

CUBA

By Gerald M Ellis

Cuba has seen a history of mining extending over a period of three hundred years. Luis Soto Gonzalez' work, published in 1981 in Santiago de Cuba, describing the history of mining in the country, presents a year-by-year and decade-by-decade record of the principal mining events in the country during the period 1731 to 1897. During the period 1900 to 2002 mining has been a permanent activity and, during WWII, the mining of manganese, some copper, and nickel was most important, particularly nickel from the extensive laterites that are considered among the largest reserves in the world. Cuba ranks with Canada, Russia, Australia and New Caledonia among the world's principal producers.

During the 1950s, nickel laterite deposits were mined by Freeport, and the plant, built by its subsidiary, Moa Bay Mining Co., was intended to produce 50 Mlb of nickel and 4.5 Mlb of cobalt annually in concentrates. The deposits are located at Moa Bay and Nicaro in Oriente Province along a 260 km belt in the north coast range. Ore reserves at Moa Bay are very extensive, with nickel grades ranging from 1.2% to 1.5% while at Nicaro they average about 1.3%. Some 25 years ago, Richard Hoppe believed that there were sufficient reserves just at Moa Bay to justify the construction of eight commercial plants with about 250,000 t/y of capacity.

Mineral exploration

In 1993, the Cuban Government created the state-owned enterprise Geominera and this company has since worked with foreign groups in joint ventures to prospect and explore for metals. It also participates in technical research, feasibility studies, and other studies, particularly with Canadian firms interested in gold, copper and other metals. Interest increased when it was thought that a Pueblo Viejo-type geological environment could be present in Cuba.

Foreign exploration companies began to arrive on the scene in the mid-1990s, many of them Canadian and a number are still active, often in association with Geominera. Foreign participants have included:

- Bolivar Goldfields Inc. (negotiated to explore four concessions);
- Cabo Ventures Ltd (negotiated an interest in a mining concession);
- Caledonia Mining Corp. (exploring with Holmer Gold Mines);
- Carib Gold Resources (in a gold-copper joint venture with Geominera);
- Euro-Nevada Mining (held areas that were operated by CaribGold and Joutel Resources);
- Holmer Gold Mines (in a jv with Geominera and Caledonia Mining Corp.);
- Joutel Resources (exploring in the Santa Clara, Cienfuegos and Villa Clara areas);

- MacDonald Mines (in jv with Geominera in several provinces);
- Mill City Gold Mining (in a jv with MacDonald Mines Exploration);
- Miramar Mining Corp. (involved in several projects with the Cuban Government);
- Northern Orion Exploration (searching for gold and copper in Mantua with Geominera);
- Redstone Resources (involved in various projects with Joutel and Carib Gold);
- Republic Goldfields (various projects with Geominera); and
- Robex Resources (with Caribbean Mines evaluating calcium carbonate deposits).

Some of these projects have lasted for several years and, depending on future gold and copper prices, could eventually lead to mine development.

Northern Orion Explorations, through Minera Mantua Inc. holds a 50% interest in the Mantua copper project, with Geominera holding the remaining 50%. A total of 12 Mt of measured and indicated resources averaging 2.0% Cu have been calculated from the results of 318 drill holes. International Barytex Resources Ltd has an option to acquire Northern Orion's 50% interest in Minera Mantua. Northern Orion completed successful metallurgical pilot-plant testing to produce LME grade A copper cathode, and envisaged an operation that would produce 39 Mlb/y of cathode copper over 11 years at a capital cost of US\$48.5 million. Operating costs have been estimated at US\$0.45/lb. Copper mining in Cuba ceased in mid-2001 when the Mina Grande mine near Santiago de Cuba was finally closed.

Holmer Gold Mines has announced a US\$6 million debt financing with TCC Ventures, with proceeds earmarked for development of Holmer's 50%-owned Loma Hierro silver project. Holmer has signed a joint-venture agreement with Geominera and has commissioned an update on a feasibility study previously conducted by Rescan-Hatch that confirmed the economic viability of the project at current silver prices. Holmer intends to repay the loan in five years from the cash flow generated by the operations.

Carib Gold Resources has been reviewing results from several exploration projects and has made decisions on the more favourable properties. It holds a 50% interest in exploration and exploitation rights over an area of 82 km² in east central Cuba, and a scoping study has outlined an inferred resource of approximately 1.6 Mt averaging 3.94 g/t Au in three zones.

The Delita gold project of Northern Orion and Geominera has been evaluated but a development decision has been deferred. The property, on the Isla de la Juventud, contains a resource of the order 13.3 t of gold. The gold is refractory and the deposit has an average grade of 3.27 g/t Au.

Oil is also an exploration target in Cuba and all companies deal with state-owned Cuba Petroleo (Cupet). Discoveries are being made and a number of foreign firms are actively exploring for hydrocarbons from Canada, Sweden, France, Spain and Brazil.

Mining operations

Nickel mining is one of Cuba's most important industries and nickel exports contribute around 27% of annual export revenues. The government owns two mining and processing operations at Punta Gorda and Nicaro in Holguin Province, and has a 50% interest in Metals Enterprise SA, a 50:50 joint venture with Sherritt International Corp. of Canada. Metals Enterprise operates open-pit mines and pressure acid leaching hydrometallurgical processing plant at Moa Bay. All three operations exploit lateritic nickel.

Last year, production at Moa Bay reached a record 33,282 t of nickel plus cobalt in mixed sulphides, surpassing the 2001 record by 1,022 t. The increase was attributed to higher ore grades. The product is sent to Sherritt's Port Sakatchewan refinery in Canada.

At Nicaro and Punta Gorda, laterite ore is treated by ammonia leaching (the Caron process) to produce nickel oxide and sinter. The combined capacity is 60,000 t/y but annual output is closer to 40,000 t/y. About 80% of the nickel oxide output is shipped to Europe and the remainder to Asia. An expansion to 40,000 t/y at Punta Gorda has been initiated.

There have been two nickel projects considered in recent years, one involving a joint venture between the Cuban Government and WMC of Australia, Empresa Mixta Pinares SA, which was established to develop the Pinares de Mayari Oeste deposit in Holguin Province. The project envisaged a production capacity of 35,000 t/y of nickel and cobalt, and a prefeasibility study was prepared for a mine and processing plant. Only the first part of the drilling programme, geophysical and metallurgical testwork, and preliminary cost studies were completed.

A second nickel project in Holguin Province, known as Cupey (formerly Las Camariocas) envisaged an operation producing 32,000 t/y of nickel and 1,300 t/y of cobalt. The Russians were to have funded the project but all work on the project halted in 1989. Work recommenced in 1992 with the assistance of the Council for Mutual Economic Assistance, but was never completed and the Cuban Government is still seeking an international partner.

In early 2001, there was a possibility that the Russian nickel producer Norilsk might become involved and offered to complete the US\$300 million project on condition that the product was sent for final treatment to Norilsk's smelters on the Kola Peninsula. The Cuban Government declined the offer, preferring to treat the nickel-cobalt ore at one of the three existing Cuban plants.

Early in 2002, it was forecast that Cuba's nickel production for the year would rise by as much as 10%. In practice, total output last year reached 75,600 t, or 1,000 t less than in 2001, mainly as a result of a shortage of fuel supplies from Venezuela.

Cuba ranks fourth after Russia, Canada and Australia as a leading producer of nickel and its remaining resources of laterite nickel are close to 60 Mt,

including 50 Mt proven and probable, and sufficient to meet the current annual production rate for at least 50 years.

Non-metallic minerals

Cuba, like its Caribbean island neighbours, produces industrial minerals such as gypsum, limestone, marble, salt, sand and gravel in varying amounts. The Ministry of Construction Materials operates six cement plants with more than 3.5 Mt/y of capacity. Cementos Mexicanos SA, one of the largest cement manufacturers in the world, manages Cuba's Mariel cement plant.

Hydrocarbon industry

Petroleum production in Cuba dates from 1881 when light oil production was established from the Motembo field in the central part of the island. Currently, almost all of Cuba's production comes from a series of oilfields along the northern margin of the Cuban Basin. The largest is Varadero, which produces heavy oil used for electricity generation. Most of the production today comes from fractured Upper Jurassic and Lower Cretaceous carbonate reservoirs in structural traps of the Cuban fold and thrust belt.

The Cuban Government continues to offer Production-Sharing-Contracts (PSCs) for the Eastern Gulf of Mexico, Yucatan Channel, Caribbean Sea and the western Straits of Florida for direct negotiation at any time. The Cuban Exclusive Economic Zone includes the deepwater Gulf of Mexico, which corresponds to the Eastern Gulf, and to the Cuban Northwest Offshore. The Comercial Cupet SA, a subsidiary of Cuba's state oil company Cupet, is responsible for contract negotiations and interactions with foreign companies.

All onshore and shallow water acreage in Cuba is open for negotiation with Comercial Cupet SA. In addition to the 49 deepwater blocks, 10 shallow water and 22 onshore blocks are currently available.

In 2002, the Cuban oil industry achieved a record production of 4.1 Mt of oil and equivalent, a 20% increase over 2001. Sherritt International Oil is the leading foreign firm working with Cupet in oil exploration and production.

Firms that have explored for hydrocarbons in Cuba in recent years include, from Canada, Sherritt, Alturas Resources, Pebercan, Genoil, Explogas, Kroes Energy, Cubacan Exploration, MacDonald Oil, Beau Canada Exploration, Intercap Resources and Niko Resources; Taurus from Sweden; from Spain, Prospeccion y Desarrollo de Hidrocarburos Espanoles, Repsol-YPF and PYDHESA; and Braspetro a subsidiary of Brazil's Petrobras. Some are still actively involved in a programme that has been discovering petroleum deposits, mainly off the north coast.

Cuba is not yet self-sufficient in petroleum and imports some of its crude from Venezuela. PDVSA resumed oil shipments to Cuba in September 2002, after the company announced that it had received approximately US\$29 million from Cupet as the first of six installments aimed at reducing Cuba's oil debt within six months. Oil imports from Venezuela had been halted in April 2003

during a failed coup against Venezuelan President Hugo Chavez and after Cuba had accumulated some US\$146 million in debt arrears. Venezuela supplies Cuba with 53,000 bbl/d under very liberal terms through a bilateral agreement.

Since Cuba opened its oil exploration and production sector to foreign participation in the late 1990s, the recently-drilled wells have sustained production rates above 1,000 bbl/d, with some wells reaching 3,000 bbl/d and this currently satisfies about 30% of domestic demand.

In early May 2002, the International Conference on the use of Mineral Resources (CINAREM 2002) was held in Moa and followed on from a number of other international meetings held in Cuba such as the Third International Conference on Geology and Mining, Geomin 2002, an International Workshop on Environmental Protection and Sustainable Exploitation of Geological Resources, the Third International Metallurgical Seminar 2002, the Second International Workshop on Electromechanical and Minerals/Metallurgical Techniques and Electromet 2002, all held at the Metallurgical and Mining Institute of Moa.