The Mineral Industry of Burma

By Gordon L. Kinney[1]

Burma's most important mineral production during 1981 was crude oil and natural gas. Production was sufficient for Burma to maintain petroleum self-sufficiency albeit at the cost of some consumer shortages. In addition to the mineral fuels, Burma also produced economically important amounts of lead, zinc, tin, tungsten, silver, barite, and precious stones. Nineteen other minerals were produced commercially, mostly for domestic consumption.

Prior to World War II, Burma was an important supplier of metals and ores to the world economy. Subsequently, Burma's mineral sector underwent a decline which was only arrested in the last 5 years. Since 1975, Burma's Ministry of Mines has successfully stimulated a major recovery of the mining sector through new investments and rehabilitation of old facilities. Significant loans from bilateral and multilateral sources have been the chief catalysts in the process.[2]

The Burmese plan for fiscal year (FY) 1980-81[3] called for an allocation of $107 million[4] in the mining sector. According to provisional data, however, $161 million was actually spent during the year, exceeding the original allotment by $54 million. The reason for the excess was an increase in expenditure for oil exploration and development, the Monywa copper project, the direct-reduction iron project, and the new Metallurgical Research and Development Center (Ela) of the Department of Geological Survey and Mineral Exploration. The mining expenditure accounted for 15.8% of total public investment in FY 1980-81.[5] The FY 1981-82 plan allocated 14% of capital investment for the mining industry.

In spite of these very significant investments, the Ministry of Mines was unable to maintain the momentum of the general recovery in FY 1980-81. As a result, the overall production results were mixed. Some of the major mining operations still suffer from inefficiency and energy shortages, particularly since the last quarter of 1980. Some of the mining sector renovation projects were slow to come online and delayed expected production increases.

The mining sector employed about 69,000 persons, or 0.5% of the active labor force in 1981. Less than 3% of the total mining work force were employed in private or cooperatively owned mines. The remaining 97% worked in the state-owned mining companies. Mining accounted for just over 2% of the net output of goods and services.

The general policy of the Government in regard to the mining industry was that all the economically important mining operations would be owned and operated by the state. Foreign equity investment was not allowed. However, foreign help was accepted on new projects wherever the technology was needed and funding was available. The mining industry had the highest FY 1981-82 goal set by the Government of any sector, to increase production by 31%. The goal could be reached if sufficient petroleum supplies were available during the period.

Over the past 5 years, Burma has enjoyed a modest economic boom and reversed a previous long period of decline. Growth, as measured in gross domestic product (GDP), has averaged 6.5% in the last 5 years and in FY 1980-81 reached 8.3%, the highest since Burma became independent in 1947. In constant 1970 prices, GDP was $2.91 billion in FY 1978-79, $3.07 billion in FY 1979-80, and $3.32 billion in FY 1980-81. In current prices, GDP was $5.62 billion in FY 1980-81.

Inflation has declined to less than 5% in

recent years, providing a measure of stability not seen since 1962. In the unofficial market, however, the inflation rate is higher than 5%. Per capita income has risen 30% in constant-dollar terms to $170 over the last 4 years.

The Government was predicting a modest growth rate of 5.7% for FY 1981-82. Long-term growth will depend on political stability and the flexibility of Burmese economic planners in the face of changing world conditions.

The Government announced the opening of Burma's first metallurgical research and development laboratory after a 20-month construction period. The laboratory is in Ela, 325 kilometers north of Rangoon. The laboratory will be able to do complete mineral analyses and will also help in the training of metallurgists, chemists, and geologists. The Japanese International Cooperation Agency financed the $8.4 million project.

The electric power sector was a key factor in the economic growth of the country. Burmese planners have programed a steady increase in capacity since 1975 and have built a power system composed of a diversified group of generating facilities. The 1981 plants of the state-owned Electric Power Corp. (EPC) were distributed by type and capacity as follows: Hydroelectric plants, 168,000 kilowatts; thermal powerplants, 74,000 kilowatts; gas-turbine plants, 177,000 kilowatts; and diesel plants, 82,000 kilowatts. Burma has by far the highest proportion of gas-turbine-powered capacity of any of the Southeastern Asian countries. In addition to the EPC capacity, other Burmese organizations had a captive generating capacity totaling 218,000 kilowatts in 1981. The total installed capacity of 719,000 kilowatts was a 19% increase over the 1980 capacity.[6] Over 1.2 billion kilowatt-hours of power was generated in FY 1980-81, or 12% more than in FY 1979-80. Much of the transmission system is old and in poor repair, and 27% of the overall power generated was lost in transmission and distribution.

The EPC was striving to lower this excessively high loss factor by renovation and improvement of the distribution network. Capital investment in the power sector in FY 1980-81 was $74 million, or 7.2% of total public investment. The Government plan called for a 20.5% growth in the power sector for FY 1981-82. A number of projects were underway that will contribute to an increase in both the amount of electric power produced and the reliability of the power supply. The continued aggressive growth of the power sector will contribute to the mining industry by making a reliable electric power source available where and when it is needed.

The No. 4 Mining Corp. was abolished in a reorganization of the Government-owned mining companies. The No. 1 Mining Corp. was unchanged and controlled the lead, zinc, silver, and copper output. The No. 2 Mining Corp. picked up the responsibility for the antimony mines and retained control of the tin and tungsten operations. The No. 3 Mining Corp. retained the coal mines and the steel plant and assumed control of the industrial minerals, including limestone, gypsum, and barite. The Government's Myanma Gem Corp. operates independently.

PRODUCTION

In FY 1980-81, the mining sector produced 84% of the Government's planned output. The value of the output of the mineral sector rose for the fifth consecutive year, according to one Burmese Government source.[7] In current prices, the value of nonfuel minerals totaled about $115 million in FY 1979-80 and $120 million in FY 1980-81. In addition, the value of natural gas production in FY 1980-81 was estimated at over $40 million, and crude oil production would be valued at more than $340 million at world market prices. Technical problems at the oilfields restricted production of crude oil in the last quarter of FY 1980-81.

The Government planned a 31% increase in mineral production for 1982. This goal should be relatively easy to achieve considering that the iron pellet plant was completed late in 1981, the Monywa copper project was scheduled to start up in early 1982, and several other mineral projects were to start operating during the year. The main constraint would be if the problems in the petroleum industry were not resolved and fuel shortages restricted the normal operation of the mining sector.[8]

Table 1.—Burma: Production of mineral commodities[1]

(Metric tons unless otherwise specified)

Commodity[2]	1977	1978	1979	1980[p]	1981[e]
METALS					
Antimony, mine output:					
Gross weight	1,331	1,477	1,690	1,094	875
Sb content[e]	530	590	680	440	350
Copper:					
Mine output, metal content	45	56	67	56	77
Matte, gross weight	99	125	148	123	170
Iron and steel: Crude steel[e]	40,000	40,000	--	--	NA
Lead:					
Mine output, metal content[e]	8,250	9,900	14,500	14,200	15,600
Metal:					
Refined including secondary	4,833	4,975	6,237	6,014	7,500
Antimonial lead (18% to 20% Sb)	120	127	185	185	190
Nickel:					
Mine output, metal content[e]	17	18	18	14	15
Speiss, gross weight	69	70	67	57	60
Silver, mine output thousand troy ounces	355	377	340	587	590
Tin, mine output, metal content:					
Of tin concentrate	114	346	573	540	530
Of tin-tungsten concentrate	248	411	660	750	780
Total	362	757	1,233	1,290	1,310
Tungsten, mine output, metal content:					
Of tungsten concentrate	108	189	276	305	275
Of tin-tungsten concentrate	170	282	416	518	540
Total	278	471	692	823	815
Zinc, mine output, metal content	1,834	2,645	3,028	4,079	4,500
NONMETALS					
Barite[3]	16,096	35,320	39,486	39,689	30,000
Cement, hydraulic	269,000	254,000	390,606	386,159	380,000
Clays:[3]					
Ball clay	4,674	4,573	4,294	4,390	4,200
Bentonite	975	1,377	1,446	1,347	1,200
Fire clay[4]	4,627	4,878	4,413	3,711	3,600
Industrial white clay	3,449	2,000	6,876	4,626	4,500
Feldspar[3]	1,422	2,000	2,004	1,689	2,400
Graphite[3]	96	280	268	199	300
Gypsum[3]	33,511	35,431	38,265	37,132	39,000
Pigments, mineral, natural: Iron oxide	230	461	369	330	350
Precious and semiprecious stones: Jadeite[3] kilograms	6,532	12,454	7,707	7,953	8,000
Salt thousand tons	230	304	258	268	270
Stone:[3]					
Dolomite	431	1,616	1,882	2,450	2,600
Limestone, crushed and broken thousand tons	1,159	1,437	1,259	1,151	1,300
Quartz	73	--	122	143	130
Talc and related materials: Soapstone[3]	201	391	394	333	300
MINERAL FUELS AND RELATED MATERIALS					
Coal	23,926	33,113	36,064	26,919	37,000
Gas, natural:					
Gross million cubic feet	16,000	17,000	18,000	[e]24,000	28,000
Marketed[3] do.	8,784	[r]9,892	12,030	20,016	23,000
Petroleum:					
Crude thousand 42-gallon barrels	9,178	9,995	10,822	10,480	11,200
Refinery products:[5]					
Gasoline do.	1,864	1,864	2,008	[e]2,080	2,060
Jet fuel do.	248	[e]280	[e]300	[e]300	300
Kerosine do.	909	744	548	[e]450	570
Distillate fuel oil do.	2,351	2,500	2,626	[e]2,570	2,770
Residual fuel oil do.	1,279	1,532	1,396	[e]1,540	1,610
Lubricants do.	133	140	[e]140	[e]140	140
Other do.	179	[e]223	[e]220	[e]220	220
Total do.	6,963	7,283	7,238	[e]7,300	7,670

[e]Estimated. [p]Preliminary. [r]Revised. NA Not available.

[1]Table includes data available through June 30, 1982.

[2]In 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.

[3]Data are for fiscal years beginning Apr. 1 of that stated.

[4]Includes fire clay powder.

[5]Data exclude products used as fuel in refineries.

TRADE

Total foreign trade has had a dramatic increase in recent years. Exports have improved substantially, and total trade has gone from $400 million in FY 1975-76 to $1,200 million in FY 1980-81 and should reach $1,500 million in FY 1981-82. This would be the first time that trade exceeded in constant-dollar value the levels attained before the Socialist government assumed power in 1962.

The main reason for the improvement has been a large input of foreign capital in the form of concessional loans. These loans have enabled Burma to purchase necessary capital equipment and spare parts to rehabilitate old industries and to create new production capabilities.

In 1979-80, Burma's annual balance of trade was in deficit about $250 million, and a similar deficit was forecast for 1981. The large amounts of loan and grant aid helped offset Burma's trade deficits and provided small net surpluses in overall balance of payments in FY 1979-80 ($67 million) and in FY 1980-81 ($49 million).[9]

According to provisional data, 17% of total exports were minerals and gems, while 23% of imports were classed as raw materials in FY 1979-80. Burma's mineral exports (excluding petroleum products) exceeded $52 million in FY 1980-81 compared with $38 million in the year before. The increases were a result of better world market prices and also expanded sales of silver, lead, copper matte, and zinc and tungsten concentrates.

COMMODITY REVIEW

METALS

Copper.—Burma's plans for greatly increasing its copper production appeared to be going well during 1981. Construction activity at the Government-owned Monywa copper project was reportedly ahead of schedule, and production from the mines and concentrator could begin in early 1982. Currently about 100 tons of copper-in-concentrate is believed to be produced as byproduct from the Bawdwin lead mine each year.

RTB Bor of Yugoslavia is providing the design and technology for the mines and copper concentrator. It will also provide operating assistance in the early startup stages. The Kyesintaung and Sabetaung ore bodies are being developed just west of the Chindwin River, opposite the railhead town of Monywa. Overburden removal at the open pits was well underway. Mining and milling capacity was expected to be 12,000 tons per day of chalcocite ore containing 1% to 1.5% copper. Earlier plans had called for a capacity of 8,000 tons per day. Proved reserves are reported to total 250 million tons.

The No. 1 Mining Corp. of Burma was studying the possibility of constructing a flash smelter for production of blister copper or copper cathodes. Estimated cost would be $30 million, and the output would be for export.

Iron and Steel.—In October 1981, the Danieli Co. of Italy completed a 20,000-ton-per-year-capacity Kinglor Metor direct-reduction steel plant. The plant is located in northern Burma at Anisakan in Maymyo Township and is the first commercial application of this noncoking-coal and natural gas-based direct-reduction process outside Italy. A nearby iron ore mine with a small reserve of good ore will supply the plant. Coal, limestone, and natural gas will also be supplied from domestic sources. A 15- to 17-ton-capacity electric arc furnace was apparently still under construction at yearend.

In November 1981, Burma reportedly signed a contract with Danieli for a second direct-reduction stage, doubling the plant's capacity to 40,000 tons per year. In addition, an outdated steelmaking plant will be replaced. The second stage will incorporate a two-strand continuous-casting line for billet production. The completed plant will have a capacity of 25,000 tons per year of reinforcing rods and will supply most of Burma's needs for pig iron.

Lead, Zinc, and Silver.—The Bawdwin mining complex at Namtu in northern Shan State is Burma's only source of lead and zinc ore and refined silver. In FY 1980-81, the mine produced about 250,000 tons of ore assaying 4% zinc, 5% lead, and about 4 ounces of silver per ton of ore. In recent years, the refining capacity of the smelter at Namtu has dropped significantly, lowering the overall productivity of the Bawdwin complex. A new refinery was completed early in the year, and opening ceremonies were conducted by the Minister of Mines on

April 2, 1981.

According to No. 1 Mining Corp. officials, the new plant will handle 500 tons of ore per day and produce 3,000 tons of zinc concentrate, 2,300 tons of refined lead, and 160,000 ounces of silver annually. The Ministry of Mines financed the new facility through a loan from the Federal Republic of Germany. It took 3 years to complete and replace the old smelter, which was built at the turn of the century.

The No. 1 Mining Corp. still had plans to change the underground mine to an open pit operation. The high-grade ore zones have been worked out, but there is still a considerable tonnage of lower grade ore that is readily minable by open pit methods. Conversion to open pit mining would allow an increase of about 60,000 tons per year of ore production.

Tin and Tungsten.—The No. 2 Mining Corp. under Burma's Ministry of Mines took delivery of its new offshore tin dredge Heinze. The dredge was constructed by Far East Livingston Co. of Singapore. Design problems were encountered, and the dredge required extensive alterations. It presumably operated along the Tenasserim coast in southern Burma at least during the last of the fair weather season in 1981.

The Burmese Government officially reported the completion in FY 1980-81 of the Heinda Mine expansion project under the No. 2 Mining Corp.[10] The mine and equipment were ready for a test run and were expected to have an output of 1,000 tons of tin concentrate per year. The mine is located 35 miles east of Tavoy in southern Burma.

The Heinda fossil placer tin deposit is an unusual, tightly cemented series of coarse to fine conglomerate layers. Each ore layer is about 8-meters thick and grades from very coarse at the base to sand and clay at the top. The cassiterite occurs mostly in the coarse basal material. This causes problems in handling the ore horizon, which contains solid granite boulders up to 2 meters in diameter. The entire deposit requires drilling and blasting, and the bigger boulders require secondary blasting. The distribution of the cassiterite in the ore body is highly uneven, varying from 0.05 to 3.0 kilograms SnO_2 per cubic yard. In addition, there is a very wide range of cassiterite grain sizes evenly distributed from 150 millimeters down to 0.075 millimeter causing further complications in the milling process. Reported recoverable ore reserves were put at about 7,000 tons of contained tin metal at Heinda.

The nearby underground Hermyingyi Mine was being rehabilitated, and a detailed ore reserve estimate was being made by the Department of Geological Survey and Mineral Exploration.

Construction began in 1981 on a small (1,000-ton-per-year) tin smelter in Syriam, a southeast suburb of Rangoon. The work was being done with financial and technical assistance from North Korea. Most of the plant's output will be exported and will provide a considerable increase in foreign exchange earnings to the Burmese Government.

The Department of Geological Survey and Mineral Exploration continued a comprehensive survey of the tin and tungsten resources of southern Burma both onshore and offshore.

The FY 1981-82 plan called for production of 1,750 tons of 65% SnO_2 concentrate and 700 tons of 65% WO_3 concentrate. The plan also called for an output of 700 tons of mixed tin-tungsten concentrates. Statistics for the first 8 months of calendar 1981 showed production was proportioned quite differently from the plan. Tin concentrates totaled just over 400 tons and tungsten concentrates just under 400 tons. The mixed tin-tungsten concentrates, however, came to nearly 1,600 tons by the end of August.

The officially reported tin and tungsten production figures are believed to be far less than the actual tonnage mined in Burma each year. Many of the small mines are operated by tribute miners and are located in remote rugged jungle terrain. Political instability in the mining area and a very low price paid to the miners for the tribute concentrates combine to make smuggling both easy and profitable. Some sources believe the true output to be nearly double the official figures.

NONMETALS

Burma began to develop its nonmetallic minerals after 1962 in an effort to become self-sufficient in a number of key areas and to promote local ceramic and cement industries. With the exception of some specialized clays used in ceramics and barite production, this effort has been highly successful, and over the long term, there have been steady production increases.

Barite.—Burma's barite comes from the Maymyo area in Mandalay Div., where this mineral has been extracted over the past decade. Burma mines barite principally to supply the domestic petroleum sector, but

neither the No. 3 Mining Corp. nor the Myanma Oil Corp. (MOC) operates an efficient barite mud production facility. The Canadian International Development Agency had originally planned to construct such a plant and to upgrade the barite mining operation but dropped the project 2 years ago.

Since that time at least one U.S. firm has expressed interest in building such a facility, but negotiations over the price and Burmese difficulties in moving the ore from northern Burma to Rangoon have stalled the discussion.

Fertilizers.—Burma produces urea fertilizer from natural gas at plants in Pagan and Sale. Consumption, however, has gone up faster than production in recent years, and increasing amounts of expensive nitrogenous fertilizers have had to be imported. The Government authorized construction of additional capacity in order to reduce imports and use more of Burma's abundant natural gas resources. It was reported in September 1981 that Petrochemical Industries Corp. of Rangoon awarded a contract to UHDE GmbH of the Federal Republic of Germany to engineer and procure equipment for an ammonia and urea plant complex to be built at Kyawzwa, near Prome, about 350 kilometers north of Rangoon. Urea production capacity is to be 200,000 tons per year. Scheduled completion is for late 1984.

Other Nonmetals.—Limestone and gypsum are mined for cement production, and roughly 90,000 tons of crude clay is used for brick production each year. A French-financed, 200,000-ton-per-year cement plant was under construction during 1981 at Paan in Karen State about 170 kilometers east of Rangoon. In addition to the new mill, the Burmese Government reported that an extension project at the old Kyangin cement mill was progressing on schedule.[11] The report did not explain if new capacity was being added or if the old plant was being reconditioned.

MINERAL FUELS

Coal.—Burma exploits some small deposits of poor-quality coal. The new steel plant reportedly will use this domestic coal in the direct-reduction process. Production from the Kalewa coal mine, the country's largest, presumably will increase as steel production gets underway.

Natural Gas.—Natural gas use has increased at a substantial rate and will continue to do so as more industries take advantage of its relatively low cost and abundance. Several new gas-turbine electric generators were completed during the year, and three 18,000-kilowatt units are planned for completion in 1982. Natural gas also powers a widening variety of industries. Completion of the direct-reduction steel complex should boost consumption of natural gas even further in 1982. The FY 1981-82 plan called for consumption of over 23 billion cubic feet.

Petroleum.—Burma's oil industry ran into serious production problems at the end of FY 1980-81. Press reports indicated that the Mann Oilfield, the country's largest, was overproduced in an effort to increase output beyond its optimum flow. As a result, gas pressurization was reduced and considerable water was mixed with the oil. Official production figures use wellhead flow which includes the water content. Actual crude oil production may have been 10% less than official data.

The production loss came at a time of increasing demand and caused economic hardships, stalled a number of major development projects, and forced the Government to introduce fuel rationing in Rangoon.

Not only was the domestic economy affected, Burma's reemergence as an oil-exporting nation was upset as the Government was unable to fulfill a 1-million-barrel crude oil export contract with Japan. Export of a heavy semirefined fuel oil from the Chauk refinery was unaffected, however, and deliveries to Japan and North Korea continued.

To avoid problems of paying for expensive foreign oil, Burma has refused to import crude oil or refinery products since 1975. Lubricants and aviation fuel, not produced in the country, were imported in small amounts.

The newly completed 6,000-barrel-per-day extension of the 26,000-barrel-per-day Syriam refinery was closed early in 1981 because of the crude oil shortage.

Construction continued on the much delayed 25,000-barrel-per-day refinery at Mann. The plant, under construction by Mitsubishi Heavy Industries of Japan, was rescheduled for completion in late 1982. It now faces the prospect of insufficient crude oil feed if there is no significant increase in the current production rate.

Not all of the news was bad during the year. According to the Prime Minister, MOC has made three important onshore strikes. Two of the strikes were at Tantabin

and Kyontani villages in the northern Irrawaddy Delta. These discoveries mark the first time petroleum and gas have been found in limestone reservoirs in Burma. Four of nine wells at Tantabin struck oil and gas. The oil is sulfur-free and has a gravity of 48.5° API. One well drilled at Kyontani to a Burmese record depth of 4,100 meters struck a 105-meter-thick limestone horizon with recoverable oil and gas reserves and similar characteristics to the Tantabin structure.

The third strike was at Tuyintaung, 8 kilometers east of Pagan in central Burma. The well struck sulfur-free 30.4° API gravity crude from six oil- and gas-bearing sands between 2,440 and 2,990 meters deep. Considerable evaluation work will be necessary to determine the commercial viability of these discoveries.

After 4 years without drilling offshore, Burma is to resume its search by testing the Gulf of Martaban area. Protracted negotiations between the Government and the Japanese National Oil Corp. (JNOC) have resulted in an agreement to form a joint venture to explore four offshore concession blocks south and east of Rangoon. JNOC and 11 private Japanese companies were to work with MOC under a complicated financing arrangement. The consortium was hoping to begin drilling early in 1982. Twenty offshore wells were drilled in 1975-76 with no commercial oil being found. Some natural gas was found but in a location impractical for exploitation.

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[1]Physical scientist, Division of Foreign Data.

[2]U.S. Embassy, Rangoon, Burma. Industrial Outlook Report—Minerals. State Department Airgram A-36, July 13, 1981, p. 2.

[3]Burmese fiscal year runs from April 1 to March 31.

[4]Where necessary, values have been converted from Burmese kyats (K) to U.S. dollars at the rate of K6.62=US$1.00.

[5]Ministry of Planning and Finance. Report to the Pyithu Hluttaw on the Financial, Economic, and Social Conditions of the Socialist Republic of the Union of Burma for 1981-82. 1981, p. 242.

[6]Page 130 of work cited in footnote 5.

[7]Page 21 of work cited in footnote 5.

[8]Central Statistical Organization, Rangoon, Burma. Selected Monthly Economic Indicators. Statistical Paper 3, July-August 1981, p. 31.

[9]U.S. Embassy, Rangoon, Burma. Foreign Economic Trends and Their Implications to the United States. FET 81-069, July 1981, p. 4.

[10]Page 242 of work cited in footnote 5.

[11]Page 244 of work cited in footnote 5.