



2005 Minerals Yearbook

BURMA

THE MINERAL INDUSTRY OF BURMA

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Burma is located in Southeast Asia and is bordered by the countries of Bangladesh, China, India, Laos, and Thailand; the Andaman Sea; and the Bay of Bengal. This country has an area of 678,500 square kilometers (km²) and had an estimated population of 50.5 million in 2005 (U.S. Central Intelligence Agency, 2006[§]¹; World Bank Group, 2006[§]).

In 2005, Burma's gross domestic product (GDP) based on purchasing power parity was estimated to be \$93.8 billion, and the GDP per capita based on purchasing power parity was estimated to be \$1,700. Burma's economy was based primarily on agriculture, which included fisheries, forestry, livestock, rice, and sugarcane; agriculture accounted for nearly 57% of the GDP in 2005. Other sectors that contributed to Burma's economy were industry and services, which accounted for almost 8% and 35%, respectively, of the GDP (International Monetary Fund, 2006[§]; U.S. Central Intelligence Agency, 2006[§]). The country's mineral production included antimony, coal, copper, gemstone, lead, limestone, natural gas, petroleum, precious stones, tin, tungsten, and zinc.

Burma's export market totaled about \$3.1 billion during 2005; imports totaled about \$3.5 billion. Exports included such commodities as clothing, fish, natural gas, and rice; import goods included construction materials, transport equipment and machinery, food products, crude oil, petroleum products, and plastics. During 2005, Burma's main export partners were Thailand (44.3%), India (12.3%), China (6.8%), Japan (5%), and others (31.6%); its import partners were China (28.8%), Thailand (21.8%), Singapore (18.3%), Malaysia (7.6%), and others (23.5%) (U.S. Central Intelligence Agency, 2006[§]).

During the first quarter of 2004, the Confederation of Indian Industries and the Union of Myanmar Federation of Chambers of Commerce and Industries signed a memorandum of understanding (MOU) to create a task force to increase trade between Burma and India. The 2005 trade value between the two countries was estimated to be \$470 million; both Governments expressed interest in increasing the Burma-India trade value to \$1 billion during the next several years. Burma also intended to increase cooperation and support for its information and communication technology areas and its energy sector, and to put in place programs to attract small- and medium-size enterprises (BurmaNet News, 2005[§]).

In August 2005, the mine and minerals ministers of all the members of the Association of Southeast Asian Nations (ASEAN) approved the ASEAN Minerals Cooperation Action Plan (AMCAP) 2005-10. The agreement consisted of a cooperation plan to promote each ASEAN member country's mining sector. The countries that belong to ASEAN are Brunei, Burma, Cambodia, Indonesia, Laos, Malaysia, the Philippines, Singapore, Thailand, and Vietnam. The agreement encourages

the development of the minerals sector as a way to promote economic growth and social progress, enhance trade and investments, and encourage the use of environmentally friendly and socially responsible mineral development practices in the ASEAN region (Mining Journal, 2005).

Commodity Review

Metals

Copper.—During 2005, copper mine production in Burma reached 34,500 metric tons (t). This was an approximate increase of 9% compared with that of 2004 and 24% compared with that of 2003 (table 1).

The Monywa Copper Project, which is located in west-central Burma approximately 110 kilometers (km) west of Mandalay, 15 km west of Monywa, and 832 km north of Yangon, comprises the following deposits: Kyisintaung, Letpadaung, Sebetaung, and Sebetaung South. The first phase of the Monywa Copper Project was developed as the S&K Mine, which covered a 30.59-km² area and encompassed the Kyisintaung, the Sabetaung, and the Sabetaung South deposits.

The Monywa Copper Project was a 50-50 joint venture between Ivanhoe Myanmar Holdings Ltd. (IMHL) (a wholly owned subsidiary of Ivanhoe Mines Ltd. of Canada) and state-owned Mining Enterprise No. 1 (ME1). The Canadian company operated in Burma through Myanmar Ivanhoe Copper Company Limited (Monywa JVCo), which was a company incorporated in Burma. Monywa JVCo had a copper sales agreement with Marubeni Corporation, which had an exclusive right to market the copper throughout the world. The sales agreement expired on December 31, 2005, but the companies negotiated an extension of the agreement to December 31, 2006. Also in 2005, Monywa JVCo began its facility expansion program, which, when fully implemented, will increase the copper processing rate to 50,000 metric tons per year (t/yr) of copper cathode. Production in 2005 decreased owing to a decrease in copper grades at the Sabetaung deposit (Ivanhoe Mines Ltd., 2006).

Mineral Fuels

Natural Gas.—The amount of natural gas marketed in Burma during 2005 was 11,648 million cubic meters, which was an increase of about 13% compared with that of 2004 and 19% compared with that of 2003 (table 1). Burma's recoverable onshore and offshore gas reserves were estimated to be 87 trillion cubic feet (2.46 trillion cubic meters) (Alexander's Gas & Oil Connections, 2005e[§]).

In early 2005, a consortium of foreign oil companies with interest in Burma's gasfields announced the discovery of additional natural gas deposits in the Shwe field, which is located offshore within Block A1 along the western Rakhine coast. The discovery found an estimated 170 billion cubic

¹References that include a section mark (§) are found in the Internet References Cited section.

meters (reported as 6 trillion cubic feet) of gas in Block A1, from which initial exploration gas estimates in 2004 were up to 396.2 billion cubic meters (reported as 14 trillion cubic feet). As a result of the new discovery, Block A1's total gas estimates were revised to 566 billion cubic meters (reported as 20 trillion cubic feet). Block A1 was owned by a consortium made up of Korean companies Daewoo International Corp. (60%) and Korea Gas (10%) and Indian companies Oil and Natural Gas Corporation (ONGC) Videsh Ltd. (OVL) (20%) and Gas Authority of India Ltd. (GAIL) (10%) (Alexander's Gas & Oil Connections, 2005d§). In late 2005, the consortium partners of Block A1 announced that, according to an independent assessment made by the oil-industry consultant Ryder Scott Co., estimated gas reserves in Block A1's Shwe field zone were between 2.88 trillion cubic feet and 3.56 trillion cubic feet (Alexander's Gas & Oil Connections, 2005a§; Daewoo International Corp., 2005§; Oil and Natural Gas Corporation (ONGC) Videsh Ltd., 2005§).

The Indo-Korean consortium also held gas exploration rights to Block A3. Block A3 is located on the southern edge of Block A1 in the Bay of Bengal and measures approximately 6,780 km². In October 2005, the consortium announced that it had reached an agreement to explore Block A3 (Alexander's Gas & Oil Connections, 2005c§).

In 2005, Burma reported an increase in natural gas exports to the Asia and the Pacific region from two offshore gasfields located in the Gulf of Martaban—Yadana, which covers an area of 26,140 km², and Yetagun, which covers an area of 24,130 km². Since gas exports started, production at the Yadana field has increased to 650 million cubic feet per day from 65 million cubic feet per day in 1998; the Yetagun field exports have risen to 460 million cubic feet per day from 200 million cubic feet per day in 2000 (Alexander's Gas & Oil Connections, 2005e§).

The main operator at the Yadana gasfield was France-based Total E&P Myanmar (31.24%). Other partners included Unocal Myanmar (28.26%), Thailand based PTT Exploration and Production Public Company Limited International Limited (PTTEP) (25.5%), and Myanma Oil and Gas Enterprise (MOGE) (15%). The main operator in the Yetagun gasfield was Petronas Carigali Myanmar Inc. (40.91%). Other partners included MOGE (20.45%) and PTTEP and Nippon Oil Exploration (Myanmar) Limited (19.32% each) (PTT Exploration and Production Public Company Limited, 2006§).

Petroleum.—According to Government statistics, Burma had 19 onshore and 3 main offshore oilfields and gasfields. Reserves were estimated to be 3.2 billion barrels of recoverable crude oil. In 2005, Burma produced 8.133 million barrels of crude oil compared with 7.160 million barrels in 2004; this marked an increase of 13.6% and 12.9% respectively, compared with production in 2003 (table 1).

In May 2005, the Indian oil company Essar Oil Limited announced that it had signed two production-sharing contracts with state-owned MOGE for oil exploration—one offshore and the other onshore. The Indian company planned to conduct a feasibility study, which would involve collecting geologic, seismic, and well-drilling data; reprocessing and reinterpreting geologic and seismic data; generating geologic maps; and identifying and modeling potential prospects. Essar expected

to complete the feasibility study within a period of 1 year (Alexander's Gas & Oil Connections, 2005b§).

Outlook

By 2006, trade between Burma and India is expected to increase as a result of the MOU signed in 2004. Production in the mining sector will likely follow the trend of recent years in which the mining sector was dominated by the copper, natural gas, and petroleum industries.

Natural gas exploration activities in Burma are expected to continue to increase during 2006 mainly as the result of the many exploration projects and discoveries that were started in 2005. In 2006, the Indo-Korean consortium that holds interests in offshore natural gas Blocks A1 and A3 plans to start appraisal wells in Block A1 and to begin an exploration drilling program in Block A3 (Oil and Natural Gas Corporation (ONGC) Videsh Ltd., 2005§).

Expansion and development plans in the S&K Mine is expected to increase annual copper production capacities within the next few years. In the meantime, a decline in copper production is expected during 2006 owing to decreased copper grades encountered in the Sabetaung deposit in 2005.

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TABLE 1
BURMA: PRODUCTION OF MINERAL COMMODITIES¹

(Metric tons unless otherwise specified)

Commodity ²	2001	2002	2003	2004	2005
METALS					
Chromium, chromite, gross weight ^c	3,000	3,000	3,000	3,000	3,000
Copper:					
Mine output, Cu content	25,800	27,500	27,870	31,756	34,500
Matte, gross weight ³	50 ^r	26 ^r	79 ^r	80 ^{r,e}	80 ^e
Metal, refined	25,800	27,500	27,870	31,756	34,500
Gold, mine output, Au content ³	105 ^r	92 ^r	90 ^r	90 ^{r,e}	90 ^e
Iron and steel:^{e,3}					
Pig iron	1,500	1,500	1,500	1,500	1,500
Direct-reduced iron	40,000	40,000	40,000	40,000	40,000
Steel, crude	25,000	25,000	25,000	25,000	25,000
Lead:					
Mine output, Pb content ⁴	900 ³	2,000 ^r	2,000 ^r	2,000 ^r	2,000
Metal:					
Refined	1,105	425 ³	888	289	907
Antimonial lead (93% Pb) ³	40 ^r	2 ^r	21 ^r	-- ^e	-- ^e
Manganese, mine output, Mn content ^c	50	50	50	50	50
Nickel:^e					
Mine output, Ni content	10	10	10	10	10
Speiss (matte), gross weight ³	23 ^r	7 ^r	12 ^r	10 ^{r,e}	10 ^e
Silver, mine output, Ag content ⁴	1,804	778 ³	778	1,120	2,302
Tin, mine output, Sn content:⁴					
Of tin concentrate	503 ³	302 ³	434	330	402
Of tin-tungsten concentrate	156 ³	154 ³	172	196	306
Total	659	456	606	526	708
Metal, refined ^c	30	30	30	30	30
Tungsten, mine output, W content:⁴					
Of tungsten concentrate	1	1 ³	3	1	2
Of tin-tungsten concentrate	85 ³	83 ³	93	106	166
Total	86	84	96	107	168
Zinc, mine output, Zn content ⁴	467	138 ³	127	196	78
INDUSTRIAL MINERALS					
Barite	31,015	15,050 ³	4,850	2,224	2,058
Cement, hydraulic	377,961	470,858 ³	571,505	518,999	543,072
Clays:³					
Bentonite	634	1,104 ^r	856 ^r	800 ^{r,e}	800 ^e
Fire clay and fire clay powder	770 ^r	332 ^r	130 ^r	100 ^{r,e}	100 ^e
Feldspar ^{e,3}	10,000	10,000	10,000	10,000	10,000
Gypsum	64,609	90,002 ³	66,069	71,155	67,522
Nitrogen, N content of ammonia	28,000	21,000	62,500	34,800 ^e	30,000 ^e
Precious and semiprecious stones:					
Jade kilograms	8,173,936 ³	10,878,789 ³	10,692,780	12,407,576	19,445,758
Diamond ^c carats	5	5	5	5	5
Rubies, sapphires, spinel do.	8,630,000 ³	4,579,624 ³	4,378,545 ³	6,198,915 ^r	5,219,817
Salt ^{e,5} thousand metric tons	35	35	35	35	35
Stone:					
Dolomite	4,922	3,806 ³	4,572	4,184	3,980
Limestone, crushed and broken ^c thousand metric tons	2,600	3,200	3,500	3,300	3,400
MINERAL FUELS AND RELATED MATERIALS					
Coal, lignite	41,736	115,175 ³	109,214	237,949	229,647
Gas, natural:					
Gross ^c million cubic meters	9,700	9,400	9,400	9,400	9,400
Marketed do.	8,804	9,353 ³	9,799	10,277	11,648

See footnotes at end of table.

TABLE 1--Continued
BURMA: PRODUCTION OF MINERAL COMMODITIES¹

(Metric tons unless otherwise specified)

Commodity ²	2001	2002	2003	2004	2005	
MINERAL FUELS AND RELATED MATERIALS--Continued						
Petroleum:						
Crude	thousand 42-gallon barrels	4,696	6,387 ³	7,204	7,160	8,133
Refinery products ⁶	do.	5,286	6,028 ³	5,835	5,133	4,638

⁶Estimated; estimated data are rounded to no more than three significant digits; may not add to totals shown. ¹Revised. -- Zero.

¹Table includes data available through November 2006.

²In addition to the commodities listed, construction aggregates, sand and gravel, and silica sand are produced, but available information is inadequate to make reliable estimates of output levels.

³Data are for fiscal year ending March 31 of the following year.

⁴Data are for the production by the state-owned mining enterprises under the Ministry of Mines.

⁵Brine salt production, in metric tons, reported by the Government was 2001--61,466; 2002--59,825; 2003--73,112; 2004--58,395 and 2005--116,768.

⁶Includes diesel, distillate fuel oil, gasoline, jet fuel, kerosene, and residual fuel oil.

Sources: International Fertilizer Industry Association, Ammonia Statistics 2004; Ministry of Mines and Central Statistical Organization (Yangon), Statistical Yearbook 2004; Selected Monthly Economic Indicators, December 2005; World Bureau of Metal Statistics, August 2006.

TABLE 2
BURMA: STRUCTURE OF THE MINERAL INDUSTRY IN 2005

(Metric tons unless otherwise specified)

Commodity	Major operating companies and major equity owners	Location of main facilities	Annual capacity	
Cement	Union of Myanmar Economic Holdings Limited	Sinmin Cement plant	146,000	
Coal	No. 3 Mining Enterprise	Kalewa Coal Mine in Sagaing Division, near Kalewa	13,000	
Copper	Ivanhoe Myanmar Holdings Ltd. (50%) and Mining Enterprise No.1 (50%)	Monywa Copper Project, the S&K Mine and the Monywa refinery, located in central Burma	40,000	
Fertilizer, N content	Myanma Petrochemical Enterprise, 100% state-owned	No. 1 Fertilizer plant at Sales, 190 kilometers southwest of Mandalay	94,900	
Do.	do.	No. 2 Fertilizer plant at Kyun Chung, central Burma	75,555	
Do.	do.	No. 3 Fertilizer plant at Kyaw Zwar, central Burma	219,000	
Natural gas	million cubic meters	Total E&P Myanmar (31.24%), Unocal Myanmar (28.26%), PTT Exploration and Production Company Limited International Limited (25.5%), Myanma Oil and Gas Enterprise (MOGE)(15%)	7,227	
Do.	do.	Petronas Carigali Myanmar Inc. (40.91%), Myanma Oil and Gas Enterprise (MOGE) (20.45%), PTT Exploration and Production Company Limited International Limited (19.32%), and Nippon Oil Exploration (Myanmar) Limited (19.32%)	4,635	
Do.	do.	Myanmar Petroleum Resources Limited and Myanma Oil and Gas Enterprise (MOGE)	37	
Petroleum:				
Crude	thousand 42-gallon barrels	do.	876	
Refined	do.	Myanma Petrochemical Enterprise, 100% state-owned	No. 1 Refinery at Thanlyin (near Yangon)	9,490
Do.	do.	do.	No. 2 Refinery at Chauk, central Burma	2,190
Do.	do.	do.	No. 3 Refinery at Thanbayakan, central Burma	9,125
Steel		Myanmar POSCO Steel Co. Ltd. (70%)	POSCO steel plant in Yangon	30,000