

THE MINERAL INDUSTRY OF THAILAND

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From 1985 to 1995, the Thai economy had grown at an average rate of 9% per year of gross domestic product (GDP). During 1996, the economic growth did not keep pace with previous years, the GDP increased only by 6.9%, compared with 1995. Investors confidence, domestic and foreign, had weakened in 1996. The Thai stock market was down almost 30% in 1996 and was expected to continue to fall in 1997.

Thailand's economic development is based upon an export-oriented economy with a free market philosophy. Thailand's economy has changed from one primarily based upon agriculture, with some light industries, to one dominated by manufacturing. About 52% of Thai labor force is engaged in agriculture, but the growing service, manufacturing, and wholesale and retail trades account for two-thirds of Thailand's GDP. After years of strong export growth, Thai exports were flat because of slow demand in developed countries in 1996. In some sectors, especially labor-intensive goods, Thai exports are under pressure from countries with cheap labor forces, such as Bangladesh and Vietnam. The Government plans to shift Thai manufacturing sector away from low-value-added activities to become a producer and exporter of higher value-added and technology-intensive industries such as petroleum products, transportation equipment, and integrated circuits. However, with high illiteracy rate and a shortage of skilled labor hindered the upgrading of Thai industry to higher skill levels.

Mining and quarrying in Thailand accounts for less than 1.5% of the GDP and is a smaller share of total employment. Structural changes, as well as land-use conflicts, including environmental issues, resulted in sharp declines in the production of certain mineral products. The Government policy for the mining sector changed from being export-oriented to promoting sustainable development and serving the needs of domestic industry. The Government imposed export controls on tin ore and certain low-value-added minerals, including lignite, gypsum, feldspar, and limestone, for which domestic demand increased. About 90% of all minerals produced is consumed domestically. Gypsum was the major valuable export commodity in 1996.

In Thailand, minerals are owned by the State. All activities regarding mineral development were under the Ministry of Industry (MOI) and the Ministry of Science, Technology, and Environment supervision to ensure that benefits would be maximized for the country. The Department of Mineral Resources under MOI was responsible for issuing licenses, establishing emission standards, monitoring compliance, and enforcing regulations for mining activities.

Thailand withdrew its membership from the Association of

Tin Producing Countries in October 1996 after being an active member for 13 years. Thailand became a consuming country rather than a producing country, with domestic production less than 2,000 metric tons (t) of tin concentrates and consumption more than 5,000 t of tin metal. Thailand Smelting and Refining Co. Ltd., the only tin smelting company in the country, relies on imported concentrates to feed its smelter.

Production of nonmetallic mineral products, metal, and fabricated metal products accounted for about 9.4% of the total Thai manufacturing sector output. Iron and steel and petrochemicals were identified by the Government as a sectoral priority of investment promotion. New projects were permitted 8-year corporate income tax exemptions regardless of location. In early 1990's the Board of Investment (BOI) decided to liberalize the iron and steel sector to meet the domestic demand. About 90% of domestic production was long products, and the remainder was casting and forging products. Within the next 3 years, BOI expected that Thailand will have the capacity to manufacture all types and forms of iron and steel products (Low, 1997).

Thailand attempted to reduce its dependence on imported energy for domestic consumption from 90% in 1980's to 60% in 1990's. Domestic production of energy resources (primarily natural gas) increased by eightfold in the same time. Energy imports accounts for about 70% of domestic consumption, and domestic production is about 810,000 barrels per day. The major problems facing Thailand's energy sector are rapidly increasing energy demand, a distorted pricing structure, environmental deterioration related to vehicle emissions, and the use of lignite coal in power generation.

Thailand ratified the Uruguay Round agreements in December 1994. The Government is moving to meet its World Trade Organization (WTO) and Association of Southeast Asian Nations tariff reduction commitments, with reduction to be completed on 4,000 items by the beginning of 1997. The total number of tariff rate categories will be reduced from 39 to 6, as following: 0% on goods as medical equipment and fertilizer, 1% for raw materials, electronics components, and vehicles for international transport, 5% for primary and capital goods, 10% for intermediate goods, 20% for finished products, and 30% for goods requiring "special protection", such as agricultural products, automobiles and parts and alcoholic beverages. Thailand is also beginning the process of changing its import license procedures to be in accord with WTO obligations.

In 1996, the Government suspended gypsum mining licenses to relieve the oversupply. However, gypsum exploration was allowed to continue. Gypsum production had exceeded the

domestic consumption, and the surplus in the domestic market had led to severe price cutting among exporters. The export volume of gypsum will be reduced gradually in the next several years in order to protect the country's natural resources.

Union Miniere S.A. of Belgium withdrew its partnership in the Thai Copper Industries Co. Ltd. (TCI) in the copper smelter project. Codelco of Chile signed an agreement with TCI to replace Union Miniere for providing technological assistance in the 185,000-metric ton-per-year copper smelter project at Rayong Province. The smelter is expected to be commissioned in 1998 at a cost of \$600 million. Most of its output is expected to supply domestic consumption. Currently, the copper consumption in Thailand is about 180,000 t of copper yearly and is expected to increase by 15% per year. TCI postponed its public listing of the company stocks until 1997 because of unfavorable market conditions on the Bangkok Stock Exchange.

Advanced Material Resources (AMR) of Canada planned to establish a \$4 million rare-earth powder plant in Thailand. The plant will produce value-added rare-earth products that will supply to the major electronics and automobile manufacturers in Japan, the Republic of Korea and other Southeast Asian countries. The raw materials consumed at the plant will be imported from two AMR plants in China where neodymium oxide is currently produced. Following the addition of a melt furnace during the middle of 1997, AMR will also have the ability to produce neodymium/iron/boron alloy in China. The alloy will be shipped from China to Thailand to manufacture magnetic powder at the new facility. AMR will set up a whollyowned subsidiary, Advanced Magnetic Materials (Thailand) Ltd., to oversee the project.

H.C. Starch GmbH & Co. KG, Goslar of Germany acquired a majority share in Thai Tantalum Co. The acquisition included the potassium fluorotantalate and tantalum metal powder production facilities in Map Ta Phut in Rayong Province. The plant produces about 30 t of tantalum metal powder yearly. Tantalite is mostly imported from Burma. H.C. Starck will invest \$10 million in the next several years to upgrade the facility to the technical standards as other H.C. Starch plants in Europe. The plant began production in 1992 and the production is based on the combination of earlier H.C. Starck technology and old plant equipment of the former Tantalum Division of Fansteel Inc. of the United States. The acquisition will give the German company better access to raw material sources in the Southeast Asian market.

The steel sector plays an important part in Thailand's economic growth. The strong construction and infrastructure growth in the past several years have provided a high demand for steel products. However, the Thai economy suffered a slight set back in its development in 1996 that forced several steel companies, such as Siam Strip Mill, Thai Special Steel Industry (TSSI), and LPN Plate Mill Public Co., to delay proposed listings on the Bangkok Stock Exchange despite receiving approval from the Government. Domestic consumption of steel will increase by 8% and steel production will grow at 10% in the next several years. Expansion projects in recent years have led to some overcapacity in some of steel products in Thailand. BOI is unlikely to approve any new projects in 1997 because

many approved projects will come on stream in coming years.

On August 21, 1996, BOI imposed additional surcharges on imports of structural sections, low-carbon wire rod, and stainless cold rolled steel products for 1 year to protect domestic steel makers for their large investments. Additional surcharges for structural sections, low-carbon wire rod, and stainless cold-rolled steel were set at 16%, 10%, and 9%, respectively. BOI also planned to change the basis of the duty from a fixed sum to a percentage to bring uniformity to the tax structure of other sectors. Thailand normally imposes zero or 1% on raw materials, 10% on semi-manufacturing products, and 20% on finished products. A permanent duty change on steel requires an endorsement by the Thai parliament.

TSSI awarded \$800 million to Mannesmann Demag (MDH) of Germany for construction of a turnkey blast furnace and oxygen steelmaking plant in Rayong. A 12.5-meter-diameter blast furnace will have a designed capacity for producing 3.8 million metric tons per year (Mt/yr) of hot metal with pulverized coal injection. Part of the blast furnace output will be cast as pig iron while the balance will be fed into 2.3-Mt/yr oxygen steel plant from where it will be cast as commercial- and special-grade steels. The steel plant will be equipped with two 170-t converters, two 170-t ladle furnaces, a 170-t VD facility, and as well as two bloom and billet continuous casters with six strands each. The plant is scheduled to be put into operation in 1998.

MDH also received an order from Siam Strip Mill Co. of Thailand to supply electric arc furnaces for its greenfield project in Rayong. The project will be divided into two phases. Each phase will have a designed capacity for producing 1.7 Mt/yr of crude steel. The input raw materials for the furnace will be 60% scrap, 20% pig iron, and 20% of direct reduced iron. The first phase was scheduled to start up in 1998.

MDH is also a supplier for the Nakornthai Strip Mill Co. (NSM) project in Chonburi. NSM will be equipped with a 180-t Consteel furnace from MDH and will use SMS Schloemann-Siemag's compact strip production technology to produce 1.5-Mt/yr crude steel in early 1998. Nucor of the United States received a contract to provide management and operator training for NSM's employees. NSM plans to progress into the downstream production of galvanized coils in the future.

When all mini-mills begin operating in the region, it is expected that local supply of steel scrap is scarce. Thailand generated an estimated of 200,000 t of steel scrap per month. Only one-half of this amount is currently collected. The balance is to be met by imports.

Padaeng Industry Co. Ltd. sold all its shares on Western Metals Ltd. of Australia that it acquired in 1995. The stake represented about 8% of Western Metals' equity.

The study conducted by Golder Associates and H.A. Simons Ltd. on the development of a potash mine in the Somboon field in Udon Thani was completed. The study, based on underground mining by continuous miners and electric shuttle cars, estimated that the production cost would be \$45.69 per ton. Processing is likely to use conventional flotation technology but it may be possible to employ a dry, electrostatic system. The Somboon field is the smaller of two fields discovered in a 2,333-square-kilometer concession area in Udon

Thani. Based on annual output of 2 Mt of potash, the Somboon field is expected to last for 24 years. The second field, Udon, is estimated to contain more than 1,000 Mt of sylvinite. Asia Pacific Potash Corp. is discussing with international financial institutes to secure funds for the initial stage of the development of the Somboon Potash Mine. Once the financing has been secured, the invitation to bid for the construction of the mine will be issued. It is anticipated that mine construction will begin in early 1998 and will be completed in 2000.

In October 1995, MOI invited investors to bid for exploration and production of petroleum in an area of 120,000 km² in Andaman Sea. Nine companies submitted 14 applications in 1996. PTT Exploration and Production of Thailand (PTTEP), a subsidiary of Petroleum Authority of Thailand (PTT); Soco Exploration (Thailand) Co. Ltd.; Texaco Exploration (Thailand) Co. Ltd.; Cairn Energy (Thailand) Co. Ltd.; Anschutz (Thailand) Co. Ltd.; Unocal, Total Khorat, and Statoil Siam; Amerada Hess Exploration Kerr McGee (Thailand); and Novus Exploration (Thailand) were granted exploration concessions.

PTTEP signed a 30-year gas purchase agreement with Myanmar Oil and Gas Enterprise, Texaco Exploration Myanmar Inc., Premier Petroleum Myanmar Ltd., and Nippon Oil Exploration (Myanmar) Ltd. from the Yanada and Yetakun field in Burma to PTT. Beginning in 1999, Burma will supply about 5.5 million cubic meters per day of natural gas to Thailand for the use of generating electricity in western Thailand.

PTT and Pertamina of Indonesia signed a memorandum of understanding for the sale of gas from Natuna Gasfield in Indonesia to Thailand. However, gas from the Natuna has insufficient quantities of ethane, propane, and butane that can be extracted for the development of petrochemicals. The major components of the gas from Natuna that PTT intends to buy are methane and carbon dioxide. Therefore, PTT plans to use the gas for powerplants. The Natuna Gasfield is reported to have reserves of 1,300 billion cubic meters of gas, excluding carbon dioxide (Asian Chemical News, 1997).

Thailand's petrochemical sector continues to expand to meet the country's demand and is aggressively developing export-oriented petrochemical products. Within the next 3 to 4 years, the country's ethylene supply will increase from current 700,000 metric tons per year (t/yr) to between 1.7 Mt/yr and 3 Mt/yr, depending on which projects go forward. Two integrated complexes are being built—Thai Petrochemical Industries (TPI) and Siam Cement Co. Ltd. (SCC). TPI's 350,000 t/yr cracker plant is scheduled to begin operation in 1998, and the company plans to build a second 700,000 t/yr unit. SCC's naphtha-based 600,000 t/yr cracker plant is expected to come on-stream in 1999. A third cracker, planned by National Petrochemical Corp., which was approved by BOI, would have a capacity of 600,000 t/yr and be operational by 2000. Thailand has strong and growing domestic demand for petrochemicals. International

companies have set up 11 automotive plants in the country. Other chemical consuming sectors such as electronics and textiles, are continuing to build facilities in Thailand. Geographic location also allows Thailand to develop as chemical exporter in Southeast Asia. The Government believes that the petrochemical sector is sufficiently mature to sustain international competition. Therefore, The Government planned to liberalize the country's production capacities of olefin in 1997 and aromatics in 2003. In December 1996, the Government announced that a proposed cut in tariffs on polymers from 30% to 20% would be delayed by 1 year to January 1998 (Chemical Week, 1997). Duties on ethylene and propylene were reduced as planned from 12% to 5%, while those on aromatics were cut from 30% to 20%. However, with the changes in tariff rates in the next several years, the Thai petrochemical sector is under pressure to improve its competitiveness against imports.

References Cited

- Asian Chemical News, 1997, PTT: Natuna gas not for petchems: Asian Chemical News, May 19, p. 33.
Chemical Week, 1997, Thailand benefits from delayed tariff cuts: Chemical Week, February 19, p. 12.
Low, A., 1997, Where do we go from here?: Metal Bulletin Monthly, May, p. 51-55.

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).
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:
Annual Economic Report.

TABLE 1
THAILAND: PRODUCTION OF MINERAL COMMODITIES 1/

(Metric tons unless otherwise specified)

Commodity	1992	1993	1994	1995	1996 e/
METALS					
Antimony:					
Ore and concentrate:					
Gross weight	632	1,464	1,123	522	600
Sb content e/	269 3/	620	500	230	270
Metal, smelter	1,847	1,692	1,424	577	550
Cadmium	635	449	643	600 e/	340
Iron and steel:					
Iron ore:					
Gross weight	427,242	208,939	142,795	34,480	50,000
Fe content e/	234,980 3/	115,000	78,000	17,000	22,000
Metal: Steel:					
Crude	779	954	1,460	1,500 e/	2,000
	thousand tons				
Ferroalloys:					
Ferromanganese	549	70	140	150 e/	160
Silicomanganese	4,275	1,503	689	650 e/	700
Lead:					
Mine output, Pb content of 42.5% Pb concentrate	11,880	6,050	7,950	9,680	21,000
Metal: Ingot, secondary	18,906	17,060	16,904	19,070	20,000
Manganese ore:					
Battery- and chemical-grade, 75% MnO2	1,676	1,925	1,152	815	800
Metallurgical-grade, 46% to 50% MnO2	6,151	4,530	5,300	2,663	2,500
Total, gross weight	7,827	6,455	6,452	3,478	3,300
Total Mn content e/	3,800	3,100	3,100	1,600	1,550
Rare-earth mineral: Monazite concentrate, gross weight	89	220	57	--	--
Tin:					
Mine output, Sn content	11,484	6,363	3,926	2,201	1,450
Metal, smelter, primary	10,679	8,099	7,759	8,243	7,700
Titanium:					
Ilmenite concentrate, gross weight	2,922	20,715	1,600	--	--
Leucoxene concentrate, gross weight	45	106	77	33	20
Rutile concentrate, gross weight	281	87	49	--	--
Tungsten concentrate:					
Mine output, gross weight	178	203	93	92	65
Mine output, W content	70	80 e/	40 e/	60	30
Zinc:					
Mine output, gross weight	407,180	445,761	349,642	135,198	181,000
Mine output, Zn content e/	62,000	70,000	55,000	20,000	30,000
Metal, smelter, primary	60,557	65,000 e/	58,513	46,398	65,000
Zirconium concentrate, gross weight	1,723	707	326	--	--
INDUSTRIAL MINERALS					
Barite	46,328	42,385	53,248	58,807	100,000
Cement, hydraulic	21,832	26,870	26,000 e/	26,500 e/	27,000
Clays:					
Ball clay	224,254	345,846	329,286	308,001	300,000
Kaolin, marketable:					
Beneficiated	301,035	397,330	417,064	460,629	554,000
Nonbeneficiated	182,255	209,994	108,442	--	--
Filler	3,445	6,699	8,503	10,856	10,000
Diatomite	10,425	8,290	5,874	5,991	6,000
Feldspar	559,806	600,835	554,227	670,178	669,000
Fluorspar, crude mine output					
Metallurgical-grade	51,597	48,387	23,705	24,114	17,200
Low-grade	--	600	--	--	--
Total	51,597	48,987	23,705	24,114	17,200
Gemstones	4,766	3,032	2,105	1,036	1,000
	thousand carats				
Gypsum	7,111	7,456	8,140	8,533	8,900
	thousand tons				
Phosphate rock, crude	7,981	10,764	7,739	9,301	9,000

See footnotes at end of table

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

(Metric tons unless otherwise specified)

Commodity	1992	1993	1994	1995	1996 e/
INDUSTRIAL MINERALS--Continued					
Salt:					
Rock	212,750	261,612	287,806	380,544	350,000
Other e/	100,000	100,000	100,000	100,000	100,000
Sand, silica	595,325	459,062	471,386	325,492	350,000
Stone:					
Calcite	17,215	7,037	23,300	37,700	40,000
Dolomite	331,819	537,119	744,847	668,795	700,000
Limestone for cement manufacture only	25,272	32,036	42,224	45,559	50,000
Marble	86,995	88,398	87,163	96,992	98,000
Marl for cement manufacture only	675	564	562	611	600
Quartz, not further described	18,051	18,193	9,770	11,288	11,000
Shale for cement manufacture only	2,860	3,597	3,574	4,357	4,000
Talc and related materials:					
Pyrophyllite	34,638	43,404	55,326	76,189	75,000
Talc	4,786	7,007	8,950	4,252	4,000
MINERAL FUELS AND RELATED MATERIALS					
Coal:					
Anthracite	22,000	15,500	11,900	5,000	5,000
Lignite	15,618	15,593	17,100	18,419	21,700
Natural gas (gross production)	8,643	9,675	10,723	11,389	11,000
Petroleum:					
Crude	9,632	9,120	9,161	8,159	8,000
Natural gas condensate	9,676	10,505	11,174	10,936	11,000
Refinery products: e/					
Liquefied petroleum gas	2,400	2,400	2,400	2,400	2,400
Gasoline	19,000	19,000	19,000	19,000	20,000
Jet fuel	12,500	12,500	12,500	12,500	12,300
Kerosene	900	900	900	900	950
Distillate fuel oil	28,500	28,500	28,500	28,500	28,500
Residual fuel oil	22,500	22,500	22,500	22,500	23,000
Unspecified 2/	3,400	3,400	3,400	3,400	3,500
Total	89,200	89,200	89,200	89,200	90,650

e/ Estimated.

1/ Includes data available through July 17, 1997.

2/ Includes refinery fuel and refinery gains or losses.

3/ Reported.

TABLE 2
THAILAND: STRUCTURE OF THE MINERAL INDUSTRY FOR 1996

(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 Mining Co. Ltd.	Song Toh, 250 kilometers northwest of Bangkok	45
Steel, rolled	Bangkok Iron & Steel Co. Ltd.	Bangkok	160
Do.	Bangkok Steel Industry Co. Ltd.	Samut Prakan Province, south of Bangkok	250
Do.	Sahaviriya Steel Industries Co.	Bang Saphan District, Prachuap Khiri Khan Province	2,400
Do.	Siam Iron & Steel Co. Ltd.	Saraburi Province, 100 kilometers north of Bangkok	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 south 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)	1.2
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, 64 kilometers west of Tak	350
Refined	do.	Tak	105

e/ Estimated. NA Not available.