The Mineral Industry of Colombia

By Gordon W. Koelling [1]

The overall performance of Colombia's mineral industry during 1971 was impeded by a slight decline in crude oil production in comparison with the peak output of the previous year. Other sectors of the country's minerals industry displayed a mixed performance. Coal continued to be the most valuable nonpetroleum mineral product, probably followed by emerald. Colombia, the world's principal source of emerald, ranked among the top 10 gold producers, and was one of the few producers of platinum.

During July 1971, the Colombian Government signed a loan agreement with the U.S. Agency for International Development (AID) that provided for assistance in the investigation of Columbia's mineral resources by expanding an existing mineral survey program to additional areas of the country. This was the second mineral resources survey loan awarded to Colombia by AID. The first such loan, signed in 1963, provided funds to increase the country's capacity to carry out geological research and to determine areas most likely to contain substantial mineral deposits suitable for commercial extraction. The new agreement will facilitate the continuation of these programs, especially the investigation of potential resources in the southern part of the country.

In December 1971, the lower chamber of the Colombian Congress approved a bill that would have major implications for the private petroleum industry but the Senate did not act on the measure prior to the adjournment of its 1971 session. Should the Senate approve the bill in its 1972 session, it would go to the President for signature. A major provision of this bill would, after a 5-year transitional period, reserve all future exploration and production responsibilities in areas not presently covered by concession agreements for the Government-owned oil company, Empresa Colombiana de Petróleos (ECOPETROL). However, ECOPETROL would be authorized to enter into joint ventures with private foreign or domestic firms in carrying out its exclusive responsibilities. Another section of this bill declares that refineries, pipelines, and service stations are public service facilities, which are to be operated by ECOPETROL. Unlike the provision concerning exploration and production, this provision would also apply to existing facilities, which ECOPETROL would be empowered to purchase. ECOPETROL would also be allowed to participate with other firms in the operation and construction of such facilities. The arbitration procedures set forth in the present petroleum law to resolve differences between the Government and the private companies would be eliminated by this legislation.

PRODUCTION

Output of mineral fuels, especially crude oil and coal, declined during 1971, and the performance of the metals and nonmetals sectors of the Colombian minerals industry was mixed. Production of some items including crude steel, and cement increased; however, the output of important items such as gold, silver, platinum, lead, and zinc declined.

[1] Geographer, Division of Fossil Fuels.

Table 1.—Colombia: Production of mineral commodities

(Metric tons unless otherwise specified)

Commodity [1]		1969	1970	1971 p
METALS				
Chromite gross weight		160	170	500
Copper mine output, metal content e		7	50	56
Gold	troy ounces	218,872	201,500	188,842
Iron and steel:				
Iron ore and concentrate	thousand tons	352	543	442
Pig iron	do	r 195	231	197
Crude steel	do	r 272	310	e 330
Lead mine output, metal content		409	293	205
Manganese ore, gross weight		550	464	450
Mercury	76-pound flasks	344	215	213
Platinum group	troy ounces	27,805	26,358	25,610
Silver [2]	do	77,136	75,581	66,667
Zinc mine output, metal content		r 164	156	112
NONMETALS				
Barite		12,242	6,821	5,790
Cement, hydraulic	thousand tons	2,408	2,757	2,942
Clays:				
Kaolin (including china clay)		88,000	92,610	96,575
Other		555,100	616,050	670,000
Diatomite		15,976	280	300
Feldspar		22,050	23,152	24,836
Fertilizer materials, crude, phosphate rock		10,000	12,000	e 12,000
Gem stones, emerald	thousand carats	[2] 659	[2] 60	672
Gypsum	thousand tons	r 121	151	182
Lime e	do	1,000	1,000	1,000
Mica, all grades		17	26	32
Salt:				
Marine	thousand tons	344	532	300
Rock	do	334	230	338
Total	do	678	762	638
Stone:				
Dolomite	do	13	(3)	14
Limestone	do	4,258	5,007	NA
Marble	cubic meters	100	2,850	14,380
Quartzite [4]	thousand tons	158	165	172
Sulfur:				
From ore		e 26,900	e 29,900	e 30,500
Petroleum refinery byproduct		e 3,800	e 3,600	e 3,500
Total		e 30,700	e 33,500	e 34,000
Talc, soapstone, and pyrophyllite		1,525	1,723	1,975
MINERAL FUELS AND RELATED MATERIALS				
Coal, all grades	thousand tons	3,317	e r 3,200	2,800
Coke, all types	do	465	498	490
Gas, natural:				
Gross production	million cubic feet	103,882	104,894	111,288
Marketed production	do	44,767	46,736	51,186
Natural gas liquids	thousand 42-gallon barrels	4,006	4,510	3,629
Petroleum:				
Crude oil	do	76,776	79,594	78,101
Refinery products: [5]				
Aviation gasoline	do	619	558	481
Motor gasoline	do	14,338	16,002	16,357
Jet fuel	do	1,085	1,292	1,482
Kerosine	do	3,147	3,552	3,360
Distillate fuel oil	do	6,843	6,769	7,734
Residual fuel oil	do	15,633	16,352	e 18,600
Lubricants	do	467	499	268
Other:				
Liquefied petroleum gas	do	1,216	1,651	1,499
Naphtha	do	2,117	1,731	1,338
Asphalt and bitumen	do	1,676	1,576	618
Petroleum coke	do	825	870	e 900
Miscellaneous and unspecified	do	1,847	2,378	e 3,140
Total	do	49,813	53,230	56,777

e Estimate. p Preliminary. r Revised. NA Not available.

[1] In addition to the commodities listed, carbon black, manufactured fertilizers, coal briquets, and magnesite are also produced, but the level of output is unknown.

[2] May include gem stones other than emeralds.

[3] Less than ½ unit.

[4] Erroneously reported as including quartz and glass sand in previous editions; data are for quartzite only.

[5] Includes refinery fuel and unfinished oils destined for interrefinery transfer and further processing.

TRADE

Shipments of crude oil, Colombia's principal mineral export item, increased moderately. Exports of coal more than doubled, and shipments of platinum and ammonia also rose sharply. A majority of imported mineral items registered increases; the rise in iron and steel was the most significant.

Table 2.—Colombia: Exports of mineral commodities

(Metric tons unless otherwise specified)

Commodity[1]	1969	1970	Principal destinations, 1970
METALS			
Aluminum metal including alloys, all forms	399	210	Ecuador 137; Nicaragua 64.
Chromium, chromite	27	3	All to Mexico.
Copper:			
Ore and concentrate	139	544	Mainly to Japan.
Metal including alloys	750	440	Denmark 292; Sweden 91.
Gold:			
Ore and concentrate	72	31	All to Sweden.
Metal unworked ... troy ounces	129	225	Mainly to United States.
Iron and steel metal including alloys, all forms	826	1,261	Ecuador 500; United States 365.
Lead:			
Ore and concentrate	550	1,119	Mainly to United States.
Metal including alloys	1	3	Mainly to Venezuela.
Mercury ... 76-pound flasks	21	--	
Platinum group, platinum partly worked ... troy ounces	r 27,575	34,176	All to United States.
Zinc:			
Ore and concentrate	--	286	All to Japan.
Metal including alloys	363	255	Ecuador 213; Belgium-Luxembourg 41.
Other:			
Ore and concentrate	146	198	Japan 155; Sweden 43.
Ash and residue containing nonferrous metal	--	35	Mainly to Belgium-Luxembourg.
Other metal	--	25	All to Japan.
NONMETALS			
Barium sulfate	454	455	All to Ecuador.
Cement	278,185	248,671	Puerto Rico 70,867; Brazil 51,816; Martinique 26,996; Guadeloupe 23,827; Netherlands Antilles 23,650.
Clays and products (including all refractory brick):			
Crude, kaolin and other clays	10	1	Mainly to Venezuela.
Products, refractory	152	657	Mainly to Peru.
Diatomite and other infusorial earths	20	100	All to Netherlands.
Fertilizer materials:			
Crude	1	5	All to Venezuela.
Ammonia	25,473	36,886	Costa Rica 19,340; Venezuela 10,192.
Gypsum and plasters	NA	23	All to Ecuador.
Precious and semiprecious stones, except diamond ... kilograms	659	60	Mainly to United States.
Stone, sand and gravel:			
Gravel and crushed rock	--	293	Netherlands Antilles 86; Dominican Republic 80; Puerto Rico 65.
Sand	--	425	All to Ecuador.
Sulfur, all forms	r 104	111	Ecuador 51; Peru 44.
Talc, steatite	10	10	Mainly to Venezuela.
MINERAL FUELS AND RELATED MATERIALS			
Carbon black	5,114	5,769	Peru 2,872; Chile 1,482.
Coal and coke, all grades	3,689	8,802	Belgium-Luxembourg 5,500; Japan 2,418.
Petroleum:			
Crude[2] ... thousand 42-gallon barrels	29,853	31,246	United States 15,185; Chile 5,778; Ecuador 5,188.
Refinery products:			
Gasoline and naphtha	475	--	
Distillate fuel oil	1,399	1,513	Mainly to United States.
Residual fuel oil	9,893	9,014	United States 7,688; Peru 1,101.
Other	(3)	3	Mainly to Ecuador.
Mineral tar and other coal-, petroleum-, or gas-derived crude chemicals	r 33,957	5,174	Mainly to Saudi Arabia.

r Revised. NA Not available.

[1] In addition to the reported commodities, Colombia is known to export gold, silver, and emeralds, but data are not available concerning shipments of these items.

[2] Includes small quantities of natural gas liquids mixed with crude oil.

[3] Less than ½ unit.

Table 3.—Columbia: Imports of mineral commodities

(Metric tons unless otherwise specified)

Commodity	1969	1970
METALS		
Aluminum:		
Bauxite and concentrate	4,600	1,472
Oxide (alumina) and hydroxide	954	923
Metal including alloys:		
Ingots, castings, and scrap	8,005	8,050
Semimanufactures	2,973	1,912
Antimony including alloys	11	7
Chromium, chromite	--	27
Copper metal including alloys, all forms	4,420	6,939
Iron and steel:		
Ore and concentrate	--	293
Metal:		
Pig iron and scrap	12,097	14,437
Ferroalloys	3,472	3,747
Steel, primary forms	71,471	80,861
Semimanufactures	244,623	288,883
Lead:		
Oxides	936	1,997
Metal including alloys, all forms	2,339	2,552
Magnesium including alloys, unwrought	r 29	21
Manganese ore and concentrate	--	50
Mercury ... 76-pound flasks	r 343	87
Nickel:		
Metal including alloys, unwrought	8	3
Semimanufactures	209	234
Platinum-group metals ... troy ounces	60,980	11,639
Silver including alloys ... do	r 4,565	3,256
Tin metal, including alloys, all forms ... long tons	336	182
Zinc metal, including alloys, all forms	5,607	5,952
Other:		
Ores and concentrate	99	315
Other base metals, n.e.s	19	9
NONMETALS		
Abrasives, natural, n.e.s.:		
Crude	171	95
Grinding stones and wheels	53	56
Asbestos, crude	12,187	16,763
Barite and witherite	2	3,506
Boron materials, refined borax	266	419
Cement	351	704
Chalk	NA	1
Clays and products:		
Crude n.e.s.:		
Bentonite	2,889	2,165
Kaolin	2,484	3,862
Other	38	145
Products:		
Refractory	1,372	3,130
Nonrefractory	NA	409
Cryolite	5	--
Diatomite and other infusorial earths	1,312	1,362
Fertilizer materials manufactured:		
Nitrogenous	8,634	21,046
Phosphatic	67,608	38,219
Potassic	61,925	61,835
Other including mixed	16,609	26,470
Fluorspar	NA	15
Graphite, natural	50	79
Gypsum and plasters	22,071	10,990
Lithium mineral	216	162
Magnesite	71	66
Mica, all forms	36	78
Pigments, mineral	817	669
Precious and semiprecious stones, except diamond ... kilograms	56	66
Salt	10	13,263
Sodium and potassium compounds n.e.s	19,103	29,291
Stone, sand and gravel	4,651	2,410
Sulfur	r 2,627	113
Talc, soapstone, pyrophyllite	1,391	1,270
MINERAL FUELS AND RELATED MATERIALS		
Asphalt and bitumen, natural	153	87
Carbon black	428	399
Coal, including briquets, all grades	7	14

See footnotes at end of table.

Table 3.—Colombia: Imports of mineral commodities—Continued

(Metric tons unless otherwise specified)

Commodity		1969	1970
MINERAL FUELS AND RELATED MATERIALS—Continued			
Petroleum refinery products:			
Gasoline	thousand 42-gallon barrels	463	21
Kerosine and jet fuel	do	22	35
Distillate fuel oil	do	15	19
Residual fuel oil	do	--	172
Lubricants	do	122	97
Gas, hydrocarbon	do	1	2
Mineral jelly and wax	do	161	192
Other	do	107	165
Mineral tar and other coal-, petroleum-, or gas-derived crude chemicals		r 4,218	1,402

r Revised. NA Not available.

Source: Official customs returns of Colombia.

COMMODITY REVIEW

METALS

Gold.—Gold production continued to decrease for the seventh consecutive year although the rate of decline was less severe than in the past. The 6 percent drop in output during 1971 resulted primarily from a decline in the placer mining activities of small independent operators. Almost 76 percent of the year's total gold production was accounted for by five companies. Four of these firms were wholly owned subsidiaries of the International Mining Corp. (United States), which also owned a controlling interest in the fifth, Pato Consolidated Gold Dredging, Ltd.

The 1971 output of gold by wholly owned subsidiaries of International Mining increased 7 percent to 82,612 troy ounces. Of this total, 46,148 troy ounces were from the country's only significant underground gold mining operation at Frontino. The 8 percent decline in this mine's production, in comparison with that of the previous year, resulted from the continuing failure of an expansion program initiated in 1964 to develop sufficient new high-grade reserves to support previous production levels at current prices. Placer mining operations of International's wholly owned subsidiaries resulted in the dredging of 19.9 million cubic yards of materials from which 36,464 troy ounces of gold were recovered, a 37 percent increase for the year. This large rise in gold output resulted from a 13 percent increase in the quantity of materials dredged and a 17 percent rise in the average gold content of these materials.

Pato Consolidated Gold Dredging, Ltd., operated four dredges, which dredged 17.8 billion cubic yards during the year. Almost 62,000 troy ounces of gold were recovered from this material. The 2 percent decline in production during 1971 resulted from the time lost in moving two dredges to new locations and the shutdown of another dredge for 21 days for general repairs.

Iron and Steel.—Acerías Paz del Rio, S.A., continued to be Colombia's dominant iron and steel producer during 1971. It produced all of the country's pig iron from iron ore produced at its own mine and from sizable quantities of fines withdrawn from its large stockpile. These fines provided part of the feed for the company's ore-sinterization and oxygen-blasting facilities. The company also accounted for a major portion of Colombia's crude steel output.

Nickel.—Work probably was initiated during 1971 on the Cerro Matoso ferronickel project which will be the largest mining venture in Colombia's history. This project will be carried out by Compañia de Niquel Colombiano, S.A., which is owned jointly by the Instituto de Fomento Industrial (IFI), Hanna Mining Co., and Chevron Oil Co. Each of the parent entities is to contribute one-third of the investment required for the project, but the Government-owned IFI has a 50 percent voting interest.

The lateritic nickel deposit involved in this project is located in the Montelibano district of the Department of Córdoba. Plans call for the exploitation of this deposit by open pit methods. A smelter to be constructed adjacent to the mine probably

will have an annual capacity of approximately 25,000 tons of ferronickel ingot (nickel content only) instead of 17,000 tons as originally planned. Production may be delayed until 1977 as a result of technical problems and the likely decision to increase the planned capacity of the smelter.

NONMETALS

Asbestos.—It was announced in late 1971 that design work for the Las Brisas asbestos project in the northern part of the Department of Antioquia had been assigned to the General Engineering Co. of Toronto, Canada. The Las Brisas asbestos mining and milling facilities are to be operated by Asbestos Colombianas, S.A., in which Nicolet Industries, Inc., of Ambler, Pa., holds a 70 percent interest. This project is to be designed for the mining and processing of 36,000 to 63,000 tons of ore annually.

Cement.—Work was in progress during the year to increase the daily output of the Cementos Diamante, S.A., plant at Ibaqué from 700 to 1,000 tons.

Fertilizer Materials.—Recent discoveries of phosphate rock have led to the initiation of a program by IFI to develop local production in order to replace phosphate imports costing an estimated $20 million [2] annually. The first step under this program was the development of a project for the exploitation of the Turmeque deposits near Ventaquemada in the Department of Boyacá by Compañia Colombiana de Minas (COLMINAS), a dependency of IFI. A 60,000-ton-per-year superphosphate plant being constructed under contract by Pan American Consulting, Ltd., as a part of this project probably was nearing completion at yearend 1971.

Similar exploitation projects were being considered in connection with phosphate rock deposits in the Sardinata and Azufrada areas in the Department of Santander, the Sogamosa area of the Department of Boyacá, and at several locations in the Department of Huila.

An initial annual output of 200,000 tons of ammonium fertilizer is expected as a byproduct of the operations of the Monómeros Colombo-Venezolano caprolactam plant inaugurated at Barranqilla in November 1971. Byproduct fertilizer output from this plant is expected to eventually reach 300,000 tons annually.

Salt.—Development of a marine salt production and export complex at Bahía Hondo on the Guajira Peninsula was in progress during 1971. This complex is to have an annual output capacity of 1.5 million tons of salt and is scheduled for completion during 1973.

MINERAL FUELS

Coal and Coke.—Early in 1971, IFI requested the submission of proposals from firms interested in the development of the coal deposits at El Cerrejon in the Department of Guajira. Recent test drilling of these deposits indicates reserves of 50 to 100 millions tons of low-sulfur, steam-grade, noncoking coal. Strip mining methods would reportedly be economical for 10 to 15 years but part of the reserves would be recoverable only by underground mining.

Acerías Paz del Rio, S.A., continued to be Colombia's principal producer and consumer of metallurgical coke. It was also the operator of the country's only major coal washery.

Petroleum and Natural Gas.—Total output of crude oil declined 2 percent during 1971 as the decrease in aggregate production from the country's older producing areas more than offset a 9 percent increase in output from the recently developed Putumayo area fields. Expansion of production from the Putumayo fields, owned by Gulf Oil Co. and Texas Petroleum Co. (TEXPET) and operated by the latter, was curbed as the result of a dispute between the Ministerio de Minas y Petróleos and TEXPET concerning the maximum efficient rate of production at Orito, the area's principal field. The Ministerio maintained that one-half-inch chokes should be installed in the producing wells of the Orito field to limit the rate of production for conservation purposes in order to guarantee maximum crude oil recovery from the field while TEXPET insisted that this step was not necessary. Output from the Putumayo area was held to a compromise level of 65,000 barrels per day during much of the year pending resolution of this dispute by an arbitration tribunal.

Natural gas production, which rose 6 percent during 1971, was primarily from

[2] Where necessary, values have been converted from Colombian Pesos (CP) to U.S. dollars at the rate of CPs 17.60=US$1.00.

Table 4.—Colombia: Salient statistics of the petroleum and natural gas industry

		1969	1970	1971
Crude oil:				
Production	thousand 42-gallon barrels	76,776	79,594	78,101
Delivered to refineries	do	46,565	49,030	53,048
Exported	do	29,853	31,246	e 24,000
Natural Gas:				
Production	million cubic feet	103,882	104,894	111,288
Consumption [1]	do	44,767	r 56,736	51,186
Injected [2]	do	37,421	38,150	37,075
Flared	do	21,694	20,008	23,027
Natural gas liquids:				
Production	thousand 42-gallon barrels	4,006	4,510	3,629
Consumption [3]	do	e 2,200	e 2,500	e 2,500
Delivered to refineries	do	1,519	1,706	e 900
Exported, mixed with crude oil	do	e 220	e 230	e 220
Refinery products:				
Refinery output [4]	do	49,813	53,230	56,777
Consumption [5]	do	32,005	35,396	37,462
Unfinished oils rerun following interrefinery transfer	do	1,449	1,844	e 2,000
Exported	do	11,767	10,558	e 10,000

e Estimate. r Revised.
[1] Includes shrinkage at natural gas processing plants, and oil company use for fuel.
[2] Includes small quantities used for gas-lift operations.
[3] Excludes the propane and butane output of refineries.
[4] Includes refinery gains and quantities used for fuel.
[5] Excludes propane and butane produced at refineries, and most oil company use.

Source: Centro de Información de la Industria Petrolera.

oilfields where, in a number of cases, gas oil ratios have been rising steadily in conjunction with reservoir depletion. Output of natural gas liquids declined 20 percent during the year.

Proved reserves of crude oil reportedly totaled 1,663 million barrels at yearend 1971. As of the same date, proved reserves of natural gas were reported at 2,500 billion cubic feet.

In accordance with the authority granted it by Law 20 of 1969, the Government-owned oil company ECOPETROL signed joint-venture contracts with private firms during 1971 for the exploration and development of its large petroleum reserve area in the northeastern part of the Llanos Orientales (eastern plains). Contracts covering three of the nine sites or blocks available were signed with a partnership comprised of Continental Oil Co. and Shell Oil Co. (U.S.-based member of the Royal Dutch/Shell Group). Another three blocks were awarded to International Petroleum Colombia, Ltd., (INTERCOL), and one block each was assigned to BP Colombia, Inc., and the Superior Oil Co. of Colombia in partnership with Sun Oil Co. and Signal Companies, Inc.

Under the terms of these joint-venture contracts, the private companies are required to undertake stipulated minimum levels of exploration investment at their own expense. The contracts provide for an initial exploration period of 3 years, renewable for 3 years, and under special circumstances the total exploration period of 6 years could be extended. If oil or gas is discovered, the private company will make the decision as to the feasibility of commercial production. Upon determination that a discovery is commercial, an operations committee is to be formed, with the private contractor and ECOPETROL each having an equal voice in management decisions. Both parties will also share in the costs, equity, and profits relating to the development and production of the field. The development and production period provided for in the contracts is 25 years, unless the exploration period extends beyond 6 years in which case the total length of the exploration and development periods may not exceed 31 years.

Japanese interests became involved in their first petroleum exploration venture in Columbia during early 1971 when Colombia Oil Co., Ltd., a consortium of three Japanese oil firms, acquired a 50 percent interest covering a part of the offshore concession acreage held by Colombia Gulf Oil Co. The area covered by this agreement totals 485,000 acres in eight tracts located in the Golfo de Morrosquillo, approximately 95 kilometers southwest of Cartagena.

A long-standing dispute between an affiliate of the Petroleum Workers Federa-

tion (FEDEPETROL) and the Colombian Petroleum Co. (COLPET), owned jointly by Mobil Oil Corp. and Texaco, Inc., involving a number of issues, including the company's use of contractors, culminated during May 1971 in the appointment of a committee of inquiry by the Ministerio de Minas y Petróleos. This committee reported a number of alleged concession contract violations on the part of COLPET. Subsequently, the Ministerio issued a resolution requiring COLPET to correct the alleged violations or face termination of its concession. The resolution required, among other things, that COLPET perform all normal work with its own equipment and employees, maintain all roads within the concession area except those to officially abandoned wells, and submit data concerning its activities, including projected investment for the remaining 10 years of the concession agreement. Negotiations between the Ministerio and COLPET, which followed issuance of the resolution, were still in progress at yearend. Chances of a settlement appeared centered on the possibility that ECOPETROL, the Government petroleum entity, would obtain participation in COLPET operations. This would be achieved by the transfer of Mobil's interest and obligations with respect to COLPET to ECOPETROL.

The combined footage of exploratory and development drilling continued to decline during 1971 although the total number of wells drilled rose sharply. Data on drilling activity and results were as follows:

	1970	1971
Wells drilled:		
Exploratory:		
Oil.....number..	3	11
Dry.....do....	15	10
Subtotal...do....	18	21
Development:		
Oil.....do....	39	57
Gas.....do....	1	--
Dry.....do....	2	--
Subtotal...do....	42	57
Total.....do....	60	78
Footage drilled.....feet..	404,898	354,100

A new 27,000-barrel-per-day crude oil distillation unit was placed on stream at ECOPETROL's Barrancabermeja refinery in May 1971. The addition of this unit raised the refinery's rated crude throughput to 110,000 barrels per day. Installation of a paraffin unit was probably also completed during the year.

Production at the Barrancabermeja refinery was interrupted in early August by a short strike that involved the takeover of the plant by the workers. Damage to plant facilities, which occurred during the worker occupation, prevented the refinery from returning to full-scale production until the end of the month. As a consequence, severe gasoline shortages were experienced in many parts of the country, especially in the Bogotá area.

The special exchange rate of Col $9 per US$1.00 at which private oil companies and ECOPETROL were required to sell 25 percent and 100 percent, respectively, of their crude oil output to domestic refineries for pesos (all oil transactions in Colombia between producers and refiners are quoted in terms of U.S. dollars per barrel) was eliminated by the Government in June 1971. In its place, an exchange rate of Col$20 per US$1.00 was set for all Colombian crude sold to domestic refineries. At the same time the Government lowered the dollar price for crude oil sold to refineries by private producers, thus neutralizing the effect of the higher exchange value on private producer profits. The net effect of these actions was the elimination of foreign exchange subsidies to refineries and a consequent increase in the cost of refinery operations and in the retail price of most petroleum products.

Plans were under consideration at yearend 1971 for the construction of two additional refineries to be operated by ECOPETROL. The largest of these plants, with a planned capacity of 70,000 barrels per day, is to be located at Tumaco. The other, to be constructed at Cali, is expected to have a capacity of 40,000 to 50,000 barrels per day.

Construction of ECOPETROL's aromatic hydrocarbons plant, located adjacent to the Barrancabermeja refinery, was completed in mid-1971. Processes used in this plant were licensed by the Universal Oil Products Co. of Des Plaines, Ill. Among the processes involved are platforming and sulfolane extraction for the production of high-purity nitration-grade aromatics, hydeal hydrodealkylation for the catalytic conversion of toluene and/or xylenes to benzene, and hydrar hydrogeneration for

the catalytic saturation of benzene with hydrogen to produce equivalent purity cyclohexane. Annual production capacity of this plant is 23,000 tons of benzene, 20,000 tons of toluene, and 36,000 tons of xylenes.

The Monómeros Colombo-Venezolano caprolactam plant at Barranquilla was inaugurated in November 1971. IFI and ECOPETROL have a 25-percent and 20-percent share, respectively, in this joint Colombian-Venezuelan venture. A 45-percent interest is owned by Instituto Venezolano de Petroquimica (I.V.P.), a Venezuelan Government-owned company, and the remaining 10 percent is owned by a Netherlands firm. Principal feedstocks for this plant are cyclohexane from ECOPETROL's Barrancabermeja aromatic hydrocarbons complex and ammonia from an I.V.P. plant in Venezuela. Initial annual capacity of the Monómeros plant was 10,000 tons of caprolactam and 200,000 tons of byproduct ammonium fertilizer, but output is expected to eventually reach 11,500 tons of caprolactam and 300,000 tons of fertilizer annually.

Table 5.—Colombia: Summary data on companies producing and/or refining crude oil during 1971

Company	Principal ownership or affiliation	Nationality of ownership	Crude oil production during 1971 (thousand 42-gallon barrels)	Refining capacity as of Dec. 31, 1971 (thousand 42-gallon barrels daily)
Antex Oil and Gas Co., Inc	Petroqumíca del Atlántico and U.S. citizens.	Colombian/United States.	2	--
Chevron Petroleum Co. of Colombia.	Standard Oil Co. of California.	United States	9,177	--
Colombia-Cities Service Petroleum Corp. (COLCITCO).	Cities Service Co	do	3,216	--
Colombian Petroleum Co. (COLPET).	Mobil Oil Corp. and Texaco Inc.	do	5,938	4
Empresa Colombiana de Petróles (ECOPETROL).	Colombian Government	Colombia	9,633	110
International Petroleum Colombia, Ltd. (INTERCOL).	Standard Oil Co. (New Jersey).	United States	--	56
Provincia Petroleum Co	International Petroleum Colombia, Ltd. and British Petroleum Co., Ltd.	United States/ British.	8,561	--
Shell-Condor, S.A	Royal Dutch/Shell Group	British/Dutch	6,903	--
Tennessee Colombia, S.A. (TENNECOL).	Colombian citizens and Southdown, Inc.	Colombian/United States.	757	--
Texas Petroleum Co. (TEXPET).	Texaco, Inc	United States	8,511	2
Texas Petroleum Co. and Colombia Gulf Oil Co.	Texaco, Inc. and Gulf Oil Corp.	do	25,403	1
Total			78,101	173