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The Mineral Industry of Thailand

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In 2008, Thailand was one of the world's leading producers of cement, feldspar, gypsum, and tin. The country's mineral production encompassed metals, industrial minerals, and mineral fuels (table 1; Carlin, 2009; Crangle, 2009; Potter, 2009; van Oss, 2009).

Minerals in the National Economy

Thailand's gross domestic product (GDP) in 2008 was valued at $274 billion, and the annual GDP growth rate was 2.6%. The growth rate of the mining sector's portion of the GDP increased by 0.6% compared with that of 2007, and that of the manufacturing sector increased by 3.9%. Thailand's economy was export dependent, and the export of goods and services accounted for more than 70% of the GDP in 2008. The global financial crisis and persistent political uncertainty weakened Thailand's economic growth by reducing domestic and international demand for its goods and services, including tourism. The country's economic growth slowed and was negative in the fourth quarter of 2008 (Bank of Thailand, 2009; U.S. Department of State, 2009).

Government Policies and Programs

The principal law governing mineral exploration and mining in Thailand is the Minerals Act (1967), which was last amended in 1991 by Minerals Act No 4. The Mineral Act governs onshore and offshore exploration, mineral production, mineral trading, ore dressing, and the transport and export of minerals other than petroleum. The Mineral Royalty Rates Act (1966) prescribes the royalty rates to be assessed for different kinds of minerals. The Department of Primary Industry and Mines (DPIM), which is under the jurisdiction of the Ministry of Mines, is empowered to administer the Minerals Act and to issue ministerial regulations. DPIM also provides technical assistance in exploration, mining, mineral processing, and metallurgical activities. In Thailand, minerals belong to the state. No one can explore for minerals or undertake mining unless a prospecting license or mining lease is first obtained from the Government. The Government has a policy of promoting private-sector development of the mineral industry (Chandler & Thong-ek Law Office Ltd., 2001; Chandler and others, 2009, p. 1)

Production

In 2008, Thailand's mineral sector had both significant decreases and large increases in production. The country, for example, produced no primary refined copper metal and only 438 metric tons (t) of secondary copper metal, which was a decrease of 97% from the 12,714 t of copper produced in 2007. Zinc ore production decreased by 33% to 118,739 t from 176,042 t in 2007, and zinc content of ore production decreased by 46% to 17,811 t from 32,921 t in 2007. Production of iron ore and Fe content (pig iron and semimanufactured products) each increased by about 10% to 1,709,750 t and 855,000 t, respectively; manganese output increased by more than 10 times to 52,700 t from 4,550 t in 2007, and tungsten output increased by 52% to 778 t from 512 t in 2007 (table 1).

Among the industrial minerals, production of sand, silica, and glass decreased by 41%; that of marble, dimension stone, and fragment, by 22%; and pyrophyllite, by 74%. Production of ball clay increased by 166% to 1,499,993 t from 563,353 t in 2007; calcite and dolomite increased by 22% each; crude petroleum oil increased by 9% to 53,151 barrels (bbl) from 48,745 bbl in 2007; and natural gas condensate increased by 9% to 31,340 bbl from 28,778 bbl in 2007 (table 1).

Mineral Trade

Thailand's annual exports increased by 16.8% in 2008, and the manufacturing sector was the leading contributor to this growth. Crude oil, iron and steel, and mineral fuels and related materials were among Thailand's principal imports. The United States was Thailand's leading export market (including minerals) and its third ranked supplier of imports to Thailand (including minerals) after Japan and China. Although Thailand's traditional major markets have been Europe, Japan, and North America, export growth has also been high in some of Thailand's nontraditional export markets, including China, India, and the Middle East (U.S. Department of State, 2009).

In 2008, Thailand's exports to the United States were valued at $23.5 billion compared with about $22.8 billion in 2007 and $22.5 billion in 2006. Of these exports, crude petroleum accounted for about $465 million; other gemstone (precious, semiprecious, and imitation), about $267 million; iron and steel products, about $199 million; iron and steel mill products (semifinished), about $134 million; finished metal shapes and advanced manufactured products, about $128 million; and advanced iron and steel manufactured products, about $106 million. The values of other exported metals, including nickel, steelmaking and ferroalloying materials, and tin, all increased (U.S. Census Bureau, 2008b).

Imports from the United States were valued at $9.1 billion in 2008 compared with about $8.3 (revised) billion in 2007 and $7.9 (revised) billion in 2006. These imports included nearly $452 million in steelmaking materials; $258 million in petroleum products; and $133 million in gem diamond. Imports that increased in value also included metals, such as aluminum and alumina, copper, finished metal shapes, nonmonetary gold, and iron and steel mill products; other nonferrous metals; energy fuels, such as fuel oil, metallurgical-grade coal, natural gas, natural gas liquids, nuclear fuel materials, and other coal and fuels; and nonmetallic minerals (U.S. Census Bureau, 2008a).

Structure of the Mineral Industry

Thailand's mineral industry consisted of an industrial mineral mining and processing sector and a ferrous and nonferrous metals mining and processing sector. The Electricity Generating Authority of Thailand (EGAT), which was a state enterprise under the Ministry of Energy, and several coal mining companies owned and operated most of the country's major coal exploration and mining businesses. The Petroleum Authority of Thailand (PTT), PTT Exploration and Production Public Co. Ltd. (PTTEP), joint ventures of PTTEP, and major multinational oil companies owned most of the country's oil and gas exploration and exploitation businesses. Private companies in Thailand owned and operated most of the nonfuel minerals mining and mineral processing businesses (table 2).

Commodity Review

Metals

Aluminum.—In 2008, Thailand consumed 0.4 million metric tons (Mt) of refined aluminum, imported 0.4 Mt of aluminum and 0.2 Mt of semifinished aluminum alloys, and exported 0.03 Mt of aluminum. The major aluminum and aluminum alloy suppliers to Thailand were Australia (49%), the United Arab Emirates (13%), Russia (10%), China (8%), and South Africa (7%). Thailand exported aluminum and aluminum alloys mainly to Indonesia (17%), Hong Kong (5%), and Japan (4%) (World Bureau of Metal Statistics, 2009, p. 9-13).

Copper.—The Puthep copper exploration project was a joint venture between Padaeng Industry Public Co. Ltd. (PDI) of Thailand and Pan Australian Resources Ltd. (PanAust) of Australia. As of December 31, PanAust held a 33.17% interest in this project, and the company expected to increase its interest in the project to a total of 51% by completing a feasibility study; it would then have a further option to increase its total interest in the project to between 60% and 70%. Padaeng Industry Public Co. owned the remaining interest in the project. The Puthep copper project is located near the major Provincial center of Loei in northeastern Thailand. The feasibility study that was begun in early 2007 was expected to be completed in late 2009 for announcement in early 2010. The scope of the feasibility study was to include a review of copper leaching options for processing the predominantly chlorite copper mineralization (Pan Australian Resources Ltd., 2009).

Thai Copper Industries Public Co. Ltd. (TCI) was established in July 1994. The company owned a copper smelter with a design capacity of 165,000 metric tons per year (t/yr) of copper cathodes. Construction of the smelter, which started at Rayong Industrial Park in October 1995, was suspended in February 1998 because of the Asian economic crisis. The project was resumed in January 2003, and began producing smelted and refined copper in July 2004. The plant produced refined copper with 99.99% purity and copper cathode for the domestic market. TCI's target customers included the electrical wire and enameled copper wire industrial sectors. From September 2005 through December 2006, the smelting operation of the plant was shut down to overhaul the plant and perform maintenance work. TCI closed in April 2007; no copper was produced in 2008 (Thai Copper Industries, 2007).

Gold.—Amanta Resources Ltd. of Canada continued its initial gold drilling program at the Langu property through 2008. The Langu property is located in Satun Province in southern Thailand. It consists of four special prospecting licenses (Amanta Resources Ltd., 2009).

Kingsgate Consolidated Ltd. (Kingsgate) of Australia owned and operated the Chatree gold mine in central Thailand through its wholly owned subsidiary Akara Mining Ltd. The Chatree gold mine is located 280 kilometers north of Bangkok. In 2008, Kingsgate's ore feed for the plant averaged only 1.1 grams per metric ton gold, which was the main reason for the decrease in gold production (Kingsgate Consolidated Ltd., 2008).

Iron Ore and Iron and Steel.—In 2008, Thailand's iron ore production increased by about 6% to 1.7 Mt from 1.6 Mt in 2007; crude steel production decreased by about 7% to 5.2 Mt from 5.6 Mt; and steel semimanufacturers decreased by about 4% to 7.6 Mt from 7.8 Mt in 2007. The country's imports of steel products increased owing to the stockpiling of hot-rolled coil, which was used to produce automotive parts, and exports of steel decreased owing to the decrease in sales in the world markets. In 2008, Thailand consumed 0.7 Mt of iron in 2008, and 5.3 Mt of iron and steel scrap, which accounted for 37% of the total scrap consumed in the Southeast Asia region (South East Asia Iron and Steel Institute, 2009; World Steel Association, 2009).

Tin.—Thailand Smelting and Refining Co. Ltd. (Thaisarco) was the only tin smelter in Thailand. It was managed by Amalgamated Metal Corporation PLC of the United Kingdom. In 2008, in order to meet the demand of its Asian customer base, Thaisarco imported 22,569 t of tin (contained). The company was affected by the worldwide economic downturn at the end of 2008, and its production and sales for 2009 were expected to decline by approximately 15% to 18,500 t. Thaisarco also had an offshore tin exploration project, which was also affected by the low tin price (Mining Journal, 2009, p. 21).

Tungsten.—On May 21, Amanta Resources Ltd. announced that it had signed a contract with Global Prospectors and Consultants (a Thai mining services company). Amanta's objective was to begin the rehabilitation of the former Mae Lama tungsten mine in northern Thailand, and to develop between 0.5 and 1 Mt of minable tungsten resources. The reported grade for the former Mae Lama operation was 2% WO_3, and the program aimed to verify this as an expected average ore grade for the resumption of tungsten production at the mine (Amanta Resources Ltd., 2008).

Zinc.—Thailand's domestic consumption of zinc in 2008 totaled 112,005 t, which was an increase of 4.7% compared with that of the previous year. PDI operated a zinc mine and smelter with a capacity of 115,000 t/yr, and also conducted zinc ore exploration both in Thailand and in neighboring countries. The company's head office was located in Bangkok, and its mine and plant locations are listed in table 2. PDI's major shareholdings were held by Bali Ventures Ltd. (21.7%), the Thai Ministry of Finance (13.81%), and the United Arab Emirates' RAK Minerals & Metals Investments (12.5%). PDI reported that production of zinc metal in 2008 was 104,134 t, zinc sales

were 103,719 t, and zinc exports were 19,350 t. In addition, PDI imported zinc concentrate (zinc sulfide) from Australia and Peru. The company, however, was affected by the global economic downturn, a 50% decrease in the price of zinc, the higher freight rate for ore transport (particularly between South America and Thailand), and a mining interruption of more than 6 months that took place at PDI, which together caused the company's 2008 revenues to decrease by about 33% compared with results achieved the previous year. PDI renewed its Mae Sot Mine mining lease for an additional 15 years on April 8 and resumed zinc mining in this area (Mining Journal, 2009, p. 17; Padaeng Industry Public Company Ltd., 2009).

Industrial Minerals

Cement and Gypsum.—Thailand was one of the world's leading producers of gypsum and produced 8.5 Mt in 2008. In 2008, the domestic cement demand decreased by about 5%; the decrease was caused by decreased local construction activities; flooding, which delayed construction projects; and lower Government investment expenditures (International Cement Review, 2008a, b; Mining Journal, 2009, p. 19).

Siam City Cement Co. Ltd. (SCCC) reported that net sales decreased by 7% in 2008 and net profit decreased by 2%. SCCC expected to maintain its domestic market share of 27%. The company was approved to raise its local cement ceiling price by about 13% for portland cement and mixed cement. SCCC had increased its selling price for domestic cement by about 33% and its selling price for exported cement by about 29% compared with that of 2007 (International Cement Review, 2008a; 2009).

The two main gypsum board producers were Siam Gypsum and Thai Gypsum. Thai Gypsum supplied the domestic and overseas markets in Asia, the Middle East region, and North Africa. The company produced 76 million square meters of gypsum board annually. Siam Gypsum was a joint venture between Lafarge S.A. of France (70%) and Siam Cement (30%), and it had three factories in Thailand with a combined annual production capacity of more than 100 million square meters (International Cement Review, 2008a, b; Mining Journal, 2009, p. 19).

Potash.—Italian Thai Development Public Co. Ltd. (ITD) continued to pursue a potash mining license in Udon Thani Province in northeastern Thailand; however, the planned project to produce 2 million metric tons per year of potash faced considerable obstacles in getting off the ground. The local community expressed concerns about the environmental, health, and social implications, as well as the effect that the mine would have on local livelihoods (Mining Journal, 2009, p. 19).

Mineral Fuels

Coal.—Banpu Public Co. Ltd. closed down the last of its coal mines in Thailand after reserves were exhausted in 2008. The company's future mining activities would remain outside of Thailand (Mining Journal, 2009, p. 17).

EGAT is the state-owned electricity generating authority and the leading producer of lignite in Thailand. In 2008, EGAT produced and supplied 16 Mt of lignite to its own 2,625-megawatt powerplant, which was located in Mae Moh. EGAT studied the feasibility of investing in coal mining in Australia and Indonesia to secure imported coal for its future coal-fired powerplants (Mining Journal, 2009, p. 17).

Consumption of domestically produced lignite totaled 18.5 Mt in 2008, of which 16 Mt was consumed by EGAT and 2.5 Mt was consumed as fuel by manufacturers of cement, fiber, lime, and paper; by tobacco curers; and by other users. Consumption of imported coal (mostly anthracite, bituminous, and coking coal) totaled 16 Mt in 2008, of which about 11 Mt was consumed in the industrial sector by manufacturers of cement, iron and steel, and nonferrous metals; 1.7 Mt, by small power producers; and 3.3 Mt, by independent power producers (Energy Policy and Planning Office, 2009a).

Natural Gas and Petroleum.—PTTEP announced in June that the Arthit project had started producing natural gas at a rate of 370 million standard cubic feet per day and condensate at a rate of approximately 19,800 barrels per day (bbl/d). This project was located off the coast of Songkhla in the Gulf of Thailand (MBendi Information Services (Pty) Ltd., 2009; PTT Exploration and Production Public Co. Ltd., 2008).

Production of crude petroleum increased by 7% to an average of 143,935 bbl/d in 2008 from 134,563 bbl/d in 2007 as a result of increased production from the Jusmin oilfields. In 2008, crude petroleum was produced from more than 12 oilfields. The leading onshore oilfield, the Sirikit oilfield, which was operated by Thai Shell Exploration and Production Co. Ltd., averaged 20,942 bbl/d and accounted for 14.5% of the total crude petroleum output in 2008. The leading offshore oilfield, the Benjamas oilfield, which was operated by Chevron Offshore Ltd., averaged 44,960 bbl/d and accounted for 31.2% of crude petroleum production. To meet the raw materials requirements of its seven oil refineries, Thailand imported a total of 295.8 million barrels, or 810,400 bbl/d, of crude oil in 2008. More than 80% of imported crude oil was from the Middle East (Energy Policy and Planning Office, 2009c).

In 2008, condensate was produced from more than 12 gasfields, of which about 27% was produced from the Pailin gasfield; 22%, from the Bongkot gasfield; 15%, from the Arthit gasfield; 12%, from the Erawan gasfield; 12%, from Funan & Jakrawan gasfield; and the remaining 12%, from more than seven smaller fields (Energy Policy and Planning Office, 2009b).

Outlook

Thailand's mining sector, along with the Thai economy, is still facing risks associated with the severe contraction of major trading partners' economies and the slow recovery of private spending. According to the Thailand Fiscal Policy Office of the Ministry of Finance, in 2009, the country's economy in terms of the real GDP growth would continue to contract by about 3% compared with 2.6% in 2008. Private investment and consumption would continue to decrease as unemployment increased as a result of the contracting economy. As a result of decreased oil prices compared with those of 2008, however, the strengthening of the Baht, and the trade surplus, which includes

minerals and mineral products trade, the country's economic stability is expected to improve in 2009 (Ministry of Finance, 2009).

References Cited

Amanta Resources Ltd., 2008, Amanta commences rehabilitation of Mae Lama Tungsten Mine: America Resources Ltd. news archive, May 21. (Accessed December 14, 2009, at http://www.amantaresources.com/news/2008/index.php?&content_id=80.)

Amanta Resources Ltd., 2009, Langu gold project: Amanta Resources Ltd. (Accessed December 9, 2009, at http://www.amantaresources.com/properties/langu_gold/.)

Bank of Thailand, 2009, Key economic indicators: Bank of Thailand. (Accessed March 10, 2010, at http://www.bot.or.th/English/Statistics/Indicators/Pages/index.aspx.)

Carlin, J.F., Jr., 2009, Tin: U.S. Geological Survey Mineral Commodity Summaries 2009, p. 172-173.

Chandler, A.T., Poonsombudlert, Ratana, Hunt Talmage, III, E.T., 2009, Thai mining legislation: Chandler & Thong-ek Law Offices Ltd., June, 7 p. (Accessed March 10, 2010, at http://www.ctlo.com/data/Thai Mining Legislation-Jun09.pdf.)

Chandler & Thong-ek Law Offices Ltd., 2001, Thai mining legislation: Chandler & Thong-ek Law Offices Ltd., March. (Accessed March 10, 2010, at http://www.ctlo.com/tml.htm.)

Crangle, R.D., Jr., 2009, Gypsum: U.S. Geological Survey Mineral Commodity Summaries 2009, p. 72-73.

Energy Policy and Planning Office, 2009a, Consumption of lignite and coal classified by sector: Energy Policy and Planning Office. (Accessed December 11, 2009, at http://www.eppo.go.th/info/stat/T04_01_02.xls.)

Energy Policy and Planning Office, 2009b, Production of condensate: Energy Policy and Planning Office. (Accessed December 11, 2009, at http://www/eppo.go.th/info/stat/T02_01_02-2.xls.)

Energy Policy and Planning Office, 2009c, Production of crude oil: Energy Policy and Planning Office. (Accessed December 11, 2009, at http://www.eppo.go.th/info/stat/T02_01_01-2.xls.)

International Cement Review, 2008a, Siam city price cushion: International Cement Review, October, p. 15.

International Cement Review, 2008b, Thai cement industry outlook: International Cement Review, November, p. 8.

International Cement Review, 2009, Siam city cement may shut down third kiln: International Cement Review, April, p. 16.

Kingsgate Consolidated Ltd., 2008, Kingsgate annual report: Kingsgate Consolidated Ltd., February. (Accessed December 9, 2009, at http://www.kingsgate.com.au/sx_releases/annual_reports.htm.)

MBendi Information Services (Pty) Ltd., 2009, Oil and gas in Thailand—Overview: MBendi Information Services (Pty) Ltd., December 15. (Accessed December 15, 2009, at http://www.mbendi.com/indy/oilg/as/th/p0005.htm.)

Mining Journal, 2009, Thailand yet to fulfill potential: Mining Journal, November 13, p. 16-21.

Ministry of Finance, 2009, Thailand economic projection 2009: Ministry of Finance [Thailand] economic report, June 25, 3 p. (Accessed December 11, 2009, at http://www2.mof.go.th/economic_report_detail.php?id=39.)

Padaeng Industry Public Company Ltd., 2009, Padaeng Industry Plc. annual report of year 2008: Padaeng Industry Public Company Ltd., 90 p. (Accessed December 11, 2009, at http://www.padaeng.com/pdf/Annual/2008_AnnualReport.pdf.)

Pan Australian Resources Ltd., 2009, Puthep copper (Thailand): Pan Australian Resources Ltd. (Accessed December 8, 2009, at http://www.panaust.com.au/PNA_ProjectsPuthep.html.)

Potter, M.J., 2009, Feldspar: U.S. Geological Survey Mineral Commodity Summaries 2009, p. 56-57.

PTT Exploration and Production Public Co. Ltd., 2008, Gas production and condensate of Arthit project: PTT Exploration and Production Public Co. Ltd., June 20. (Accessed March 12, 2010, at http://www.pttep.com/en/InvestorRelations_SETNotificationDetail.aspx?ContentID=437.)

South East Asia Iron and Steel Institute, 2009, 2009 steel statistical yearbook: South East Asia Iron and Steel Institute, August, 120 p.

Thai Copper Industries, 2007, Profiles: Thai Copper Industries. (Accessed December 4, 2009, at http://www.thaicopperind.com/en/company.htm.)

U.S. Census Bureau, 2008a, U.S. exports to Thailand from 2004 to 2008 by 5-digit end-use code: U.S. Census Bureau. (Accessed December 3, 2009, at http://www.census.gov/foreign-trade/statistics/product/enduse/exports/c5490.html.)

U.S. Census Bureau, 2008b, U.S. imports from Thailand from 2004 to 2008 by 5-digit end-use code: U.S. Census Bureau. (Accessed December 3, 2009, at http://www.census.gov/foreign-trade/statistics/product/enduse/imports/c5490.html.)

U.S. Department of State, 2009, Thailand: U.S. Department of State background note. (Accessed December 1, 2009, at http://www.state.gov/r/pa/ei/bgn/2814.htm.)

van Oss, H.G., 2009, Cement: U.S. Geological Survey Mineral Commodity Summaries 2009, p. 40-41.

World Bureau of Metal Statistics, 2009, World metal statistics—Aluminium: World Bureau of Metal Statistics, August, 150 p.

World Steel Association, 2009, Steel statistical yearbook: World Steel Association, 110 p.

TABLE 1
THAILAND: PRODUCTION OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity	2004	2005	2006	2007	2008
METALS					
Antimony:					
Ore:					
Gross weight	110	735	2,980	--	--
Sb content	52	347	1,409	--	--
Metal, smelter	2	460	544	271	422
Copper, metal, refined:					
Primary[e]	18,100 [2]	13,700	25,300	11,900	--
Secondary[e]	1,900 [2]	2,100	1,750	814	438
Total	20,000	15,800	27,050	12,714	438
Gold kilograms	4,500	4,400	4,300	3,401 [r]	2,721
Iron and steel:					
Iron ore:					
Gross weight	135,580	230,946	264,289	1,554,860	1,709,750
Fe content[e]	68,000	116,000	132,000	779,000	855,000
Crude steel thousand metric tons	4,533	5,161	4,914 [r]	5,565 [r]	5,211
Lead, metal, refined, secondary	57,500	61,100	61,160	73,159	73,303
Manganese ore:					
Metallurgical-grade, gross weight, 46% to 50% MnO_2	4,550	88,500	--	9,500 [r]	111,000
Mn content[e]	2,180	42,400	--	4,550	52,700
Silver kilograms	10,700	14,100	11,800	7,727 [r]	5,465
Tantalum, metal and oxide powder	317	150	230	142	158
Tin:					
Concentrate:					
Gross weight	724	188	225	149	235
Sn content	586	158 [e]	190 [e]	122	169
Metal, primary	20,800	31,600	27,540	23,104	21,860
Tungsten concentrate:					
Gross weight	337	622	546	923 [r]	1,112
W content[e]	187	345	303	512 [r]	778
Zinc:					
Ore:					
Gross weight	199,477	203,810	214,023	176,042	118,739
Zn content	43,400 [e]	30,572	32,100 [e]	32,921	17,811
Metal, primary	68,300	60,866	94,779 [r]	99,337 [r]	107,753
Alloy, Zn content	46,800	40,320	61,600 [r]	64,600 [r]	70,000
INDUSTRIAL MINERALS					
Barite	115,100	101,186	96,469	8,631 [r]	9,180
Cement, hydraulic thousand metric tons	35,626	37,872	39,408	35,668	35,668
Clays:					
Ball clay	610,193	393,935	1,003,267	563,353	1,499,993
Kaolin, marketable:					
Beneficiated, washed	200,671	156,853	157,900	159,186	162,215
Nonbeneficiated, unwashed	430,364	580,376	675,886	518,143 [r]	479,443
Filler	--	9,031	9,326	7,985	6,061
Diatomite	1,372	990	1,344	1,260	4,075
Feldspar	1,001,053	1,149,717	1,067,684	684,668	670,618
Fluorspar, crude, metallurgical-grade	2,375	295	3,240	1,820	29,529
Gemstones thousand carats	911	699	81	102	32
Gypsum thousand metic tons	7,169	7,113	8,355	8,643	8,500
Perlite	6,000 [e]	5,500 [e]	22,000	6,400	7,000
Phosphate rock, crude	2,580	3,020	900	3,550	3,675
Salt:					
Rock	1,031,200	1,074,214	1,008,251	1,134,931	1,211,581
Other[e]	100,000	100,000	100,000	100,000	100,000
Sand, silica, glass	587,655	718,320	861,847	844,071	495,848

See footnotes at end of table.

TABLE 1—Continued
THAILAND: PRODUCTION OF MINERAL COMMODITIES[1]

(Metric tons unless otherwise specified)

Commodity		2004	2005	2006	2007	2008
INDUSTRIAL MINERALS—Continued						
Stone:						
Calcite		436,628	692,850	625,950	672,580	823,706
Dolomite		992,907	795,466	899,512	1,108,425 r	1,353,763
Granite:						
Dimension stone	cubic meters	10,000 e	9,500 e	8,321	10,515	10,579
Industrial rock	thousand metric tons	3,500 e	3,000 e	4,463	5,229 r	5,190
Limestone:						
Dimension stone	do.	--	--	201	233	233
For cement manufacture only	do.	63,196	55,584	61,583	63,799	54,885
Construction and other uses	do.	70,000	75,000 e	87,887	87,402	87,000
Marble, dimension stone and fragment	cubic meters	236,643	267,797	547,582	848,806	664,930
Marl for cement manufacture only		184,750	196,500	68,700	31,750	41,720
Quartz		19,216	2,604	2,897	4,924	3,290
Shale for cement manufacture only	thousand metric tons	3,622	3,695	5,590	4,769	4,026
Travertine		--	--	3,316	3,490	3,640
Talc and related materials:						
Pyrophyllite		108,691	177,684	131,843	415,420	106,600
Talc		12,592	10,270	4,374	3,508	3,264
Zirconium		--	--	--	1,023	--
MINERAL FUELS AND RELATED MATERIALS						
Coal, lignite	thousand metric tons	20,038	21,429	19,071	18,239	18,095
Natural gas, gross production	million cubic meters	22,360	23,689	24,317	25,400	25,400
Petroleum:						
Crude	thousand 42-gallon barrels	31,299	41,570	47,067	48,745 r	53,151
Natural gas condensate	do.	24,963	25,363	27,466	28,778 r	31,340
Refinery products:						
Liquefied petroleum gas	do.	41,520	45,241	45,475	48,759 r	53,842
Gasoline	do.	56,339	58,072	57,172	54,739 r	53,142
Jet fuel	do.	29,127	30,421	35,240	33,478 r	37,750
Kerosene	do.	7,041	6,395	6,548	776 r	1,226
Distillate fuel oil	do.	42,277	38,740	39,681	40,581 r	43,231
Residual fuel oil[e]	do.	24,000	25,000	26,000	27,109 2	26,500
Unspecified[e, 3]	do.	3,600	3,600	3,600	3,626 2	3,600
Total[e, 4]	do.	204,000	207,000	214,000	209,000 r	219,000

[e]Estimated; estimated data are rounded to no more than three significant digits; may not add to totals shown. [r]Revised. do. Ditto. -- Zero.
[1]Table includes data available through December 4, 2009.
[2]Reported figure.
[3]Includes refinery fuel and refinery gains or losses.
[4]Data are rounded to three significant digits; may not add to totals shown.

Sources: Department of Mineral Resources, Mineral Statistics of Thailand; Department of Primary Industries and Mines; Ministry of Energy, Energy Policy and Planning Office; and U.S. Geological Survey Minerals Questionnaires, 2004-2008.

TABLE 2
THAILAND: STRUCTURE OF THE MINERAL INDUSTRY IN 2008

(Thousand metric tons unless otherwise specified)

Commodity		Major operating companies and major equity owners	Location of main facilities	Annual capacity
Barite		Asian Mineral Resources Co. Ltd.	Loei, Mae Hong Son, Nakhon Si Thammarat, and Satun Provinces	60
Do.		P&S Barite Mining Co. Ltd.	Loei and Nakhon Si Thammarat Province	60
Cement		Asia Cement Co. Ltd.	Pra Phutthabath, Saraburi Province	4,800
Do.		Jalaprathan Cement Co. Ltd. (Cement Francais S.A., 37%; Veatprapat Holding Co. Ltd., 19%; others, 44%)	Takli, Nakhorn, Sawarn Province; and Cha-Am, Petchburi Province	2,350
Do.		Samukee Cement Ltd.	Pakchong, Nakhon Ratchasima Province	125
Do.		Saraburi Cement Co. Ltd. (CEMEX Asia Holdings Ltd., 99%)	Chalerm Phrakiat, Saraburi Province	700
Do.		Siam Cement Industry Co. Ltd. (Bureau of the Crown Property, 30%; Thai Security Depository Co. Ltd., 6.94%; CPB Equity Co. Ltd., 5.6%; other financial institutions and the general public, 57.46%)	Kaeng Khoi, Phabhudhabat, and Khao Wong, Saraburi Province; Chae Hom, Lampang Province; Thung Song, Thammarat Province; and Ta Luang, Ayutthaya Province	23,200
Do.		Siam City Cement Co. Ltd. (SCCC) (Holcim Ltd., 33.7%; Rattanarak family, 27%; other investors, 39.3%)	Kaeng Khoi, Saraburi Province	14,500
Do.		TPI Polene Co. Ltd.	do.	9,900
Coal, lignite		Electricity Generating Authority of Thailand (EGAT) (Government, 100%)	Mae Moh, Lampang Province	20,000
Do.		Lanna Lignite Public Co. Ltd.	Ban Pakha, Lamphun Province	1,000
Copper		Thai Copper Industries Public Co. Ltd. (TCI)	Rayong Industrial Park	165
Feldspar, concentrate		Asia Mineral Processing Co. Ltd.	Provinces of Nakhon Si Thammarat and Trang	500
Fluorspar, concentrate		Asian Mineral Resources Co. Ltd.	Mae Hong Son Province	14
Gas, natural	million cubic meters per day	Esso Exploration and Production Khorat Inc.	Namphong, Khon Kaen Province	4
Do.	do.	TOTAL Exploration and Production (Thailand)	Bongkot in the Gulf of Thailand	15
Do.	do.	Unocal Thailand Ltd.	Baanpot, Erawan, Funan, Kaphong, Pladang, Satun, Pailin, Trat, all in the Gulf of Thailand	33
Gold	kilograms	Akara Mining Ltd. (Kingsgate Consolidated Ltd., 100%)	Chatree, Phichit Province	5,000
Gypsum		Vanich Gypsum Co. Ltd.	Khlong Prab, Mai Riang. Thoong Yai Mai in the Provinces of Nakhon Si Thammarat and Surat Thani	8,500
Do.		Lotus Mines Co. Ltd.	Nakornsawan	NA
Do.		General Mining and Trading Co. Ltd.	Talad, Muang	NA
Iron ore, gross weight		P.T.K. Mining Co. Ltd.	Phu Ang, Loei Province	720
Lead, in concentrate		Kanchanaburi Exploration and Mining Co. Ltd.	Song Toh, Nong Phai, and Bo Ngam in Kanchanaburi Province	30
Petroleum, crude, including condensate	thousand 42-gallon barrels per day	Chevron Offshore (Thailand) Ltd.	Benjamas, Tantawan, offshore in the Gulf of Thailand	35
Do.	do.	PTT Exploration and Production Public Co. Ltd. (PTTEP)	Arthit, Songkhla of Gulf of Thailand	20
Do.	do.	Tahi Shell Exploration and Production Co. Ltd.	Sirikit in Kamphaenghet Province	24
Do.	do.	TOTAL Exploration and Production (Thailand)	Bongkot, offshore in the Gulf of Thailand	12
Do.	do.	Unocal Thailand Ltd.	Baanpot, Erawan, Funan, Gomin, Jakrawan, Kaphong, Pailin, Platon, Satun, Surat, Trat Plamuk, offshore in the Gulf of Thailand	38
Steel, rolled		The Bangkok Iron and Steel Works Co. Ltd.	Phrapradaeng, Samutprakarn Province	120
Do.		Bangkok Steel Industry Public Co. Ltd.	do.	300
Do.		Tata Steel (Thailand) Plc (Tata Steel Ltd., 67.11%; McDonald Investment, 6.5%; other investors, 26.39%)	Map Ta Phut, Rayong Province; Sriracha, Chonburi Province; Ban Mon, Saraburi Province	1,700
Do.		Namheng Steel Co. Ltd.	Lopburi Province	300
Do.		Sahaviriya Group Corp. Ltd.	Bang Saphan, Prachuap Khiri Khan Province	2,400
Do.		Siam United Steel Co. Ltd.	Rayong Province	1,000
Do.		G-Steel Plc (formerly Siam Ystrip Mill Plc)	Map Ta Phut, Rayong Province	600

See footnotes at end of table.

TABLE 2—Continued
THAILAND: STRUCTURE OF THE MINERAL INDUSTRY IN 2008

(Thousand metric tons unless otherwise specified)

Commodity		Major operating companies and major equity owners	Location of main facilities	Annual capacity
Tantalum, metal powder and oxides	metric tons	H.C. Starck (Thailand) Co. Ltd. (H.C. Starck GmbH, 94.98%, and others, 5.02%)	Map Ta Phut, Rayong Province	250
Tin:				
Concentrate		Numerous small companies	Nakhon Si Thammarat, Phangnga, Phuket, and Rayong Provinces	3
Refined		Thailand Smelting and Refining Co. Ltd. (Thaisarco) (Amalgamated Metal Corporation PLC, 75.25%, and other, 24.75%)	Phuket, Phuket Province	30
Tungsten, in concentrate	metric tons	SC Mining Co. Ltd. (Som Chai family, 100%)	Ban Pin, Chiang Mai Province	650
Zinc:				
In concentrate		Padaeng Industry Public Co. Ltd. (PDI) (Bali Ventures Ltd, 21.7%; Thai Ministry of Finance, 13.81%; RAK Minerals & Metals Investments, 12.5%; others, 52%)	Mae Sot district, Tak Province	65
Refined		do.	Smelter in Muang district, Tak Province; Roaster plant in Rayong Province	115

Do., do. Ditto. NA Not available.