

# THE MINERAL INDUSTRIES OF CAMBODIA AND LAOS

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## Cambodia

Cambodia's mineral resources had not been extensively explored and developed in the past two decades because of war and internal conflict. According to the Government, however, earlier geologic investigations and studies by Chinese and French geologists had indicated that Cambodia has potential for a wide variety of minerals. The potential minerals included such metallic minerals as antimony, bauxite, chromium, copper, gold, iron ore, lead, manganese, molybdenum, silver, tin, tungsten, and zinc; such industrial minerals as clays, construction aggregates, dolomite, fluorite, gemstones, kaolin, limestone, phosphate, quartz, silica sand, sulfur, and zirconium; and such mineral fuels as coal, lignite, and peat (Asian Journal of Mining, 2000a).

In recent years, Cambodia's mining sector was involved only in quarrying construction aggregates, crushed stones, and sand and gravel, as well as mining small quantities of gemstones, gold, iron ore, phosphate rock, and zirconium. None of Cambodia's potential minerals or produced minerals was of world significance. According to Cambodia's Government statistics, the output of the mining sector accounted for only 0.16% of the country's gross domestic product (GDP) in 1999. Cambodia was a net importer of minerals. The major imported mineral commodities were, in decreasing order of significance, refined petroleum products, gold, cement, steel, and construction materials (International Monetary Fund, 2000a, p. 4, 26).

In past years, the economy of war-torn Cambodia was sustained largely by financial assistance provided by such organizations as the Asia Development Bank, the International Monetary Fund, and the World Bank, as well as by donor assistance from foreign governments and nongovernmental organizations. In the first half of the 1990's, the country's real GDP grew at an average annual rate of 6.2% as a result of increased foreign investment in the textile, tourism, and wood-processing industries. Because of a substantial cutback in investment by the major foreign investors from China, Hong Kong, the Republic of Korea, Malaysia, Singapore, Thailand, and Taiwan, as well as a regional economic downturn that resulted from the 1997 financial crisis, however, Cambodia's real GDP growth slowed to about 1% per year in 1997 and 1998 (Far Eastern Economic Review, 2000a). According to the Cambodia Development Resources Institute, the country's real GDP growth was estimated to be 5.0% in 2000 compared with 4.5% in 1999. The continued growth of output and exports in the textile (including garments) industry and the continued growth in the tourism industry were cited as the main contributing factors of the country's economic growth in 1999 and 2000 (Far Eastern Economic Review, 2001a). In 2000, Cambodia's GDP was estimated to be \$3.3 billion (International Monetary Fund, 2000a, p. 34).

In 2000, mining and quarrying activities were limited to about 10 companies that engaged in mining gold and iron ore and about 7 companies, in quarrying construction aggregate and sand and gravel mainly in the Kampong Speu area (Far Eastern Economic Review, 2001b). The major operating companies were Slin Trading Co. at the O Trom and the Sre Char areas in Kratie Province for gold; Brewer Co. Ltd. in the northeastern part of Ratanakiri Province for gold and zirconium; and Delcom Cambodia Co. at the Bo Sub Trup (gold) and the Phnom Dek (iron ore) areas in Preah Vihear Province (Asian Journal of Mining, 2000). Crushed stone, sand, and gravel were produced mainly from the Kampong Speu area in Kampong Speu Province.

Cement was produced and marketed by Naga Cement Ltd., which was a group company of Holderbank of Switzerland. In 2000, ordinary portland cement was imported from Siam City Cement Co. of Thailand and distributed under the Bayon brand by Naga Cement to meet domestic cement requirements (Cambodia-Web, 2001, Naga Cement, accessed March 20, 2001, at URL <http://www.cambodia-web.net/industry/nagacmnt>). By yearend, a new cement plant with an annual capacity of 50,000 metric tons was expected to come on-stream in Kampot Province. The new cement plant was a joint venture of Boon Ronng Group of Thailand (62.5%) and Yuan Wang Group of China (37.5%).

## Laos

Laos' mineral resources were barite, coal, copper, gemstones, gold, gypsum, iron ore, lead, silver, tin, and zinc. Based on the limited geologic mapping and geochemical and geophysical surveys, 479 mineral occurrences on the 1:1,000,000-scale map had been compiled by the British Geological Survey and published by the United Nations Economic and Social Commission for Asia and the Pacific (1990). According to the Department of Geology and Mines, coal, copper, gemstones, gold, iron ore, lead, potash, tin, and zinc were the potential minerals for further exploration (Asian Journal of Mining, 2000c). Other minerals, such as bauxite, carbonate rocks, gypsum, and phosphate rock also have potential (Mining Magazine, 1992).

In 2000, barite, coal, construction aggregates, gemstones, gold, gypsum, limestone, rock salt, sand and gravel, and tin were produced for domestic consumption and export. Limestone and gypsum were further processed into cement and chalk. With the exception of gypsum and tin, most of the minerals production was small. None of Laos' mineral production was of world significance. According to Laos' latest Government statistics, the output of the mining and quarrying sector in 1998 accounted for 0.42% of the country's GDP, which was estimated to be \$1.4 billion (International Monetary Fund, 2000b, p. 32). In mineral trade, barite, gemstones,

gypsum, and tin were the major export mineral commodities. Cement, gold, refined petroleum products, and steel products were the major import mineral commodities.

Laos' economy, which had experienced hyperinflation (triple digit) and sharp currency depreciation in 1998 and 1999, stabilized considerably in 2000. The Government had slowed the inflation to an annual rate of 30% by capping salaries and curbing imports and had strengthened the national currency by officially pegging the kip at 7,820 to the U.S. dollar in early 2000. According to the Asian Development Bank, Laos' real GDP was estimated to have grown by 4.5% in 2000 compared with 4.0% in 1999 (Far Eastern Economic Review, 2000b).

Laos' mining industry was dominated by the production of gypsum and tin. Other mineral commodities produced in Laos were barite, coal, and sapphire. Gypsum was produced by the State Gypsum Mining Enterprise from the Dong Hene Mine in Savannakhet Province. About 95% of the output was exported to Vietnam. Gypsum production increased considerably in the past 2 years because of increased demand by the Vietnamese cement industry. The State Tin Mining Enterprise produced tin from the Nam Pathene Valley in Khammouan Province; several small alluvial tin mines were also located in the Province. Tin ores were concentrated at two joint-venture plants that used North Korean and Russian technology. All tin concentrate, which graded 70% tin, was exported. Coal was produced by the State Coal Mining Enterprise (SCME) from the Chakeui Mine (anthracite) in Salavan Province, the Hongsa Mine (lignite) in Sayaboury Province, and the Muong Ngeum Mine (lignite) in Louangnamtha Province. All coal output was for domestic consumption mainly by the cement plant. The SCME also produced barite from the Na Ang (Nalang) Mines in the Muong Feuung Valley in Vientiane Province. All barite output was exported to Thailand. Sapphire was produced by the State Sapphire Mining Enterprise and individual miners from placers at the Ban Houei Xai in Bokeo Province. Most cut sapphire was exported to Australia and Thailand (Asian Journal of Mining, 2000c, p. 12-13).

Laos' first cement plant with a capacity of 73,000 metric tons per year (t/yr), which was at Vang Vieng in Vientiane Province, began production in 1994 (United Nations Economic and Social Commission for Asia and the Pacific, 1995, p. 122). In January, construction work on the second cement plant, which would have a capacity of 200,000 t/yr, was started at Vang Vieng; it was expected to come on-stream by early 2001. The \$36 million project was a joint venture of Agricultural and Forestry Development and Services Company of Laos (40%) and Yunnan International Economic-Technical Cooperation Company of China (60%) (Vientiane Times, January, 2000, Second cement plant foundation-stone laid, accessed March 3, 2001, at URL <http://www.laoembassy.com/vtimes/year2000/jan2000.htm>).

In minerals exploration, Lane Xang Minerals Ltd., which was a wholly owned subsidiary of Rio Tinto Ltd., had been exploring for copper and gold in the Sepon area in Savannakhet Province since 1992. In July 2000, the Government approved the acquisition of an 80% interest in the Sepon copper-gold project by Oxiana Resources NL from Rio Tinto (Asian Journal of Mining, 2000d). In May, Oxiana Resources appointed a general manager to undertake a bankable feasibility study for subsequent development so that the mine could produce 40,000 t/yr cathode copper by using solvent extraction-electrowinning and 3,732 kilograms per year of gold for 14 years; the study was

to be completed by mid-2001. The copper resources of the Sepon main deposit (Khanong), mostly chalcocite mineralization, were estimated to be 41.1 million metric tons (Mt), which grade 2.4% copper, using a 0.5% cut-off grade and more than 99,531 kilograms (kg) of contained gold (Asian Journal of Mining, 2000b, p. 13-14).

In September 2000, Pan Australian Resources NL (PARNL) had acquired 80% interest in Phu Bia Mining Ltd. (PBML) from Normandy Anglo Pte. Ltd. PBML, which was a 50-50 joint venture between Normandy Mining Ltd. and Anglo American Plc, had a mineral exploration and production agreement with the Government of Laos, which held 20% interest in PBML (Asian Journal of Mining, 2000a). PBML's main project within the contract area was the Phu Kham project, which is located 100 kilometers northeast of Vientiane, where the inferred copper and gold resources were estimated to be 125 Mt, of which 40 Mt was oxide ore that grades 0.5% copper and 85 Mt was sulfide ore that grades 1% copper. According to PARNL, check assays and metallurgical tests at the Phu Kham copper deposit in Laos indicated that early development may be possible (Metal Bulletin, 2000).

In mid-2000, the Government signed an agreement with Padaeng Industry Co. Ltd. (PICL) of Thailand for zinc exploration in a 12-square-kilometer area north of the Kaiso deposit near Vang Vieng. PICL, which had been exploring for zinc at the Kaiso deposit since 1998, was scheduled to start mining zinc at the deposit in November (Mining Journal, 2000). The measured resources at the Kaiso deposit were estimated to be 30,000 metric tons that grade 46% zinc using a cut-off grade of 20% zinc (Padaeng Industry Public Co. Ltd., 2000, Regional exploration—Kaiso Project, accessed April 4, 2001, at URL <http://www.padaeng.co.th/expl.htm>).

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## **Major Sources of Information**

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TABLE 1  
CAMBODIA AND LAOS: PRODUCTION OF SELECTED MINERAL COMMODITIES 1/

(Metric tons)

Country and commodity	1996	1997	1998	1999	2000
CAMBODIA 2/					
Cement, clinker e/	200,000	200,000	300,000	300,000	300,000
Salt e/	40,000	40,000	40,000	40,000	40,000
LAOS 3/					
Barite	--	--	9,050	6,600	9,000
Coal, all grades	74,686 r/	97,352 r/	86,081 r/	190,461 r/	210,000
Cement	78,000 r/	84,000 r/	80,000 r/ e/	80,000 r/ e/	80,000
Gemstones	carats 95,000 r/	211,511	40,960 r/	126,070	150,000
Gold, mine output, Au content	grams 6,000 r/	24,755	--	--	--
Gypsum	113,000 e/	114,306	130,250	134,745	154,000
Limestone	--	113,855	68,892	66,549	200,000
Salt, rock e/	1,400	1,800	3,894 4/	4,000	4,000
Tin, mine output, Sn content	1,056 r/	717 r/	627 r/	492	600

e/ Estimated. r/ Revised. -- Zero.

1/ Table includes data through May 11, 2001.

2/ In addition to the commodities listed, clays, lime, phosphate rock, and crude construction materials, such as sand and gravel and varieties of stone, presumably are produced, but available information is inadequate to make reliable estimates of output levels.

3/ In addition to the commodities listed, crude construction materials, such as sand and gravel and varieties of stone, presumably are produced, but available information is inadequate to make reliable estimates of output levels.

4/ Reported figure.

Sources: Ministry of Industry and Handicraft, Department of Geology and Mines. Asian Journal of Mining, Asian Mining Yearbook (11th ed.), 2000, p. 13.