

THE MINERAL INDUSTRY OF

VIETNAM

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Economic slowdown was marked by the 8% to 9% growth of the gross domestic product (GDP) compared with 9.3% in 1996. The Government planned to speed up privatization of state-owned enterprises, strengthen the debt-laden financial sector, and further liberalize the trade policy. It achieved price stability and low inflation through a tight monetary program that relied mainly on credit controls. The State Bank of Vietnam lowered the ceiling on lending rates to spur economic growth. The current-account deficit was expected to be 12% of GDP. Currency turmoil in Southeast Asia activated the second devaluation of the dong in 1997.

The World Bank pledged \$95.8 million in loans to Vietnam, of which \$73 million would be for an inland waterway and port rehabilitation project in the Mekong Delta and \$22.8 million, for a forest-protection and rural-development project in the central provinces. International donors also pledged \$2.38 billion in development aid to Vietnam. The country and its companies turned to international markets to raise much-needed capital. Foreign investment declined in 1997 as the region's financial crisis deepened. Through September, licenses were granted to 248 projects with a total capital investment of \$3 billion. In order to encourage more foreign investment, the Government provided more incentives.

The country's new mining law was issued in November 1996. It offered a few incentives and did not grant investment licenses simultaneously with exploration permits. The law imposes a special right to apply for a mining license once exploration has established a viable find. For gold, a provision limits the size of an exploration license to 50 square kilometers (km²) and for base metals; the maximum is 100 km². The law also allows the Government to ban certain minerals from being exported, a move intended to encourage onshore minerals processing. Another provision gives the state-owned mining companies favorable conditions to take a leading role in the mining industry.

Child slavery was found in Vietnamese gold mines (Mining Journal, 1997b). Investigations discovered more than 80 children being used as cheap labor in gold mines, 150 kilometers (km) north of Hanoi. In another case, a raid on an illegal gold mine near the Laotian border found 15 teenaged boys working under poor conditions. Mine accidents occurred in 1997. Landslides triggered by heavy rain at two gold mines near Danang in central Province of Quang Nam killed 54 people (Mining Journal, 1997e).

China's direct investment in Vietnam was \$79 million in 41 projects which were modest ventures. China planned to lend \$170 million to refurbish and upgrade the Thai Nguyen Iron & Steel facility in Thai Nguyen Province, north of Hanoi, but was waiting for a feasibility study on the new steel plant. No progress

was made.

A preliminary feasibility study on the practicality of constructing a \$400 million aluminum plant in the central highland Province of Lam Dong was being conducted by Vietnam Minerals Corp. On the basis of bauxite reserves of 300 million metric tons (Mt) from a local mine (Mining Magazine, 1997), the proposed smelter and refinery were projected to produce from 150,000 to 200,000 metric tons per year (t/yr) of alumina and between 75,000 and 100,000 t/yr of primary aluminum with technology provided by Pechiney of France. The company might borrow from domestic and foreign sources to fund the project. In another development, Daewoo Corp. of the Republic of Korea was considering investment in a \$1 billion integrated aluminum casting project in the central highlands. A survey of two bauxite reserves in Daklak Province was to be conducted. Development of an alumina plant with a capacity of 1 million metric tons per year (Mt/yr) was planned for 2000. Construction of a powerplant and an upgrade of transport links from the area were to be considered. A feasibility study of the project was planned to begin in September 1997.

Palmer Resources of Canada, through its Vietnamese subsidiary Canexco, was exploring copper mineralization in Bac Giang Province. The company secured three exploration licenses for the Cam Son, Lang Cha, and Bien Dong areas. The primary copper sulfides were found to be chalcocite with minor bornite and rare chalcopyrite. The company began geologic mapping, geophysical surveying, trenching, and sampling in February.

Indochina Goldfields Ltd. of Singapore sold its interest in adjoining gold exploration prospects at Bong Mieu and Tien Ha in central Vietnam for \$7.5 million to Olympus Pacific Minerals Inc. of Canada. The exploration properties cover a combined area of 10,000 km². Olympus Pacific was in a joint venture with Iddison Group Vietnam Ltd. of New Zealand to explore the Na Pai gold prospect in northern Vietnam. These three companies also set up a joint venture to conduct exploration work in the Phuoc Son area.

The country's steel output was 1.3 Mt in 1997. Steel imports dropped to 300,000 metric tons because the Government banned the import of some steel products. Steel demand was projected to be 7.7 Mt/yr by 2010, and anticipated production would reach 7.4 Mt/yr. Vietnam Steel Corp., Krupp AG of Germany, Billiton of South Africa, and Mitsubishi Corp. of Japan were to develop a 10-Mt/yr iron ore operation at Thach Khe in Ha Tinh Province, 350 km south of Hanoi. Feasibility studies on the \$1 billion project indicated reserves of more than 300 Mt with ore grades of up to 60% iron (Mining Journal, 1997d) and with an unacceptably high zinc content of 0.07%. The deposit has a structural complexity and a high water table. The consortium withdrew a \$1.75 million

drilling program. Consequently, the Government abandoned the project and planned to import iron ore from Australia, Brazil, or India. Vietnam Steel had hoped to supply a future direct reduced iron plant in Ba Ria-Vung Tau Province with 1.5 Mt/yr of iron ore from Thach Khe.

Japanese International Cooperation Agency proposed a \$5.4 billion master plan to build a massive steel works in Vietnam. The project involved \$4 billion for steel-tempering support processes, \$1.1 billion for a laminated steel plant, and \$300 million for building a production line for shaped steel bars. The melt capacity of the works would be 4.5 Mt/yr, and output would be divided into 3 Mt/yr of flat products and 1.5 Mt/yr of billets.

Sheng Yu Steel Co. of Taiwan would jointly invest with its parent company, China Steel Corp., and Vietnam Steel Corp. in a \$90 million cold-rolled steel plant in Ho Chi Minh City. The partners expected the project to be approved by the Government by October 1997 and construction to begin in mid-1999. The plant with a planned production capacity of 250,000 t/yr of steel coil was slated to be operational by late 2000.

A preliminary feasibility study conducted by Mintek of South Africa for Golden Tiger Resources of Australia on the Na Tum manganese project indicated that the resources could provide for the production of high-grade electrolytic manganese dioxide. The project was based on an inferred resources of 12.76 Mt at a grade of 9.95% Mn with small amounts of silver, lead, and zinc (Mining Journal, 1997a). Reserves were sufficient for a 20-year mine life, and capital costs were estimated to be \$35.4 million. If the project were developed, then Golden Tiger Resources could initially produce 5% of the total annual consumption in the country.

Tiberon Minerals Ltd. of Canada formed a strategic alliance (50-50) with Vietnam Resources Corp. Ltd. (VRC) to explore and develop mineral projects in Vietnam. The Niu Phao tin-copper project in North Vietnam, 90 km north of Hanoi, was being mined by open-pit by Bac Thai Mineral Co. at a rate of 100 metric tons per day. Mineralization observed in the open pit consists of a massive sulfide zone more than 20 meters (m) thick and at least 150 m long. Tiberon and VRC were to begin a delineation program on the existing mineralized zone and an exploration program over the entire property. The partners could earn 70% of the project by completing a positive final feasibility study. Exploration of the Coi Ky lead-zinc-silver-gold project was begun in December 1996 by the partners. Geologic mapping of a strata-bound massive sulfide deposit was completed in spring 1997.

Spectrum Resources of New Zealand encountered high-grade nickel intercepts at its Ban Phuc prospect on the Ta Khoa concession, 200 km west of Hanoi. The company planned a 16-hole, 2,000-m diamond drilling program and found evidence of further nickel-copper-cobalt mineralization on the property. Spectrum Resources holds a 70% interest in the concession, and the remaining 30% is shared by the Government and Son La Province.

Banpu Public Co. Ltd. of Thailand was to begin production of calcium carbonate from a new plant in Vietnam in January 1998. The plant is a joint venture with a Vietnamese partner. Capacities were expected to be 280,000 t/yr at the crushing plant and 15,000 t/yr at the grinding facility. The bulk of the lump and chip calcium carbonate produced would be sold throughout the

Southeast Asia. The ground calcium carbonate was to be marketed in Vietnam.

Japan Vietnam Fertilizer began building a 350,000-t/yr fertilizer plant at Long Thanh, 70 km from Ho Chi Minh City. The company is a joint venture of Nissho Iwai (60%) and Central Glass (10%), both of Japan, and Southern Fertilizer Co. (30%) of Vietnam.

Vietnam was reported to have total coal reserves of 6,600 Mt, including 100 Mt of lignite (Mining Journal, 1997c). Vinacoal controlled 3,400 Mt of proven reserves of anthracite and semi-anthracite. Quang Ninh Province, the country's coal producing center, is the location of the main Vinacoal companies and smaller companies within Vinacoal. Vinacoal also controls the Interior Coal Co. which operates mines outside Quang Ninh Province. Vinacoal controls two coal-loading facilities at Cam Pha and Hon Gai, both on Halong Bay in Quang Ninh Province.

In coal mine development, the 0.6-Mt/yr Dong Vong-Uong Tuong Mine, a joint venture between Uong Bi Coal Co. and Vietminco, started production in 1997. Vinacoal secured a foreign loan of \$20 million to upgrade equipment and to increase production. The new Hon Gai coal-washing plant, which had a designed throughput capacity of 2 Mt/yr and was built by Bulk Materials Coal Handling, part of Birtley Engineering of Australia, produced 1.2 Mt/yr of clean coal.

A large resource of subbituminous/brown coal was found south of Hanoi in the Red River basin. Effective in 1997, Vinacoal was to handle all coal-export deals, including the Hongay anthracite previously exported by Mine Coal Quang Ninh of Quang Ninh Province. Vinacoal would be responsible for all contract negotiations with consumers and traders in foreign countries on all types of Vietnamese coal. Coal production grew at an average rate of 10.3% per year, was 10 Mt in 1997, and would be 12 Mt by 2000. Coal exports were expected to increase from 3.6 to 4 Mt/yr by 2000. Exports were mainly to China, Japan, and other Southeast Asian countries.

An explosion set off by a hand grenade inside a coal mine killed three miners and seriously wounded a fourth in January. The blast took place at the Hon Gai Coal Co. coal mine in Quang Ninh Province near the Chinese border. It might have been the result of a dispute between coal miners and the mine management (Journal of Commerce, 1997).

PetroVietnam signed an oil exploration deal with Opeco of the United States and International Petroleum Corp. of Canada for offshore Block 12E. In case of any discovery, PetroVietnam would hold up to 15% of a production-sharing contract. Fina Exploration Minh Hai, in a joint venture with SODEC Vietnam, discovered oil and gas in a well in Block 51 and in three wells in Block 46, both offshore southwest Vietnam. Fina Exploration Minh Hai is a subsidiary of PetroFina and has a 75% interest in the blocks, and SODEC Vietnam is an affiliate of Showa Shell and has a 25% stake. In Block 15-1, a four-company consortium was trying to work out a pact with PetroVietnam to explore for oil. They included Conoco of the United States, Pedco and Yukong of the Republic of Korea, and Geopetrol of France.

PetroVietnam went ahead alone with the \$1.3 billion project to build the country's first oil refinery with a capacity of 130,000 barrels per day at Dung Quat in Quang Ngai Province. The refinery was due to begin operation in 2001 and would have an

output of 65 Mt/yr. Total of France pulled out of the project in 1996, citing that the remote coastal site lacked infrastructure and was 1,000 km from the oilfields in the south. A consortium of six foreign companies completed a feasibility study and requested a number of incentives to help attract bank support. The incentives included tax exemptions, the right to export the refined product, and the ability to market and sell it domestically. The state oil company, however, rejected the conditions of the proposal and planned to fund 60% of the project with domestic capital, as well as hard currency crude oil revenues of \$150 million per year from a Russo-Vietnamese oil extraction venture in which it holds a 30% stake. The remaining 40% would be financed by foreign loans. The Asian Development Bank ruled out lending money to PetroVietnam for the project. PetroVietnam would open bids to choose a consulting firm from local and foreign companies.

The World Bank predicted a 15% per year growth in electricity demand in Vietnam. Hydropower accounted for 62% of its electricity supply. The country desperately needed natural gas to feed its demand for electricity. In 1993, a partnership between British Petroleum (BP) of the United Kingdom and Statoil of Norway discovered commercially viable quantities of natural gas at 57 billion cubic meters (Far Eastern Economic Review, 1997). Mobil of the United States was involved with the BP-Statoil partnership in pipeline discussions, and other firms were negotiating build-operate-transfer terms for several gas-fired powerplants at the southern Phu My Complex.

Energy Australia Ltd. negotiated a \$20 million joint venture with Vietnam's Power Co. No. 3 to upgrade a power grid in the central region of Danang and Hue. The Danang grid covers a

population of 10 million with an installed capacity of 250 megawatts. Energy Australia's main contributions were cash and technology.

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Major Sources of Information

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Ministry of Power and Coal
Hanoi, Vietnam

TABLE 1
VIETNAM: ESTIMATED PRODUCTION OF MINERAL COMMODITIES 1/

(Metric tons unless otherwise specified)

Commodity 2/	1993	1994	1995	1996	1997	
Bauxite, gross weight	6,000	6,500	6,500	6,500	7,000	
Cement, hydraulic	thousand tons	4,200	4,700	5,200	5,700	6,000
Clays, kaolin	800	1,000	1,000	1,000	1,100	
Coal, anthracite	thousand tons	6,000	6,100	7,200	7,500	7,600
Gold	kilograms	10,000	10,000	10,000	10,000	10,000
Gypsum	30,000	30,000	30,000	30,000	30,000	
Nitrogen, N content of ammonia	51,700 3/	53,000	52,000	53,000	54,000	
Petroleum, crude	thousand 42-gallon barrels	44,895 3/	51,100 3/	55,000	58,000	60,000
Phosphate rock:						
Gross weight	thousand tons	362 3/	470 3/	480	480	490
P ₂ O ₅ content	do.	116	144 3/	145	145	146
Salt	do.	350	375	375	375	390
Steel, crude	do.	270 3/	300 3/	320	320	330
Tin:						
Mine output, Sn content	3,500	4,000	4,500	4,500	4,700	
Metal, smelter	2,500	2,500	2,800	2,800	2,900	
Zinc:						
Mine output, Zn content	15,000	15,000	15,000	15,000	15,000	
Metal, smelter, primary	10,000	10,000	10,000	10,000	10,000	

1/ Table includes data available through April 24, 1998.

2/ In addition to the information listed, iron ore was mined in the past, and pig iron was produced at industrial facilities, but the status of these industries under prevailing conditions was not sufficiently clear to allow formulation of reliable estimates of output levels. Similarly, data on output of crude construction materials are not available, and no basis is available to make reliable estimates of output level.

3/ Reported figure.