www.bkkpost.samart.co.th/Bparchive/BP970604/0406_busi10.html).

Reflecting the country's economy, petroleum consumption began to slow down in 1997. The demand for petroleum, except for that used in the petrochemical sector, rose by 6.9% during the first three quarters of 1997, this was down from 10.1% during the same period in 1996. The use of natural gas instead of fuel oil increased by 30% during the same period because of the greater availability of natural gas from the Gulf of Thailand. Also, the price of natural gas became more competitive with other fuels. Local production of natural gas rose by 21.9% and of crude oil was down by 13.7% compared with those of 1996.

The Government decided to delay plans to purchase liquefied natural gas (LNG) from Oman until 2007. Under an initial agreement, the Petroleum Authority of Thailand (PTT) agreed to begin importing 1 Mt/yr of LNG in 2001 and to increase imports to 1.7 Mt/yr in 2003 and 2.2 Mt/yr in 2004. According to PTT plans, Thailand will spend about \$600 million to build a liquefied natural gas receiving plant in Rayong. With the sharp downturn of the economy and the massive budget cut, PTT was uncertain regarding the prospects of financing the project.

PTT informed Pertamina, an Indonesian state oil company, that the Government had decided to postpone the purchase of natural gas from the Natuna Field until 2007. Thailand had

intended to start purchasing the natural gas in 2003 at an initial rate of 14 million cubic meters per day (Mm³/d) before doubling to 28 Mm³/d in 2007. In addition to the cost for constructing a 1,600-kilometer submarine pipeline that would carry the gas to Ratchaburi through Malaysian waters, Thailand required an additional investment of \$40 billion for participating in the development of the Natuna Field Project. The group developing Natuna, including Esso and Mobil, was looking for gas buyers in Indonesia and other countries to fill the gap for that 4-year period.

Thailand and Malaysia finally signed a gas sale agreement to share equally the natural gas jointly produced in an offshore area that both claimed as their territory. Intense exploration in an area of 7,250 square kilometers in the Gulf of Thailand was rewarded for the two countries. A 370-billion-cubic-meter of gas reserve, mostly on two large Joint Development Areas, was reported in the Malaysia-Thailand Joint Authority progress report (Oil & Gas Journal, 1997). A 283-billion-cubic-meter gas reserve was discovered on Block A-18, operated by the joint venture of Petronas Carigali of Malaysia and Triton Energy Corp. of the United States. Gas reserves on Block B-17, operated by PTT Exploration and Production plc of Thailand and Petronas Carigali were estimated 85 billion cubic meters. Beginning in 2001, 1.8 million cubic meter per day of natural gas will run through a pipeline to a gas separation plant near Songkla area in the southern part of Thailand. Thailand and Cambodia are discussing on a joint development of natural gas on a large area of overlapping claims.

The falling value of the baht against the US dollar and the shrinking domestic demand for oil caused Thai refiners to run at losses in 1997. Refiners were expected more difficult times ahead as the financial crisis in the region continued in 1998. The National Energy Policy Office agreed to the oil refiners' request to reduce legally required oil reserves from 5% of their refining capacities to 3% in order to reduce their operating costs.

Caltex Petroleum Corp. and Royal Dutch/Shell signed a memorandum of understanding to merge their two refineries, Star Petroleum Refining Co. Ltd. (SPRC) and Shell International Holding's Rayong Refining Co. Ltd. (RRC) in the Map Ta Phut Industrial Estate; the new company will be called Refining Co. SPRC and RRC started production in 1996. Caltex and Shell owned 64% of their respective refining affiliates; PTT holds the remaining 36%. Under the terms of the agreement, ownership of the underlying refining assets and their associated financing liabilities would remain for the foreseeable future with SPRC and RRC. The facilities would be linked by pipelines and operated as a single entity by a single operating and management company. The new company would have a combined capacity of 300,000 barrels per day. The merging of the two facilities would reduce overhead cost and have greater bargaining power in purchasing crude oil. The two refineries already share terminal, transport, and off-loading facilities (Petroleum Economist, 1998a).

Thailand's new petrochemical projects were been hard hit by the financial crisis. Consequently, producers and investors froze their greenfield and expansion projects. The Thai Petrochemical Industry (TPI) canceled its 700,000-t/yr cracker project. The company asked its bankers to accept a freeze in repayment of principal, but would continue to pay the interest (Chemical and Engineering News, 1997b). Siam Cement Co. Ltd.'s second

cracker plant was expected to be delayed, but the 600,000 t/yr cracker project which was under construction was expected to start in 1999. PTT Petroleum Co.'s 200,000-t/yr polyethylene project was canceled. Chevron Chemical and PTT postponed their planned joint venture aromatics complex project (Chemical and Engineering News, 1997a; Journal of Commerce, 1998).

To ease its economic crisis, the Thai Government looked for buyers for 480 billion baht of its shares in the energy sector. Among the companies in which the Government planned to sell its shares were Electricity Generating Plc, Esso Thailand Ltd., PTT Exploration and Production Plc, and Thairoil Ltd. The National Energy Policy Committee asked PTT to submit a plan of its partial privatization structure. At the same time, PTT was required to provide a plan to end its monopoly on natural gas supply and to allow the private sector to participate in the natural gas transmission ventures.

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Major Sources of Information

Department of Mineral Resources

Ministry of Industry, Thanon Rama 6, Bangkok 10400, Thailand

National Statistical Office

Office of the Prime Minister, Larn Luang Road, Bangkok 10100, Thailand

Mining Industry Council of Thailand

132 Sinthorn Building, Room 11, Wireless Road, Bangkok 10500, Thailand

The Electricity Generating Authority of Thailand

52 Charan Sanit Wong Road, Bang Kruai, Nonthaburi 11000, Thailand

Major Publications

Department of Mineral Resources, Bangkok:

Mineral Statistics of Thailand (annual).

Metal Statistics of Thailand (annual)

National Statistical Office, Office of the Prime Minister, Bangkok:

Statistical Summary of Thailand, 1987 et seq.

Statistical Yearbook of Thailand, 1990 et seq.

Bank of Thailand, Bangkok:

TABLE 1
THAILAND: PRODUCTION OF MINERAL COMMODITIES 1/

(Metric tons unless otherwise specified)

Commodity	1993	1994	1995	1996	1997
METALS					
Antimony:					
Ore and concentrate:					
Gross weight	1,464	1,123	522	149 r/	125
Sb content e/	620	500	230	70 r/	60
Metal, smelter	1,692	1,424	577	949 r/	782
Cadmium	449	643	365 r/	385 r/	238
Gold kilograms	--	96	103	32	--
Iron and steel:					
Iron ore:					
Gross weight	208,939	142,795	34,480	85,880 r/	43,840
Fe content e/	115,000	78,000	17,000	43,000 r/	22,000
Metal, Steel:					
Crude thousand tons	972 r/	1,391 r/	2,134 r/	2,143 r/	2,430 e/
Ferrous alloys:					
Ferromanganese	70	140	-- r/	-- r/	--
Silicomanganese	1,503	689	-- r/	-- r/	--
Lead:					
Mine output, Pb content of 42.5% Pb concentrate	6,050	7,950	9,680	21,000	5,280
Metal, Ingot					
Primary	5,726	4,950	7,965	4,922	4,000 e/
Secondary	11,334 r/	11,953 r/	11,150 r/	12,789 r/	15,080 e/
Total	17,060	16,903	19,115	17,711	19,080
Manganese ore:					
Battery- and chemical-grade, 75% MnO ₂	1,925	1,152	815	707 r/	208
Metallurgical-grade, 46% to 50% MnO ₂	4,530	5,300	2,663	2,388 r/	291
Total, gross weight	6,455	6,452	3,478	3,095 r/	499
Total Mn content e/	3,100	3,100	1,600	1,550	260
Rare-earth mineral, Monazite concentrate, gross weight	220	57	--	--	12
Tin:					
Mine output, Sn content	6,363	3,926	2,201	1,457 r/	756
Metal, smelter, primary	8,099	7,759	8,243	10,981 r/	12,028
Titanium:					
Ilmenite concentrate, gross weight	20,715	1,600	--	--	--
Leucoxene concentrate, gross weight	106	77	33	-- r/	--
Rutile concentrate, gross weight	87	49	--	--	--
Tungsten concentrate:					
Mine output, gross weight	203	93	92	67	54
Mine output, W content e/	80	40	60	30	25
Zinc:					
Mine output, gross weight	445,761	349,642	135,198	181,233 r/	91,132
Mine output, Zn content e/	70,000	55,000	28,787 r/	11,375 r/	8,894
Metal, smelter, primary	58,881 r/	58,513	46,398	59,738 r/	72,036
Alloy	10,519	12,586	10,509	12,643	12,018
Zirconium concentrate, gross weight	707	326	--	5 r/	--
INDUSTRIAL MINERALS					
Barite	30,085 r/	36,356 r/	35,883 r/	48,074 r/	54,817
Cement, hydraulic thousand tons	26,870	29,900 r/	34,900 r/	35,000 r/	35,000 e/
Clays:					
Ball clay	345,846	329,286	308,001	386,334 r/	288,406
Kaolin, marketable:					
Beneficiated	397,330	417,064	460,629	553,770 r/	366,563
Nonbeneficiated	209,994	108,442	138,594 r/	134,972 r/	132,028
Filler	6,699	8,503	10,856	22,564 r/	18,197

See footnotes at end of table.

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

(Metric tons unless otherwise specified)

Commodity	1993	1994	1995	1996	1997	
INDUSTRIAL MINERALS--Continued						
Diatomite	8,290	5,874	5,991	1,576 r/	91	
Feldspar	600,835	554,227	677,852 r/	684,983 r/	611,789	
Fluorspar, crude mine output						
Metallurgical-grade	48,387	23,705	24,114	17,247 r/	7,826	
Low-grade	600	--	--	--	--	
Total	48,987	23,705	24,114	17,247 r/	7,826	
Gemstones	thousand carats	3,032	2,105	1,036	677 r/	962
Gypsum	thousand tons	7,456	8,140	8,533	8,934 r/	8,858
Phosphate rock, crude	10,764	7,739	9,301	3,528 r/	3,818	
Salt:						
Rock	261,612	287,806	380,544	529,674 r/	554,891	
Other e/	100,000	100,000	100,000	100,000	100,000	
Sand, silica	459,062	471,386	325,492	447,050 r/	515,859	
Stone:						
Calcite	7,037	23,300	37,700	32,700 r/	29,550	
Dolomite	537,119	744,847	668,795	1,064,699 r/	803,511	
Limestone for cement manufacture only	thousand tons	32,036	42,224	45,559	50,058 r/	58,796
Marble	88,398	87,163	96,992	390,497 r/	136,084	
Marl for cement manufacture only	563,709 r/	561,600 r/	610,600 r/	566,500 r/	9,543	
Quartz, not further described	18,193	9,770	11,288	9,831 r/	5,133	
Shale for cement manufacture only	thousand tons	3,597	3,574	4,357	4,605 r/	5,387
Talc and related materials:						
Pyrophyllite	43,404	55,326	76,189	64,330 r/	304,524	
Talc	7,007	8,950	4,252	7,238 r/	7,139	
MINERAL FUELS AND RELATED MATERIALS						
Coal:						
Anthracite	15,500	11,900	5,000	3,000 r/	--	
Lignite	thousand tons	15,593	17,100	18,419	21,685 r/	23,443
Natural gas (gross production)	million cubic meters	9,675	10,723	11,389	13,123 r/	16,159
Petroleum:						
Crude	thousand 42-gallon barrels	9,103 r/	9,692 r/	8,674 r/	9,669 r/	10,024
Natural gas condensate	do.	10,504 r/	11,174	10,937 r/	13,044 r/	16,352
Refinery products: e/						
Liquefied petroleum gas	do.	2,400	2,400	17,940 r/	21,970 r/	26,610
Gasoline	do.	19,000	19,000	38,750 r/	48,410 r/	59,250
Jet fuel	do.	12,500	12,500	19,740 r/	22,460 r/	23,970
Kerosene	do.	900	900	710 r/	1,190 r/	771
Distillate fuel oil	do.	28,500	28,500	37,740 r/	52,540 r/	54,740
Residual fuel oil	do.	22,500	22,500	22,500	23,000	24,000
Unspecified 2/	do.	3,400	3,400	3,400	3,500	3,500
Total	do.	89,200	89,200	140,780 r/	173,070 r/	192,841

e/ Estimated. r/ Revised.

1/ Includes data available through October 10, 1998.

2/ Includes refinery fuel and refinery gains or losses.

TABLE 2
THAILAND: STRUCTURE OF THE MINERAL INDUSTRY IN 1997

(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, 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
Fluorspar, concentrate	Phanom Thuan Mining Co. Ltd.	Phanom Thuan, 45 kilometers north of Kanchanaburi	60
Do.	Skt Minerals Co. Ltd.	Mine is 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	Song Toh, 250 kilometers northwest of Bangkok	45
Steel, rolled	The 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.	The Siam Construction Steel Co. Ltd.	Bangkok	500
Do.	The 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
Tantalum and niobium in tin slag	Thai Tantalum Co. Ltd.	Rayong	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 Ngoem, 100 kilometers southeast of Chiang Mai	0.1
Do.	Siamerican Mining Enterprise Co. Ltd.	Khao Soon, 185 kilometers east of Phuket, temporarily inactive	1.2
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.