

THE MINERAL INDUSTRY OF TRINIDAD AND TOBAGO

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The nation of Trinidad and Tobago comprises two islands in the Caribbean, the larger (Trinidad) lying just off Venezuela and noted for petroleum resources. The smaller island (Tobago), about 50 kilometers (km) to the northeast, is the southernmost of the outer Antilles volcanic arc and is accessible by sea and air from Trinidad.

Although traditionally having had a relatively high gross domestic product (GDP) for a small Caribbean nation, and a notably high standard of living, Trinidad and Tobago had been in an economic decline through most of the decade of the 1980's, mainly because of weak world oil prices. The decline changed in 1991 as a combination of oil-price recovery and consumer confidence took hold sufficiently to spark improvement in other sectors of the economy. The recovery was short, unfortunately. A burgeoning of external debt to about \$2.4 billion² brought debt-service requirements close to \$600 million by 1993. Further instability in crude prices into early 1994 prolonged the economic uncertainty that had already frustrated labor, added to unemployment, rekindled inflation, and led to devaluation of the Trinidad and Tobago dollar earlier in 1993. The Government indicated that austerity would be the watchword in 1994 as world oil prices sank to the \$14 to \$15 range. Later in the year, crude prices began a gradual recovery that continued into 1995.

Altogether, mining and petroleum, including refining, accounted for about one-third of the GDP, and petroleum exports alone were about 70% of export revenues in 1992.³

In April 1993, the Government floated the Trinidad and Tobago dollar, which settled downward to lose about 36% of its former value after having been pegged to the U.S. dollar. Sensing that the path to recovery lay in boosting exports, primarily petroleum and petroleum products, the Government pushed exploration for new production, and sought direct private investment to help fund such ventures. Two State-owned oil companies, Trinidad and Tobago Petroleum Co. Ltd. (Trintopex) and Trinidad & Tobago Oil Co. (Trintoc), were merged early in 1993 for cost-cutting and efficiency. The Petroleum Company of Trinidad and Tobago (Petrotrin), also Government-owned, offered all of its unassigned holdings of onshore and offshore oil- and gas-producing grounds for farm-out, joint venture, or outright sale. The Government went further in 1994 by reducing the corporate tax rate to 38% from 45%, and took away the 30% incremental-profits tax.

The Government saw that natural gas production was the strategic key to new economic activity, and awarded five preliminary contracts as part of a program for development of a large liquefied natural gas (LNG) production facility that will be the biggest single industrial investment in the country's history.

As Trinidad and Tobago shifted to increased industrial activity in the form of refining and petrochemicals, air pollution, and ground water contamination, both previously more or less overlooked, were becoming issues. Besides chronic oil leaks from pipelines in south Trinidad, problems included deforestation, squatters' large-scale rice farming in the swampland of the east coast, household and small-manufacturing waste, and inadequate sewage treatment. The perception that environmental legislation might impede badly needed investment engendered uncertainty, ironically, that of itself was seen to be a deterrent to investment. Environmental activity seemed, increasingly, to be driven by conditions attached to Inter-American Development Bank and World Bank loans.

The mineral industry of Trinidad and Tobago produced petroleum crude and natural gas, refined products, and petrochemicals such as ammonia, methanol, and urea. Production included some metals, such as iron and steel from offshore sources of iron ore, and refined (secondary) lead. Industrial minerals included asphalt, cement, limestone, sand and gravel, and sulfur. Building stone was produced for local use.

Crude oil production has been divided almost evenly between the state-owned oil companies and AMOCO Trinidad Oil Co., wholly owned by the U.S. company, AMOCO Inc. The country ranked seventh as a crude oil producer, after Ecuador, in Latin America. (*See table 1.*)

Major trading partners of Trinidad and Tobago were the United States, Puerto Rico, and the Virgin Islands. Imports generally totaled about \$579 million in 1993, the latest year for which data are available. Exports to the United States in 1993 totaled \$862 million, including about 50% of the total output of crude oil, as well as anhydrous ammonia, diesel fuel, methanol, and urea. Other exports included nitrogenous fertilizer, sulfur, and asphalt, primarily to Germany, French Guiana, the United Kingdom, and the United States. Roughly 80% of refined petroleum products was exported, including about 20% to the United States. Trinidad and Tobago was the fourth most important supplier of crude oil and refined products to the U.S. market after Mexico,

Venezuela, and Colombia.

Beginning in 1992, the Andean Pact countries (Bolivia, Colombia, Ecuador, Peru, and Venezuela), which formed the Andean Development Corp., extended credit to Trinidad and Tobago through this multipurpose bank to stimulate mutual trade. Meanwhile, Trinidad and Tobago remained a member of the Caribbean Community and Common Market, or CARICOM. Although Government and private sector together controlled much of the mineral industry through joint ventures, several mineral producers were owned entirely by the Government. A shift continued toward greater participation by private-sector and foreign capital. Foreign investment included U.S. firms in the petroleum and ammonia sectors, and U.S. and Indian groups in the steel industry (*See table 2*).

After more than 10 years of effort, it appeared that the Trinidad and Tobago iron and steel industry was finally realizing its production objectives. Caribbean Ispat Ltd. (CIL), which leased and operated the Government-owned facility at the Point Lisas Industrial Estate, was an Indian firm based in Jakarta, Indonesia. Operating at about 35% of capacity, the mill was rumored to have been losing about \$250,000 every day until Ispat stepped in. CIL products included direct-reduced iron, steel ingots, and wire rod. The mill operated on inexpensive local natural gas. Upon expiration of Ispat's lease in 1994, the Government contemplated sale of the operation and retention of a minor equity. The U.S. minimill steelmaker Nucor Steel Corp., based in North Carolina, invested \$75 million for the construction of a 320,000-metric-tons-per-year (mt/a) iron carbide plant at Point Lisas, fed by fine granular hematite from Brazil. The product was to be shipped to the United States to feed Nucor's steel mills. Production started in late 1994. After initial difficulties, the plant was in full operation by yearend.

Ammonia production seemed headed for sharp increases as U.S.-based Arcadian Corp., already producing at its Point Lisas plant, decided to move in another anhydrous ammonia plant from Brea, California, at a relocation cost of \$75 million. Moreover, Farmland Industries, of Kansas City, Missouri, and Mississippi Chemical Co. of Yazoo, Mississippi, announced that they would jointly build the largest single-train ammonia production facility in the world in the Brighton-La Brea area of Trinidad. This new \$300-million plant would produce 1,720 metric tons per day (mt/d) of ammonia using a gas-efficient process developed by the U.S.-based M. W. Kellogg Co. to take advantage of Trinidad's burgeoning natural gas resources.

Lake Asphalt of Trinidad and Tobago Ltd. (LATT) studied the feasibility of converting a laboratory asphalt pelletization process to large-scale commercial production. The company envisioned new packing techniques wherein plastic containers would melt into the final heated asphalt mix, thus precluding the necessity of special shipping cases presently used. LATT mined reserves in southwest Trinidad from the largest natural asphalt lake in the world.

Trinidad Cement Ltd., on the western coast near Point

Lisas, was the only producer in the country. The main firing used natural gas, with gypsum supplied from Venezuela. Beyond domestic consumption, the company exported more than 250,000 mt/a. Sand and gravel were produced for use as concrete aggregate. Crushed stone was used for the manufacture of cement clinker.

Natural gas accounted for most domestic energy consumption, supplying more than 85% of the Nation's requirements. The Government encouraged the use of compressed natural gas in vehicles, but progress in this direction was modest. Substantial reserves were being developed for local use, both for fuel and petrochemical feedstock, and also for LNG for export. Trinidad and Tobago ranked fourth in Latin America in gas production, after Venezuela, Mexico, and Argentina. To meet its supply contract with National Gas Co., Amoco Trinidad Oil Co. (ATO) stepped up development of the Flamboyant and Immortelle fields off southeastern Trinidad, intending to drill as many as 15 wells in these fields, about 60 km offshore. Gas from the Flamboyant field flowed southwest, past the Immortelle field, to Cassia gasfield through a 20-km submarine pipeline laid in 1992. A pipeline between Cassia and the future site of Immortelle was being installed during 1993. New discoveries of world-class natural gas reservoirs by ATO in 1994 and early 1995 boded well for the future of this source of energy.

Compared with that of 1993, production of crude oil decreased between 5% and 6% in 1994, reflecting natural decline curves for existing wells in conjunction with little in the way of discoveries. At the beginning of 1994, 3,262 wells were producing out of a total of 14,060 originally drilled starting in 1903. Although exploration had been stagnant in view of world price weakness, the search resumed to expand the offshore fields that accounted for about 80% of Trinidad and Tobago's oil production. A decision had been made in 1993 to stimulate the hunt for new oil in the hope that augmented production might compensate for lower prices. Accordingly, the Government awarded oil exploration rights to Unocal Trinidad Ltd. for Block 89/3, about 70 km off the east coast of Trinidad. Operations would commence with the first well to be drilled in 1994 in waters that averaged about 90 meters (m) deep. Unocal held a 100% interest in the block. Previously, ATO had been the only major foreign producer of crude in Trinidad and Tobago, delivering about 50% of total domestic production.

Next, Petrotrin, the Government-owned consolidated company, offered its unassigned land and offshore producing grounds for farm-out, joint venture, or outright sale. Trinidad and Tobago Oil Co. Ltd. (Trintoc), one of the components of Petrotrin, asked for foreign drilling and other oil-field service contractors to submit qualifications for enhanced (secondary) recovery onshore of heavy oil in southwest Trinidad. Shortly after, other tenders were solicited for developmental drilling in established fields in south Trinidad.

Domestic refinery utilization remained low at about 35% of design capacity because of aging facilities and

infrastructure in need of rehabilitation. Trintoc operated two oil refineries, one at Point-a-Pierre having a throughput of about 31 million barrels per year (Mbbbl/a) and the other at Point Fortin, producing only fuel oil, with a throughput of about 11 Mbbbl/a. Expansion plans for the Point-a-Pierre plant involved upgrading the capacity by 160,000 barrels per day.

Petrochemical activity centered on partial privatization of methanol production facilities with the construction of a new plant at Port Fortin, 31% of which would be purchased by a German consortium in return for an investment of \$235 million.

Estimated proven crude oil reserves officially⁴ were 541 Mbbbl in late 1993, and probably decreased slightly in 1994. Industry sources estimated that actual reserves might be more than 1.5 billion bbl, and potential oil reserves as much as 2.9 billion bbl, mostly offshore. Proven natural gas reserves in late 1994 were projected⁵ as 295 billion cubic meters (m³), ranking fourth in Latin America after Venezuela, Mexico, and Argentina. Additional probable reserves of natural gas would bring the total to 625 billion m³. Industrial mineral reserve data were unavailable.

The Nation's infrastructure includes 8,000 km of roads, with 4,000 km paved, 1,000 km improved, and 3,000 km unimproved. Of five usable airports, two have permanent surface runways, two have runways 2,440 to 3,659 m long, and one has runways 1,220 to 2,439 m long. Main seaports include Pointe-a-Pierre, Point Lisas, and Port-of-Spain, all in Trinidad. Smaller harbors in Tobago are at Scarborough and Charlotteville. Trinidad and Tobago's economic outlook is

related to the world market prices for crude oil and natural gas. Debt-service requirements in 1993 were about 24% of the external debt of \$2.4 billion. It is not unlikely that further emphasis on petroleum refinery products and petrochemicals can add to exports sufficiently to curtail much of the outstanding debt. Energy-intensive operations, such as smelting and refining, might be expanded to capitalize on value-added, based on plentiful and locally inexpensive energy.

¹Text prepared May 1995.

²Where necessary, values have been converted from Trinidad and Tobago's dollar (TT\$) to U.S. dollars at the rate of TT\$5.58=US\$1.00. The previous conversion rate, pegged officially at TT\$4.25=US\$1.00, was abandoned in early Apr. 1993.

³Ridgeway, J. M., Trinidad and Tobago. Min. Ann. Rev. (London), v. 83, folio 506, 1993.

⁴_____. Department of State Telegram 01839 11 June 1993.

⁵_____. Department of State Telegram 03639 15 Oct 1992, p.5.

Major Sources of Information

Ministry of Energy
Port-of-Spain, Trinidad
Telephone: 809-623-6708

Major Publication

Ministry of Energy
The Petroleum Industry.
Port-of-Spain, Trinidad, monthly.

TABLE 1
TRINIDAD AND TOBAGO: PRODUCTION OF MINERAL COMMODITIES 1/2/

(Metric tons unless otherwise specified)

Commodity	1990	1991	1992	1993	1994
Asphalt, natural	19,200 e/	20,000 e/	24,600	24,600	16,700
Cement, hydraulic	438,000	485,000	482,000	527,000 r/	583,000
Gas, natural					
Gross	6,720	8,730	7,000	8,200	7,700
Marketed e/	3,750	3,750	3,750	4,000	6,240
Iron and steel:					
Iron, sponge	697,000	710,000	680,000	675,000	912,000
Steel, crude	372,000	444,000	553,000	515,000	631,000
Semimanufactures (rolled) e/	290,000	290,000	450,000 2/	446,000	525,000
Lead, refined (secondary) e/	1,800	1,800	1,800	1,700	1,600 e/
Natural gas liquids e/	40	120 r/	280 r/	320 r/	384
Nitrogen: N content of ammonia	1,520	1,530 r/	1,570 r/	1,460 r/	1,560 e/
Petroleum :					
Crude	55,200	52,600	51,000 e/	43,600	43,400
Refinery products	28,100	30,200	30,000	30,000	37,000
Stone: Limestone	600 e/	1,030	1,420	1,580	1,600 e/
Sulfur, byproduct of petroleum e/ 3/	5,000	5,000	5,000	5,000	4,500 e/

e/ Estimated

1/ Table includes data available through April 1995.

2/ Previously published and 1994 data are rounded by the U.S. Bureau of Mines to three significant digits; they may not add to totals shown.

3/ Sulfur as a byproduct of natural gas may be produced, but information is inadequate for reliable output estimates.'

TABLE 2
TRINIDAD AND TOBAGO: STRUCTURE OF THE MINERAL INDUSTRY FOR 1994

(Thousand metric tons unless otherwise specified)

Commodity	Major operating companies and major equity holders	Location of main facilities	Annual capacity
Anhydrous ammonia	Trinidad Nitrogen Co. Ltd. Norsk Hydro AS, 49%; Government, 51%) Tringen I Tringen II	Point Lisas, Caroni Co. do.	370 1/ 450 1/
Do.	Fertilizers of Trinidad and Tobago Ltd., (Arcadian Corp., U.S., 100%)	do.	710 1/
Do.	Federation Chemicals (Norsk Hydro AS, 100%)	do.	230 1/
Asphalt	Lake Asphalt of Trinidad and Tobago (1978) Ltd. (Government, 100%)	Brighton, St. Patrick Co.	60
Cement	Trinidad Cement Ltd. (Cemex of Mexico, 20%; Government, 80%)	Claxton Bay, Caroni Co.	cement 540 clinker 600
Iron and Steel	Iron and Steel Co. of Trinidad and Tobago (Government, 100%; leased to Caribbean Ispat Ltd.)	Point Lisas, Caroni Co.	sponge iron 900 steel 700 wire rod 600
Do.	Nucor Iron Carbide Inc. (Nucor, USA, 80%; Samitri, Brazil, 20%)	Point Lisas, Caroni Co.	iron carbide 320
Petroleum: Crude	Amoco Trinidad Oil Co. Ltd. (Amoco International Oil Co. Ltd., 100%)	Poui, Samaan, Teak, and Cassia fields, offshore\ east of Guayaguayare	95,000 2/
Do.	Trinidad and Tobago Oil Co. Ltd.' (Trintoc) 3/ (Government, 100%)	Point Fortin, Ortoire, Penal Forest fields, offshore, east of Guayaguayare	20,000 2/
Do.	Trinidad Northern Areas Ltd. (Texaco Trinidad Inc., Trinidad and Tobago Oil Co. Ltd., and Trinidad and Tobago Petroleum Co. Ltd., 33 1/3 % each.)	Soldado fields, offshore in Gulf of Paria	40,000 2/
Do.	Trinidad and Tobago Petroleum Co. Ltd. (Trintoppec) (Government, 100%)'	Soldado field, onshore; Galeota field, offshore (exported)	24,000 2/
Products	Trinidad and Tobago Oil Co. Ltd. (Trintoc) (Government, 100%)	Point Fortin, St. Patrick Co.	80,000 2/
Do.	do.	Point-a-Pierre, Victoria Co.	220,000 2/

e/ Estimated

1/ Based on 340-day operating year.

2/ Barrels per day

3/ State-owned companies Trintoc and Trintoppec, combined to form Petrotrin, are distinguished under former names to track ownership and production.