

The Mineral Industry of Burma

By Gordon L. Kinney¹

Burma continued its development activities in the mineral field with the assistance of foreign loan and aid programs. Overall, the mining sector grew by 24% in fiscal year (FY) 1982,² with export earnings rising 45% to \$41 million.³ In FY 1983, copper ore production led in tonnage⁴ of metallic minerals, while tin ore was first in value. Ores of lead, silver, tungsten, zinc, and a number of industrial minerals also were produced in amounts economically significant to the Government, which owns and operates all the important mines. In all, about 30 minerals were produced in commercial quantities during 1984. Only the tin and tungsten output, however, could be considered as being of consequence on the world market. Burma continued to allocate about 10% of its capital budget to the mining sector and planned to continue with this policy. The capital budget for FY 1984 was targeted at \$137 million including local currency expenditures, but because of a tight foreign exchange situation, expenditures were probably closer to \$100 million with foreign exchange requirements of \$50 to \$60 million.

Burma continued to put priority on its search for additional petroleum deposits. Petroleum production has not kept up with the country's expanding needs. The Government's persistent policy of not importing crude oil has led to shortages that have steadily worsened. This has adversely affected economic development as a whole and some mineral development in particular.

The mining industry increased overall employment in FY 1983 by more than 2,000 persons, to a total of 85,000. Approximately 72,000 of these were employed by the state-owned mining operations or 4.6% of the

total Government employment.⁵ Overall, the mining sector accounted for 0.6% of national employment and 1.2% of the value of the net output of goods and services at current prices.

Since 1976, Burma's economy has grown at an average rate of 6% per year, after a decade of decline or stagnation. Changes in Government policies since about 1975 have been a key factor in this rate of growth. In 1983 and 1984, however, Burma faced deteriorating terms of trade for rice, its major export earner. This led to serious problems of foreign exchange availability. These difficulties could persist at least over the next few years.

The policy of the Government of Burma was to avoid direct participation by foreign investors. The Burmese legal system does, however, permit joint ventures between Burmese state companies and foreign interests. Several such arrangements were operating, but none were known for any onshore mining projects. Foreign aid has contributed greatly to the economic growth rate, especially in the industrial and mining sectors. In 1983, multilateral sources supplied over \$200 million and bilateral sources provided approximately \$300 million.⁶ This aid has financed mineral-related projects in copper, lead-zinc, tin-tungsten, and petroleum. These positive results have been offset, at least in part, by three important factors. First, Burma's debt service ratio was approaching 30%. It must, therefore, satisfy most of its future needs for foreign exchange through loans made on concessional terms, or through projects with clear commercial viability. The high international demand for concessional loans limits what Burma can expect to receive, and few commercially viable projects have been identi-

fied as yet. Second, even with dramatic increases in rice production already achieved, Burma may be unable to increase its earnings from international rice sales. Excellent international rice crops were likely to depress prices in the short term, and prospects for increased rice export earnings were limited. Third, despite successes in the rice program, the Government has been reluctant to introduce market-type incentives in the industrial and mining sector.⁷

In the short term, Burma's economic outlook was therefore somewhat clouded. In the longer term, the major internationally financed projects should start to generate revenue, and the economic situation should improve markedly.

The electric power sector continued to show substantial gains as the Government made strong efforts to stay ahead of the rapidly increasing demand for stable and

predictable power supplies. Net value of the sector increased 11% in FY 1983 and installed capacity was increased more than 13% to 818 megawatts. Continuing work on major projects to increase power output and expand transmission facilities contributed to the growth. These projects included a Czechoslovak steam-powered generating plant, British-aided gas-powered units, Austrian-aided hydropower miniplants and West German-aided installation of transmission lines.⁸

The Government's Electric Power Corp. operated 635 megawatts of the total, with the remainder in captive power in state organizations. Over 47% of Electric Power's installed capacity was in natural gas fueled, gas turbine powered generators. No other country in the area utilized its natural gas production for such a high percentage of its electric power needs.

PRODUCTION

The value to the Burmese economy of the output of the mining sector increased for the eighth straight year in FY 1983. According to a Government source, the non-fuel mining output at current prices topped \$122.5 million.⁹

Burmese mineral production tonnage and value figures are difficult to evaluate because data are often changed, mostly by reducing the previous year's figure. The result is that each current year's output is more favorable compared with those of other years.

Crude oil and natural gas continued to be by far the most valuable mineral commodities. Copper, tin, and tungsten were the most important in value of the metallics. Limestone topped the list of both value and tonnage for the nonmetallics.

Burma has changed its method of reporting annual tin and tungsten production figures. Instead of one tonnage figure each for tin, tungsten, and a mixed tin-tungsten concentrate, tin was reported as 65%- and 74%-tin concentrate; tungsten as 65%- and 67%-tungsten concentrate; and a percentage figure was not reported for mixed tin-tungsten-scheelite concentrate. In addition, the tonnage of scheelite concentrate, undefined, was reported in FY 1983 for the first time.¹⁰ Monthly reported figures from the Central Statistical Organization have retained the old reporting system, leading to further complications. Widely differing interpretations of these figures are expected in the mining literature when metal content totals are extracted.

Table 1.—Burma: Production of mineral commodities¹

(Metric tons unless otherwise specified)

Commodity ²	1980	1981	1982	1983 ^p	1984 ^e
METALS					
Antimony, mine output:					
Gross weight	1,094	^r 250	--	--	--
Sb content ^e	440	^r 100	--	--	--
Copper:					
Mine output, metal content	56	77	101	4,200	12,000
Matte, gross weight	123	170	223	173	173
Iron and steel: Pig iron	--	3,753	13,328	15,200	7,764
Lead:					
Mine output, metal content	^e 14,200	^e 16,100	^e 16,050	23,146	21,937
Metal:					
Refined including secondary	6,014	4,068	7,829	7,636	6,996
Antimonial lead (18% to 20% Sb)	185	254	279	254	254
Nickel:					
Mine output, metal content ^e	14	20	20	20	20
Speiss, gross weight	57	80	81	80	80
Silver, mine output	587	450	526	558	576
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Tin, mine output, metal content:					
Of tin concentrate	540	596	804	629	745
Of tin-tungsten concentrate	750	842	877	1,013	1,283
Total	1,290	1,438	1,681	1,642	2,028
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Tungsten, mine output, metal content:					
Of tungsten concentrate	305	248	243	235	216
Of tin-tungsten concentrate	518	577	601	695	880
Total	823	825	844	930	1,096
Zinc, mine output, metal content	4,079	3,556	5,382	4,537	5,320
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NONMETALS					
Barite ³	4,819	6,933	16,029	^e 11,200	11,000
Cement, hydraulic	386,159	317,434	344,225	334,685	311,179
Clays: ³					
Ball clay	4,390	793	409	404	110
Bentonite	1,347	2,317	1,463	^e 1,710	1,710
Fire clay ⁴	3,711	1,755	1,633	^e 1,780	1,020
Industrial white clay	4,626	813	813	810	810
Feldspar ³	1,689	4,267	2,540	2,700	6,220
Graphite ³	199	1,422	279	200	234
Gypsum ³	37,132	31,095	26,079	34,278	39,200
Nitrogen: N content of ammonia ^e	59,900	59,300	51,000	53,900	57,800
Pigments, mineral, natural: Iron oxide	330	350	^e 350	^e 350	300
Precious and semiprecious stones: Jadeite ³					
kilograms	7,953	8,891	9,682	29,107	20,694
Salt ⁵	268	270	269	288	280
Stone: ³					
Dolomite	2,450	6,381	3,250	4,400	4,000
Limestone, crushed and broken	1,151	1,219	1,221	1,247	1,210
Quartz	143	37	39	--	--
Talc and related materials: Soapstone ³	333	128	128	128	128
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MINERAL FUELS AND RELATED MATERIALS					
Coal, lignite	26,919	38,100	38,200	34,500	43,200
Gas, natural:					
Gross ^e	^r 16,000	^r 16,000	^r 19,000	^r 20,000	26,000
Marketed ³	14,837	14,878	17,400	18,190	24,796
Petroleum:					
Crude (gross wellhead)					
thousand 42-gallon barrels	10,110	10,447	9,789	10,168	11,761
Refinery products ^e	7,300	7,670	7,000	7,000	8,000

^eEstimated. ^pPreliminary. ^rRevised.¹Table includes data available through June 5, 1985.²In addition to the commodities listed, pottery clay, common sand, glass sand, other varieties of crude construction stone, and other varieties of gem stones are produced, but available information is inadequate to make reliable estimates of output levels.³Data are for fiscal years beginning Apr. 1 of that stated.⁴Includes fire clay powder.⁵Brine salt production as reported by the Burmese Government was as follows: 1980—80,701; 1981—83,795; 1982—73,901; 1983—200,944; and 1984—100,000 (estimated).

TRADE

Burma's export earnings from minerals during FY 1983 totaled \$41 million, exclusive of the gem and jewelry trade. This was a 46% increase over the 1982 figure. The initial sale of copper concentrate was not made as reported in 1983. Delivery was delayed because the Ministry of Mines was weighing the four bids that had been tendered for the concentrate. A Japanese firm finally received the contract for delivery by yearend 1984.

Overall, FY 1983 imports decreased to \$327 million from \$846 million in FY 1982, while exports increased to \$409 million from \$391 million in FY 1982. The large

swing in imports gave Burma a favorable balance of trade for the first time in many years. Partial figures for 1984 showed a strong favorable trade balance in the first third of the year, then a gradual swingback toward a possible small trade surplus. Current year trade data for Burma is seldom available early enough for even this preliminary appraisal.¹¹

In 1983, the 20th annual Government gem and jewelry sale to foreign dealers showed a significant increase over the 1982 sale. Proceeds reached \$8.8 million in the 1983 sale compared with \$5.4 million in its 1982 sale.

COMMODITY REVIEW

METALS

Copper.—The No. 1 Mining Corp.'s Monywa Copper Mine near Monywa, Sagaing Division, hit a production level of 8,000 tons per day in 1984. The latest ore reserve figures were reported to be 117 million tons at an average grade of 0.734% copper. Projected project life would be 48 years at current levels. A Japanese firm bought the first year's production of copper concentrate, which averaged 22% copper and 25 to 30 grams of silver per ton.

The Government proposed building a small smelter near Monywa and opening up a second copper deposit located at Letpadaung, near the Monywa Mine.¹²

Iron and Steel.—The second electric arc furnace at Anisakan near Mandalay was reportedly completed and a test run made. The second furnace was to be used for steel billet production, while the first would continue to be used to supply pig iron to the several small foundries in Burma. Both furnaces use 100% direct-reduced iron feed from the adjacent direct-reduction plant, which uses the Italian Kinglor Metor process. The second direct-reduction module was believed to still be under construction at Anisakan.

Kobe Steel Ltd. of Japan was to lead a Japanese consortium in renovating the 26-year-old Ywama steelworks near Rangoon. The contract was signed 17 months after the Metal Industries Corp. called for international bids on the job. The contract was to provide for design, engineering, equipment supply, supervision of construction, and the

training of Burmese personnel in Japan. The renovation will include work on the electric furnace, the wire mill, and the rolling mills. A two-strand continuous billet caster of 12,000 tons per year capacity was also to be installed. Work is to begin in April 1985, with startup scheduled for mid-1987.¹³

Lead, Zinc, and Silver.—The Bawdwin Mine in Shan State, the only domestic source of lead, zinc, and silver, continued to represent a substantial source of foreign exchange earnings. The mine now consists of a combined underground and open pit operation. Limited production from its open pit began in 1984, and equipment was still being procured and assembled at yearend. The underground mine was being worked concurrently to a depth of 520 meters on 14 levels. With the startup of the open pit, the combined ore production was about 1,000 tons per day. The mine and nearby Namtu smelter and refinery together employed 7,122 workers.

The Federal Republic of Germany funded the development of the open pit operation and, in addition, provided a \$1.7 million¹⁴ credit to No. 1 Mining to expand the Bawdwin ore-dressing facility. Klöckner Industrie Anlagen GmbH of the Federal Republic of Germany was reportedly selected to supply equipment for the 500-ton-per-day extension of the flotation mill.

Tin and Tungsten.—The increasing tin production reflected investments funded by the International Development Association under the tin-tungsten expansion project. Performance was marred, however, by a

mechanical problem with the new dredge operating near the Tenasserim coast. It was not known if the dredge would have to be towed to Penang, Malaysia, for repairs or if they could be made locally. Late 1984, production would have suffered if the repairs were not made quickly.

Development of five new gravel pump mines, which were to be funded by a \$16 million Asian Development Bank (ADB) loan, has apparently been canceled at the request of Burmese authorities. The apparent cancellation was because of a dispute over the suitability of a Mining Corp. No. 2 controlled consulting group for the project. The ADB maintained that the consultants did not have the expertise required. The new mines would have raised the country's tin and tungsten output significantly.

Following severance of diplomatic relations with North Korea, the plan to expand the tin smelter at Syriam, Pegu Division, from 1,000 to 2,000 tons per year was shelved.¹⁵ The Burmese Government report to the legislature for 1984 indicated that the smelter had been producing refined tin satisfactorily but had not reached design capacity yet.

NONMETALS

Cement.—Despite a modest production increase in cement raw materials and portland cement, Burmese consumers faced constant shortages because of the heavy demand from large Government projects like the Kinda and Sedawgyi Dams. Plans for increased production were dealt a severe blow in October 1983 when the French-aid-supported mill that was under construction at Myaingalay, Kawthule State, near Pa-an, was severely damaged by insurgents. As of June 1984, repairs had not been started. The Government had been counting on the plant to begin supplying 840 tons per day by yearend.

A plant expansion project was still underway at the Kyangin cement plant. A capacity of 1,400 tons per day was scheduled for completion during 1984, but apparently was not yet operational. The only new facility now likely to open within the next few years is the 800-ton-per-day plant planned for Kyaukse in Mandalay Division.

Fertilizer Materials.—The Government-owned Petrochemical Industries Corp. (PIC) began plans for the fertilizer complex part of the Martaban gas development project. PIC proposed to build a large ammonia and urea complex and also a large methanol

plant whose output would be for export. A European consortium was reported to be interested in building the plants if financing can be arranged. PIC wanted to develop a site on the eastern bank of the Irrawaddy Delta southwest of Rangoon, but the site proved to be too soft for economical construction. The consortium favored a site on the western side of the delta at the end of the Arakan Hills where the ground would be more suitable for heavy construction. A feasibility study would have to be made of the new site before any definite financial commitments could be made with the world lending organizations.

In other developments, Voest-Alpine AG of Austria had nearly completed a \$3 million modernization of the 20-year-old urea plant at Sale in the Chauk Oilfield in Magwe Division. The project was scheduled for startup before yearend after incurring major delays because of a cement shortage.

Uhde GmbH of the Federal Republic of Germany was building a 91,000-ton-per-year nitrogen-ammonia-urea plant in Kyaw Zwa near Prome, Pegu. The plant was in its final construction stages and was due for startup early in 1985.

MINERAL FUELS

Coal.—A Government report showed that lignite production has been climbing steadily since 1980, and the FY 1984 plan continued the trend with a 22% increase. Mining Corp. No. 3 planned to develop lignite deposits in northern Burma for power production in order to bridge the gap between declining petroleum production and gradually increasing hydropower. The project has been hindered by the remote and rough terrain where the sites are located and the high capital costs, which when compared with other alternatives make the project marginally attractive in economic terms. The project was unlikely to move ahead quickly unless Burma's energy problems worsen dramatically.

Oil and Natural Gas.—The Burmese Government was developing plans to exploit natural gas deposits discovered in the Gulf of Martaban. The overall project would require an expenditure of more than \$1 billion and would depend heavily on foreign funding for its execution. The gas deposits were discovered in 1982 by the Burma Petroleum Development Co., a 60:40 joint venture between the Government-owned Myanma Oil Corp. (MOC) and the Japan National Oil Corp. Depending on the source

of the estimate, the reserves have been quoted at from 3 to 8 trillion cubic feet. Basically, the project would consist of developing the fields, bringing a pipeline to shore, and building a methanol, a urea, and two ammonia plants to utilize the gas.¹⁶ Two gas-fired powerplants would supply the project's electricity needs and the surrounding areas. Since the gas from the Gulf of Martaban is apparently available in considerable volume, the Burmese planners felt that its development would furnish a source of foreign exchange, which has been in short supply during recent years. All of the methanol and most of the fertilizer would be exported.

Burma has been unsuccessful in finding significant commercial deposits of crude oil in its recent exploration attempts. Crude oil production onshore has continued to cause economic problems. The Government policy of not importing crude oil had led to serious shortages because domestic production has been stagnant for the last several years. Production figures vary considerably depending on the sources, but it was certain that whatever the actual figures were in 1983 and 1984, production was not enough for the needs of the Burmese economy, and the country's refineries operated at less than 50% of capacity.

There was one encouraging find at Payagon near Kyailat in the Irrawaddy Delta. It reportedly flowed 300 barrels per day of crude and 9 million cubic feet per day of gas from a limestone and sandstone formation similar to that found in the Gulf of Mar-

taban.¹⁷ MOC was drilling a well on a small island in the estuary in an attempt to confirm the probability that this formation forms a continuous structure between Payagon and the Martaban discovery. Prospects of significant oil production would be much better if the beds and reservoir conditions are continuous.

Burma has purchased its first offshore drilling rig, the jackup "Trident I," and renamed it "Rewati I." MOC generally leases the use of offshore rigs for its exploration drilling.

¹Physical scientist, Division of International Minerals.

²The Burmese fiscal year begins Apr. 1 of the year stated.

³Values have been converted from Burmese kyats (K) to U.S. dollars at the average rate in FY 1982 of K7.76=US\$1.00; FY 1983, K8.25=US\$1.00; and FY 1984, estimated at K8.25=US\$1.00.

⁴Metric tons are used throughout this chapter.

⁵Ministry of Planning and Finance. Report to the Pyithu Hluttaw on the Economic and Social Condition of the Socialist Republic of the Union of Burma for 1984-85. 1984, p. 15.

⁶U.S. Embassy, Rangoon, Burma. State Dep. Airgram A-13, Oct. 25, 1984, p. 2.

⁷Page 3 of work cited in footnote 6.

⁸Far Eastern Economic Review. Asia 1985 Yearbook. P. 128.

⁹Page 19 of work cited in footnote 5.

¹⁰Page 116 of work cited in footnote 5.

¹¹Central Statistical Organization, Rangoon, Burma. Selected Monthly Economic Indicators. Statistical Paper No. 3, Sept.-Oct. 1984, p. 1.

¹²U.S. Embassy, Rangoon, Burma. Industrial Outlook Report—Minerals. State Dep. Airgram A-007, June 1, 1984, p. 2.

¹³Metal Bulletin (London). No. 6924, Sept. 28, 1984, p. 33.

¹⁴Value was converted from deutsche marks (DM) to U.S. dollars at the rate of DM2.846=US\$1.00.

¹⁵Page 3 of work cited in footnote 12.

¹⁶Far Eastern Economic Review. V. 126, No. 92, Oct. 18, 1984, p. 66.

¹⁷Petroleum News. V. 15, No. 10, Jan. 1985, p. 19.