

THE MINERAL INDUSTRIES OF CENTRAL AMERICA—BELIZE, COSTA RICA, EL SALVADOR, GUATEMALA, HONDURAS, NICARAGUA, AND PANAMA

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With their diverse political and economic conditions, the countries of Central America—Belize, Costa Rica, El Salvador, Guatemala, Honduras, Nicaragua, and Panama—operated small mining industries that produced a variety of metals, industrial minerals, and mineral fuels. Central America's economy was based primarily on agriculture, food processing (agro business), and merchandising. Mineral industry activity in the metals sector continued to be limited to the mining of lead and zinc, as well as production of ancillary antimony, copper, gold, and silver. Industrial minerals production included cement, limestone, gypsum, marble, salt, and sand and gravel. Gold mining activity in this region was centered primarily in Costa Rica, Guatemala, Honduras, Nicaragua, and Panama. Guatemala also produced iron and steel, marble, and a variety of construction materials, as well as a low-gravity crude oil.

Mineral exploration by a handful of companies continued throughout the area. In some countries of Central America, the mineral industry was dominated by cement production, as well as less important petroleum refinery products and metal products made from imported raw materials. Most of the country's mineral output was for its own consumption, and were trying to promote and facilitate international investment to develop their mineral resources.

BELIZE

Belize has been an independent member of the British Commonwealth since 1981 and has a Governor General who represents the Queen. After a period of sluggish economic growth in the mid-1990s, the Government designed its economic policies with the intention of achieving high rates of economic growth and reducing poverty. In 1999, economic growth was estimated to be 6% compared with the 1.5% growth rate in 1998, and consumer prices declined by 1%. The public sector borrowing requirement narrowed to 2.6% of the gross domestic product (GDP) in 1999-2000 from 6% of the GDP in 1998-99. In 2000, analysts expected real economic growth to remain at 6% and consumer prices to rise by 2%. A privatization program was continued as a means to generate resources for the Government's investment program and to strengthen the economy's competitiveness by reducing costs of key services over time (International Monetary Fund, May 25, 2000, IMF concludes article IV consultation with Belize, Public Information Notice No. 00/38, accessed March 8, 2001, at URL <http://www.imf.org/external/np/sec/pn/2000/pn0038.htm>).

Mining activities in 2000 were regulated by the Mines and Minerals Act of 1998; petroleum was not included. Although

clays, limestone, marble, and sand and gravel for construction and civil works were the mainstay of Belize's mineral production, a very small amount of gold has been produced yearly by stream panning. No mineral commodities were known to have been exported, and the country was dependent on imports for its mineral and fuel requirements. The United States continued to be Belize's main trading partner.

COSTA RICA

The Republic of Costa Rica was one of the most stable and robust democracies in Latin America. Costa Rica's economy emerged from a small recession in 1997 and has shown strong aggregate growth since then. The country's GDP was projected to have increased to about \$11.17 billion in 2000 from \$10.75 billion in 1999, the overall growth rate was about 8.0%. Total exports decreased to \$5.8 compared with \$6.6 billion in 1999, and imports increased to \$6.38 billion in 2000 compared with \$6.35 billion in 1999 (Latin America Monitor, 2000; Banco Central de Costa Rica [undated], *Indicadores económicos—Sector externo*, accessed April 16, 2001, at URL <http://websiec.bccr.fi.cr/indicadores/cuadro.web?sector=1&doc=2&cuadro=21>). Sources of fossil fuels, apart from minor coal deposits, have not been discovered but abundant rainfall has permitted the construction of several hydroelectric powerplants, which made Costa Rica self-sufficient in all energy needs except oil for transportation. Costa Rica exported electricity to Nicaragua and has the potential to become a major exporter of electricity (U.S. State Department, April 2001, *Costa Rica—Economy, Background Note*, accessed April 10, 2001, at URL <http://www.state.gov/r/pa/bgn/index.cfm?docid=2019>).

Canadian and U.S. companies were involved in a number of gold and silver exploration and mining operations (table 2). Since 1986, El Valiente Ascari, S.A., operation in Las Juntas Province, which was operated by Vancouver-based Ariel Resources Ltd., recovered gold from the treatment of ore at the Mato Palo mill; ore was from the Boston, the Fortuna, the Tres Hermanos, El Recío, The San Martín deposits. Exploration by trenching continued along the northern extension of the Tres Hermanos vein; and geochemistry indicated a doubling of the known strike length to 4,000 meters (Mining Journal, 1998).

Wheaton River Minerals Ltd., which was a Toronto-based mining and exploration company, owned three gold projects in the development stage. The Bellavista project is in Costa Rica. The company completed a feasibility study in 1999 that included a mine plan in which production would total 13,561

kilograms (kg) (436,000 ounces) of gold during 7 years. In 2000, the company applied for and got an environmental operating permit for the project in January 2001. The company said that a feasibility study for the project had raised proven and probable reserves by 8% to about 17.2 metric tons (t) (555,000 contained ounces of gold). The estimate, which was based on 11.3 million metric tons (Mt) of ore at a grade of 1.54 grams per ton (g/t) gold was prepared by Snowden Mining Industry Consultants as part of a bankable feasibility study that was completed in April 2000. An earlier study suggested a mine with a life of about 9 years, using heap leaching to produce up to about 2000 kilograms per year (64,000 ounces per year) at total cash costs of \$168 per ounce (Metals & Minerals Latin America, 1999a). Rayrock Esperanza was entitled to 23.2% of the project's net operating profits. In February 2000, Wheaton River was offered a \$19 million construction loan by Barclays Bank of the United Kingdom. Total construction costs were estimated to be \$28 million. Wheaton River anticipated receiving the main environmental operating permit in early 2001, but further development of the mine was on hold pending a more favorable gold price (Wheaton River Minerals Ltd., 2000).

Lyon Lake Mines Ltd. acquired Placer Dome Inc.'s Crucitas Property in 1999. Lyon Lake completed a feasibility study in December 1999 after the receipt of a \$70 million financing agreement in August 1999. In June 2000, however, Lyon Lake agreed to sell the Crucitas Property to Vanessa Ventures Ltd. of Canada, which also purchased the mill at the Beta Vargas Mine (Lyon Lake Mines Ltd., 2000, p. 30).

Industrial mineral production included cement, clays, diatomite, lime, pumice, salt, sand and gravel, and crushed stone (table 1). According to information released by Industria Nacional de Cemento, S.A. (INCSA), the apparent consumption figures of cement reached almost 1.2 Mt with an annual increase of 50,000 t, or about 4.5%, or an equivalent of 320 kg of consumption per person. INCSA exported 30,000 t of cement in 1999. The milling capacity of this sector after the expansion of Cementos del Pacifico, S.A., reached 1.6 million metric tons per year (Mt/yr) (Cemento Hormigon, 2000).

EL SALVADOR

El Salvador was a poor Central American economy that has been suffering from a weak tax collection system, factory closings, the aftermath of Hurricane Mitch, and low world coffee prices. In recent years, however, inflation has fallen to single-digit levels, and total exports have grown substantially. The substantial trade deficit has been offset by remittances from the large number of Salvadoreans who live abroad and from external aid. The Salvadorean economy depended on services (66% of GDP), industry (22% of GDP), agriculture (12% of GDP), and mineral production (less than 1%); the GDP was estimated to be about \$12.4 billion in 1999 (U.S. State Department, August 2000, El Salvador—Economy, Background Notes, accessed March 9, 2001, at URL <http://www.state.gov/r/pa/bgn/index.cfm?docid=2033>).

El Salvador continued to score highly in economic risk ratings relative to its Latin American peers. Mining was not a major contributor to El Salvador's economy although the potential for discovery, particularly of precious-metal deposits, was estimated to be excellent. The Mining Code implemented in 1996 encourages a modest influx of exploration companies. A number of companies who obtained exploration rights in 1996 are now in the process of renewing these licenses (Mining

Journal, 1999a).

A new Chamber of Commerce assists in the development of the industry as a whole and lobbies for reform of the country's mining law. In particular, the Chamber hopes to have the mining law revised to allow for 5-year rather than 3-year exploration license, the present (2000) 1-year extension would be retained. Tax laws would be modified from the present (2000) 4% royalty on gross ore value and 25% corporate tax rates, which are an obstacle to mining, according to the Chamber (Metals & Minerals Latin America, 1999b).

In April 2000, Dayton Mining Corp. acquired all shares of Mirage Resources Corp. Dayton subsequently completed an infill drilling program at El Dorado and generated a new resource estimate of 873,600 t of ore at a grade of 13.41 g/t gold with a cutoff grade of 6 g/t. Mirage's 1997 resource estimate was more than 1.2 Mt of ore at a grade of 11.01 g/t gold with a cutoff grade of 3 g/t (Dayton Mining Corp., 2000).

The El Dorado gold project is located approximately 65 kilometers (km) northeast of San Salvador, which is the capital city of El Salvador. Site access is via the Pan American Highway to San Rafael Cedros, San Isidro, and Sensuntepeque, where Mirage maintained a field office and staff quarters. Exploration activities by Mirage's two wholly owned subsidiaries continued within six exploration license areas. Prefeasibility studies and an environmental impact assessment were initiated, but the entire project was slowed by low gold prices. Kinross Gold Ltd., which was a Canadian company, owned 51% of Mirage.

Intrepid Minerals Corp. remained one of a handful of companies that was actively exploring in Central America. Early in 1999, Intrepid concluded negotiations with Montana Gold Corp. to advance the San Cristobal project in El Salvador. In the first quarter of 1999, Intrepid completed a Phase I drill campaign at the Aldea El Zapote project. Results from this program were truly outstanding—typical widths of 50 m of 100 to 450 g/t silver were intersected, in addition to gold, lead, and zinc credits (Intrepid Minerals Corp. 1999). During 2000, Francisco Gold Corp. of Canada acquired Montana Gold. The joint venture sampled the San Cristobal prospect, and trenched and sampled the Hormiguero concession, which the joint venture acquired during the year. On the Aldea El Zapote property, Intrepid continued diamond drilling and soil sampling. Intrepid was negotiating to set up a separate joint venture for Aldea El Zapote. At the same time, Cementos de El Salvador, S.A. (CESSA), which was the largest industrial mineral enterprise in the region, was mining about 1,200 metric tons per day (t/d) of limestone at Aldea El Zapote. Intrepid and CESSA created an alliance that will smooth the way for any mining development being considered on the Aldea El Zapote property.

Probably the most economically significant mineral operation in El Salvador continued to be the limestone-base cement plant in Metapan operated by CESSA. A planned expansion of this site was underway with the help of financing from the European Bank. Production in 2000 amounted to more than 2,500 t/d of raw cement. Another significant private sector operation was the Refinería Petrolera Acajutla S.A., which had a charge capacity of 17,000 barrels per day (bbl/d); the company was owned by Exxon/Mobil Corp. (65%) and Royal Dutch/Shell Group (35%).

GUATEMALA

Guatemala's mineral production included small amounts of antimony, gold, iron ore, and lead. The country was the third

largest producer of antimony in Latin America after Bolivia and Mexico. The 1980 suspension of nickel production from El Estor Mine was the result of low nickel prices and high oil prices. Although nickel prices have increased and oil prices are still high, there seem to be no plans to resume production in the near future. Production of industrial minerals in 2000 included barite, clays, feldspar, gypsum, lime, pumice, and construction materials. The GDP, in terms of purchasing power parity, was estimated to be about \$47.9 billion in 1999 with a growth rate of about 3.5% in that year (U.S. Central Intelligence Agency, 2000). The mining sector has exhibited continuous growth during the 1990s and has much potential owing to a particularly diverse regional geology, much of which would require exploration and evaluation.

Guatemala was the only oil-producing country in Central America. Reserves were concentrated in the northern Peten jungle region; much of the oil comes from the Xan field in the Peten Basin. Proven oil reserves have been estimated to be 200 million barrels (Mbbbl) (International Petroleum Encyclopedia, 1998). The Government has been opening areas for bidding and granting concessions, as well as encouraging exploration in such areas as the Amatique Basin in the southeast and Pacific Basin on the Pacific coast. Although some significant natural gas reserves may exist, proven ones were small (3.1 billion cubic meters of estimated natural gas reserves) (International Petroleum Encyclopedia, 1998). Norcen Energy Resources Ltd. of Calgary, Canada, acquired Bahamas-based Basic Petroleum International Ltd., which included operations in Guatemala, for \$303 million. Basic gathered and processed crude oil, operated a small asphalt plant, and maintained pipeline to a loading terminal in the Caribbean (Anadarko Petroleum Corporation, 2001). Norcen planned to spend more than \$100 million to almost double Basic's mid-1997 production of 24,000 bbl/d. Proven reserves were estimated to be 65 Mbbbl with 18 Mbbbl of probable reserves. Four oilfields are already in production with more than 1.5 million acres of exploratory acreage available (International Petroleum Encyclopedia, 1998). In February 1999, Union Pacific Resources Group Inc. (UPR) and Union Pacific Resources Inc. announced the purchase by UPR of 2.5 million common shares of Norcen Energy Resources Ltd. through the facilities of the Toronto Stock Exchange. On July 14, 2000, UPRI merged with Anadarko Petroleum Corp. to form one of the largest independent oil and gas companies in the world. As a result of the merger, UPR became a wholly owned subsidiary of Anadarko (Anadarko Petroleum Corporation, July 14, 2000, Anadarko and Union Pacific Resources close merger—New Anadarko expects double digit production growth and strong earnings, News Release, accessed April 10, 2001, at URL http://www.corporate-ir.net/ireye/ir_site.zhtml?ticker=apc&script=461&layout=0&item_id=104508). By 2000, crude production had dropped to about 17,000 bbl/d. Anadarko continued a work out program that could increase production.

Bassano Guatemala Ltd. (Pacalta) held two concessions in the Peten Basin, which is an extension of the Campeche Basin of southern Mexico. Pacalta planned to re-enter and complete the single well bore on each concession and later drill four wells to fulfill the work program.

A bilateral agreement with Mexico was being negotiated to build a \$320.7 million natural gas pipeline from Ciudad Hidalgo, Mexico, to Escuintla; completion was expected by 2004, and it may be part of a wider Central America gas pipeline network.

Intrepid's base-metal interests in Guatemala were being advanced by the joint-venture partner Chesbar Resources Inc. During 2000, an agreement was reached whereby Chesbar would focus on nickel in Guatemala, and Intrepid would focus on gold and silver opportunities. Under the terms of the agreement, Chesbar was required to spend \$300,000 to earn an additional 20% interest in the nickel properties, whereas Intrepid would retain a 50% interest in any precious-metal (gold-silver) property. Chesbar completed more than 30 test pits to depths of 15 m on the Sechol property. The purpose of the pitting program was to verify earlier samplings reported by Cominco Ltd. and Transmetales Ltda. Additional pitting was being conducted on satellite zones. Chesbar conducted assessments of Sechol and other properties under application for the amenability of various nickel ores to the pressure acid leach and the solvent extraction electrowinning (SX-EW) processes.

Production of mineral commodities in Guatemala in 2000 was estimated to parallel that of the previous 2 or 3 years. Antimony ore and concentrate were produced by Minas de Guatemala S.A. from underground mines at Ixtahuacan near the city of Huehuetenango in the western part of the country (Ministry of Energy and Mines, 1998).

In 2000, Aquest Minerals Corp. of Canada evaluated the results from the second phase of drilling on the Anabella mine project and terminated its option to acquire the property in the western part of Guatemala. The drilling tested major geochemical anomalies to the east of the Anabella deposit for their potential to host ore-grade gold mineralization. The results, however, were disappointing and have led the company to the conclusion that the Anabella Project would not likely reach the critical number of ounces required to justify its acquisition. Therefore, the Anabella purchase option was to be terminated (Aquest Minerals Corp., 2000). The Anabella extension, which was discovered at the end of the program, yielded rock-chip samples that ranged up to 67.94 g/t gold and 9.03% antimony (Metals & Minerals Latin America, 2000).

The Guatemalan cement industry was expanding to meet domestic demand. Cementos Progreso S.A., which was the country's sole producer and was owned by private Guatemalan investors, completed a third production line in 1998; this brought total clinker and cement production capacities to 1.68 Mt/yr and 2.5 Mt/yr, respectively. The company planned to convert its kilns to coal fired plus additional packing and distribution facilities. For 1999-2000, a 10% growth rate in domestic cement demand was expected to be maintained, with scope for exports and a diminishing import requirement. Further development was anticipated around 2000 when the existing kilns will be converted to burn coal (Global Cement Report, 2000).

HONDURAS

In 1999 and 2000, Honduras recovered from Hurricane Mitch, which killed more than 5,000 people and caused about \$3 billion in damage. Although it was slated to receive about \$2.76 billion in international aid, the economy shrank 3% with widening current account and fiscal deficits in 1999. The year 2000 should see economic recovery as reconstruction projects make progress and the agricultural sector recovers. Honduras may also get relief from its \$4.4 billion external debt under the Highly Indebted Poor Countries (HIPC) Initiative. Increasing mineral exploration suggested that its economy might eventually benefit from mineral production. The GDP, in terms

of purchasing power parity, was estimated to be about \$14.1 billion in 1999; the growth rate was about of -3% in that year (U.S. Central Intelligence Agency, 2000). Honduras produced mainly lead (5,226 t in 1999 and 4,805 t in 2000) and zinc (40,996 t in 1999 and 43,064 t in 2000) with ancillary gold and silver (52,565 kg), as well as minor amounts of cadmium associated with the zinc and a little antimony (Mining Journal, 1999a).

Breakwater Resources Ltd. had the second most productive year on record in 1999 at its El Mochito zinc-lead-silver mine. The underground operation, which started in 1948, was the largest and oldest mine in Central America. In 2000, the mine should achieve record crude ore production of 635,000 t (Metals & Minerals Latin America, 2000a). El Mochito, which is mined down to the 762-m level (2,500-foot), is located in northwestern Honduras, achieved the highest mill throughput in its 53-year history, in 2000. Also, a new productivity record was set while setting a safety performance record of over one million person hours without a lost-time accident. This was a safety record for Central America underground mining. Operating earnings at El Mochito were \$1.6 million in 2000 compared with \$4.6 million in 1999. The reduction in earnings was due primarily to lower realized metal prices. Zinc production at El Mochito mine has increased almost 60% over the past five years. The mill has the capacity to increase production another 15% as new ore zones are developed (Breakwater Resources Ltd., 2000, Operations—El Mochito, accessed August 22, 2001, at URL

<http://www.brealwater.ca/oper/elmo.htm>). El Mochito accounted for 26% of Breakwater's 1999 gross revenue of \$255 million from mining activities and 14% of the company's \$32 million operating earnings after depreciation (Metals & Minerals Latin America, 2000b).

First Point Minerals Corp. of Canada had earned a 60% interest in the Cacamuya gold project, which is located near the border of Honduras and Nicaragua. First Point conducted a diamond drilling program on its property in 2000. Breakwater, which owned a 40% interest in the property, decided not to fund its share of the 2001 exploration program, and accordingly its interest was diluted to 25%. At yearend, Breakwater decided to sell its remaining interest to First Point (Breakwater Resources Ltd., 2002, Central America—Honduras, Breakwater Exploration, accessed April 18, 2002, at URL <http://www.breakwater.ca/oper/explor.htm>). Exploration in 2001 will consist of a drilling of approximately eight holes that total 1,200 m. The drilling will test the downdip and lateral extensions of the property's Cerro Chachagua and D4 veins where earlier drilling by the joint venture of Battle Mountain Gold Co. and Breakwater intersected potentially economic grades and widths of gold-silver mineralization. First Point said that the two veins are classical bonanza epithermal veins similar to Meridian Gold's El Peñon gold mine in Chile. The initial drill program will cost approximately \$220,000 and will be totally funded by First Point, which was to be the project manager (Metals & Minerals Latin America, 2000c).

In December 2000, Nevada-based Glamis Gold Ltd. began gold recovery from a heap-leach operation at the San Martin gold mine in August. The company estimated the capital cost of equipping the mine to be \$27 million with new crushing and grinding mills to increase treatment capacity. Annual gold production of around 3,700 kg (120,000 ounces) from ores at an average grade of 1 g/t gold was projected (Metals & Minerals Latin America, 2000c).

Intrepid has optioned its La Labor silver property in the

southwest to Apex Silver Mines Ltd, which can earn an 50% interest by investing \$250,000 in the property before September 1999. Based on Intrepid's preliminary mapping and sampling efforts, high-grade silver and base-metal values have been located in several zones that grade up to 2.05 kilograms (66 ounces) per metric ton of silver, 19% zinc, and 10% lead (Mining Journal, 1999b).

Honduras also produced a number of industrial minerals, which included gypsum and marble largely for export and salt from the Choluteca district. Local limestone was used by Cementos de Honduras S.A. and Industria Cementera Hondureña S.A. de C.V. (in which Lafarge, the French group, has taken a majority stake) with capacities of 600,000 tons per year (t/yr) and 450,000 t/yr, respectively. Cemento Progreso at San Miguel will expand cement production to 2.5 Mt (Mining Journal, 1999b).

The country depends on imported petroleum products for domestic consumption, but its Refinería Texaco de Honduras S.A. is a privately operated refinery in Puerto Cortes, Trujillo Bay. There are several oil basins with 500,000 barrels per year of oil produced by Texaco Inc. near the Mosquita coast (Mining Journal, 1999d).

NICARAGUA

Nicaragua was one of the hemisphere's poorest countries with low per capita income, flagging socioeconomic indicators, and a huge external debt. The country has made significant progress toward macroeconomic stabilization during the past few years, even with the damage caused by Hurricane Mitch in fall 1998. International aid, debt relief, and continued foreign investment have contributed to the stabilization process. Nicaragua's GDP which was based on purchasing power parity, was estimated to be \$12.5 billion in 1999; this is the latest available information for marking the rate of the country's economic growth, which had been at about 6.3% per year. Inflation remained about 12%. Nicaragua may qualify for the (HIPC) Initiative (U.S., Central Intelligence Agency, 2000, Nicaragua—Economy, World Factbook 2000, accessed March 29, 2001, at URL <http://www.odci.gov/cia/publications/factbook/geos/nu.html>). Although Nicaragua's recovery after Hurricane Mitch has been slow, mining and minerals exploration areas were least affected. Out of more than 100 mineral exploration concessions acquired by mostly Canadian juniors before 1997, however, just three companies remain active and have reported very encouraging exploration and production results.

In mid-1998, Toronto-based Black Hawk Mining Inc. acquired the assets of Triton Mining Corp; which included its 95% stake in the operational El Limon gold mine; the remaining 5% was owned by Inversiones Mineras S.A., which was a holding company that represented the unionized mine workers in Nicaragua. In 1999, gold production was 2,037 kg (65,471 ounces) at a cash operating cost of \$226 per ounce when mill feed was 71% underground ore and 29% open pit ore. Despite a 1-month shutdown of the production facilities at El Limon in November 1998 because of the effects of Hurricane Mitch, the mine produced 1,545 kg (49,658 ounces) of gold from underground and open pits at a cash operating cost of \$253 per ounce. As of December 31, 2000, proven and probably reserves at El Limon were more than 1.0 Mt at a grade of 7.92 g/t gold giving a contained gold content of 8,300 kg (Black Hawk Mining Inc., 2001, p. ii). In 2000, the mine produced 2,825 kg (90,758 ounces) of gold at \$165 per ounce. In 2000, the Santa

Pancha open pit mine was closed down. By the end of 2000, El Limon mine's proven and probable ore reserves were reported to be 7,565 kg (266,848 ounces) of gold.

In mid-1998, Greenstone Resources Ltd., which was another Toronto-based junior, continued its expansion of commercial production at Cerro Mojon near La Libertad where throughput capacity was being increased to 2.8 Mt/yr. The company reported encouraging results from exploratory drilling at the Santa Elena gold-bearing zone, which was also in the La Libertad area. The result of drilling prompted Greenstone to undertake ore reserve redefinition and consideration of a proposed superpit area, Cerro Mojon. At the end of 1998, proven and probable gold reserves at Cerro Mojon totaled 14.1 Mt at an average grade of 2.22 g/t gold (Mining Journal, 1999d). In 2000, Greenstone closed the mine because of funding problems and evacuated its personnel from Nicaragua (Greenstone Resources Ltd., 2000).

Nicaragua's cement demand was steadily increasing with double-digit growth. Although the Nicaraguan cement production base gained 350,000-t capacity in 1999, clinker-grinding imports were expected to remain part of the national cement scene for some time to come (Cementos de Nicaragua S.A., [undated], Información corporativa, accessed April 16, 2001, at URL <http://www.cemenic.com/infocorp.htm>). Meanwhile, the economy was showing signs of some improvement, which was beginning to filter through to the local construction sector. Nicaragua's cement production was controlled by the state-owned Compañía Nacional Productora de Cement, which had a clinker production capacity of 350,000 t/yr installed at its plant at San Rafael del Sur. In March 1999, a new company Cemenic became operational (Cementos de Nicaragua S.A., 1999). It was owned by Unión Marítima Internacional S.A.; Union was a Holderbank Group Company, which held 70% of the company's equity.

Nicaragua relied on imports for mineral fuels, especially crude oil from Venezuela. Esso Standard Oil S.A. Ltd. of Nicaragua supplied most of the count, which was an important energy resource. In August 1998, following the approval of Nicaragua's new hydrocarbon law, Fugro-Geoteam, in association with Instituto Nicaraguense de Energía, announced a competitive bid for a three-dimensional, nonexclusive 7,500-km survey to cover the entire Caribbean shelf of Nicaragua. The Government offered flexible licensing terms, which included concession and production-sharing contracts. In January 1999, Atlantic Coast Resources's acquisition of several off-shore concessions and continuation with an exploration program were revealed (Mining Journal, 1999c).

PANAMA

Because of its key geographic location, Panama's economy was service based, heavily weighted toward banking, commerce, and tourism. The transfer of the Panama Canal and military installations by the United States has given rise to new construction projects. The current (2000) administration inherited an economy that was much more structurally sound and liberalized than the one inherited by its predecessor. Panama's GDP, which is based on purchasing power parity, was estimated to be \$21 billion in 1999, which is the latest available datum for marketing the country's rate of economic growth, which had been at about 4.4%. Panama's GDP continued to expand as a result of the Government's aggressive free-trade negotiations and modernization of the national economy with

the Panama Canal at the center. Services, which formed the cornerstone of the economy, accounted for 67% of the GDP; such industries as petroleum refining, sugar milling, brewing, construction and building materials, 25%; and agriculture, 8% (U.S. Central Intelligence Agency, 2000, Panama—Economy, World Factbook 2000, accessed March 29, 2001, at URL <http://www.odci.gov/cia/publications/factbook/geos/pm.html>).

Panama did not extract sufficient minerals to rank it as one of the world's significant producers; several properties were, however, considered to be highly promising. At the beginning of 1999, Tiomin Resources Inc. agreed to a loan and option agreement with Aur Resources Inc. whereby Aur was granted an option for 26 months to purchase Pana Cobre S.A. by providing Tiomin with a \$2.0 million loan at an interest rate of 6% and repayable within 2 years. The Cerro Colorado copper-molybdenum-gold property located in Panama was held by Pana Cobre, which was a wholly owned subsidiary of Tiomin Resources, was recognized as the world's 12th largest unexploited porphyry-type deposit with estimated resources of 1.75 billion metric tons of contained copper with an average grade of 0.64% copper with a cut-off grade of 0.5%. According to the feasibility study completed by the private consultants Kvaerner Metals's Davy Non-ferrous Division, the mine will have a life of about 12 years for SX-EW treatment of the upper supergene cap to produce cathode copper at an average cost of \$0.49 per pound. Pana Cobre had been granted a delay in project development by CODEMIN, which was the Government mining agency, owing to low copper prices (Tiomin Resources Inc, 1999, p. 6). Aur continued evaluation of Cerro Colorado in 1999 and 2000.

In early 1998, Adrian Resources Inc. reported that Teck Corp. had deferred its decision on placing Adrian's Petaquilla copper project into production. Teck had the option of acquiring half of Adrian's 52% interest in the project by bringing it into production. The decision was made as a result to the current depressed copper prices; when economic conditions are more favorable, the project will likely go ahead. A final feasibility study of Petaquilla, which was completed in 1998, estimated that minable reserves are 986 Mt at a grade of 0.5% copper, 0.09 g/t gold, and 0.016% molybdenum, plus recoverable silver. The total geological resource was estimated to be 3,700 Mt and to contain 14.4 Mt of copper, 305 t (9.8 million ounces) of gold, and 437,000 t of molybdenum.

The Santa Rosa Gold Project, which was owned by Greenstone Resources Ltd., produced 1,517 kg (48,766 ounces) of gold at a cash operating cost of \$298 per ounce. During 1998, the project was on track to produce 1,866 kg (60,000 ounces) for the year, but operating difficulties during December 1998 severely hampered this target. Operations were suspended in early 1999, and gold production was to continue from the leaching of the existing 6.9 Mt of ore on the pads. The mine was sold to Seabridge Resources Inc. in November 1999; in March 2000, however, Seabridge terminated the acquisition.

In January 1999, Rayrock Resources Inc. announced the discovery of the significant Viento Frio gold-silver deposit. Located 65 km from Colon, Viento Frio was claimed to have the potential to be large bulk minable deposit. Rayrock has been granted an exploration concession totaling 96 square kilometers (Mining Journal, 1999). In April 1999, Rayrock was acquired by Glamis, which drilled and sampled the property in 1999 and evaluated new targets in 2000.

Panama produced cement, clays, lime, limestone, marine salt, and sand and gravel in small operations. The country was the

home of two cement companies, each of which has had cement works near the capital of Panama City. The larger was the 500,000-t/yr plant of Cemex-owned Cementos Bayano at Calzada Larga, and Cemento Panama, S.A., which owned a 400,000-t/yr works at Quebrancha. Cement production in 1999 and 2000 was estimated to be about 760,000 t/yr.

Crude oil for Panama's refineries was imported from Ecuador, Mexico, Saudi Arabia, and Venezuela.

Investment in mining is expected to offer strong opportunities for expansion of capital in Panama. The country is in position not only to become a major producer of copper, but also of gold as a coproduct of the copper. In the meantime, however, the reversion of the Panama Canal to domestic control remains the focal point of principal commercial interest in Panama.

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Major Sources of Information

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TABLE 1
CENTRAL AMERICA: PRODUCTION OF MINERAL COMMODITIES 1/ 2/

(Metric tons unless otherwise specified)

Country and commodity		1996	1997	1998	1999	2000
BELIZE e/						
Clays	thousand tons	2,250	2,600	2,600	2,600	2,600
Dolomite	do.	29	30	30	30	31
Gold	kilograms	5	5	6	6	6
Lime		1,200	1,200	1,250	1,250	1,250
Limestone	thousand tons	310	310	315	320	320
Marl	do.	1,100	1,300	1,300	1,300	1,300
Sand and gravel	do.	320	350	360	360	360
COSTA RICA e/						
Cement		830,000 3/	940,000 3/	1,085,000 3/	1,100,000	1,150,000
Clays, common		410,000	412,000	415,000	415,000	418,000
Diatomite		2,000	1,194 3/	1,595 3/	1,600	1,650
Gold	kilograms	510	502 3/	483 3/	300	350
Iron and steel, semimanufactures		59,594 r/ 3/	78,773 r/ 3/	84,074 r/ 3/	85,000 r/	86,000
Lime		9,800	9,800	9,800	9,800	9,800
Petroleum, refinery products	thousand 42-gallon barrels	4,500	4,500	5,475 r/ 3/	5,480 r/	5,500
Pumice		8,000	8,000	8,000	8,000	8,000
Salt, marine		37,000	37,000	37,000	37,000	37,000
Silver	kilograms	200	100	69 3/	65	65
Stone, sand and gravel:						
Crushed rock and rough stone	thousand tons	1,350	1,350	1,060 3/	1,100	1,150
Limestone and calcereous materials	do.	1,500	1,500	1,600	1,600	1,600
Sand and gravel	do.	1,400	1,400	1,640 3/	1,650	1,650
Sandstone	do.	2,000	2,500	3,262 3/	3,300	3,300
EL SALVADOR e/ 4/						
Aluminum, metal including alloys, semimanufactures		2,550	2,600	2,650	2,650	2,650
Cement		948 3/	1,020 r/ 3/	1,065 3/	1,134 3/	1,100
Fertilizer materials:						
Phosphatic		13,000	13,500	13,500	13,700	13,600
Other mixed materials		56,000	56,000	56,500	56,500	56,500
Gold	kilograms	--	110 3/	98 r/ 3/	100	100
Gypsum		5,400	5,500	5,600	5,600	5,600
Steel, secondary		41,000 r/ 3/	45,000 3/	44,000	39,000 r/	41,000
Limestone	thousand tons	3,000	3,000	3,000	3,200	3,200
Petroleum, refinery products	thousand 42-gallon barrels	6,200	6,200	6,300	6,300	6,300
Salt, marine		31,000	95,335 3/	88,948 3/	90,000	90,000
Silver	kilograms	--	23 3/	39 3/	40	40
GUATEMALA e/						
Metals:						
Antimony:						
Mine output, Sb content		880 3/	880	440	440	440
Trioxide		336 3/	350	250	250	250
Gold	kilograms	30	100	100	100	100
Iron and steel:						
Iron ore, gross weight		4,889 3/	3,300	3,500	3,000	3,000
Steel, semimanufactures		50,000 3/	50,000	50,000	50,000	50,000
Lead metal, including secondary		5	10	10	10	10
Industrial minerals:						
Barite		3,000 r/	3,000 r/	75 r/	113 r/	100
Cement, hydraulic	thousand tons	1,090 3/	1,280	1,500	1,600	1,600
Clays:						
Bentonite		3,755 3/	3,750	3,800	3,800	3,800
Kaolin		109 3/	110	110	110	110
Unspecified		12,871 3/	12,500	12,500	12,500	12,500
Feldspar		11,060 3/	11,000	11,000	11,000	11,000
Gypsum		27,761 3/	30,000	52,216 r/	110,173 r/	212,109 r/
Lime		73,000	73,000	73,000	74,000	74,000
Pumice	cubic meters	64 3/	6,000	6,350	6,400	6,400
Salt		48,000	48,000	48,000	50,000	50,000
Stone, sand and gravel:						
Dolomite		16,202 3/	15,000	15,000	16,000 r/	16,000
Limestone	thousand tons	1,280 3/	1,500	1,500	1,600	1,600

See footnotes at end of table.

TABLE 1--Continued
CENTRAL AMERICA: PRODUCTION OF MINERAL COMMODITIES 1/ 2/

(Metric tons unless otherwise specified)

Country and commodity	1996	1997	1998	1999	2000	
GUATEMALA--Continued e/						
Industrial minerals--Continued:						
Stone, sand and gravel--Continued:						
Marble:						
Block	cubic meters	1,260 3/	2,800	2,800	2,800	2,800
Chips and pieces		16,568 3/	17,000	17,000	17,500	17,500
Sand and gravel	thousand tons	623 3/	1,000	1,000	1,000 r/	1,000
Silica sand		47,495 3/	49,000	50,000	50,000	50,000
Stone crushed		1,200	1,300	1,300	50,000 r/	50,000
Talc		694 3/	700	700	750	750
Mineral fuels and related materials:						
Gas, natural, gross	thousand cubic meters	20,000	25,000	35,000	750 r/	750
Petroleum:						
Crude	thousand 42-gallon barrels	5,326 3/	8,395 3/	9,308 3/	8,833 3/	8,900
Refinery products	do.	6,000	7,300 3/	7,300	7,300 3/	7,300
HONDURAS						
Antimony, mine output e/		400	300	--	--	--
Building materials: e/						
Limestone		450,000	450,000	450,000	460,000	460,000
Marble	square meters	94,000	95,000	95,000	95,000	95,000
Cadmium, Cd content of lead and zinc concentrates e/		74	75	75	75	75
Cement		952,000	1,041,000	895,500 r/	980,000 r/	1,100,000 p/
Gold	kilograms	142 3/	150	150	879 r/	878 3/
Gypsum e/		26,000	28,000	30,000	30,000	30,000
Lead, mine output, Pb content		4,700	5,900	4,329	5,226	4,805
Petroleum, refinery products e/ 5/	thousand 42-gallon barrels	2,100	2,100	2,200	2,200	2,200
Salt e/		25,000	25,000	25,000	25,000	25,000
Silver	kilograms	29,430	35,000 e/	42,964	46,545	52,565
Zinc, mine output, Zn content		37,000	39,500	36,639	40,996	43,064
NICARAGUA 6/						
Bentonite e/		850	926	875	900	900
Cement		360,000	377,000	377,000	350,000 e/	360,000 e/
Gold, mine output, Au content e/	kilograms	1,500	2,562 3/	3,834 3/	2,700	2,800
Gypsum and anhydrite, crude e/		12,500	15,820 3/	22,660 3/	23,000	22,800
Lime		3,600	7,285 r/	58,527 r/	58,000 r/ e/	58,000 r/ e/
Petroleum, refinery products	thousand 42-gallon barrels	4,455	5,559	5,600	5,600 e/	5,650 e/
Salt, marine e/		15,000	13,619 3/	15,132 3/	15,000	15,200
Sand and gravel e/	thousand tons	1,350	434 3/	696 3/	700	750
Silver, mine output, Ag content e/	kilograms	2,000 r/	3,000 3/ r/	4,000 3/ r/	1,780 r/	1,589
PANAMA						
Cement		647,000	700,000	750,000 3/	760,000	760,000
Clays:						
For cement		117,616	40,112	45,000	46,000	45,500
For products		5,170	7,217	7,200	7,400	7,300
Gold	kilograms	834	1,202	1,500	1,500	1,500
Lime		6,767	3,246	3,500	3,500	3,500
Petroleum, refinery products e/	thousand 42-gallon barrels	10,000	10,000	10,000	10,000	10,000
Salt, marine e/		22,000	22,000	22,500	22,500	22,500
Silver	kilograms	1,307	2,178	2,000	2,000	2,000
Stone, sand and gravel: e/						
Limestone:						
For cement		550,798 3/	263,338 3/	270,000	275,000	270,000
For other uses		62,000	62,500	62,500	63,000	63,000
Sand and gravel	thousand tons	3,000	3,000	3,000	3,000	3,000
Sand and silica		23,000 e/	--	--	--	--

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

1/ Estimated data are rounded to no more than three significant digits.

2/ Table includes data available through March 2001.

3/ Reported figure.

4/ In addition to commodities listed, construction materials (clays, gravel, miscellaneous rock, sand, and weathered tuffs) were presumably produced. Available information is inadequate to make reliable estimates of output levels of these commodities.

5/ Includes liquefied petroleum gas, aviation and motor gasoline, diesel, kerosene, and distillate fuel oil.

6/ In addition to the commodities listed, Nicaragua produced a variety of industrial minerals to meet domestic needs. Output of these materials was not reported, and information was inadequate to make reliable estimates.

TABLE 2
CENTRAL AMERICA: STRUCTURE OF THE MINERAL INDUSTRIES IN 2000

(Thousand metric tons unless otherwise specified)

Country and commodity		Major operating companies and major equity owners	Location of main facilities	Annual capacity
COSTA RICA 1/				
Cement		Industria Nacional del Cemento, S.A. (INCSA) (Cementfabrik Holderbank AG 44%, other private, 56%)	Aguas Calientes, Cartago, Cartago Province	550 e/
Do.		Cementos del Pacifico, S.A. (CEMPASA) (CEMEX 95.3%; Government 4.7%)	Near Colorado, Guanacaste	850 e/
Clays		CEMPASA	Tajo Finca, near Platanar, Guanacaste Province	100 e/
Gold	kilograms	El Valiente Ascari, S.A. (Ariel Resources, Ltd., Canada, 100%)	Tres Hermanos and El Recio mines, San Martin mine, Matapalo mill Las Juntas, Guanacaste Province	500 e/
Do.	do.	Vanessa Ventures Ltd. of Vancouver	Beta Vargas mine, Guanacaste Province	160 e/
Do.	do.	do.	Cerro Crucitas and Cerro Conchudita projects, San Carlos Province	
Limestone		INCSA	La Chilena quarry, near Cartago, Cartago Province	550 e/
Do.		CEMPASA	Cerro Pena Blanca Quarry, Guanacaste Province	300 e/
Petroleum products	thousand 42-gallon barrels	Refinadora Costarricense de Petroleo, S.A.	Moin refinery, Limon Province	5,760 e/
GUATEMALA				
Antimony		Minas de Guatemala S.A. (private, 100%)	Los Lirios and Anabella Mines, Ixtahuacan, Huehuetenango Department	1.9
Cement		Cementos Progreso S.A. (Lambert Freres et Cie. 69.8%; other, 30.2%)	San Miguel plant, Sanarate, El Progreso Department, and La Pedrera plant, Guatemala City	1,800
Nickel		Exploraciones y Explotaciones Mineras Izabal, S.A. [(Exmibal) (Inco, 70%; and Government, 30%)] 2/	Mine and processing plant near El Estor, Izabal Department (inactive)	9
Iron and steel (semimanufactures)		Grupo Industrial Minera Mexico S.A. de C.V. (IMSA), 100%.	Guatemala City	80
Petroleum:				
Crude	thousand 42-gallon barrels	Anadarko Petroleum Corp.	Rubelsanto, West Chinaja fields, Alta Verapaz Department, and Caribe, Tierra Blanca and Xan fields, Peten Department	9,600
Products	do.	Texaco Petroleum Co. (Texaco Inc., 100%)	Refinery at Escuintla, Escuintla Department	6,200
Do.	do.	Norcen Energy Resources Ltd. (Canada; public company)	Refinery near Santa Elena, El Naranjo, Peten Department	7,300
HONDURAS				
Cement		Cementos del Norte S.A. (private, 100%)	Rio Bijao plant, San Pedro Sula, Cortes Department	600 e/
Do.		Industria Cementera Hondurena S.A. de C.V. (LaFarge, 53%)	Piedras Azules plant, Comayagua Department	610 e/
Gold	kilograms	Cia. Minera Santa Barbara (Breakwater Resources Ltd., 100%)	Puerto Cortes, Cortes Department	300 e/
Do.	do.	Cia. Minerales de Copan S.A. de C.V. (Greenstone Resources Ltd., 100%)	San Andres Mine, Copan Department	2,000 e/
Lead		Cia. Minera Santa Barbara (Breakwater Resources Ltd., 100%)	El Mochito Mine, Santa Barbara Department	6 e/
Petroleum:				
Crude	thousand 42-gallon barrels	Texaco, Inc.	Near the Mosquita Coast.	500
Products	do.	Reneria Texaco de Honduras S.A. (Texaco, Inc., 100%)	Puerto Cortes, Cortes Department	5,040 e/
Silver	kilograms	Cia. Minera Santa Barbara (Breakwater Resources Ltd., 100%)	El Mochito Mine, Santa Barbara Department	47,000 e/
Do.	do.	Cia. Minerales El Paso Mining (private, 100%)	La Pochota Mine, Valle Department	20 e/
Zinc		Cia. Minera Santa Barbara (Breakwater Resources Ltd., 100%)	El Mochito Mine, Santa Barbara Department	41 e/

e/ Estimated.

1/ Because changes occur frequently, information relating to capacity may be revised yearly.

2/ Ownership equity change in 1991.