

TRINIDAD AND TOBAGO



MINISTRY OF PETROLEUM AND MINES

**ANNUAL ADMINISTRATION REPORT
FOR THE YEAR
1969**

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HIGHLIGHTS OF THE PETROLEUM INDUSTRY DURING 1969

Highlights of the petroleum industry in Trinidad and Tobago during 1969 are as follows:—

(1) *Oil and Gas Discovery off the East Coast:*

Substantial quantities of natural gas, condensate and crude oil were discovered off the East Coast of Trinidad by AMOCO Trinidad Oil Company during 1969. A total of four wells (15,000 feet) were completed in this area and as a result of preliminary productions tests further delineation wells were being drilled. A second drilling barge was expected to commence drilling in the area by March 1970 in order to accelerate the delineation of the fields discovered and development activities are expected to begin around mid-year with the erection of a 12-well platform.

(2) *Assignment of Marine Acreage off the East Coast by DOL to Trinidad-Tesoro:*

Some 79,000 acres have been assigned by Dominion Oil Ltd. to Trinidad-Tesoro off the East Coast of Trinidad. Trinidad-Tesoro has programmed development of a field in this acreage to begin sometime around mid-1970.

(3) *Assignment of Erin Acreage by Shell Trinidad Ltd., to Texaco Trinidad Inc.:*

Government approved the assignment by Shell Trinidad Ltd. of 2,266 acres, 2 roods, 35 perches to Texaco. This was the remaining acreage from the original lease No. 2761/47 held by United British Oilfield (Trinidad) Ltd. whom Shell succeeded. An area of 2,708 acres, 1 rood and 15 perches was surrendered by Shell Trinidad Ltd., by Deed of Surrender No. 6750/52.

(4) *Marine Area off the North Coast of Trinidad:*

During July 1969 Government released the technical data for its North Coast marine acreage which was obtained through a seismic survey undertaken jointly by Government and the United Nations. Some twenty-seven oil companies have now registered and acquired the data and are expected to submit bids for Exploration and Production (Public Petroleum Rights) Licences in this area which will be issued under the provisions of the New Petroleum Legislation. The deadline for receiving bids is 28th February, 1970.

(5) *South Coast Marine Licence to Texaco Trinidad Inc.:*

Government approved the grant to Texaco of an Exploration and Production Licence for over 175,900 acres on the South Coast of Trinidad under the same terms and conditions or duration, surrender, minimum payments and royalty as those prescribed for North Coast Licences. Under the provisions of the licence the company is obligated to drill a well to 15,000 feet (or basement) within twelve months of the issue of the licence.

(6) *Acquisition of BP Trinidad Ltd.:*

The entire petroleum rights and producing assets of BP (Trinidad) Ltd. were acquired by Government on 1st July, 1969, for the sum of (TT) \$44 million. The Trinidad-Tesoro Petroleum Company Ltd. owned equally by the Government of Trinidad and Tobago and Tesoro Oil Company was established to operate the acquired assets.

(7) *Land Leases:*

Government approved the grant to the Trinidad-Tesoro Petroleum Company Ltd., oil mining rights on certain land areas in the Ward of Erin. More parcels were originally held by BP (Trinidad) Ltd., but were surrendered shortly before the purchase of that Company by the Government of Trinidad and Tobago.

(8) Government approved the grant of an oil mining lease to Texaco Trinidad Inc., in respect of a parcel of land comprising approximately 508 acres situated in the Johnson Road Area, Tabaquite, subject to the payment by the Company of a bonus of \$6.00 per acre and subject to the further condition that the Company drilled a Nariva test well within one (1) year of the grant of the licence or surrender the entire acreage.

(9) *Submission to U.S. Government re Trinidad and Tobago's Oil Exports to the U.S.A.:*

During July and August the Government of Trinidad and Tobago presented its submission to President Nixon's Cabinet Task Force and the U.S. Department of State in connection with Trinidad and Tobago's oil exports to the U.S.A. Other oil exporting countries, international companies and other interested parties also made submissions.

(10) *Establishment of a National Petroleum Company:*

In September 1969, the Government of Trinidad and Tobago established a National Petroleum Company in order to manage and develop petroleum resources in Trinidad and Tobago. The interests obtained by Government in the Trinidad-Tesoro Petroleum Company have been vested in the National Petroleum Company.

Legislative Measures :

(i) *Exemption from Purchase Tax and Import Duty:*

As from October 1969, all petroleum equipment materials and supplies imported for use in off-shore oil exploration operations and not manufactured locally are exempted from customs duty up to 31st December, 1976.

(ii) *Territorial Sea Act:*

The Territorial Sea Act (Act No. 38/69) was passed on 31st December, 1969 to extend the Territorial Sea of Trinidad and Tobago from the previous three-mile sea limit to a twelve-mile sea limit. The act incorporated provisions of the 1958 Geneva Convention on the Territorial Sea and contiguous Zones as far as they can be applied to Trinidad and Tobago.

(iii) *The Continental Shelf Act:*

The Continental Shelf Act (Act No. 43/69) was passed on 30th December, 1969 to regulate the exploration and exploitation of the Continental Shelf of Trinidad and Tobago and to carry out the obligations of Trinidad and Tobago under the 1958 Geneva Convention on the High Seas.

(iv) *Petroleum Legislation:*

A new Petroleum Act was proclaimed in December, 1969, to consolidate and amend the law relating to petroleum so as to make better provision for the exploration for, and the development and production of, petroleum and all other related matters. Petroleum Regulations pursuant to this Act will be laid in Parliament early in 1970.

Most of the major petroleum companies operating in Trinidad and Tobago carried out exploratory drilling during 1969 in an attempt to discover new petroleum reserves both on land and in marine areas. AMOCO has been very successful in their exploratory programme and are now carrying out further delineation drilling operations.

With the increasing difficulty of finding new locations, development drilling activity has been somewhat reduced during 1969. However, most companies are engaged in re-evaluations of their geological and geophysical data and it is anticipated that new locations will be proposed in 1970.

Production during 1969 showed a steady decline throughout the year. The annual production amounted to 57,418,493 barrels.

In the Refinery Sector of the industry another record has been established when 154,076,702 barrels of crude oil were refined at a daily average rate of 422,128 barrels.

Summary

Although drilling and production activities registered significant decreases during 1969, all other aspects of the Petroleum Industry in Trinidad and Tobago showed healthy increases. Table I below, summarises the results obtained during 1969 and presents comparable statistics for the three (3) previous years. The overall performance was good even though no newly discovered areas had been developed during the year.

TABLE I
Summary of Statistics for the Trinidad and Tobago Petroleum Industry—1966-1969

	1966	1967	1968	1969
Annual Crude Oil Production (barrels)	55,604,058	64,994,582	66,903,906	57,418,493
Annual Natural Gas Production (msecf)	118,927,017	140,338,345	157,444,945	137,502,590
Average GOR (sef/barrel)	2,138	2,160	2,264	2,394
Annual CHPS (Natural Gasolene) Production (barrels) ...	187,962	191,995	163,670	150,466
Daily Refinery Capacity (barrels/day)	390,000	405,000	430,000	433,000
Annual Refinery Throughput (barrels/year)	144,193,269	138,924,636	151,282,098	154,076,702
Total Wells completed during the year	272	221	175	130
Average depth of completed wells (feet)	4,427	4,328	5,356	5,468
Total footage drilled during the year	1,187,202	928,210	942,686	690,671
Oil and Gas Wells completed during the year	247	197	151	99
Drilling success-ratio (per cent)	91.0	90.3	86.9	76.2
Proven Crude Oil Reserves (million barrels)	580	612	N.A.	N.A.
Acreage developed	40,420	42,175	43,630	44,915
Average Rigs running	15.0	9.5	8.2	7.0

GEOLOGICAL AND GEOPHYSICAL ACTIVITY

The North Marine Seismic Survey sponsored by the United Nations and the Trinidad and Tobago Government, which was initiated in 1968 was completed and final reports were delivered to Government in June 1969. Although the field phase of the exercise was completed in 1968, the processing, interpretation and preparation of reports were not completed until 1969. The surveyed area comprised approximately 3,000 square miles of marine territory off the North Coast of Trinidad. Copies of the final seismic report together with the previously completed Aero-magnetic Survey Report of the area were made available to all companies which had registered as participants in the proposed competitive bidding for the grant of Exploration and Production Licences. The companies each paid a registration fee of \$50,000.00 (T.T.). Altogether, twenty-six (26) companies registered yielding a total income of \$1.3 million (T.T.). Bids were received up to the 28th February, 1970 and it is anticipated that concessions will be granted in the area by 30th June, 1970.

The survey indicates the existence of a significant sedimentary basin off the North Coast having sufficiently large thicknesses of sedimentary rocks and a considerable number of important geological structures which might contain accumulations of petroleum in commercial quantities.

The companies which registered their interest in the area were:—

SHELL TRINIDAD LTD.
 GULF OIL COMPANY—LATIN AMERICA
 TESORO PETROLEUM COMPANY
 TEXACO TRINIDAD INC.
 PHILLIPS PETROLEUM COMPANY
 ESSO EXPLORATION INC., NEW YORK
 AMOCO TRINIDAD OIL COMPANY
 AMERADA PETROLEUM CORPORATION
 UNION CARBIDE PETROLEUM CORPORATION
 SUN OIL COMPANY
 OCCIDENTAL PETROLEUM CORPORATION
 KERR-McGEE CORPORATION
 TRINIDAD CANADIAN OIL LTD.
 UNION OIL COMPANY OF CALIFORNIA
 CONTINENTAL OIL COMPANY
 FRONTIER PETROLEUM COMPANY
 MONIL LATIN AMERICA
 DOMINION OIL LTD.
 ROYAL RESOURCES CORPORATION
 SIGNAL OIL AND GAS COMPANY
 BP CARIBBEAN (HOLDINGS) LTD.
 COMPAGNIE FRANCAISE DES PETROLES
 MARATHON OIL COMPANY
 DEMINEX
 OCEANIC EXPLORATION COMPANY
 LIVINGSTON OIL COMPANY

Texaco Trinidad Inc. conducted seismic surveys in three (3) marine areas during 1969. A total of 82,700 acres were surveyed in San Fernando Bay, Galeota Point and the South Coast of Trinidad. This is illustrated in the Fig. I. The surveys were shallow-water surveys employing the Dinoseis technique which utilises a controlled explosion of diesel-vapour and air in a chamber which projects the shock waves downwards. The resulting explosions cause no damage to marine life.

Texaco also conducted surface geological work on 25,000 acres in the Guayaguayare-Canari area and spent a total of 8.6 Party months on this exercise.

Amoco Trinidad Oil Company carried out a small amount of in-fill shooting in the Offshore Point Radix marine area. The survey was executed by Geophysical Services Incorporated.

The types of survey and amount of work involved in the surveys are summarized in Table II.

TABLE II

Country : Trinidad and Tobago

Party-Months of Geological and Geophysical Exploration in 1969

Company or Area	Surface Geology	Seismograph	Total
Amoco	—	0.07	0.07
Texaco Trinidad Incorporated	8.6	3.5	12.1
TOTALS	8.6	3.57	12.17

DRILLING

Drilling activities in Trinidad and Tobago declined considerably during 1969 with the resultant laying off of most of the contractor rigs and an average of 7 rigs being kept in operation during the year.

One hundred and thirty-one (131) wells were drilled, accounting for 690,671 feet of hole, this footage being 26.7 per cent less than that drilled in 1968. In spite of the number of wells completed during 1969 being less than that for the previous year, i.e. 130 in 1969 as against 175 in 1968, a reasonable success ratio of 76.2 per cent was still obtained. Six (6) companies were engaged in drilling activities.

Exploratory Drilling

Exploratory drilling effort was slightly reduced in Trinidad and Tobago in 1969 as was reflected by the drilling of only twenty (20) wells compared with twenty-six (26) in 1968. The aggregate depth of the twenty (20) wells was 158,804 feet and on the completion of these wells a success-ratio of 50 per cent was attained. Fig. II shows the location of exploratory and semi-exploratory wells drilled in 1969.

Amoco Trinidad Oil Company (formerly Pan American Trinidad Oil Company) actively continued exploratory drilling operations off the East Coast and accounted for 59,022 feet of hole, 8.5 per cent of the total footage drilled or 37.2 per cent of the exploratory footage for 1969. Their drilling activity was concentrated on delineating the South-East Galeota and Offshore Point Radix "structural highs" where they drilled a total of 4 wells. Five wells, including SEG 3, which was drilled in 1968, were completed during the year and tests on three (3) of these wells have proved extremely encouraging with the production of substantial quantities of gas, condensate, and black oil. The future looks promising indeed and it is anticipated that development work will begin in August, 1970.

Belpetco drilled one semi-appraisal well to a depth of 8,600 feet in their concession in the Gulf of Paria. The well, based on sub-surface geology, was designed to test the Manzanilla sands which were producing in CM-2 and CM-3X. It was completed as an oil producer.

T.N.A.'s exploratory drilling effort was confined to the East Soldado area where they commenced drilling three (3) wells, one of which was still being drilled at year end. These wells accounted for 17,324 feet of hole and only one (1) rig was intermittently employed in exploratory drilling.

S.289 was drilled to a depth of 5,100 feet to determine the extent of oil-bearing Morne L'Enfer sands down-flank of the developed area. Although the total thickness of the producing sands found was not as great as in the developed area, the well was nevertheless completed as an oil producer.

S.299 a 8,344-foot well, was sited approximately two (2) miles to the East of the East Soldado Field. The well was drilled to appraise the Morne L'Enfer Forest and Cruse Sands in a new fault block. Resistive Cruse sands were found and the well was successfully completed as an oil producer.

The results of S2.99 were sufficiently encouraging to warrant the drilling of another well, S.302, to further evaluate the Cruse sands in the new fault block. At the end of the year S.302 was still being drilled.

Texaco Trinidad Inc. continued their efforts to discover new fields as evidenced by the drilling of 13 exploratory wells. The total footage on exploratory drilling was 73,858 which was some 62.4 per cent less than that drilled in 1968.

Guayaguayare was once again the scene of much activity and five (5) wells were drilled in an effort to discover new reservoirs in the area. Two (2) of these wells were successfully completed, two (2) were abandoned dry, and the fifth was being tested at year's end.

G.601 was drilled to a depth of 10,000 feet to evaluate the Lower Gros Morne Sands, zones 4 and 5. The well encountered the sands as anticipated and was completed as an oil producer.

G.602 was based on seismic and subsurface geological data and was designed to test the Lower Gros Morne Sands on the downdip edge of the Beach Field. These sands had not been tapped by any well in this field. The Lower Gros Morne Sands were not encountered and the well was completed as an oil producer in the Middle Gros Morne.

G.603 was designed to test Gros Morne sands which are productive in the Navette field. The well was sited on the South flank of the Lizard Spring anticline, 3 miles South-West of the Navette Field. All the Gros Morne sands penetrated were wet and the well was abandoned.

G.604 was located on the East flank of the Marcelle Valley Field and was drilled to evaluate deeper untested Gros Morne Sands in this area which, according to surface and subsurface geology, were on-lapping an unconformity. No economic oil bearing sands were encountered and the well was abandoned.

In the Trinity area, about two (2) miles South of Shell's Catshill Field, two wells were drilled to test stratigraphically trapped Herrera sands on the South flank of the Siparia-Ortoire Basin. These wells, AT.84 and AT.84X, found no resistive sands and were abandoned.

MD-52 was sited about $\frac{1}{2}$ mile South of Premier Consolidated Oilfields Limited, Siparia Field, and, was drilled to a depth of 9,403 feet to test gas and condensate bearing Karamat sands. The well was abandoned when it failed to encounter the objective sands.

Q.36 was drilled to a depth of 3,600 feet to test Cruse Sands on the North flank of the southern anticline South of the Los Bajos fault. The well was completed as a producer in the Cruse Sands and led to follow-up development drilling.

About $2\frac{1}{2}$ miles West of Trinidad Tesoro Petroleum Company Limited's Moruga West Field, in the Congo River area Bp. 446 was drilled to test stratigraphically trapped Herrera sands on the South flank of the Siparia-Ortoire basin. The well found 60 feet of Herrera sand which was all wet, and it was abandoned.

Johnson Rd. 1 JR 1, located in the picturesque central range 2 miles West of Tabaquite field and about 9 miles East of Pointe-a-Pierre Refinery, was designed to test Miocene Nariva sands productive in the Tabaquite and Brighton fields, and the Eocene Pointe-a-Pierre sands on the North-West dipping flank of a monocline. The well was completed in the Nariva sands as a gas producer.

Texaco's Erin acreage, which they recently acquired from Shell Trinidad Limited, was also the scene of some semi-exploratory drilling. Two (2) wells, En 10 and En 10X, were drilled to test the Upper Cruse and Lower Forest Sands, on the downthrown side of the Skinner Fault. The sands were found to be 100 per cent wet in both wells and they were abandoned.

Table III summarises exploratory drilling activity for 1969.

TABLE III
Summary of Wildcat Drilling in Trinidad and Tobago—1969

Operator	Well Name	Index Map Reference	Basis for Location	LAHEE Explor. Class	Completion Date	Total Depth (Feet)	Name and/or Age of Deepest Formation	Results/Remarks
AMOCO ...	S.E.G. 3	C 36	Seis SSG	C 1	1. 1.69	13,648	Miocene	Dry
	S.E.G. 4	D 35	Seis SSG	C 1	9. 2.69	13,750	Miocene	Dry
	OPR 3	H 33	Seis SSG	B 1	8. 6.69	14,710	Miocene	Oil, gas and Condensate Producer (Temp. Abdn.)
	OPR 4	H 32	Seis SSG	B 1	2. 9.69	15,500	Miocene	Oil, Gas and Condensate Producer (Temp. Abdn.)
	OPR 5	H 32	Seis SSG	B 1	31.12.69	15,062	Miocene	Gas Producer (Temp. Suspended)
BELPETCO ...	CM 4	N 13	SSG	B 1	9. 3.69	8,600	Miocene (Top Manzanilla Sds)	Oil Producer
T.N.A. ...	S. 289	G 8	SSG	D 1	23. 1.69	5,100	Miocene Morne L'Enfer	Oil Producer
	S. 299	H 8	Seis SSG	B 2c	8. 9.69	8,344	Miocene Top Lower Cruse	Oil Producer
	S. 302	H 9	SSG	A 1	—	8,215	Miocene Top Lower Cruse	Drilling at year end
T.T.I. ...	Gy. 601	I. 24	Seis SSG	B 2c	20. 1.69	10,000	Miocene Top Lower Gros Morne	Oil Producer
	Gy. 602	G 24	Seis SSG	B 2c	2. 2.69	6,114	Eocene Top Lizard Springs	Oil Producer
	Gy. 603	H 23	SSG	C 3	—	7,070	Top Naparima Hill (Cretaceous)	Dry CIAA (6.3.69)
	Gy. 604	G 24	SSG	C 2b	29.12.69	7,215	Top 604 Sand Series	Dry
	Gy. 606	G 25	—	A 3	—	9,595	—	Testing
	AT. 84	H 21	SSG	C 3	1. 1.69	5,604	Oligocene Top Ciperio	Dry
	AT. 84X	H 21	SSG	C3	10. 1.69	5,720	Oligocene Top Ciperio	Dry
	Bp. 446	F 16	Seis SSG	C 2c	—	8,542	Oligocene Top Herrera	Dry CIAA (14.4.69)
	MD. 52	F 15	SSG	C 2c	7.10.69	9,403	Oligocene Top Herrera	Dry
	En. 10	G 11	SSG	C 1	16. 7.69	9,557	Miocene Top Cruse	Dry
	En. 10X	G 11	SSG	C 1	29. 7.69	8,600	Miocene Base Upper Forest Clay	Dry
	Q. Johnson Rd. 1	F 14 J 18	SSG SSG	B 3 B 3	7. 8.69 18. 9.69	3,600 6,000	Miocene Cruse Oligocene Lower Herrera Sds.	Oil Producer Gas Producer

Development Drilling

Development drilling activity in 1969 was even lower than in 1968. A total of 531,867 feet of hole were drilled as compared with 746,512 feet in 1968.

Texaco was responsible for most of the Development Drilling and the greatest effort was expended in the Palo Seco, Grande Ravine and Erin areas, in which a total of sixty-four (64) development wells were drilled: fifty-five (55) of these were completed as oil producers and ten (10) were abandoned dry. A total of twelve (12) development wells were drilled in the Guayaguayare, Forest Reserve, Morne Diablo and Quinam areas where a success ratio of 75 per cent was achieved. There was also some development drilling in the Barrackpore area.

Trinidad Northern Areas drilled fourteen (14) development wells in the Soldado area. Other companies that contributed to development drilling were Trinidad Tesoro Petroleum Company Limited, Trinidad Canadian Oilfields Limited, Premier Consolidated Oilfields Limited and Belpetco. Table IV presents a summary of Development Drilling by areas.

TABLE IV
Summary of Development Drilling in Trinidad and Tobago—1969

Area No.	Producers Completed	Dry Holes Completed	Total Completed	Feet Drilled	Rigs Active 31.12.69
1	13	2	15	70,103	1
2	2	—	2	5,050	—
3	—	—	—	—	—
4	60	11	71	366,380	2
5	4	1	5	12,695	—
6	5	—	5	25,628	—
7	—	—	—	—	—
8	4	5	9	42,401	1
9	—	—	—	—	—
10	1	1	2	6,200	—
11	—	—	—	—	—
12	—	—	—	—	—
13	—	—	—	—	—
14	—	1	1	3,410	—
TOTALS	89	21	110	531,867	4

PRODUCTION

The trend of decreasing crude oil production which began in March, 1968 continued steadily throughout 1969 resulting in a drop of 25,486 bbls. in the daily average production figure.

During 1969, the country produced 57.4 million barrels of oil at a daily average rate of 157,311 barrels. This represented a decrease of 9.5 million barrels or 14.2 per cent when compared with the production for 1968.

T.N.A.'s production which had been showing a steady and healthy growth rate since 1955 reached a peak of 70,328 barrels/day in May, 1969, then a slight decline set in. Despite this, T.N.A. was the only company that registered an increase, (4.6 per cent.) in production for 1969. All other companies showed decreases ranging from Texaco's 30.5 per cent to Shell's 8.6 per cent.

The country's production pattern continued to be dominated by the behaviour of Texaco's Navette Field in Guayaguayare (*see* Fig. III), which field alone accounting for 64 per cent of the total decline in production for 1969. Towards the end of the year, however, the rapid decline trend in the Navette Field was showing signs of levelling off, and it is anticipated that in 1970 the decline rate in this field would be considerably less than that established in 1969.

In 1969, for the first time in the history of Trinidad's oil industry, marine production showed a drop, some 1.3 per cent less than that produced in 1968. The average well-productivity of the marine wells was 232.1 barrels/well as compared with 243.6 barrels/well in 1968, while that for marine wells deviated from land was 25.8 barrels/well and 30.2 barrels/well in 1969 and 1968 respectively.

The corresponding figures for land wells were 27.8 and 34.7 barrels/well respectively. This indicates a large drop in the productivity for these wells, and was reflected by the correspondingly large drop of 23.4 per cent experienced in production from land wells during 1969.

Despite the drilling effort expended by companies during 1969 to maintain their levels of crude oil production, the total production obtained from new wells was low as 2.7 million barrels, thereby representing 4.7 per cent of the total oil produced. Recompleted wells accounted for 1.0 million barrels or 1.8 percent of the total production.

Figure IV illustrates graphically the contribution of new and recompleted wells to the country's total crude oil production and Table V gives a detailed comparison, by fields, of production for 1968 and 1969.

TABLE IVA
Key to Area—Numbers used on Map (Fig. II) on Table IV and in Text

Area No.	Description
1	Soldado, North Marine, Couva Marine
2	Point Ligoure, F.O.S. Area IV, Point Fortin West and Central, Guapo, Parrylands, Cruso
3	Brighton (Land and Marine), Vessigny, Merrimac, Rousillac
4	Palo Seco, Los Bajos, Erin
5	Forest Reserve, Fyzabad, Point Fortin East, New Dome, San Franciquo
6	Quarry, Coora, Quinam, Morne Diablo
7	Oropouche
8	Penal, Barraekpore, Wilson, Siparia, Mandingo
9	Moruga West, Rock Dome, Inniss, Trinity, Moruga North, Catshill, Balata, Bovallius
10	Guayaguayare, Lizard Springs, Moruga East
11	Palmiste, Galeota (East Coast)
12	South Marine (South Coast)
13	Tabaquite and Pointe-a-Pierre
14	Icacos

Country : TRINIDAD AND TOBAGO

TABLE V
Oil Production—Trinidad and Tobago
(In Barrels)

Company	Field	Area No.	Discovery Year	Total Wells Drilled	Age of Producing Formation	ANNUAL PRODUCTION		Cumulative Production through December, 1969 (x000)
						1968	1969	
SHELL TRINIDAD LIMITED:	Balata East and West	9	1952	48	Miocene	48,922	45,884	1,875
	Catshill	9	1950	112	Miocene	625,289	553,586	18,278
	Inniss	9	1956	33	Miocene	136,487	134,382	5,172
	Rock Dome	9	1962	3	Miocene	—	—	16
	Penal	8	1936	257	Miocene	1,288,116	1,213,740	51,434
	New Dome	5	1928	31	Miocene	18,636	15,776	2,991
	Point Fortin East	5	1929	109	Miocene	533,519	476,051	18,181
	San Francique	5	1929	27	Miocene	22,459	22,086	5,730
	Los Bajos	4	1918	29	Miocene	—	—	546
	*Erin	4	1963	4	Miocene	74,491	5,789	710
	Area IV and Guapo	2	1963	156	Miocene	228,616	210,018	32,027
	Parrylands 2 and 3	2	1918	199	Miocene	184,529	175,335	19,731
	Parrylands, 1, 4, 5	2	1913	142	Miocene	221,754	184,924	12,795
	Point Fortin Central	2	1916	94	Miocene	79,369	130,877	11,477
	Point Fortin West	2	1907	204	Miocene	186,138	166,844	17,326
	TOTAL			1,448		3,648,325	3,335,302	198,289
TRINIDAD NORTHERN AREAS:	F. O. S.—Ft.	2	1954	16	Miocene	73,781	84,984	1,444
	Soldado	1	1955	306	Miocene	24,146,852	25,238,438	170,952
		TOTAL			322		24,220,633	25,323,422
TEXACO TRINIDAD INC.	Guayaguayare	10	1902	626	Miocene	10,920,228	5,118,325	60,094
	Trinity	9	1956	93	Miocene	600,485	476,320	11,692
	Barrackpore	8	1911	273	Miocene	794,235	560,015	20,157
	Oropouche	8	1944	40	Miocene	101,678	85,685	2,543
	Morne Diablo/Quinam	6	1926	—	Miocene	80,273	95,565	6,830
	Forest Reserve	5	1913	1,772	Miocene	6,262,138	5,080,340	214,900
	Palo Seco	4	1929	—	Miocene	6,273,341	5,978,042	66,697
	Brighton	3	1908	584	Miocene	4,626,374	3,043,514	59,147
	Erin	4	1963	10	Miocene	—	174,676	175
		TOTAL			3,398		29,658,752	20,612,482

*Shell Erin taken over by Texaco, February, 1969.

Country : TRINIDAD AND TOBAGO

TABLE V—CONTINUED

Oil Production—Trinidad and Tobago—Continued
(In Barrels)

Country	Field	Area No.	Discovery Year	Total Wells Drilling	Age of Producing Formation	ANNUAL PRODUCTION		Cumulative Production through December, 1969 (x000)	
						1968	1969		
BELPETCO: PREMIER CONSOLIDATED OILFIELDS LIMITED:	Couva Marine	1	1963	6	Miocene	14,336	8,792	178	
	Bovallius	9	1954	6	Miocene	—	—	189	
	Rock Dome	9	1955	11	Miocene	513	—	134	
	Siparia	8	1957	5	Miocene	37,701	28,305	703	
	Fyzabad	5	1918	252	Miocene	79,935	72,739	12,371	
	San Francique	5	1929	72	Miocene	79,382	62,612	2,545	
	Palo Seco	4	1915	83	Miocene	12,648	10,564	1,540	
	Icaos	14	1965	13	Miocene	99,110	61,504	283	
	TOTAL				442		309,289	235,724	17,765
TRINIDAD TESORO PETROLEUM COMPANY LIMITED:	Fyzabad	5	1920	805	Miocene	2,215,234	2,118,317	128,321	
	Quarry	6	1938	—	Miocene	172,085	147,209	14,492	
	TOTAL				805		2,387,319	2,265,526	142,813
KERN FIELDS: TRINIDAD PETROLEUM DEVELOPMENT FIELDS :	Guapo	2	1922	423	Miocene	789,153	671,160	32,145	
	Moruga East	10	1953	59	Miocene	69,218	62,781	1,748	
	Moruga North	9	1956	18	Miocene	36,870	26,447	797	
	Moruga West	9	1957	129	Miocene	213,883	158,673	7,796	
	Coora/Quarry	6	1936	591	Miocene	1,696,764	1,377,468	71,408	
	Palo Seco/Erin (McK.)	4	1926	860	Miocene	2,962,595	2,689,021	61,615	
	North Marine	1	1959	15	Miocene	290,047	182,157	887	
	TOTAL				1,675		5,269,377	4,496,547	144,251
	TRINIDAD CANADIAN OILFIELDS LIMITED	Balata Central	9	1949	6	Miocene	9,883	7,873	364
Wilson		8	1936	74	Miocene	405,241	311,215	17,803	
Cruse		2	1913	150	Miocene	186,774	146,864	24,794	
Tabaquite		13	1911	218	Miocene	4,824	3,586	1,333	
TOTAL					448		606,722	469,538	44,294
GRAND TOTAL						66,903,906	57,418,493	1,194,366	

SURVEY OF FLUID INJECTION OPERATIONS DURING 1969

Gas Injection

The total quantity of natural gas injected into the formation in approved fluid-injection projects in Trinidad and Tobago during 1969 was its highest ever at 24,672 million standard cubic feet (s.c.f.). The quantity injected was equivalent to some 17.9 per cent of the total quantity of natural gas produced in the country during the year. There were 31 active projects from which more than 5.2 million barrels of crude oil were produced.

In comparing the results obtained during 1969 with those of the previous year, it is highly commendable that the *Texaco Trinidad Inc.* had increased its figure for the total annual quantity of gas injected from 13,075 million s.c.f. to 17,315 million s.c.f. and simultaneously, had received 2,923,196 barrels of oil during 1969 as against 2,681,507 barrels in 1968.

A favourable improvement in the Texaco's operational efficiency was reflected in decreasing average gas oil ratios from 5,345 s.c.f. to 4,969 s.c.f. per barrel of oil produced during the same period. Projects in the Forest Reserve Field particularly the U.C.R.A. and U.C.W.E. in the Upper Cruse horizons, were mainly responsible for the continuing good response to this company's gas-injection efforts.

Government's fifty per cent owned company, the *Trinidad-Tesoro Petroleum Co., Ltd.*, which had acquired the *BP Trinidad Limited's* producing assets during the year maintained its level of gas-injection activity at 4,300 million s.c.f. compared with 1968's total of 4,415 million s.c.f. However, the annual production of crude oil from these projects fell from 762,251 barrels to 669,047 barrels and the average G.O.R.'s increased adversely from 6,091 to 6,936 s.c.f. per barrel of oil produced.

Trinidad Northern Areas showed a significant decline in its Soldado gas-injection operations from a total of 3,832 million s.c.f. during 1968 to 3,057 million s.c.f. during 1969. Crude oil produced from wells which were still considered under the influence of gas injection fell from 1,958,483 barrels to 1,608,090 barrels. Gas-oil ratios increased considerably from 2,012 to 2,606 s.c.f. per barrel of oil produced and reflected reduced displacement efficiency in these operations.

During the year, with the assistance of the Venezuelan Ministry of Mines and Hydrocarbons, a modified Muskat-Hoss form of the material balance for dispersed gas injection was programmed for the Main Soldado Field on a high-speed computer and the recovery efficiency of the field was determined for several levels of gas injection.

Results of this study have indicated that in this field, from theoretical considerations alone, under the current gas-injection programme which averages less than 10 per cent of gas produced only 0.4 per cent additional oil recovery would be recovered from the main field. On the other hand; by increasing the gas-injection rate from its current 10 per cent to 30 per cent of the total gas produced, an increase in the ultimate oil recovery of some 9 million barrels was postulated. Joint computer engineering studies are continuing in this area to determine how optimum productivity could be derived at minimum cost. With the average oil gravity at 30-API and its viscosity at 2 centipoises, the prospects for water-injection operations in this field appear very encouraging. The additional costs of recovering injected water along with the produced oil have been considered prohibitive to date. The Hydraulic pump which is being tested in Soldado field operations has proven its mechanical feasibility in these operations and the revised economics at high rates of production now appear attractive.

Water Injection

Generally, the level of 2.7 million barrels of water injected into the formations for secondary oil recovery operations fell by almost 200,000 barrels compared with the previous year's figure. *Texaco*, nevertheless, mainly by increasing its water injection activity in its Guayaguayare Field (with a view to arresting its rapid rate of production decline), contributed a total of nearly 2.5 million barrels during the year. Its annual oil recovery from these operations was 462,246 barrels compared with 123,003 in the previous year.

Shell decreased its annual water injection rate in its Catshill project from 173,000 barrels to 136,000 barrels; the annual oil recovery fell slightly from 45,735 to 44,754 barrels.

Trinidad-Tesoro virtually discontinued its water-injection operations when it registered only 112,885 barrels into the formation compared with BP's figure of 905,375 barrels in the previous year. Consequently, over the same period, oil produced from the Trinidad-Tesoro projects fell from 228,085 to 154,768 barrels.

Steam Injection

Trinidad-Tesoro obtained nearly 345,000 barrels of oil with an average water-cut of 17 per cent by injecting a total of 101,000 barrels of steam into their projects. In the previous year, the BP group had obtained 296,000 barrels of oil by injecting 78,000 barrels of steam into the same projects. *Texaco*, the only other operator injecting steam locally, recovered 522,000 barrels of oil for a total injection of 88,600 barrels of steam water an average water-cut of 41.5 per cent.

By expressing steam injection results by company, in barrels of oil produced per barrel of steam injected, *Texaco* obtained an average of 0.59 barrels and *Trinidad-Tesoro* 3.41 barrels. This comparison gives a good indication of the vast potential of the *Trinidad-Tesoro's* holdings for future oil recovery by conventional steam-injection operations.

Summaries of Trinidad and Tobago's Fluid Injection and Production Statistics are included for the period 1965-1969 in Table VI.

Statistics by Company for each type of fluid injected are presented in Table VII. Water-injection statistics are summarised in Table VIII; steam injection results are illustrated by project operating Table IX; and gas-injection data by Areas is shown in Table X.

TABLE VI

Summary of Fluid Injection Operations in Trinidad and Tobago for Period 1965-1969

Year	PROJECTS			INJECTION STATISTICS				CRUDE OIL PRODUCTION STATISTICS				Oil Expressed as A % of Trinidad's Total Oil Production
	NUMBER OF PROJECTS IN OPERATION AT END OF THE YEAR			Gas (Mmcf.)	Injection as A % of Trinidad's Total Gas Production	Water (Bbls.)	Steam (Bbls.)	TOTAL OIL RECOVERED FROM WELLS UNDER PROJECT INFLUENCE IN (BBLs.)				
	Gas	Water	Steam					Gas Injection Projects	Water Injection Projects	Steam Injection Projects	All Projects	
1965	28	17	15	13,787	12.4	3,687,473	1,084,489	4,426,542	927,175	407,866	5,761,583	11.8
1966	30	12	14	19,841	16.7	3,625,743	1,353,550	4,729,544	1,099,788	822,889	6,652,221	12.0
1967	27	4	10	22,633	16.1	2,906,151	1,321,088	5,188,386	466,180	969,395	6,623,961	10.2
1968	31	5	11	21,323	14.1	2,926,657	1,090,699	5,402,241	396,823	969,741	6,768,805	10.1
1969	31	7	12	24,672	17.9	2,741,938	989,773	5,200,333	661,768	878,734	6,740,835	11.7

TABLE VII
Fluid Injection Operations—1969
A. GAS INJECTION

Name of Company	No. of Active Projects	Gas Injected (MSCF)	Oil Produced (Bbls.)	Water Produced (Bbls.)	Gas Produced (MSCF)	G.O.R. SCF/bbl.
TEXACO	10	17,315,471	2,923,196	642,955	14,525,930	4,969
S.T.L.	—	—	—	—	—	—
TRINIDAD-tesoro	20	4,299,526	669,047	92,246	4,640,804	6,936
T.C.O.	—	—	—	—	—	—
TRINMAR	1	3,057,041	1,608,090	2,172	4,191,329	2,606
TOTALS	31	24,672,038	5,200,333	737,373	23,358,063	4,492

B. WATER INJECTION

Name of Company	No. of Active Projects	Water Injected (Bbls.)	Oil Produced (Bbls.)	Water Produced (Bbls.)	Gas Produced (MSCF)	Percentage Water
TEXACO	3	2,493,208	462,246	700,263	183,749	60.2
TRINIDAD-tesoro	3	112,885	154,768	111,613	154,613	41.9
S.T.L.	1	135,845	44,754	5,802	50,862	11.5
TOTALS	7	2,741,938	661,768	817,678	389,224	55.3

C. STEAM INJECTION

Name of Company	No. of Active Projects	Steam Injected	Oil Produced (Bbls.)	Water Produced (Bbls.)	Gas Produced (MSCF)	Percentage Water
TEXACO	9	888,607	521,950	369,622	113,244	41.5
S.T.L.	—	—	—	—	—	—
TRINIDAD-tesoro	2	101,166	344,787	70,563	40,982	17.0
P.C.O.L.	1	—	11,997	18,222	—	60.3
TOTALS	12	989,773	878,734	458,407	154,226	34.3

TABLE VIII
Water Injection Summary by Projects Year—1969

Company	Field	Project	Water Injected (Bbls.)	Oil Produced (Bbls.)	Water Produced (Bbls.)	Gas Produced (MSCF)	Percentage Water
TEXACO	Forest Reserve ...	F/R Zone 9:3 ...	1,340,000	124,005	503,484	28,686	80.2
		F/S Zone 4 ...	32,500	1,993	832	—	29.5
		Guayaguayare ...	Gros Morne Zone 4	1,120,708	336,248	195,947	155,063
TEXACO	All Fields ...	— ...	2,493,208	462,246	700,263	183,749	60.2
TRINIDAD-tesoro	Fyzabad ...	FM/UF/610/1 ...	110,355	30,374	15,232	24,067	33.4
		FS/LC/539/1 ...	1,605	124,394	96,381	130,546	43.7
		FM/UF/200/1 ...	925	—	—	—	—
TRINIDAD-tesoro	All Fields ...	— ...	112,885	154,768	111,613	154,613	41.9
S.T.L.	Catshill ...	Co. 30 S.D.S. ...	135,845	44,754	5,802	50,862	11.5
ALL COMPANIES	All Fields ...	— ...	2,741,938	661,768	817,678	389,224	55.3

TABLE IX

Steam Injection Summary by Projects Year—1969

Company	Field	Project	Steam Injected (Bbbs.)	Oil Produced (Bbbs.)	Water Produced (Bbbs.)	Gas Produced (MSCF)	Percentage Water
TEXACO ...	Forest Reserve	I	—	41,807	36,212	8,661	46.4
		IIA	221,099	132,103	64,928	21,540	33.0
		IIB	—	8,816	1,535	2,037	14.8
		III	431,019	252,861	219,110	63,677	48.6
		IV	156,432	45,764	31,934	7,977	41.1
		V	8,825	22,953	14,661	4,999	39.0
		VI	—	5,293	81	1,827	1.5
	U.U.C.	71,232	276	2	36	.7	
	Brighton ...	Vessigny	—	12,077	1,159	2,490	8.8
TEXACO ...	All Fields ...	—	888,607	521,950	369,622	113,244	41.5
TRINIDAD TESORO...	Palo Seco ...	LML'E/UF	101,166	218,735	60,987	10,025	21.8
		UC	—	126,052	9,576	30,957	7.1
TRINIDAD TESORO ...	All Fields ...	—	101,166	344,787	70,563	40,982	17.0
P.C.O.L. ...	Fyzabad ...	Zenith	—	11,997	18,222	—	60.3
ALL COMPANIES ...	All Fields ...	—	989,773	878,734	458,407	154,226	34.3

TABLE X

Gas Injection Summary by Areas—1969

Company	Field	Gas Injected (MSCF)	Oil Produced (Bbbs.)	Water Produced (Bbbs.)	Gas Produced (MSCF)	Gas Oil Ratio G.O.R.
TEXACO ...	Forest Reserve ...	10,835,547	1,690,688	535,450	8,979,404	5,311
	Brighton ...	1,432,596	96,499	39,776	414,621	4,297
	Guayaguayare ...	5,047,328	1,136,009	67,729	5,131,905	4,517
TEXACO ...	All Fields ...	17,315,471	2,923,196	642,955	14,525,930	4,969
TRINIDAD TESORO ...	Coora ...	997,940	146,747	32,133	831,349	5,665
	Quarry ...	1,579,357	169,312	14,101	1,276,597	7,540
	Moruga West ...	101,265	16,601	11,215	97,382	5,866
	Palo Seco ...	92,750	32,686	316	121,332	3,712
	Fyzabad ...	1,528,214	303,701	34,481	2,314,144	7,620
TRINIDAD-TESORO ...	All Fields ...	4,299,526	669,047	92,246	4,640,804	6,936
T.N.A. ...	Soldado ...	3,057,041	1,608,090	2,172	4,191,329	2,606
ALL COMPANIES ...	All Fields ...	24,672,038	5,200,333	737,373	23,358,063	4,492

NATURAL GAS PRODUCTION AND UTILISATION

The bulk of natural gas produced in Trinidad and Tobago is associated with the crude oil, consequently, the country's natural gas production for 1969 was adversely affected by the sharp decline in crude oil production experienced during the year. Nevertheless, the country's average gas oil ratio continued its upward trend increasing from 2,264 standard cubic feet barrels in 1968 to 2,394 standard cubic feet barrels in 1969. Natural gas production for the year averaged 377 million standard cubic feet per day, giving an annual figure of 137,499 million standard cubic feet which was 9.2 per cent lower than the total production for the previous year. Of this production, 27,326 million standard cubic feet came from the gas-condensate areas: Penal, Barrackpore and Wilson.

Decline in Texaco's Guayaguayare Forest Reserve and Brighton fields accounted for 92 per cent of the drop in the country's natural gas production.

Complete utilisation of the natural gas produced, increased by 15 per cent over the previous year's figure. This increase in gas utilisation was due to:—

- (a) Increased repressuring activity in Texaco's Guayaguayare field; from 2.296 million standard cubic feet per day in 1968 to 13.841 million standard cubic feet per day in 1969.
- (b) Increased use of natural gas as fuel in the fields, refineries and other industries.

Shell's refinery expansions to accommodate the processing of imported crude oil accounted for a 9.5 per cent increase in refinery fuel consumed over that used during 1968.

The Trinidad and Tobago Electricity Commission also showed an increase in the amount of natural gas used for generating electricity. This was as a result of the installation of an additional boiler in their Port-of-Spain generating plant.

Six (6) smaller industries started using natural gas as their fuel source during the year, while two (2) more have indicated their intention to effect a similar change in 1970.

Natural gas wasted during the year was 31.6 per cent of the total quantity produced. However, some 45.6 per cent of the total gas wasted was used for lifting and pumping crude oil prior to venting. This was the lowest percentage ever recorded. The collection and compression (for use in fluid injection operations) of low pressure gas which was formerly vented, particularly in Texaco's Guayaguayare field, was responsible for the significant reduction in the quantity of gas wasted.

The trend of gas production and utilisation over the last five years is given in Table XI.

TABLE XI
Annual Statistics for Natural Gas Production and Utilization—1965-1969

	1965		1966		1967		1968		1969	
	Millions of S.C.F.*	%								
PRODUCTION	111,503	100.0	118,927	100.0	140,338	100.0	151,445	100.0	137,499	100.0
G.O.R. (SCF/bbl.)	2,282		2,138		2,159		2,264		2,394	
A. USED AS FUEL :										
In Refineries	22,714	20.4	25,257	21.2	28,304	20.2	29,257	19.3	29,383	21.4
In Fields	6,677	6.0	8,208	6.9	7,783	5.6	7,848	5.2	8,313	6.0
In other Industries	12,126	10.9	15,227	12.8	17,759	12.7	19,294	12.8	20,652	15.0
SUB-TOTAL	41,517	37.3	48,692	40.9	53,846	38.5	56,399	37.3	58,348	42.4
B. OTHER COMPLETE UTILIZATION :										
Used as Process Gas	4,502	4.0	6,714	5.7	9,309	6.6	10,603	7.0	10,803	7.9
Injected into Formation	13,866	12.4	19,841	16.7	22,625	16.1	21,323	14.1	24,727	18.0
Converted into C.H.P.S.	206	0.2	219	0.2	204	0.1	173	0.1	158	0.1
SUB-TOTAL	18,574	16.6	26,774	22.6	32,138	22.8	32,099	21.2	35,688	26.0
C. VENTED :										
After use of Pneumatic Energy	24,078	21.6	23,224	19.5	30,877	22.0	31,257	20.6	19,748	14.4
Without use	27,334	24.5	20,237	17.0	23,478	16.7	31,690	20.9	23,715	17.2
SUB-TOTAL	51,412	46.1	43,461	36.5	54,355	38.7	62,947	41.5	43,463	31.6

NOTE: S.C.F.*—Standard Cubic Feet.

%—per cent of total natural gas produced.

REFINING AND PETROCHEMICAL MANUFACTURE

The Refining sector continues to dominate the local petroleum industry. There was expansion of the Shell refinery which raised the rated capacity from 430,000 barrels per day during 1968 to 433,000 barrels per day during 1969, an increase of 0.7 per cent.

The refinery throughput of 154,076,622 barrels of crude oil processed at a daily average rate of 422,128 barrels was 1.8 per cent above the 1968 figure of 151,282,098 barrels.

Declining rates of indigenous crude oil during 1969 coupled with increased refinery capacity brought about a re-emphasis of crude oil imports.

Movement of Crude Oil and Products

The overall picture of crude oil movement and product disposal is summarised hereunder. For details see Appendix V.

Crude Oil Balance

Availability	Million Barrels		Disposal	Million Barrels
Stock on 1st January		2,444,737	Exports	6,230,200
Production	57,568,961		Local Consumption	8,592
Less Loss	269,029	57,299,932	Delivered to Refinery	154,076,617
Imports		103,761,531	Stock on December 31	3,190,791
		163,506,200		163,506,200

Total imports of crude oil were 103,761,531 barrels or 67.3 of the total refinery throughput. The import of Crude oil from Venezuela, the largest supplier was 69.1 million barrels or 66.6 per cent of total imports, followed by Saudi Arabia with 12.8 million barrels or 12.4 per cent of total imports. A balance by months for Crude Oil and C.H.P.S. for the year 1969 is presented in Appendix VII.

Primary refined products made the biggest gains during the year with Fuel Oil increasing by 2.9 million barrels to a production of 88,271,226, amounted to 59.3 per cent of total production: Aviation Turbine Fuels had a production of 15,180,872, a decrease of 6.8 per cent over last year's figures.

In respect of the other classes of refined products there were relatively small variations. However, the production of petro-chemical intermediates showed a significant increase over the previous year. Total production was 1,703,849 barrels, an increase of 189,092 or some 12.5 per cent over the 1968 figure of 1,514,575 barrels. Normal paraffin accounted for 87.6 per cent of the increased production. Comparative production figures for 1968 and 1969 are shown hereunder:—

Production and Exports of Important Petrochemical Intermediates
(Trinidad and Tobago, 1969-1968)
(Quantities in Barrels)

Petrochemical Intermediate	1969		1968	
	Production	Exports	Production	Exports
Normal Paraffins	772,060	771,548*	606,307	653,219*
Di-isobutylene	45,217	42,387	44,915	48,009*
Nonene	24,011	26,386*	31,477	35,264*
Tetramer	51,268	59,794*	54,067	41,277
Benzene	220,955	237,816*	213,602	200,317
Toluene	381,734	386,634*	356,622	323,827
Xylene	26,405	24,672	19,215	18,262
Cyclohexane	174,308	141,830	158,475	192,605*
Unfinished Napthenic Acids	7,891	27,034*	30,926	30,394

*Excess of exports over production made up from stock.

As in the past the major portion of the Refinery Products was exported to World Markets. The value of exports of crude petroleum and petroleum products for 1969 was \$730.9 million or 77.0 per cent of total exports of which \$86.2 million were attributed to crude petroleum.

A detailed breakdown of destination of crude oil and refined products is given at Appendix V. Total exports of refined products 147,878,191 barrels represent 99.32 per cent of total production. Local consumption was 3,178,074 barrels. A balance of Refined products is summarized hereunder. For details *see* Appendix VI.

Availability	Million Barrels		Disposal	Million Barrels
Stock on 1st January ...		6.7	Shipments ...	138.0
Imports ...		1.6	Bunkers ...	9.9
Crude Delivered ...	154.1		Local Consumption ...	3.2
Refinery Gas and Loss ...	5.2			
	148.9			
Products obtained ...		148.9	Stock on 31st December ...	6.1
		157.2		157.2

The volume of excisable products amounted to 1,398,926 barrels. The excisable sales of gasolene amounted to 1,055,528 barrels, a decrease of 16.6 per cent compared to 1968. The excise duty on these sales was \$11,050,268.36. The excise tax on gasolene was 18 cents for regular and 27 cents for premium gasolene from January, 1968.

Sales of bottled propane showed an increase of 7.0 per cent over the 1968 figure amounting to 23,849,135 lb. on which excise duty at 2 cents per lb. was paid.

Details of petroleum excisable products are listed hereunder:—

<i>Premium Gas (bbls.)</i>	<i>Regular Gas (bbls.)</i>	<i>Gas-Diesel (bbls.)</i>	<i>Propane (lb.)</i>
316,770	738,758	343,398	23,849,135

Nitrogenous Fertilizers

Average ammonia production in Trinidad and Tobago exceeded the level of 1,444 short tons per day; a total of 527,232 short tons were produced for the year. This represented a 5 per cent increase over last year's production; consequently, the production of both Ammonium Sulphate and Urea showed increases and totalled 84,376 and 76,162 short tons respectively. These were increases of 6.5 per cent and 15.3 per cent over the previous year's production.

A total volume of 19,199 m.m.s.c.f. of natural gas was used in the ammonia and nitrogenous fertilizer industry during 1969, approximately the same volume as was used in 1968. Of this quantity 10,803 m.m.s.c.f. were actually used in the process, the remainder being consumed mainly as fuel.

Physical Loss of Crude

There were fifteen (15) reports of physical loss of crude oil during 1969 as compared with twenty-five (25) in 1968. However, the quantity of crude oil lost in 1969 was 71 per cent higher than that in 1968; due to severe Earthmovement, a trunk-line was broken in the Brighton Area resulting in the loss of approximately 5,000 barrels of crude oil. Net oil lost in 1969 was 5,400 barrels. This represents 0.01 per cent of the country's annual crude oil production.

Increased vigilance by the oil companies over their trunk pipe lines resulted in no acts of sabotage to these lines during 1969. In the previous year, eight (8) cases of sabotage to trunk lines were reported resulting in a loss of 800 barrels of crude.

The chief factors which contributed to the physical loss of crude oil during 1969 were:—

- (1) Non-maintenance of flowlines which resulted in corrosion and parted couplings.
- (2) Negligence in field operations resulting in overflow of oil catchments.
- (3) Pilfering of equipment and suspected sabotage at gathering stations.

In the last case the amount of crude oil lost was less than 30 barrels and this did not cause any pollution to crops.

No reports of crude oil losses were received from either Trinmar or T.C.O. during the year 1969.

Pollution

Of the six (6) reports of pollution received during the year, three (3) were made by farmers.

In four of these cases there was damage to crops while in the other cases, the Moulai River and the Gulf of Paria were polluted.

The quantity of crude involved in the damage to crops was estimated at 200 barrels. Five (5) barrels polluted the Moulai River.

All pollution reports were investigated by the Development Division of the Ministry and recommendations were put forward to the various companies involved to prevent similar recurrences.

SUMMARY OF ACCIDENTS OCCURRING IN THE PETROLEUM INDUSTRY DURING 1969

In the Petroleum Industry it would appear that a greater degree of safety consciousness was displayed during 1969 as manifested by a 33.2 per cent drop in the number of accidents when compared with those occurring during 1968. The total number of accidents reported in the fields for 1969 was 167. The number of fatalities arising out of these accidents however were five (5), while for 1968 there was only one (1). Unfortunately, all five (5) were in Texaco's Palo Seco-Forest Reserve area. Three (3) men were seriously burnt and later died when a well on which they were working caught fire, another was crushed by a crane while effecting repairs to a building in Forest Reserve, and the fifth was pinned by a tractor while preparing a location in the Palo Seco field.

About 66 per cent of the accidents were classified as minor, the injured persons were not away from work for more than three (3) days. Included in this group were typical accidents such as squeezed fingers, slipping and falling, sprains, minor strains, cuts and bruises. The other 34 per cent were regarded as serious accidents and included severe burns caused by fire; hot water or sulphuric acid; electric shocks; back strains caused mostly by lifting heavy objects; fractures; and injuries caused by severe falls or falling objects.

A summary of Accident Statistics by company is given in Table XII.

TABLE XII
Accident Statistics for 1969

Company	Field	Total Accidents	Fatalities	ACCIDENTS							
				SERIOUS				MINOR			
				D	P	E	O	D	P	E	O
BP (TRINIDAD) LTD. GROUP* ...	All ...	28	—	—	4	7	2	—	15	—	—
TRINIDAD TESORO PETROLEUM COMPANY LTD. ...	All ...	18	—	—	3	—	2	—	3	1	9
PAN AMERICAN TRINIDAD OIL- FIELDS LTD. NOW AMOCO ...	All ...	—	—	—	—	—	—	—	—	—	—
PREMIER CONSOLIDATED OIL- FIELDS ...	All ...	2	—	—	2	—	—	—	—	—	—
SHELL TRINIDAD LTD. ...	All ...	2	—	—	—	—	1	—	—	—	1
TRINIDAD CANADIAN OILS LTD....	All ...	—	—	—	—	—	—	—	—	—	—
TRINIDAD NORTHERN AREAS ...	All ...	2	—	—	—	—	—	—	2	—	—
TEXACO TRINIDAD INC. ...	Barrackpore ...	8	—	1	—	1	—	2	3	1	—
	Brighton ...	3	—	—	1	—	—	—	1	1	—
	Forest Reserve ...	—	—	—	—	—	—	—	—	—	—
	Palo Seco ...	80	3(P)1(E)1(O)	9	8	4	1	22	18	18	—
	Guayaguayare ...	24	—	5	5	1	—	3	8	2	—
	TOTAL TEXACO ...	115	5	15	14	6	1	27	30	22	—
INDUSTRY TOTALS ...	— ...	167	5	15	23	13	6	27	50	23	10

*The Company changed to T.T.P.C.L. on 1st July, 1969.

D—DRILLING P—PRODUCTION O—OTHERS E—ENGINEERING.

ROYALTY ASSESSMENT

Appendix VIII presents a summary of crude oil assessed for Crown Royalty with prices and analyses for the year under review for the half-yearly periods ending 30th June and 31st December.

Appendix IX presents a summary of the royalty assessed on crude oil, natural gasolene and natural gas produced on Crown Oil Mining leases for each of the half-yearly periods during 1967, 1968 and 1969.

Appendix X summarises the quantities of Natural Asphalt extracted from the Pitch Lake and the quantities of derived products which were exported and consumed locally during 1967, 1968 and 1969.

QUARRY OPERATIONS

Quarry operations in 1969 showed a marked increase over 1968 in respect of both production and revenue. This all-round increase resulted from the closer supervision of quarry operations and the positioning of checkers at critical points.

Hereunder is a comparative statement of production and revenue from quarry operations for the years 1968 and 1969:—

	Cubic Yards Won and Removed		Royalty Due		Royalty and Arrears Paid	
	1968	1969	1968	1969	1968	1969
			\$ c.	\$ c.	\$ c.	\$ c.
ST. GEORGE EAST ...	85,415	163,325	28,848 51	54,194 93	34,550 37	49,605 67
ST. ANDREW-ST. DAVID ...	13,063*	79,894	4,667 45*	27,241 30	3,510 60	16,306 15
SAN FERNANDO HILL ..	77,660	117,710½	23,298 00	35,313 10	18,595 00	36,646 81

*These figures are in respect of 1st July, 1968 to 31st December, 1968 only.

LEASES AND LICENCES

During 1969 Texaco Trinidad Inc. acquired an additional amount of 220,562 acres from T.N.A. (56,562) and T.P.D. (168,000) on the South Coast of Trinidad.

The total Crown oilrights under lease increased from 2,525,563 at the end of 1968 to 2,531,434 acres at the end of 1969.

P.C.O.L. surrendered some 7,434 acres during 1969.

The following is an outline of the leasing situation in the Territory as at 31st December, 1969:—

Crown Oilrights	A	R	P
Crown Leases—Crown Surface ...	224,483	0	39
Crown Leases—Private Surface ...	49,929	1	32
Exploration Licences ...	1,638,690	0	00
Marine Licences ...	519,384	0	00
TOTAL CROWN OILRIGHTS ...	2,432,486	2	31
<i>Private Oilrights</i>			
Private Leases ...	98,947	2	26
TOTAL ACREAGE OF ALL LANDS UNDER LEASE ...	2,531,434	1	17

A detailed survey of Crown and Private Leases and Licences, is set out on a Company basis in Table XIII.

TABLE XIII

Oilrights under Lease and Licence as at 31st December, 1969 in Trinidad and Tobago

Company	CROWN																					PRIVATE OILRIGHTS Land			TOTAL CROWN AND PRIVATE		
	LAND LEASES									SUBMARINE LICENCES																	
	Crown			Alienated (Surface private) Crown Oil			Total			High Seas			Territorial Waters			Exploration Licences			Total								
	A.	R.	P.	A.	R.	P.	A.	R.	P.	A.	R.	P.	A.	R.	P.	A.	R.	P.	A.	R.	P.	A.	R.	P.	A.	R.	P.
TRINIDAD NORTHERN AREAS LIMITED (T.N.A.)	32	3	33	—	—	—	32	3	33	88,486	0	0	95,161	0	0	—	—	—	183,647	0	0	—	—	—	183,679	3	33
TEXACO TRINIDAD INC. (T.T.I.)	127,482	3	35	33,495	3	32	160,978	3	27	77,000	0	0	158,906	0	0	—	—	—	235,906	0	0	80,398	1	26	477,283	1	13
TESORO GROUP--TRINIDAD PETROLEUM DEVELOPMENT (T.P.D.)	13,004	2	31	5,658	0	11	18,662	3	2	57,000	0	0	—	—	—	—	—	—	57,000	0	0	2,886	0	12	78,548	3	14
KERN TRINIDAD OILFIELDS LIMITED (K.T.O.)	347	2	23	602	0	28	949	3	11	—	—	—	975	0	0	—	—	—	957	0	0	1,004	2	33	2,929	2	4
APEX (TRINIDAD) OILFIELDS LIMITED (A.T.O.L.)	2,308	0	27	2,272	3	24	4,581	0	11	—	—	—	—	—	—	—	—	—	—	—	—	273	3	12	4,854	3	23
TOTAL--Tesoro Group	15,660	2	1	8,533	0	23	24,193	2	24	57,000	0	0	975	0	0	—	—	—	57,975	0	0	4,164	2	17	86,333	1	1
SHELL TRINIDAD LIMITED (S.T.L.)	63,591	2	10	5,239	2	24	68,831	0	34	—	—	—	—	—	—	—	—	—	—	—	—	4,487	0	29	73,318	1	23
PREMIER CONSOLIDATED OILFIELDS LIMITED (P.C.O.L.)	10,718	2	9	2,640	1	13	13,358	3	22	—	—	—	—	—	—	—	—	—	—	—	—	5,731	3	34	19,090	3	16
TRINIDAD CANADIAN OILFIELDS LIMITED (T.C.O.)	6,996	2	31	—	—	—	6,996	2	31	—	—	—	—	—	—	—	—	—	—	—	—	35	2	0	7,032	0	31
ESTATE OF TIMOTHY ROODAL	—	—	—	9	2	12	9	2	12	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	9	2	12
DOMINION OIL LIMITED (D.O.L.)	—	—	—	10	3	8	10	3	8	—	—	—	41,856	0	0	78,899	0	0	120,755	0	0	4,130	0	0	124,895	3	8
PAN AMERICAN TRINIDAD OIL COMPANY (PAN-AM) NOW AMOCO	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1,456,756	0	0	1,456,756	0	0	—	—	—	1,456,756	0	0
BELPETCO	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	103,035	0	0	103,035	0	0	—	—	—	103,035	0	0
TOTAL	224,483	0	39	49,929	1	32	274,412	2	32	222,486	0	0	296,898	0	00	1,638,690	0	0	2,158,074	0	0	98,947	2	26	2,531,434	1	17

EXPLANATIONS : A.R.P.—Acres, Roods and Perches.

SUMMARY OF PORCELLANITE SURVEY

Porcellanite is a type of clay rock deposit which is found in South Trinidad. The porcellanite deposits have been known for many years and numerous small quarries are to be found throughout the Chatham, Buenos Aires, Erin area. The only use for the material so far has been as a local roadstone for second class roads.

A details survey of the porcellanite deposits was conducted during late 1968 and 1969. This survey was made by Dr. R. Bristow through the auspices of the Overseas Division of the Institute of Geological Sciences and assisted by personnel of the Ministry of Petroleum and Mines.

Porcellanite may be defined as a clay deposit which has been heated and sintered by the spontaneous combustion of organic matter which was deposited within the clay. The porcellanite which is formed by this combustion process may have certain desirable characteristics which will give it a potential commercial value. It was with this objective in mind that this survey and testing exercise was undertaken.

Porcellanite when finally ground and mixed with portland cement, in percentages up to 40 per cent, will chemically combine with the Portland cement to form a mixture known as Portland-Pozzolana cement. Since it is considerably less expensive to produce Pozzolana than Portland cement the resultant product is less costly and certain useful and desirable properties are introduced in the Portland Pozzolana cement. The special properties which this mixture possesses are:—

- (1) Low heat of hydration.
- (2) Impermeability.
- (3) Resistance to chemical attack.

The low heat of hydration which is a cooler setting temperature than that of Portland cement make this mixture ideally suited for large concrete structures such as dams and massive footings.

The impermeability of the material improves its resistance to the passage of water and consequently forms a dense impermeable concrete which cuts down on electrolytic corrosion of the re-inforcing steel used in many concrete structures.

The resistance to chemical attack makes this type of concrete, resistant to the attack of salt water or corrosive waters and as such is especially suited for such projects as quays, concrete piles, docks, canals or any other type installation that is exposed to sea water or other corrosive waters. It may also have some specialised uses in oil well cementing.

Extensive deposits of porcellanite have been found in South Trinidad and the results of the field survey indicate that there are reserves of porcellanite in excess of 700 million tons. Numerous samples of the material were collected throughout the course of the survey and detailed laboratory tests have been conducted by the I.G.S. in the United Kingdom to determine the physical and chemical properties of the Porcellanite. Preliminary results have been very favourable. Bulk samples of porcellanite have been collected and further tests are being made with special attention paid to the suitability of porcellanite as a building material. These tests will involve a long period of time since it will be necessary to age and cure samples for a six (6) month period before testing of these samples can be carried out. The samples are being tested against utilising the ASTM Standards, and on initial testing have met the required specifications.

The low cost of pozzolana cement versus Portland cement is due to the fact that the porcellanite requires no extensive processing in its preparations it is quarried, crushed, ground, and mixed with portland cement. It is possible that because of the low production cost the price of the finished product should be less than half that of Portland Cement or less than \$20.00 per ton.

A good deal of additional work and testing must still be done before any commercial production is undertaken, however, to date the test results are very favourable and should the material prove to be suitable for use as a Portland-Pozzolana cement it should be an important contribution to Trinidad and Tobago's economy.

STAFF

The Staff structure of the Ministry of Petroleum and Mines was not altered in any way during 1969. The problem of recruiting technical staff continued to pose a major problem. Technical staff was in fact further depleted by the resignation of a Senior Engineer who had ten years experience in the Ministry. Apart from resignations, the award of Government Scholarships, and study leave accounted for a heavy drain on the Ministry's limited staff.

Reorganization

The report of the organization study of the Ministry submitted by the management consultants—Peat, Marwick and Mitchell—is still receiving the consideration of a Cabinet Committee. Implementation of recommendations must consequently be held in abeyance.

Training, Conferences, Visits and other Activities

The Ministry undertook many overseas assignments in the U.S.A., Europe and Latin America which were of prime importance to the oil industry and consequently to the economy as a whole.

Visits

- (1) Mr. Hugh Hinds, Petroleum Engineer I, visited Venezuela on February 21, 1969 to March 26, 1969, on attachment to the Computer Centre of the Ministry of Mines and Hydrocarbons in Venezuela, for the purpose of making a computerized study of the Soldado Field.
- (2) On July 31, 1969, a team of Government Officials led by the Minister of Petroleum and Mines, the Honourable J. O'Halloran, visited Washington and New York to put forward the case for Trinidad and Tobago oil exports to the U.S.A. The officials were Mr. R. A. Thomas, Permanent Secretary, Ministry of Petroleum and Mines; Mr. E. Moore, Acting Permanent Secretary, Ministry of Planning and Development; Mr. R. C. Appleton, Economist III, Ministry of Petroleum and Mines.
Mr. Appleton preceded the rest of the delegation and was attached to the Embassy of Trinidad and Tobago in Washington D.C. from the end of June to the end of August 1969, where he was engaged in preparing the preliminary case in consultation with Government's Oil Consultant in New York. Trinidad and Tobago's case was presented to the U.S. Department of State and Task Force on July 15, 1969. Second round submission were made on August 15, in the light of the cases presented by other countries, companies and individuals.
- (3) The Trinidad and Tobago Mineral Rights Mission visited the United Kingdom from August 25 to September 5, 1969. The Mission comprised Mr. R. A. Thomas, Permanent Secretary, Ministry of Petroleum and Mines; Mr. O. O. Fernandes, Chief Petroleum Engineer; Mr. R. A. Toby, Commissioner of Inland Revenue and Miss Monica Barnes, Legal Draughtsman from the Ministry of Legal Affairs. The Mission received invaluable advice and assistance from Her Majesty's Ministry of Power and wishes to record its deep appreciation.
- (4) Mr. R. Mends, Petroleum Engineer I, was attached to the Venezuelan Ministry of Mines and Hydrocarbons (Field Offices) from November 25, 1969 to December 24, 1969, to observe specific methods and practices in that country with respect to its oil industry.
- (5) A fact-finding team comprising Mr. J. L. Nunez, Administrative Officer IV, Mr. M. Marquez, Administrative Officer II, Mr. U. B. Davidson, Economist II, and Mrs. K. Bhoolai, Legal Assistant; all of the Ministry of Petroleum and Mines visited Venezuela during the period December 2, 1969 to December 11, 1969. This team was able to observe and discuss various aspects of the operations of Shell and Texaco Oil Companies, in addition to the operations and procedures of CVP—the Venezuelan National Oil Company—and particularly the Ministry of Mines and Hydrocarbons.

Seminars

- (1) Mr. J. L. Nunez, Administrative Officer IV, represented the Government of Trinidad and Tobago at the OPEC Seminar held in Vienna from June 30, 1969. The theme of the seminar was "International Oil and Energy Policies of Producing and Consuming Countries".
- (2) Messrs. H. Hinds and R. Mends, Petroleum Engineers I, attended seminars on the Petroleum Industry held at the University of Oriente in Venezuela from November 10, 1969 to November 18, 1969.
- (3) Two engineers and two economists of the Ministry attended a seminar in Examination of Oil Company Accounts for Taxation purposes held at the Training Centre, Trinidad House, from September 10, to September 23, 1969.

The seminar was conducted by Mr. Dick Kindle, Petroleum Engineer and Mr. George La Forge, Accountant, both of whom are attached to the U.S. Federal Internal Revenue Department.

Mr. Kindle covered the main technical aspects of exploration drilling and refining of oil and related these sectors to all costs associated with them for taxation purposes in the U.S.A.

Mr. La Forge dealt mainly with the techniques used in the U.S.A. for examining the accounts of the oil companies for taxation purposes.

While the course was primarily concerned with assisting the field audit staff of the Inland Revenue Department to improve their techniques of examining oil company accounts for tax purposes, the Ministry staff were on hand to relate local problems of an engineering and economic nature.

Conferences

- (1) An extraordinary session of the Special Co-ordinating Commission for Latin America (CECLA) held in Santiago, Chile, from March 31 to April 12, 1969, was attended by the Honourable J. O'Halloran, Minister of Industry, Commerce and Petroleum (Head of the delegation) at Ministerial level, and at the technical level by Mr. W. G. Demas, Economic Adviser to the Prime Minister, Mr. R. A. Thomas, Permanent Secretary, Ministry of Petroleum and Mines; Mr. F. R. Bissessar, Acting Director of Finance and Economics Division, Ministry of Finance, and Mr. Solomon Lutchman, Minister-Counsellor, Trinidad and Tobago Embassy in Washington D.C.
- (2) Meetings of the Special Co-ordinating Commission for Latin America (CECLA) were also held in Vina Del Mar, Chile, from May 7, 1969 to May 14, 1969. Trinidad and Tobago was represented at the expert level by Mr. S. Lutchman, Minister-Counsellor of the Embassy of Trinidad and Tobago in Washington D.C.; Mr. R. A. Thomas, Permanent Secretary, Ministry of Petroleum and Mines; Mr. F. R. Bissessar, Acting Director of Finance and Economics, Ministry of Finance. They were

joined for talks at ministerial level by Dr. H. E. Major, Chargé d'Affaires of the Trinidad and Tobago Embassy in Brazil, from May 15 to May 17, 1969. The Honourable J. O'Halloran, Minister of Industry, Commerce and Petroleum led the delegation at ministerial level.

- (3) The Eighth Guyana Geological Conference held in Georgetown, Guyana from August 11 to August 15, 1969, was attended by Mr. J. P. Scott, Geologist I and Mr. H. Hinds, Petroleum Engineer I.
- (4) During the period 14 to 23 June, 1969, Mr. R. Appleton, Senior Economist, represented the Ministry at the Sixth Annual Meeting of the Inter-American Economic and Social Council at the Expert level held at the Trinidad Hilton.

The main objective of the Conference at which all O.A.S. member countries were represented was the formulation of the basic aspects of development policies for Latin America's economic and social development over the next decade and the external co-operations requirements to support such policies.

Training

- (1) An In-service Training Course for Petroleum Engineering Assistants organized by Mr. E. Bertrand, Development Engineer, was conducted in the Development Division, San Fernando during the month of May, 1969. Senior administrative and technical personnel of the Ministry contributed, by way of lectures, in making the course a tremendous success.
- (2) Five (5) officials, Mr. E. Bertrand, Development Engineer; Mr. Appleton, Economist III; Mr. U. Davidson, Economist II; Messrs. H. Hinds and R. Mends, Petroleum Engineers I, and Mr. J. Scott, Geologist, attended a three-week part-time course in "Computer Application to Engineering" which was conducted at the University of the West Indies in St. Augustine and commenced on October 9, 1969.
- (3) Personnel from the Development and Geological Divisions participated in two advanced courses in log interpretation, which were arranged by the firm of Schlumberger Surencos S.A. The courses, conducted during the periods January to May and May to June, consisted of lectures on the interpretation and application of results obtained by modern logging tools, such as the continuous dipmeter, and the dual induction log.
- (4) Mr. J. P. Scott, Geologist I, attended a series of lectures on Fundamentals of Reservoir Engineering which was conducted by Texaco Trinidad Inc.
- (5) Mr. J. P. Scott attended a one-day course at the St. Augustine Campus of the University of the West Indies on the preparation of photographic rock slides. Dr. Robson of the Seismic Research Centre conducted this course.

Scholarships and Awards

- (1) Mr. McNichols Herbert, a Petroleum Inspector, was awarded a Government scholarship with effect from October 29, 1969, to do a B.Sc. degree in Chemical Engineering.
- (2) Mr. Rodney Harnarine, Petroleum Engineering Assistant, was awarded a Government Scholarship with effect from October 29, 1969, to study for the B.Sc. degree in Mechanical Engineering.
- (3) Miss Leena Ramsaran, Petroleum Engineering Assistant, was awarded a Government Scholarship with effect from November 17, 1969, to pursue a B.Sc. (General Honours) degree in Mathematics and Chemistry.

Study Leave

Mr. L. Attai, Petroleum Engineer I, was granted no-pay study leave with effect from December 2, 1969, to enable him to read for the Ph.D. degree in Petroleum Engineering.

PROJECTS AND STUDIES

Projects undertaken by the Geological Section were as follows:—

1. (i) Reconnaissance survey of the Fluorspar deposit on Gaspar Grande island.
- (ii) Establishment of a development plan for the most efficient method for quarrying operations on San Fernando Hill.
- (iii) Sampling and analysis of the black shale beds in Central Trinidad with particular reference to valuable materials, i.e., uranium and vanadine.
- (iv) Reconnaissance survey of the Valencia Long Stretch Area to determine the quality and quantity of sand and gravel deposits which may exist in the area.

Prices

A study of the annual and monthly data submitted by the oil companies to the Ministry of Petroleum and Mines over the period 1965 through 1969 was undertaken. As a result average prices were calculated for all petroleum products.

Concessions

- (i) The question of importing lube oils in bulk for sale to large industrial concessionaires was studied. This involved an examination of the production of lube oils by a large producing company under pioneer status. A consideration of all aspects of the question showed that the importation of lube oils in bulk would benefit the consumer in terms of lower prices.
- (ii) Other Concession studies included:—
 - (a) Application for exemption from duty by firms using propane gas as an input.
 - (b) Applications by companies regarding the importation of crude, partly refined petroleum products and additives for refining and blending of lubricating oils.
 - (c) An elementary cost-benefit analysis was also conducted on the production of petrochemicals, to determine whether concessions be granted in view of the loss of government revenue on one hand as against the increased efficiency, competitiveness and the maintenance of employment levels and exchange earnings by the company, on the other hand.

Other Studies

The impact on Trinidad and Tobago's petroleum and natural gas exports to Brazil was studied in view of that country's development of these industries.

APPENDIX I
Annual Statistics of Production, Drilling, Refining—Exports and Imports 1939

Item	Unit	Percentage Difference 1969-1968	1969	1968	1967	1966	1965	1964	1963	1962	1961	1960	1959
1. Crude Oil	'000 bbls.	-14.2	57,418	66,904	64,995	55,603	48,859	49,731	48,678	48,876	45,768	42,357	10,919
2. Natural Gas or C.H.P.S.	'000 bbls.	- 8.5	150	164	192	188	197	200	170	194	199	202	218
3. Total Crude Oil and Natural Gas (1+2)	'000 bbls.	-14.0	57,668	67,068	65,187	55,791	49,056	49,931	48,848	49,070	45,967	42,559	41,137
4. From Crown Oil Rights	'000 bbls.	-14.7	54,014	63,345	60,961	51,648	45,274	46,100	45,013	44,302	41,102	37,784	36,128
5. From Private Oil Rights	'000 bbls.	- 4.3	3,405	3,559	4,034	3,955	3,585	3,631	3,665	4,574	4,666	4,573	4,791
6. Total Imports	'000 bbls.	+12.9	105,418	93,380	84,146	93,508	94,050	83,682	74,758	65,409	62,707	47,267	33,826
7. Imports of Refined Products (Lubricating Oil)	'000 bbls.	-12.2	43	49	43	—	2	54	47	—	46	43	39
8. Imports of Crude Oil for Refining	'000 bbls.	+13.5	103,762	91,447	80,437	93,228	93,398	83,223	74,131	65,168	62,510	45,824	31,350
9. Imports of Other Oils for Refining and Blending	'000 bbls.	-14.4	1,613	1,884	3,666	280	650	405	580	241	197	1,900	2,437
10. Total Exports	'000 bbls.	+ 4.1	147,878	142,076	141,779	135,678	132,440	118,596	106,771	93,927	88,179	68,331	57,918
11. Exports of Crude Oil	'000 bbls.	-10.8	6,230	6,983	5,801	4,705	4,452	3,442	3,773	4,047	4,406	4,127	3,354
12. Exports of Refined Products	'000 bbls.	+ 4.9	141,648	135,093	135,978	130,973	127,988	115,154	102,998	89,880	83,773	64,204	54,564
13. Runs to Stills	'000 bbls.	+ 1.8	154,077	151,282	138,925	144,193	137,165	127,548	119,692	109,256	103,755	81,955	68,061
14. Number of Wells Started	As stated	-27.8	127	176	213	273	225	192	226	232	286	298	290
15. Total Number of Wells Completed	As stated	-26.1	130	176	221	275	224	194	232	230	288	312	278
16. Number of Drilling Wells Completed as Oil Wells	As stated	-34.4	99	151	197	244	201	170	199	255	245	276	247
17. Number of Drilling Wells Abandoned, &c.	As stated	+24.0	31	25	24	31	23	24	33	25	43	35	31
18. Total Footage Drilled (All Wells)	Feet	-26.7	690,671	942,686	928,210	1,187,202	1,058,736	1,056,337	1,246,248	1,506,187	1,426,002	1,406,412	1,466,586
19. Footage Drilled on Crown Oil Rights	Feet	-28.2	666,975	928,915	880,839	1,078,133	1,012,922	1,006,636	1,214,166	1,360,450	1,234,023	1,320,132	1,357,416
20. Footage Drilled on Private Oil Rights	Feet	+72.1	23,696	13,771	47,371	109,069	45,814	49,701	32,082	145,737	191,979	86,280	89,170
21. Average Depth of Completed Drilling Wells (15)	Feet	- 1.5	5,313	5,396	4,328	4,318	4,823	5,513	5,601	5,093	4,654	4,609	5,141
22. Total Number of Wells Producing (Average during year)	As stated	- 3.7	3,257	3,381	3,427	3,377	3,227	3,206	3,128	3,273	3,244	3,202	3,210
23. Number of Wells Produced by Flowing (Average during year)	As stated	-10.9	708	795	891	934	920	1,010	1,007	1,026	1,047	969	951
24. Number of Wells Produced Artificial Lift (Average during year)	As stated	- 1.4	2,549	2,586	2,536	2,443	2,307	2,196	2,121	2,247	2,197	2,233	2,259
25. Average Daily Production per Producing Well	Barrel	-10.7	48.3	54.1	52.0	45.1	41.5	42.4	42.6	40.9	38.7	36.1	34.9
26. Average Daily Production Flowing Well	Barrel	- 8.8	125.2	137.3	117.6	96.3	88.9	92.3	93.5	93.4	85.8	83.9	80.2
27. Average Daily Production per Artificial Lift Well	Barrel	- 5.6	26.9	28.5	28.9	25.6	22.6	19.4	18.5	33.0	16.2	15.4	15.8
28. Total Value of Domestic Exports	\$'000	+ 2.6	934,658	910,636	755,100	717,170	678,313	686,254	627,717	579,658	579,548	476,436	434,909
29. Total Value of Petroleum Products (Item 28)	\$'090	-11.1	644,676	725,430	593,653	580,947	563,319	573,903	525,690	494,343	193,918	392,612	363,753
30. Total Value of Lake Asphalt Products	\$'000	-13.9	2,764	3,209	3,368	3,570	3,139	4,086	3,276	3,024	2,661	2,327	2,122
31. Total Natural Gas Produced	MMCF	- 9.2	137,500	151,445	140,338	118,927	111,503	110,732	99,386	99,948	102,335	87,652	91,963
32. Used as Fuel	MMCF	+ 3.4	58,348	56,410	53,846	48,692	41,517	37,892	28,623	23,514	24,412	22,942	21,876
33. Replaced in Formation	MMCF	+16.0	24,728	21,324	22,625	19,841	13,866	14,688	15,824	13,177	11,841	10,777	12,500
34. Losses, Not Collected, Vented, &c.	MMCF	-30.9	43,464	62,916	54,355	50,394	56,120	58,152	54,939	62,957	66,082	59,833	57,587

APPENDIX II

Monthly Analysis of Drilling and Workover Wells, 1969

Month	Big Month	New Wells Started	DRILLING WELLS COMPLETED											CLOSED IN		MONTHLY FOOTAGE DRILLED			AVERAGE FOOTAGE DRILLED		OLD WELLS	
			OIL AND GAS GAS PRODUCERS		INJECTIONS AND OBSERVATION WELLS		ABANDONED				Total	Aggregate Depth	Average Depth	No.	Aggregate Depth	Crown	Private	Total	/Day	/Rig /Day	Recom-pleted	Aban-doned
			No.	Aggregate Depth	No.	Aggregate Depth	DRY HOLES		TECHNICAL CAUSES													
							No.	Aggregate Depth	No.	Aggregate Depth	Total	Aggregate Depth										
JANUARY ...	9.8	20	13	67,881	—	—	6	35,366	—	—	19	103,247	5,434	—	—	82,538	8,265	90,803	2,929.1	298.9	26	—
FEBRUARY ...	8.1	10	12	60,579	—	—	1	13,750	1	5,530	14	79,859	5,704	—	—	59,598	3,745	63,343	2,262.3	279.3	17	—
MARCH ...	7.5	12	9	51,239	—	—	1	6,600	1	6,500	11	64,339	5,849	1	7,070	63,778	631	64,409	2,077.7	277.0	16	—
APRIL ...	7.9	14	9	49,607	—	—	1	6,500	—	—	10	56,107	5,611	2	14,142	77,386	56	77,442	2,581.4	326.7	17	—
MAY ...	7.2	13	10	49,078	—	—	4	21,843	—	—	14	70,921	5,066	1	2,600	62,965	—	62,965	2,031.1	282.1	17	—
JUNE ...	5.9	9	7	43,710	—	—	—	—	—	—	7	42,710	6,244	1	2,852	65,534	—	65,534	2,184.5	326.7	12	—
JULY ...	6.0	7	10	60,751	—	—	4	27,881	—	—	14	88,632	6,331	—	—	47,664	—	47,664	1,537.5	256.2	18	—
AUGUST ...	5.8	7	3	13,031	—	—	1	8,200	—	—	4	21,231	5,308	—	—	41,824	—	41,824	1,349.2	232.6	21	—
SEPTEMBER ...	6.3	8	6	42,744	—	—	1	2,717	—	—	7	45,461	6,494	—	—	38,128	—	38,128	1,270.9	201.7	20	—
OCTOBER ...	7.2	11	4	18,503	—	—	3	20,304	—	—	7	38,807	5,544	—	—	49,358	—	49,358	1,592.2	221.1	17	—
NOVEMBER ...	7.2	10	9	39,887	—	—	1	3,235	—	—	10	43,122	4,312	—	—	48,721	—	48,721	1,624.0	225.5	11	—
DECEMBER ...	5.3	8	7	48,176	—	—	1	7,215	—	—	8	55,391	6,924	—	—	40,480	—	40,480	1,305.8	246.4	14	—
TOTAL 1969 ...	84.2	129	99	545,186	—	—	24	153,611	2	12,030	125	710,827	5,687	5	26,664	677,974	12,697	690,671	1,887.1	224.1	206	—
TOTAL 1968 ...	104.5	176	146	725,080	—	—	20	125,379	3	44,807	169	895,266	5,297.4	3	12,670	928,915	13,771	942,686	2,575.6	295.7	333	117
PER CENT INCREASE 1968-1969 ...	-19.4	-26.7	-32.2	-24.8	—	—	+2.0	+22.5	-33.3	-73.1	-26.0	-20.6	+7.4	—	+110.4	-27.0	-7.8	-26.7	—	—	-38.1	—
AVERAGES—1969 ...	7.0	10.7	8.2	5,506.9	—	—	2	6,400.4	—	6,015	10.4	5,686.6	—	—	5,332.8	56,498	1,058	65,464	—	—	17.2	—
AVERAGES—1968 ...	8.7	14.7	12.2	4,966.3	—	—	—	6,269.0	—	14,935.7	14.1	5,297.4	—	—	4,223.3	77,409	1,148	78,557	—	—	27.8	9.75

APPENDIX IIA

Footage Drilled—Land and Marine, 1969

Footage Drilled	January	February	March	April	May	June	July	August	September	October	November	December	TOTAL
Marine	27,858	19,798	13,983	12,057	10,220	13,167	13,444	9,617	15,157	5,955	6,930	6,863	155,049
Land	62,945	43,545	50,426	65,385	52,745	52,367	34,220	32,207	22,971	43,403	44,136	31,272	535,622
TOTAL	90,803	63,343	64,409	77,442	62,965	65,534	47,664	41,824	38,128	49,358	51,066	38,135	690,671
Daily Average Footage	2,929.1	2,262.3	2,077.7	2,581.4	2,031.1	2,184.5	1,537.5	1,349.2	1,270.9	1,592.2	1,702.2	1,230.2	1,892.2
Daily/Av./Ft./Rig	298.9	279.3	277.0	326.8	282.1	370.2	256.3	232.6	201.7	221.1	236.4	232.1	224.7
Marine Percentage of Total Footage	30.7	31.3	21.7	15.6	16.2	20.1	28.2	23.0	39.7	12.1	13.6	18.0	22.4

APPENDIX III
Analysis of Monthly Production for the year ending 31st December, 1969

MONTH	FLOWING				GAS/AIR LIFT				PUMPING				PLUNGER LIFT				OTHER METHODS				SALT WATER				Number of Wells Produced	Number of Idle Wells	Number of Wells Abd.	Number of Wells Drilling at Month End	Total Number of Wells Started	Daily Average Per Producing Wells	Total Oil Production	BREAKDOWN OF TOTAL PRODUCTION					Average B.O.P.D.	Crown C.H.P.S.	Private C.H.P.S.	Total	
	Number of Wells	Quantity Barrels	% of Total Oil	Daily Average Per Well Barrels	Number of Wells	Quantity Barrels	% of Total Oil	Daily Average Per Well Barrels	Number of Wells	Quantity Barrels	% of Total Oil	Daily Average Per Well Barrels	Number of Wells	Quantity Barrels	% of Total Oil	Daily Average Per Well Barrels	Number of Wells	Quantity Barrels	% of Total Oil	Daily Average Per Well Barrels	Number of Wells	Quantity Barrels	% of Total Oil	Daily Average Per Well Barrels								CROWN			PRIVATE						
																																Daily Average Per Producing Wells	Number of Wells	Quantity Produced Barrels	Daily Average Per Producing Wells	Number of Wells					Quantity Produced Barrels
January	763	2,999,145	58.0	126.8	1,152	1,402,256	28.9	41.8	1,336	612,504	11.0	14.8	143	61,667	1.2	13.9	—	—	—	—	2,064	1,207,601	18.0	18.8	3,394	3,614	2,283	8	9,299	49.1	5,165,661	55.7	2,818	4,866,024	16.7	576	297,637	166,634	9,417	3,148	12,565
February	746	2,706,769	57.5	120.6	1,140	1,381,997	29.4	43.0	1,321	558,790	11.9	15.1	139	58,950	1.2	15.1	—	—	—	—	2,128	1,080,710	18.8	18.1	3,355	3,663	2,237	4	9,309	50.1	4,706,506	56.8	2,789	4,435,787	17.1	566	270,719	168,088	8,619	3,001	11,920
March	742	2,945,772	57.5	128.1	1,140	1,485,628	29.0	41.7	1,337	628,736	12.3	15.2	142	60,993	1.2	13.9	—	—	—	—	2,048	1,165,288	18.5	18.4	3,370	3,647	2,298	6	9,321	49.0	5,121,129	55.7	2,796	4,826,741	16.5	574	294,888	165,198	8,882	3,443	12,325
April	707	2,780,677	56.6	131.1	1,133	1,476,255	30.1	43.4	1,312	588,199	12.0	14.9	142	62,887	1.3	14.6	—	—	—	—	1,987	1,138,117	18.8	19.3	3,294	3,720	2,303	9	9,335	49.7	4,907,518	56.5	2,718	4,610,590	17.2	576	296,928	163,563	9,606	3,320	12,926
May	719	2,863,323	57.3	128.5	1,131	1,473,755	29.6	42.2	1,319	585,966	11.7	14.3	141	67,503	1.4	15.4	—	—	—	—	1,995	1,169,775	19.0	18.9	3,310	3,724	2,309	5	9,348	48.7	4,995,547	55.3	2,739	4,696,517	16.9	571	299,080	161,146	9,718	3,440	13,158
June	709	2,666,173	56.0	125.3	1,112	1,464,035	30.8	43.9	1,291	566,307	11.0	14.6	134	62,331	1.3	15.5	—	—	—	—	1,961	1,117,102	19.0	18.9	3,246	3,792	2,312	7	9,357	48.9	4,758,896	55.7	2,681	4,480,429	16.4	565	278,467	158,630	8,995	3,066	12,061
PRODUCTION TOTAL 1st Jan.-30th June	731	16,961,859	57.2	128.2	1,133	8,773,925	29.6	42.6	1,319	3,540,592	11.9	14.8	140	373,881	1.3	14.8	—	—	—	—	2,027	6,878,689	18.8	18.7	3,323	3,695	2,312	—	9,357	49.2	29,655,257	55.9	2,757	27,918,088	16.8	571	1,737,169	163,841	55,237	19,413	74,655
July	684	2,682,405	55.1	123.5	1,118	1,581,125	31.4	44.2	1,291	591,993	12.2	14.8	132	63,728	1.3	15.6	—	—	—	—	1,994	1,202,015	19.8	19.4	3,225	3,811	2,326	2	9,364	48.7	4,869,251	55.4	2,665	4,577,427	16.8	560	291,824	157,073	9,699	2,994	12,693
August	685	2,625,701	55.3	123.6	1,095	1,489,147	31.3	43.9	1,303	576,687	12.1	14.3	140	59,317	1.3	13.7	—	—	—	—	1,945	1,155,069	19.6	19.2	3,223	3,814	2,330	4	9,371	47.5	4,750,352	54.1	2,664	4,469,982	16.2	559	280,870	153,253	10,168	3,255	13,423
September	695	2,544,639	56.0	122.0	1,053	1,400,927	30.8	44.1	1,305	540,269	11.9	13.8	130	56,056	1.3	14.4	—	—	—	—	1,885	1,133,903	20.0	20.1	3,188	3,852	2,334	4	9,378	47.5	4,541,891	54.1	2,624	4,264,001	16.4	564	277,890	151,396	9,092	3,066	12,758
October	679	2,574,369	55.7	122.3	1,064	1,440,528	31.2	43.7	1,265	542,865	11.8	13.8	137	60,679	1.3	14.3	—	—	—	—	1,931	1,134,311	19.7	18.9	3,145	3,898	2,333	7	9,388	47.4	4,613,441	54.0	2,599	4,343,605	15.9	546	269,836	148,981	9,371	2,735	12,156
November	674	2,449,929	55.2	121.2	1,081	1,401,549	31.6	43.2	1,277	523,108	11.9	13.8	136	60,361	1.3	14.8	—	—	—	—	1,933	1,055,515	19.2	18.2	3,168	3,883	2,341	6	9,398	46.7	4,439,947	53.1	2,617	4,169,314	16.3	551	270,633	147,998	9,430	2,683	12,113
December	680	2,513,957	55.4	119.5	1,053	1,416,184	31.2	43.4	1,288	554,420	12.2	13.9	143	53,293	1.2	11.9	—	—	—	—	1,902	1,033,523	19.3	18.4	3,164	3,895	2,341	6	9,406	46.3	4,542,354	52.3	2,609	4,266,412	15.9	555	276,442	146,544	9,585	3,085	12,670
PRODUCTION TOTAL—1st July—31st Dec.	683	15,396,000	55.5	122.5	1,078	8,679,460	31.3	43.8	1,288	3,334,342	12.0	14.1	137	353,434	1.2	14.0	—	—	—	—	1,932	6,764,361	19.6	19.0	3,135	3,859	2,341	—	9,406	47.4	27,763,236	53.9	2,630	26,095,741	16.3	555	1,667,495	150,841	57,945	17,368	75,313
YEAR'S PRODUCTION TOTAL	—	32,357,859	56.4	—	—	17,456,335	30.4	—	—	6,374,934	11.9	—	—	727,315	1.3	—	—	—	—	—	—	13,643,044	19.2	—	—	—	2,341	—	9,406	—	57,418,493	—	—	54,013,329	—	—	3,404,664	157,311	113,132	37,236	150,468
DAILY AVERAGES	—	88,652	—	—	—	47,831	—	—	—	18,835	—	—	—	1,993	—	—	—	—	—	—	—	37,378	—	—	—	—	—	—	—	157,311	—	—	147,983	—	—	9,323	—	310	102	412	
AVERAGES DURING YEAR	703	—	—	125.2	1,108	—	—	43.2	1,303	—	—	14.5	138	—	—	14.4	—	—	—	—	1,932	—	—	18.9	3,257	3,777	—	—	—	48.3	—	54.9	2,694	—	16.5	563	—	—	—	—	—

APPENDIX IIIA

Analysis of Production by Operating Companies

	FLOWING				GAS LIFT				PUMPING				PLUNGER LIFT				SALT WATER				Av. No. of Wells Prod.	Daily Av. per Prod Well	Total Oil Produced (Barrels)	Coy's Prod as % of Total Prod.	CROWN PRODUCTION		PRIVATE PRODUCTION	
	Av. No. of Wells	Quantity (Barrels)	% of Total	Daily Av. per Well	Av. No. of Wells	Quantity (Barrels)	% of Total	Daily Av. per Well	Av. No. of Wells	Quantity (Barrels)	% of Total	Daily Av. per Well	Av. No. of Wells	Quantity (Barrels)	% of Total	Daily Av. per Well	Av. No. of Wells	Quantity (Barrels)	% of Total	Daily Av. per Well					Production (Barrels)	% Total	Production (Barrels)	% Total
APEX TRINIDAD OILFIELDS LIMITED	32	528,760	23.3	45.3	26	288,133	12.7	30.4	203	1,388,380	61.3	18.7	10	60,253	2.7	16.5	108	411,106	15.4	10.4	271	22.9	2,265,526	4.0	897,951	39.6	1,367,575	60.4
KERN TRINIDAD OILFIELDS LIMITED	57	453,420	67.6	21.8	15	53,680	8.0	9.8	50	164,060	24.4	9.0	—	—	—	—	89	226,675	25.2	7.0	122	15.1	671,160	1.2	291,314	43.4	379,846	56.6
TRINIDAD PETROLEUM DEVELOPMENT COMPANY LIMITED	124	1,691,899	37.6	37.4	156	1,400,108	31.1	24.6	144	737,478	16.4	14.0	128	667,062	14.9	14.3	285	816,660	15.4	7.8	552	22.3	4,496,547	7.8	4,228,651	94.0	267,896	6.0
BELFETCO COMPANY LIMITED	2	8,792	100.0	12.0	—	—	—	—	—	—	—	—	—	—	—	—	1	473	5.1	5.3	2	48.8	8,792	—	8,792	100.0	—	—
TEXACO TRINIDAD INCORPORATED	227	7,218,039	35.0	87.1	824	11,255,259	54.6	37.4	449	2,139,184	10.4	13.1	—	—	—	—	1,102	7,139,090	25.7	17.7	1,501	37.6	20,612,482	35.9	19,773,225	95.9	839,257	4.1
SHELL TRINIDAD LIMITED	79	1,118,520	33.5	38.8	26	438,285	13.1	46.2	279	1,778,497	53.3	17.5	—	—	—	—	150	1,157,472	25.8	21.1	384	23.8	3,335,302	5.8	2,960,928	88.8	374,374	11.2
PREMIER CONSOLIDATED OILFIELDS LIMITED	5	18,938	8.0	10.4	2	11,190	4.7	15.3	108	205,596	87.3	5.2	—	—	—	—	44	61,712	20.7	3.8	115	5.6	235,724	0.4	60,008	25.5	175,716	74.5
TRINIDAD CANADIAN OILFIELDS LIMITED	13	159,947	34.1	33.7	10	91,985	19.6	25.2	65	217,606	46.3	9.2	—	—	—	—	66	295,700	38.6	12.3	88	14.6	469,538	0.8	469,538	100.0	—	—
TRINIDAD NORTHERN AREAS LIMITED	169	21,159,544	83.6	343.0	49	3,919,745	15.4	219.2	4	244,133	1.0	167.2	—	—	—	—	137	3,534,066	12.2	70.7	222	312.5	25,323,422	44.1	25,323,422	100.0	—	—
TOTAL	708	32,357,859	56.4	125.2	1,108	17,458,385	30.4	43.2	1,302	6,874,934	11.9	14.5	138	727,315	1.3	14.4	1,982	13,643,044	19.2	18.9	3,257	48.3	57,418,493	100.0	54,013,829	94.1	3,404,664	5.9
TOTAL—1968	795	39,957,747	59.7	137.3	1,113	19,171,094	28.6	47.1	1,302	7,005,018	10.5	14.7	171	770,047	1.2	12.3	2,041	14,836,489	18.2	19.9	3,381	54.1	66,903,906	100.0	63,344,513	94.7	3,559,393	5.3

*Inserted data.

Natural Gasoline C.H.P.S. Production

Company	CROWN OIL RIGHTS	PRIVATE OIL RIGHTS	TOTAL
	Barrels	Barrels	Barrels
Apex (Trinidad) Oilfields Limited	17,220	34,697	51,917
Trinidad Petroleum Development Company Limited	95,962	2,589	98,551
TOTAL	113,182	37,286	150,468
TOTAL—1968	120,843	42,827	163,670

APPENDIX IIIB

Daily Average Production by Months for all Companies, 1969

Company	January	February	March	April	May	June	July	August	September	October	November	December	GRAND TOTAL	
													Total	B.O.P.D.
BELPETCO ...	4,059	3,084	1,649	—	—	—	—	—	—	—	—	—	8,792	
B.O.P.D. ...	131	110	53	—	—	—	—	—	—	—	—	—		24
APEX ...	197,631	184,214	200,704	195,302	199,859	189,956	188,699	183,939	186,151	184,099	169,782	185,190	2,265,526	
B.O.P.D. ...	6,375	6,579	6,474	6,510	6,447	6,332	6,087	5,934	6,205	5,939	5,659	5,974		6,207
K.T.O. ...	62,202	54,503	61,959	58,093	59,192	50,223	57,347	56,356	51,477	52,780	51,400	55,628	671,160	
B.O.P.D. ...	2,007	1,947	1,999	1,936	1,909	1,674	1,850	1,818	1,716	1,702	1,713	1,794		1,839
T.P.D. ...	409,593	368,686	397,093	374,964	381,669	362,959	377,416	373,822	355,664	365,508	355,578	373,594	4,496,547	
B.O.P.D. ...	13,213	13,167	12,810	12,499	12,312	12,098	12,175	12,059	11,855	11,791	11,853	12,051		12,319
S.T.L. ...	298,072	270,440	300,102	284,952	277,639	260,505	279,353	279,059	266,902	265,581	270,846	281,851	3,335,302	
B.O.P.D. ...	9,615	9,658	9,681	9,498	8,956	8,684	9,011	9,002	8,897	8,566	9,028	9,092		9,138
T.T.I. ...	1,982,192	1,806,216	1,929,794	1,826,678	1,833,993	1,735,811	1,746,797	1,665,940	1,559,964	1,569,790	1,477,204	1,478,103	20,612,482	
B.O.P.D. ...	63,942	64,508	62,251	60,889	59,161	57,860	56,348	53,740	51,999	50,638	49,241	47,681		56,473
T.C.O. ...	48,627	40,520	43,774	44,114	41,865	39,923	40,518	36,652	33,331	34,448	32,642	33,124	469,538	
B.O.P.D. ...	1,568	1,446	1,412	1,470	1,350	1,331	1,307	1,182	1,111	1,111	1,088	1,069		1,286
P.C.O.L. ...	22,975	20,442	21,764	20,193	21,169	19,793	19,705	19,051	17,701	17,967	17,675	17,289	235,724	
B.O.P.D. ...	741	730	702	673	683	660	636	615	590	580	589	558		646
T.N.A. ...	2,140,310	1,958,401	2,164,290	2,103,222	2,180,161	2,099,726	2,159,416	2,136,032	2,070,701	2,128,268	2,064,820	2,118,075	25,323,422	
B.O.P.D. ...	69,042	69,943	69,816	70,107	70,328	69,991	69,659	68,904	69,023	68,654	68,827	68,325		69,379
TOTAL—1969 ...	5,165,661	4,706,506	5,121,129	4,907,518	4,995,547	4,758,896	4,869,251	4,750,852	4,541,891	4,618,441	4,439,947	4,542,854	57,418,493	157,311
	166,634	168,088	165,198	163,583	161,146	158,630	157,073	153,253	151,396	148,981	147,998	146,544		
TOTAL—1968 ...	5,949,727	5,579,622	5,873,996	5,599,058	5,721,736	5,468,891	5,696,572	5,665,431	5,382,054	5,384,509	5,244,927	5,337,383	66,903,906	182,798
	191,927	192,400	189,483	186,635	184,572	182,296	183,760	182,756	179,402	173,693	174,831	172,174		
B.P. GROUP ...	669,426	607,403	659,756	628,359	640,720	603,138	*623,462	614,118	593,292	602,387	576,760	614,412	7,433,233	
B.O.P.D. ...	21,594	21,693	21,282	20,945	20,668	20,104	20,112	19,810	19,776	19,432	19,225	19,820		20,365

*Trinidad Tesoro took over BP Group from 1st July, 1969.

APPENDIX IIC
Marine Offshore, Land Production, 1969

	JANUARY		FEBRUARY		MARCH		APRIL		MAY		JUNE		JANUARY-JUNE SUB-TOTAL		JULY		AUGUST		SEPTEMBER		OCTOBER		NOVEMBER		DECEMBER		JULY-DECEMBER SUB-TOTAL		GRAND TOTAL		
	Number of Wells	Production	Average Number of Wells	Production	Number of Wells	Production	Number of Wells	Production	Number of Wells	Production	Number of Wells	Production	Number of Wells	Production	Number of Wells	Production	Average Number of Wells	Production	Number of Wells	Production											
MARINE																															
T.N.A. Soldado	213	2,135,000	208	1,953,560	214	2,153,993	215	2,004,817	217	2,174,462	214	2,001,583	213	12,608,424	217	2,150,961	217	2,127,650	215	2,062,953	215	2,110,900	217	2,057,704	221	2,110,837	217	12,630,014	215	25,238,438	
Ft.-1, Ft.-2	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
TEXACO A.B.M.	107	218,949	108	191,181	108	199,130	106	182,059	106	186,510	106	179,168	107	1,156,997	108	189,402	110	179,043	109	169,226	106	177,475	110	163,168	104	158,915	108	1,037,229	107	2,194,226	
A.L.M.	2	6,602	2	7,711	2	6,761	2	8,849	2	8,713	2	4,823	2	48,459	2	6,911	2	5,948	2	6,485	2	5,138	2	4,490	2	6,464	2	35,436	2	78,895	
P.C.O.L. Couva Marine	1	4,059	2	3,084	2	1,649	—	—	—	—	—	—	1	8,792	—	—	—	—	—	—	—	—	—	—	—	—	1	8,792			
T.P.O. North Marine	2	18,026	2	15,775	2	17,362	2	17,193	2	16,729	2	15,516	2	100,601	2	13,230	2	12,353	2	14,784	2	12,891	3	15,095	3	13,203	2	81,556	2	182,157	
K.T.O. 'G' Wells	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
TOTAL	325	2,382,645	322	2,171,311	323	2,383,895	325	2,302,018	327	2,386,414	324	2,291,090	325	13,918,273	329	2,360,504	331	2,325,003	328	2,253,448	325	2,315,404	332	2,240,457	330	2,289,419	329	13,734,235	327	27,702,508	
DEVIATED FROM SHORE																															
T.N.A. F.O.S.	6	5,301	7	4,841	7	5,297	8	8,405	7	5,699	8	8,143	7	37,686	7	8,455	8	8,373	7	7,748	7	8,368	8	7,116	8	7,238	7	47,298	7	84,984	
TEXACO A.S.	71	53,925	68	45,115	65	43,272	61	40,722	60	41,339	59	37,745	64	262,118	60	40,273	59	40,253	57	40,092	50	39,399	63	37,296	60	41,470	58	238,783	61	500,901	
A.L.S.	7	8,955	6	12,080	7	13,379	7	11,875	6	13,236	5	11,117	6	70,642	3	1,208	4	11,323	6	12,934	3	12,297	3	11,797	3	9,824	4	59,383	5	130,025	
K.T.O. 'M' Wells	5	818	4	664	4	500	3	635	3	900	2	692	4	4,209	2	747	1	636	4	626	4	779	3	684	3	560	3	4,082	3	8,241	
TOTAL	89	68,999	85	62,700	83	62,448	79	61,637	76	61,174	74	57,697	81	374,655	72	50,683	72	60,585	74	61,400	64	60,843	77	56,893	74	59,092	72	349,496	76	724,151	
Marine and Deviation	414	2,451,644	407	2,234,011	411	2,446,343	404	2,364,555	403	2,447,588	398	2,348,787	406	14,292,923	401	2,411,187	403	2,385,588	402	2,314,348	389	2,376,247	409	2,297,350	404	2,348,511	401	14,183,731	404	28,426,659	
Land	2,980	2,714,017	2,948	2,472,495	2,959	2,674,786	2,890	2,542,963	2,907	2,547,959	2,848	2,410,109	2,922	15,362,320	2,824	2,458,064	2,820	2,365,264	2,786	2,227,043	2,756	2,242,194	2,759	2,142,597	2,760	2,104,343	2,784	13,629,505	2,853	26,991,894	
TOTAL PRODUCTION	3,394	5,165,661	3,355	4,706,506	3,370	5,121,129	3,294	4,907,518	3,310	4,995,547	3,246	4,758,896	3,328	29,655,257	3,225	4,869,251	3,223	4,750,852	3,188	4,541,391	3,145	4,618,441	3,168	4,439,947	3,164	4,542,854	3,185	27,765,236	3,257	57,418,493	

APPENDIX IV
Production and Disposal of Natural Gas, 1969
 (All figures of Gas Production in MCF)
 M—1,000 Standard Cubic Feet

Half Yearly Totals	Crude Oils Production bbls.	Average GOR Cu. ft. /bbls.	Natural Gas Production	NATURAL GAS DISPOSAL													Inter Oil Company Sales	Used for the manufacture of Petro-Chemicals
				Sale to other Companies	Replaced into Formation	Converted to C.H.P.S.	GAS USED AS FUEL		VENTED TO ATMOSPHERE			Pipe Line Losses and un-accounted for	Not Collected	NATURAL GAS RECOVERY				
							In Fields	In Refineries	After Utilization	Without Utilization	Total			Natural Gas Treated	Average Plant Recovery IG/MCF	Natural Gasoline Produced bbls.		
JANUARY	5,165,661	2,379	12,287,320	2,425,956	1,991,760	13,184	749,189	2,653,195	2,315,124	909,572	3,224,696	196,728	1,032,612	1,921,039	313	17,173	1,994,032	813,845
FEBRUARY	4,706,506	2,344	11,033,216	2,433,920	1,628,990	12,190	657,018	2,403,371	2,188,557	669,892	2,858,449	213,112	826,166	1,424,965	341	13,914	1,896,490	877,212
MARCH	5,121,129	2,315	11,855,305	2,599,087	1,767,370	12,032	693,567	2,538,417	2,110,473	972,127	3,082,600	314,383	847,039	1,754,039	334	16,772	1,883,408	875,528
APRIL	4,907,518	2,349	11,527,486	2,666,757	1,906,652	13,562	693,025	2,476,248	1,844,568	821,376	2,665,944	294,640	810,649	1,136,785	436	14,166	2,005,583	903,245
MAY	4,995,547	2,365	11,817,611	2,745,547	2,174,526	13,805	724,311	2,488,733	1,705,055	995,842	2,700,897	170,573	799,219	1,231,721	411	14,471	2,141,326	953,487
JUNE	4,758,896	2,401	11,411,357	2,571,180	2,239,305	12,654	667,989	2,409,729	1,472,635	1,041,211	2,513,846	187,478	809,176	1,924,120	296	16,275	2,005,707	909,310
HALF-YEAR TOTAL	29,655,257	2,358	69,932,385	15,442,447	11,708,603	78,327	4,185,099	14,969,693	11,636,412	5,410,020	17,046,432	1,376,923	5,124,861	9,392,669	345	92,771	11,926,546	5,332,627
JULY	4,869,251	2,386	11,683,756	2,644,258	2,247,940	13,317	694,125	2,492,980	1,374,749	1,004,116	2,378,865	356,964	855,307	1,981,357	302	17,101	1,630,044	916,567
AUGUST	4,750,852	2,399	11,395,839	2,815,665	2,197,694	14,083	530,193	2,563,035	1,308,695	947,079	2,255,774	166,301	852,594	2,038,218	311	18,102	1,573,528	974,643
SEPTEMBER	4,541,891	2,418	10,980,372	2,518,630	2,056,283	13,386	731,650	2,349,578	1,401,618	935,160	2,336,778	201,478	772,589	1,941,618	311	17,284	1,523,863	838,679
OCTOBER	4,618,441	2,473	11,424,127	2,666,705	2,267,205	12,753	750,192	2,272,226	1,376,089	858,492	2,234,581	414,793	805,672	1,259,013	384	13,830	1,563,342	908,917
NOVEMBER	4,439,947	2,445	10,856,342	2,655,241	2,134,531	12,709	714,131	2,238,362	1,284,242	715,754	1,999,996	280,997	775,376	1,480,287	346	14,644	1,647,127	903,503
DECEMBER	4,542,854	2,471	11,226,971	2,711,265	2,115,279	13,293	707,908	2,452,306	1,366,326	774,518	2,140,844	284,301	801,775	2,106,043	284	17,225	1,700,362	927,669
HALF YEAR TOTAL	27,763,236	2,431	67,567,407	16,011,764	13,018,932	79,541	4,128,199	14,413,487	8,111,719	5,235,119	13,346,838	1,705,334	4,863,313	10,806,536	317	98,186	9,638,266	5,469,978
YEAR TOTAL	57,418,493	2,394	137,409,792	31,454,211	24,727,535	157,868	8,313,298	29,383,180	19,748,131	10,645,139	30,393,270	3,082,257	9,988,174	20,199,205	330	190,957	21,564,812	10,802,605
Percentage Disposal for year	—	—	—	22.0	18.0	0.1	6.0	21.4	14.4	7.7	22.1	2.2	7.3	14.7	—	—	15.6	7.9

NOTE—APPENDIX V to appear later.

APPENDIX VI
Movement of Refinery Products, 1969
(Quantities in Barrels)

Inventory Name	Opening Inventory	Production	Imports	Total	Purchases &c. from other Pete. Mark.	Sales, &c. to other Pete. Mark.	LOCAL CONSUMPTION				EXPORTS		Gains and Losses	Closing Inventory	Totals
							Own Use	Retailer &c.	Local Bunkers	Total	Cargoes	Foreign Bunkers			
Liquefied Gases	1,167	422,691	—	423,858	292,469	292,469	732	134,500	—	135,232	288,185	—	(2,087)	2,528	423,858
Aviation Gasolines	75,118	2,099,328	2,307	2,176,753	76,716	76,716	—	16,817	1,977	18,794	2,018,353	5,881	56	133,669	2,176,753
Motor Gasolines	*1,146,770	20,064,637	5,450	21,216,857	1,908,635	1,910,150	14,765	1,274,662	3	1,289,430	18,921,397	—	(729)	1,006,211	21,216,309
Domestic Gasoline	*886	16,682	(17)	17,551	*16,880	14,234	66	15,506	—	15,572	3,581	—	36	41	19,230
Aviation Turbine Fuel	456,882	15,180,872	1,031	15,638,785	981,428	1,012,057	—	230,876	166,067	396,943	14,625,240	120,841	309	464,823	15,608,156
Kerosene	202,698	2,309,481	746,059	3,258,238	539,182	518,369	746	255,101	—	255,847	2,621,404	—	(507)	402,307	3,279,051
White Spirit	2,911	10,110	—	13,021	5,124	5,124	2,677	5,166	—	7,843	2,139	—	185	2,854	13,021
Vaporizing Oil...	8,491	72,435	—	80,926	3	3	—	3	—	3	78,701	—	—	2,222	80,926
Gas Oil	592,328	16,087,222	(510)	16,679,040	2,667,510	2,637,033	145,325	301,773	130,065	577,163	15,070,888	360,182	1,110	700,174	16,709,517
Marine Diesel	111,280	1,029,152	724	1,141,156	989,124	946,805	472	12,293	5,794	18,559	259,236	854,961	(4,922)	55,641	1,183,475
Fuel Oils	3,997,255	88,271,226	820,830	92,189,311	14,594,910	14,424,011	118,549	165,601	670	284,820	80,810,087	8,575,711	(14,888)	2,704,480	92,360,210
Tucupita Fuels*	†23,079	†(551)	†550,510	†582,038	—	†312,233	†18,731	—	—	†18,731	†148,427	—	†1,749	†100,898	†269,805
Lubes and Greases	64,697	1,470,682	43,377	1,578,756	20,252	20,252	11,573	50,278	391	62,242	1,394,140	8,580	955	112,839	1,578,756
Asphalt Products	25,888	193,075	5,865	224,828	198,492	198,492	2,580	75,202	—	77,782	134,125	—	(100)	13,021	224,828
Unfinished Oils	704,753	72,497	21,261	653,517	—	—	1,947	—	—	1,947	—	—	4,043	647,527	653,517
Petrochemicals	231,905	1,703,849	10,607	1,946,361	3,861	3,861	85	4,378	—	4,463	1,718,101	—	(12)	223,809	1,946,361
Other Finished Products	29,144	22,512	5,070	56,726	22,408	22,408	2,869	28,565	—	31,434	6,402	56	243	18,591	56,726
TOTAL	6,752,173	148,881,457	1,662,054	157,295,684	22,316,994	22,081,984	302,386	2,570,121	304,967	3,178,074	137,951,979	9,926,212	(16,308)	6,490,737	157,530,694

() Brackets indicate a negative quantity.

*Not included in Total.

† Note: Texaco is now classifying domestic gasoline as motor gasoline unfinished with effect from November.

APPENDIX VII

Movement of Crude and C.H.P.S. year ended 31st December, 1969

(All Quantities in Barrels)

Month	Production	Imports	Decrease in Inventories	Totals	Purchases and Exchanges from other Companies	Sales and Exchanges to other Companies	Own use	To Refining	Exports	Gains and Losses	Total
JANUARY	5,174,167	8,549,042	(135,672)	13,587,537	3,811,444	3,811,444	1,249	12,975,374	532,678	78,236	13,587,537
FEBRUARY	4,709,802	6,272,847	279,603	11,262,252	3,430,143	3,430,143	594	10,869,071	396,309	(3,722)	11,262,252
MARCH	5,135,888	9,784,519	(1,193,796)	13,726,611	3,775,479	3,775,479	797	13,139,307	579,070	7,437	13,726,611
APRIL	4,923,760	8,199,081	398,950	13,521,791	3,728,611	3,728,611	426	13,031,308	490,856	(799)	13,521,791
MAY	5,012,021	9,062,566	(122,073)	13,952,514	3,731,607	3,731,607	706	13,463,811	547,853	(59,856)	13,952,514
JUNE	4,774,274	8,574,991	(202,039)	13,147,226	3,530,957	3,530,957	585	12,642,842	492,563	11,236	13,147,226
JULY	4,881,944	9,234,250	(178,903)	13,937,291	3,157,014	3,157,014	717	13,354,547	511,581	70,446	13,937,291
AUGUST	4,764,275	7,192,938	1,373,647	13,330,860	2,931,470	2,931,470	703	12,928,416	385,975	15,766	13,330,860
SEPTEMBER	4,554,649	9,930,483	(1,080,879)	13,404,253	3,069,336	3,069,336	784	12,701,533	696,234	5,702	13,404,253
OCTOBER	4,630,597	9,260,379	(418,064)	13,472,912	2,915,770	2,915,770	660	13,028,890	377,688	65,674	13,472,912
NOVEMBER	4,452,060	7,918,860	1,148,070	13,518,990	2,891,305	2,891,305	656	12,938,808	522,643	56,883	13,518,990
DECEMBER	4,555,524	9,781,575	(614,898)	13,722,201	3,122,951	3,122,951	715	13,002,710	696,750	22,026	13,722,201
TOTAL	57,568,961	103,761,531	(746,054)	160,584,438	40,096,087	40,096,087	8,592	154,076,617	6,230,200	269,029	160,584,438

Appendix VIII
Summary of Crude Oil Assessed for Crown Royalty with Prices and Analysis, 1969
(For half-Yearly Assessment Periods ending 30th June and 31st December)
1 Barrel = 34.9726 I.G.

Company	Net Royalty Production Barrels	ROYALTY			SUB DIVISION OF (ROYALTY) CRUDE INTO PRODUCTS AS PER R.L.E.I. ANALYSIS											
		10% Assessed Barrels	Value \$	Average Price \$/Barrels	LIGHT FRACTIONS			GAS OIL					FUEL OIL		Crude Oil Weighted Average Gravity A.P.I.	
					Quantity Barrels	Per-centage	Tetra Ethyl Lead to blend to 70/72 Octane Gasoline mls.	53-57 D.I. Barrels	48-52 D.I. Barrels	43-47 D.I. Barrels	No. 2 Fuel Barrels	Total Gas Oils Barrels	Per-centage	Quantity Barrels		Per-centage
Apex (Trinidad) Oilfields Limited	473,035	47,303	214,510.02	4.53	4,843	10.24	528,850.14	—	—	—	14,843	14,843	31.38	27,617	58.38	23.5
Dominion Oil Limited	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Kern Trinidad Oilfields Limited	145,914	14,593	43,773.53	3.00	989	6.78	219,861.96	38	129	3	—	170	1.16	13,434	92.06	16.0
Premier Consolidated Oilfields Limited	30,102	3,010	14,628.46	4.86	503	16.71	90,040.64	—	502	—	455	957	31.79	1,550	51.50	26.9
Estate of Timothy Roodal	290	29	119.62	4.12	1	2.5	—	—	—	—	8	8	29.7	20	67.8	18.1
Shell Trinidad Limited	1,505,838	150,584	739,416.59	4.91	40,742	27.05	10,436,113.17	19,569	—	8,848	6,665	35,081	23.30	74,761	49.65	29.1
Trinidad Canadian Oilfields Limited	258,823	25,882	121,493.99	4.69	7,521	29.06	2,221,074.98	135	1,102	—	3,329	4,566	17.64	13,795	53.30	28.0
Trinidad Northern Areas Limited	12,646,110	1,264,611	5,119,195.68	4.05	229,166	18.12	78,979,767.30	163,718	—	—	—	163,718	12.95	871,727	68.93	25.1
Trinidad Petroleum Development Company Limited	2,077,722	207,772	917,069.44	4.41	19,409	9.34	2,247,033.31	—	—	—	61,421	61,421	29.56	126,942	61.10	23.7
Texaco Trinidad Inc.	10,660,422	1,066,042	5,271,186.48	4.94	159,931	15.00	40,157,392.15	145,215	64,953	—	161,348	371,516	34.85	534,595	50.15	27.7
Total and Averages for First Half-Year	27,798,257	2,779,826	12,441,393.81	4.48	463,105	16.06	134,880,133.65	328,675	66,686	8,851	248,070	652,281	23.46	1,664,441	59.88	26.1
Trinidad-Tesoro Co., Ltd.	2,531,526	253,153	1,112,796.62	4.40	29,564	11.72	2,994,604.21	40	333	3	67,564	67,940	26.84	154,763	61.13	23.1
Dominion Oil Limited	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Premier Consolidated Oilfields Limited	29,349	2,935	14,023.21	4.78	361	12.3	54,926.34	—	527	—	487	1,014	34.5	1,560	53.2	25.8
Estate of Timothy Roodal	267	27	109.32	4.05	1	2.5	—	—	—	—	8	8	29.7	18	67.8	18.1
Shell Trinidad Limited	1,454,912	145,492	724,738.06	4.98	40,928	28.13	11,618,089.88	18,003	—	8,234	6,596	32,833	22.57	71,731	49.30	29.1
Trinidad Canadian Oilfields Limited	210,715	21,072	100,214.81	4.77	5,739	27.24	1,352,062.19	60	691	—	3,234	3,985	18.91	11,348	53.85	27.8
Trinidad Northern Areas Limited	12,677,312	1,267,731	5,209,654.21	4.11	219,744	17.3	74,227,484.52	172,462	—	—	—	172,462	13.6	875,525	69.1	25.1
Texaco Trinidad Inc.	9,085,401	908,540	4,494,270.25	4.95	144,495	15.90	32,939,988.41	106,488	53,080	—	145,203	304,771	33.55	459,275	50.55	27.7
Totals and Averages for Second Half-Year	25,989,482	2,598,950	11,655,812.48	4.48	440,832	16.96	123,187,155.55	297,053	54,631	8,234	223,092	583,013	22.43	1,574,220	60.57	26.1
YEARS TOTALS AND AVERAGES	53,787,739	5,378,776	24,097,206.29	4.48	903,937	16.81	258,067,289.20	625,728	121,317	17,085	471,162	1,235,294	22.97	3,238,661	60.21	26.1

APPENDIX IX
Royalty Assessment

The Royalty assessed on the crude oil, natural gasoline and natural gas produced on Crown Oil Mining Leases for each half-yearly period during 1967, 1968 and 1969 is shown in the following Table:—

Source of Revenue	ASSESSMENT FOR HALF-YEARLY PERIOD ENDING											
	31.12.69		30.6.69		31.12.68		30.6.68		31.12.67		30.6.67	
ROYALTY ON NATURAL GAS	\$	c.	\$	c.	\$	c.	\$	c.	\$	c.	\$	c.
ROYALTY ON NATURAL GASOLINE	333,810	31	328,528	93	319,981	83	324,853	16	324,853	16	311,518	47
MINIMUM RENTS NOT OFFSET BY ROYALTY ON CRUDE OIL	41,806	82	38,347	71	42,054	10	41,530	06	44,121	56	45,735	22
ROYALTY ON CRUDE OIL	450,113	36	450,113	37	446,159	93	446,159	93	574,291	72	490,290	64
HALF-YEARLY TOTAL	11,655,812	48	12,441,393	81	14,057,594	95	16,121,992	28	14,675,919	35	12,959,841	33
YEARLY TOTALS	12,481,542	97	13,248,338	37	14,865,790	81	16,934,535	43	15,599,170	50	13,807,385	66
	\$25,729,881.34				\$31,800,326.24				\$29,406,556.16			

The Volumes upon which the above assessments were made are as follows:—

Substance assessed for Royalty	Unit	HALF-YEARLY PERIOD ENDING											
		31.12.69		30.6.69		31.12.68		30.6.68		31.12.67		30.6.67	
NATURAL GAS	M.C.F.	\$	c.	\$	c.	\$	c.	\$	c.	\$	c.	\$	c.
NATURAL GASOLINE	L.G.	2,026,487	00	1,952,690	00	2,101,916	00	2,124,466	00	1,906,982	00	2,148,531	00
CRUDE OIL—GROSS	bbl.	26,013,197	00	27,826,620	00	30,818,288	00	32,195,689	00	32,121,344	00	28,838,063	00
CRUDE OIL USED FREE OF ROYALTY	bbl.	23,715	00	28,363	00	33,833	00	33,476	00	39,645	00	42,297	00
CRUDE OIL NET	bbl.	25,989,482	00	27,798,257	00	30,784,455	00	32,162,213	00	32,081,699	00	28,795,766	00
CRUDE OIL AVERAGE ROYALTY VALUE	bbl.	4	48	4	48	4	57	5	01	4	60	4	51

APPENDIX IX—Continued

Royalty Assessment

The data used to evaluate crude oil for Crown Royalty Assessment for each of the last six half-yearly periods together with the royalty rates on Casing Head Petroleum Spirit for each of these periods are shown in the following Table:—

Product	AVERAGE PRICE IN T. & T. CURRENCY PER BARREL OF 34.9726 I.G. FOR HALF-YEAR ENDED					
	31.12.69	30.6.69	31.12.68	30.6.68	31.12.67	30.6.67
	\$	\$	\$	\$	\$	\$
BUNKER C GRADE FUEL	2.983673	2.922059	2.970749	3.467821	3.208750	3,364014
NO. 2 FUEL	7.659501	7.971725	7.671884	8.175113	7.115781	6.807786
43-47 D.I. GAS OIL	7.765212	8.102075	7.782137	8.284823	7.209370	6.898483
48-52 D.I. GAS OIL	7.870924	8.207874	7.887798	8.389914	7.302959	6.988682
53-57 D.I. GAS OIL	7.976636	8.313673	7.993458	8.495004	7.396547	7.078881
70-72 OCT. M. LEADED MOTOR GAS	8.029491	7.619505	7.592638	7.385203	7.110694	6.851141
AVERAGE MIDDLE RATE FOR SIGHT DRAFTS ON N.Y. PREMIUM IN T. & T. CENTS PER \$1.00 U.S.	101.355571	101.521271	101.258424	100.172253	100.172253	71.807735
VALUE OF TETRA-ETHYL LEAD IN T.T. CENTS PER MILLIMETRE	0.370277	0.361108	0.320961	0.323964	0.340357	0.340357
ROYALTY IN T.T. CENTS PER GALLON ON CASING HEAD PETROLEUM SPIRIT	2.257247	2.139413	2.132352	2.076715	1.998965	1.946406

The half-yearly volume of products to which the above average prices for 1969 were applied respectively in calculating royalty on Crude Oil, will be found in Appendix VIII.

APPENDIX X
The Asphalt Industry

The following table shows, for the years 1967, 1968 and 1969, the quantity of Natural Asphalt extracted from the Pitch Lake and the quantities of derived products which were exported and consumed locally.

	TONS		
	1967	1968	1969
NATURAL ASPHALT			
Extracted by Works and Hydraulics Department for local use	53,491	51,176	50,800
Extracted by the Trinidad Lake Asphalt Company	88,953	84,865	71,695
TOTAL	142,444	136,041	122,495
Derived Products Manufactured by the Company			
EXPORTED			
Crude Asphalt	4	—	—
Dried Asphalt	60,290	56,013	52,238
Cement Asphalt... ..	2,567	1,385	1,190
TOTAL	62,861	57,398	53,428
LOCAL SALES			
Crude Asphalt	610	529	168
Dried Asphalt	299	340	275
Cement Asphalt... ..	73	55	123
TOTAL	982	924	566

NOTE—The above tabulations 1 long ton = 2,240 lb.

GEOLOGICAL & GEOPHYSICAL EXPLORATION IN TRINIDAD & TOBAGO (1969)

SCALE 1:500,000

- ① TEXACO TRINIDAD INC. } GEOPHYSICAL
- ② AMOCO TRINIDAD OIL CO. } GEOPHYSICAL
- ③ TEXACO TRINIDAD INC. } GEOLOGICAL

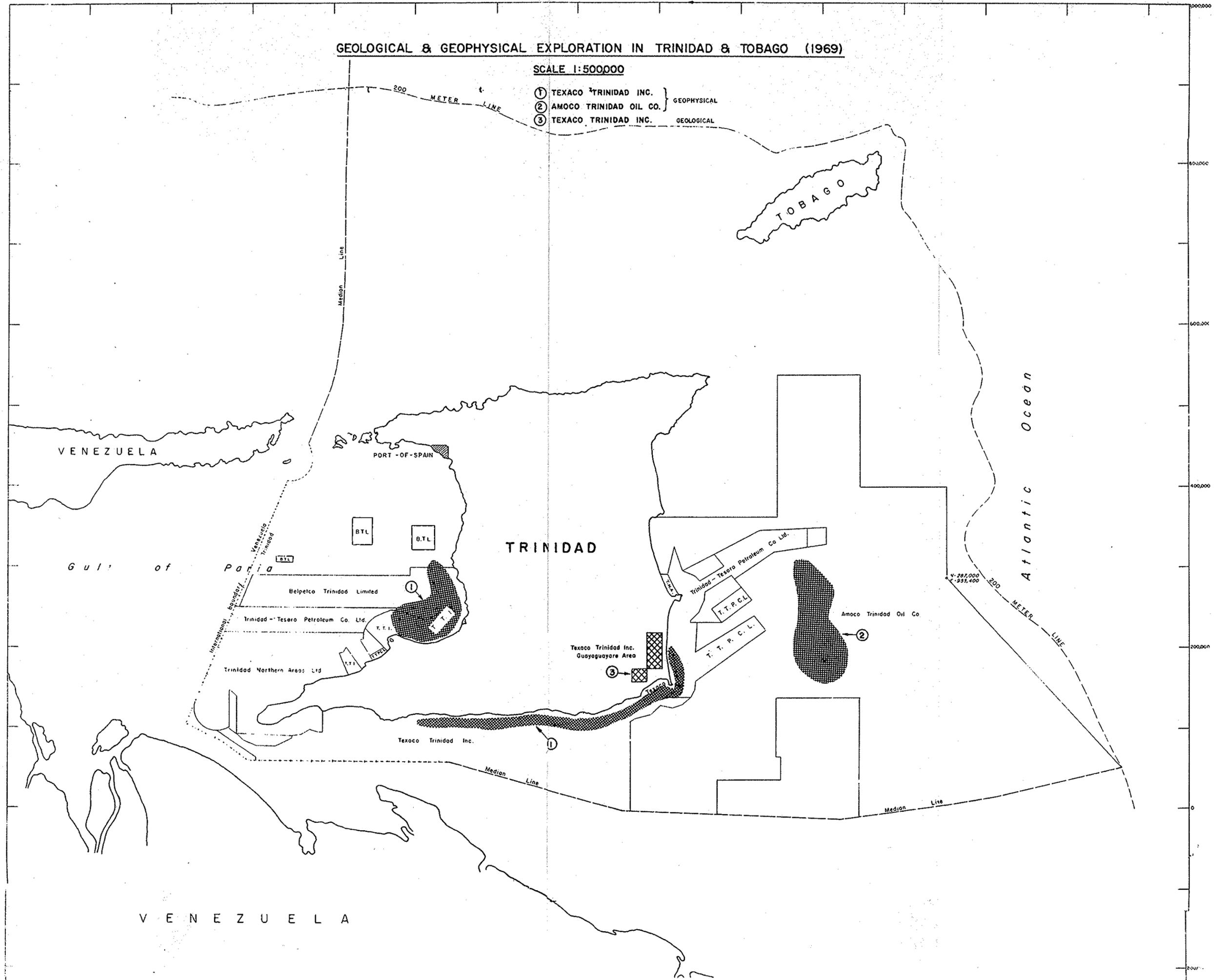
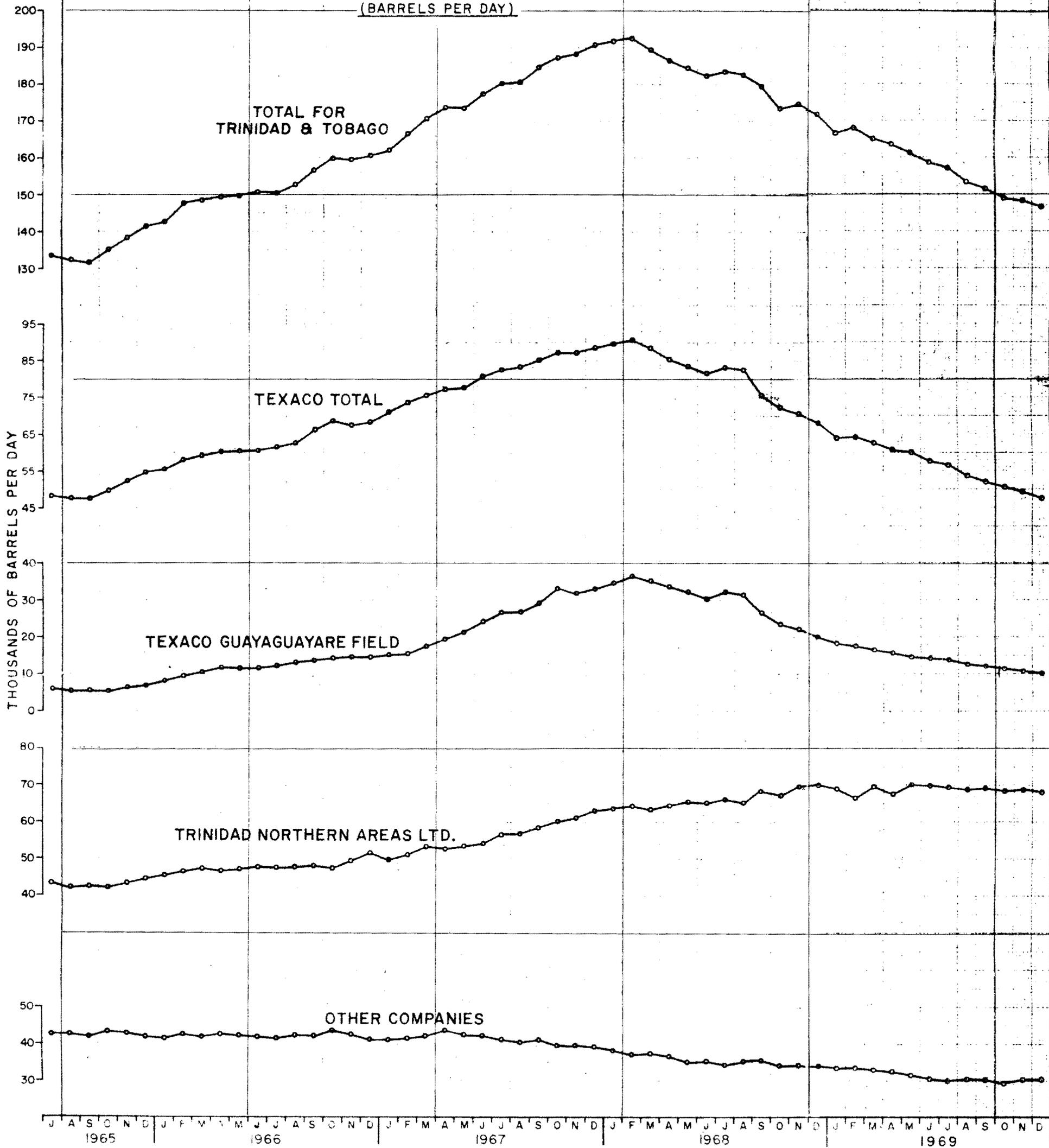


FIG. III
 MINISTRY OF PETROLEUM AND MINES
CRUDE OIL PRODUCTION RATE BY MONTHS
JULY 1965 - DECEMBER 1969
 (BARRELS PER DAY)



MINISTRY OF PETROLEUM AND MINES

TRINIDAD AND TOBAGO CRUDE OIL PRODUCTION, 1969

DAILY AVERAGE BY MONTHS

COMPLETIONS, RECOMPLETIONS AND OTHER WELLS

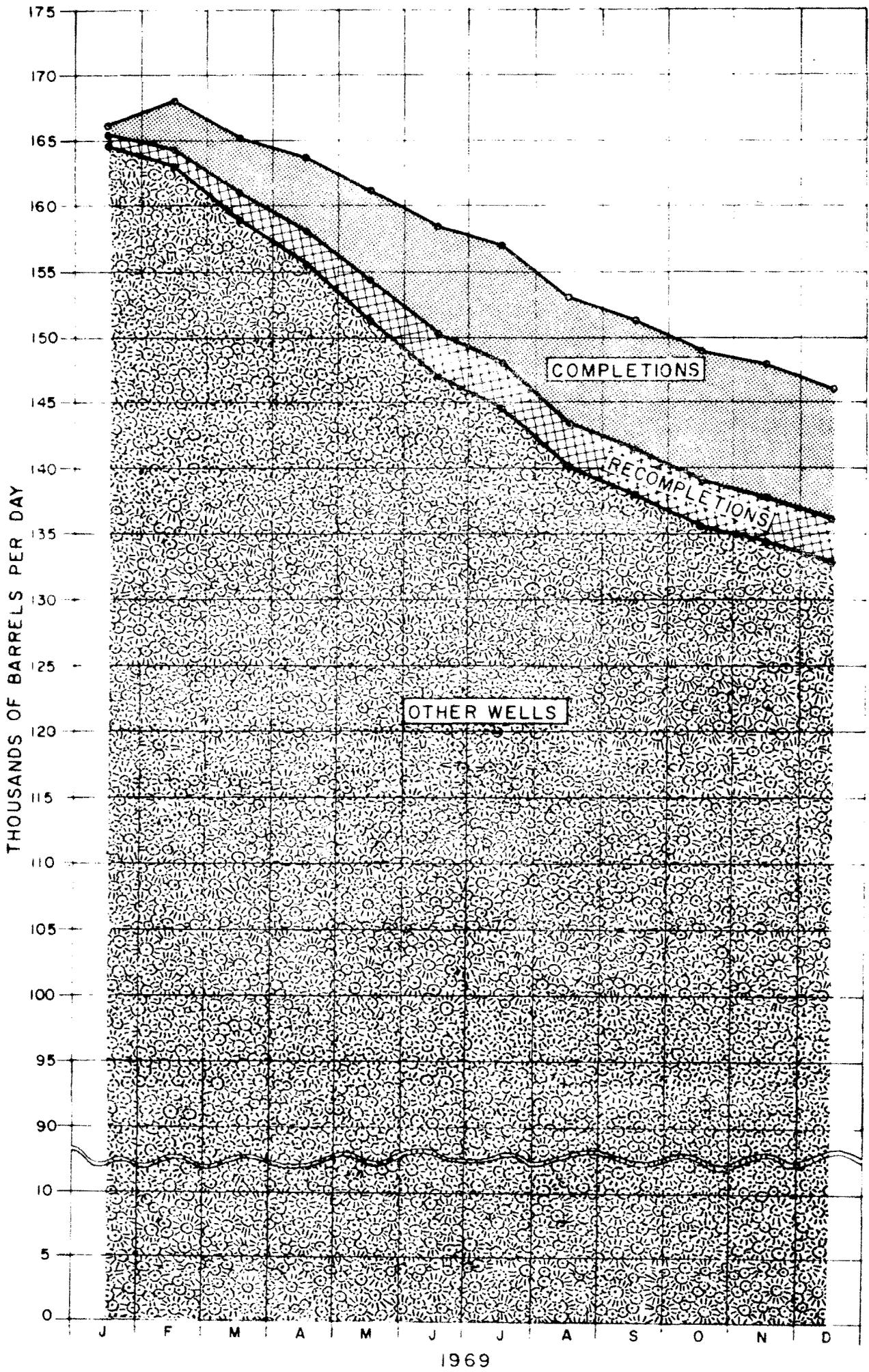
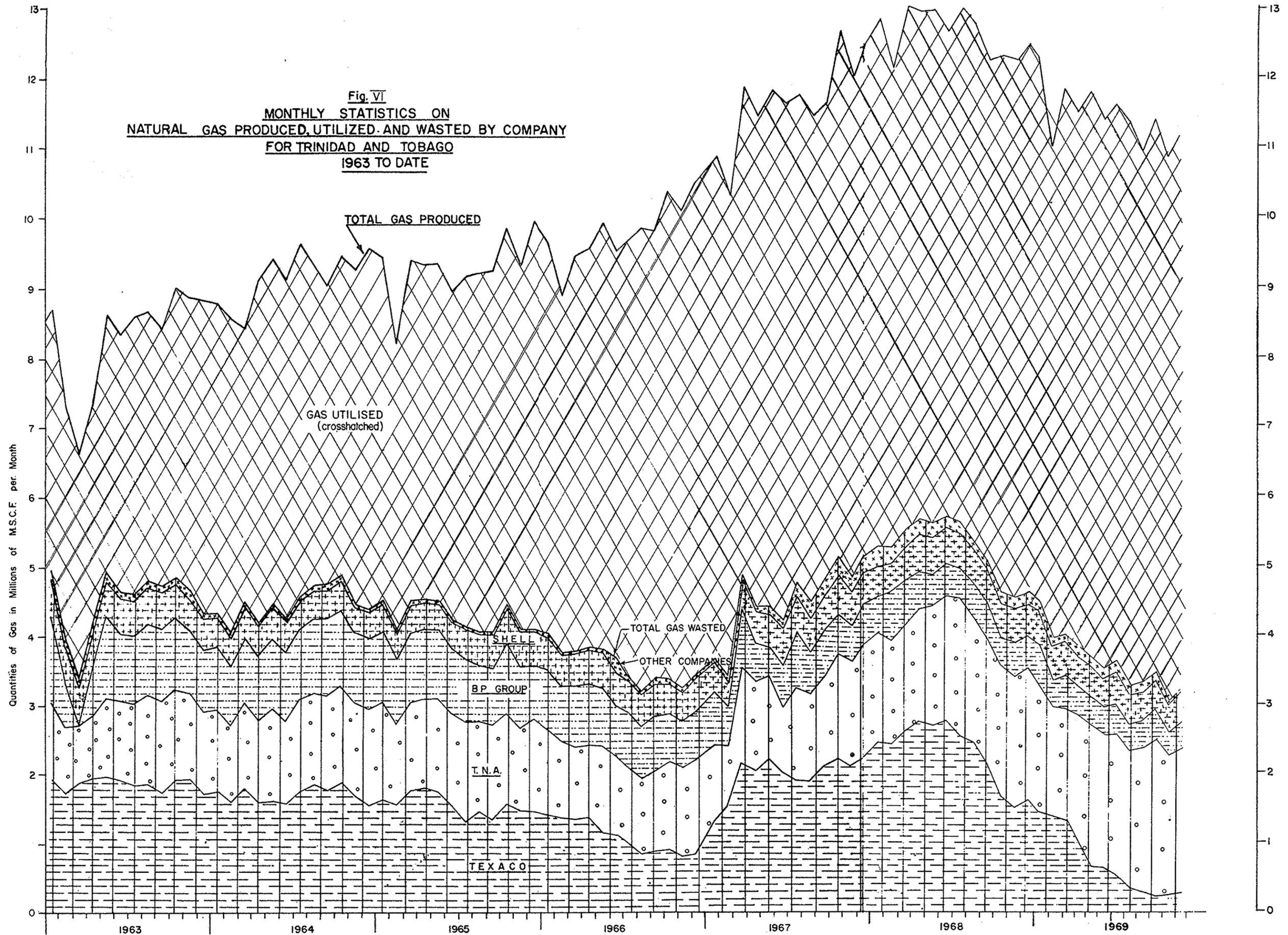


Fig. VI
MONTHLY STATISTICS ON
NATURAL GAS PRODUCED, UTILIZED AND WASTED BY COMPANY
FOR TRINIDAD AND TOBAGO
1963 TO DATE



XXXX	GAS UTILISED	=====	TEXACO	=====	BP GROUP	xxxxxx	OTHER COMPANIES
	GAS WASTED	o o o o	T. N. A.	=====	SHELL		

Fig. V
ANNUAL PRODUCTION AND INJECTION STATISTICS
FOR GAS AND WATER INJECTION PROJECTS
IN TRINIDAD AND TOBAGO
1957-1969

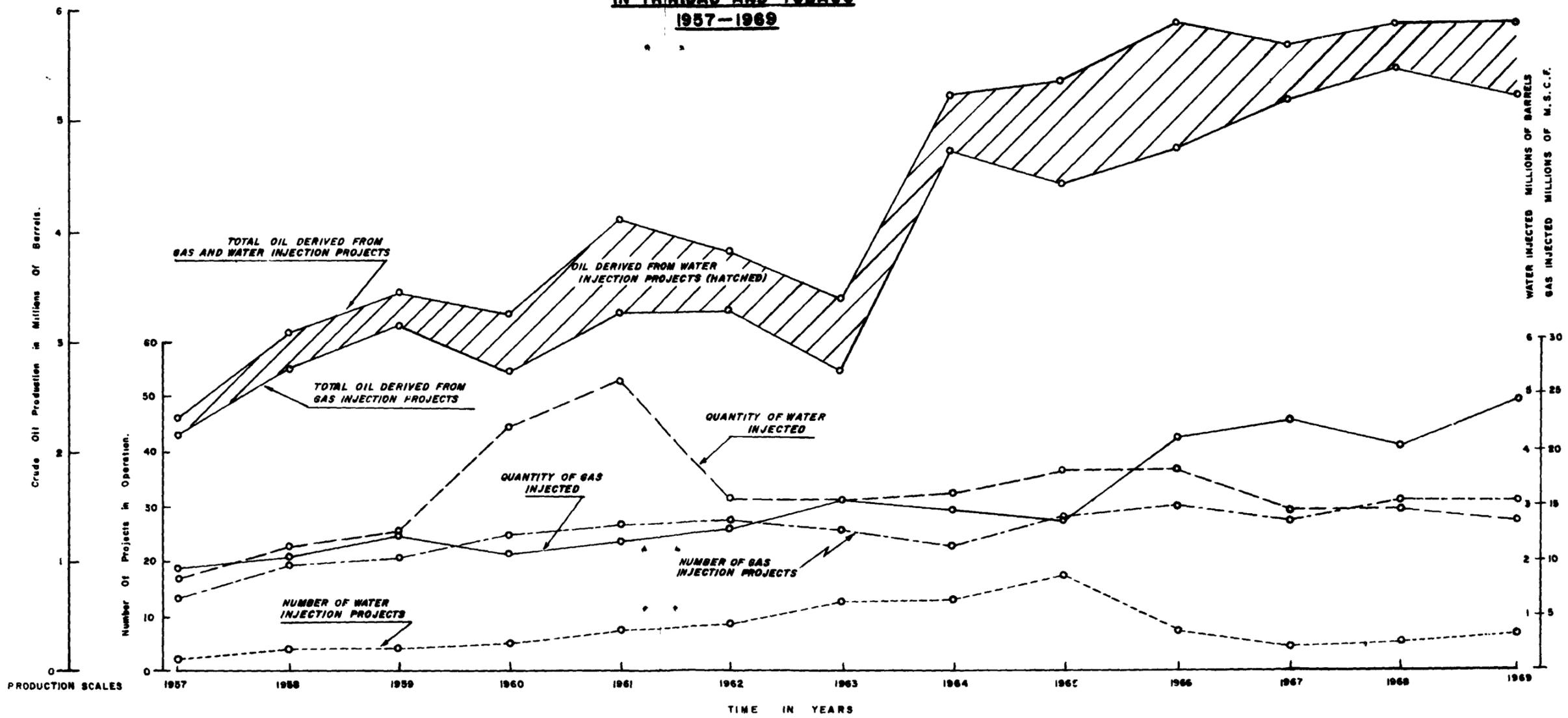


Fig VII

STATISTICS ON THE PETROLEUM INDUSTRY OF TRINIDAD & TOBAGO

DRILLING

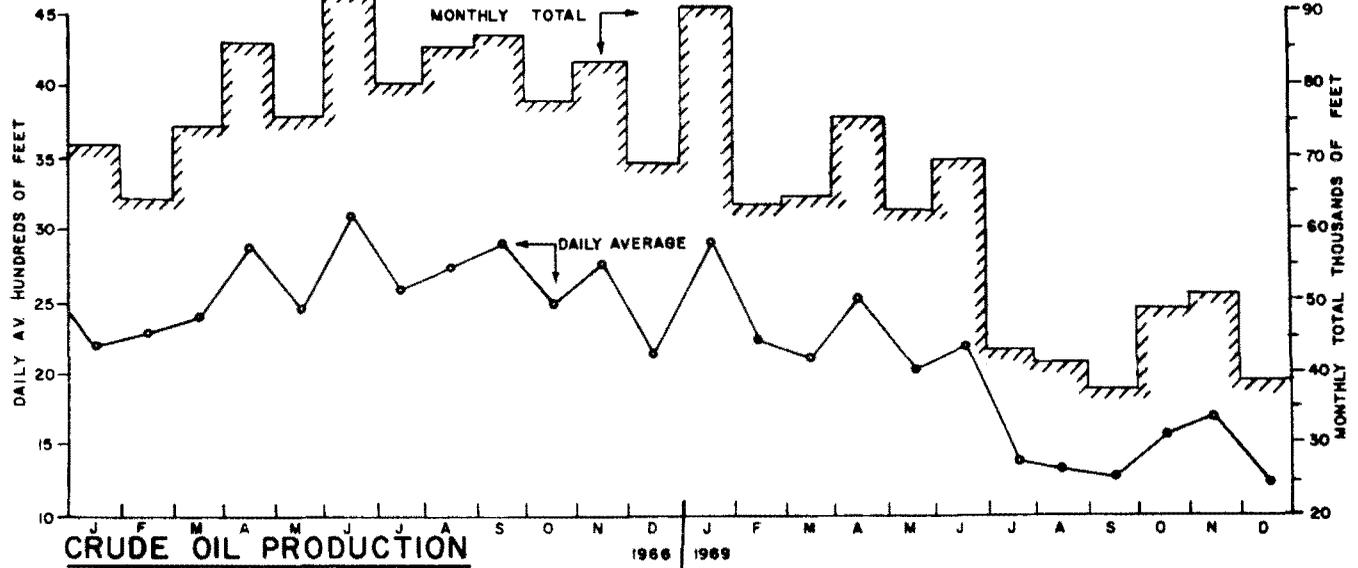
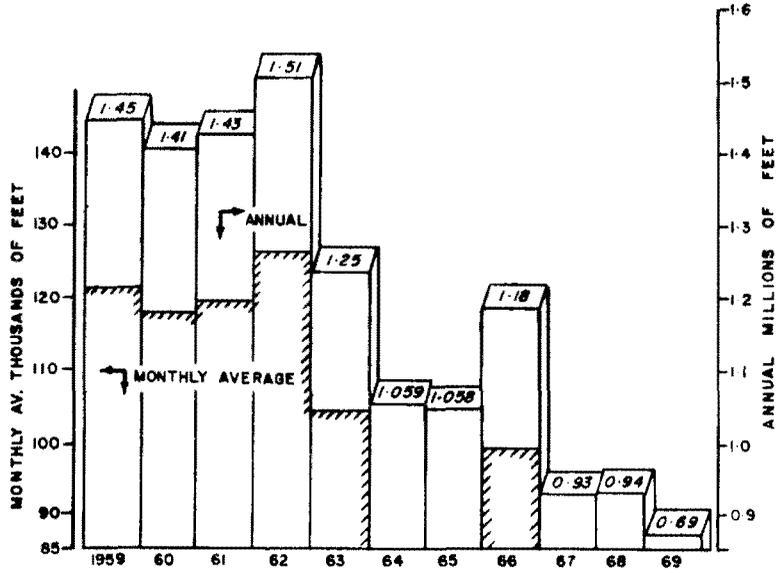


Fig VIII

CRUDE OIL PRODUCTION

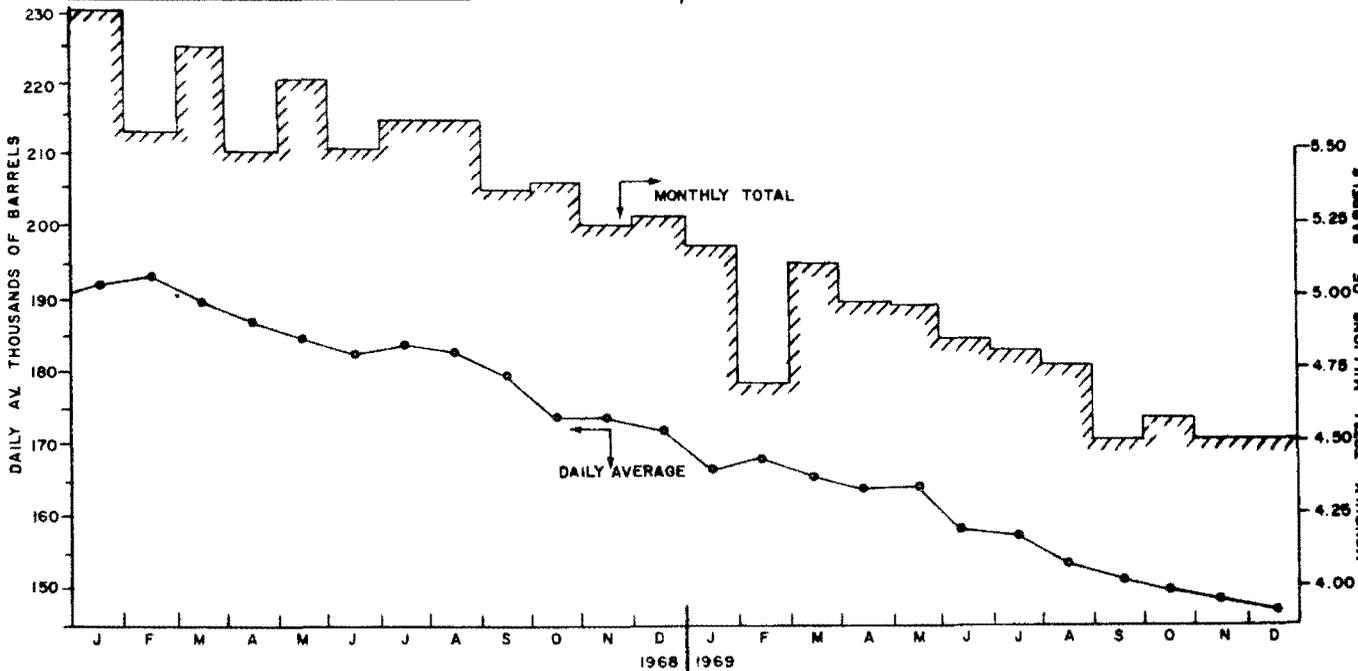
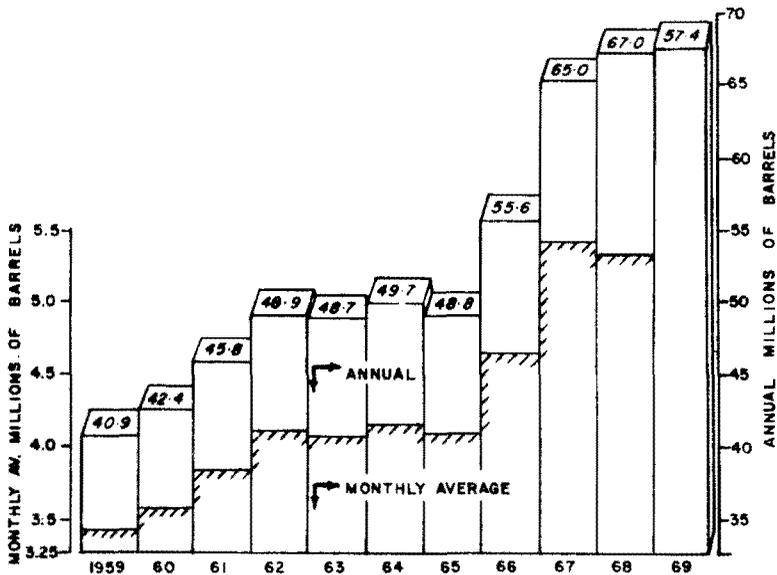
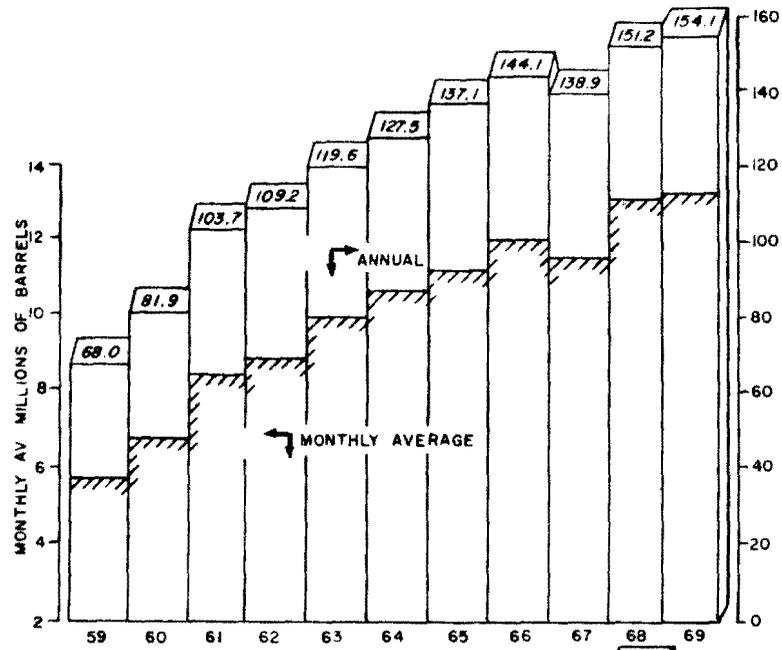


Fig IX

STATISTICS ON THE PETROLEUM INDUSTRY OF TRINIDAD & TOBAGO



REFINERY THROUGHPUT

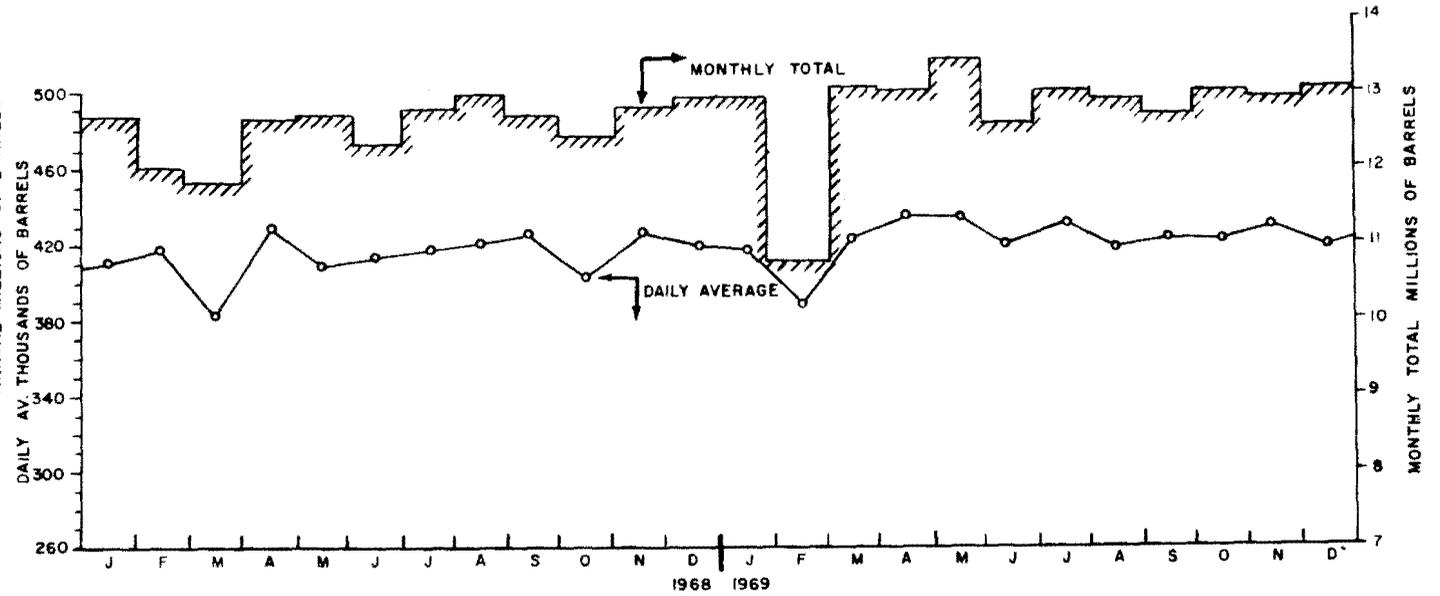
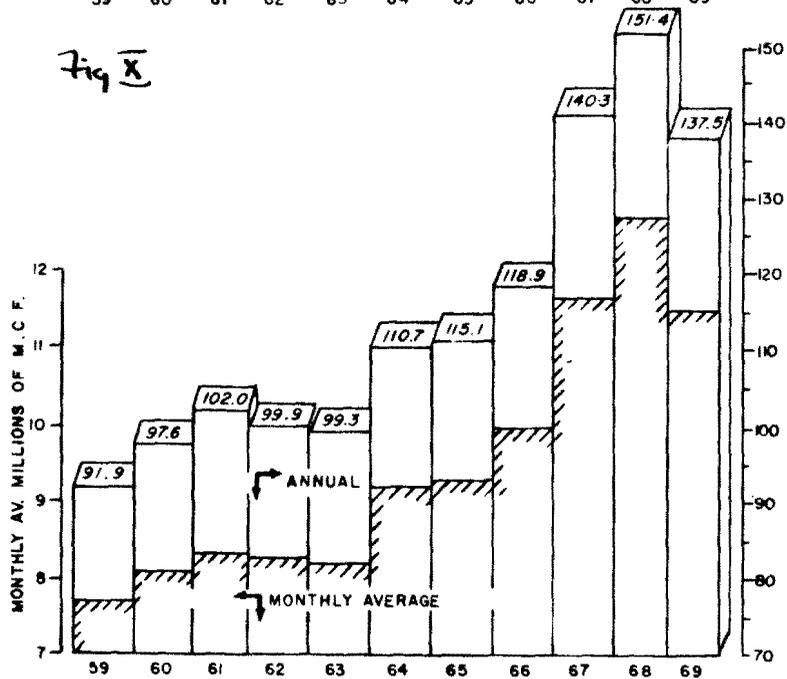


Fig X



NATURAL GAS PRODUCTION

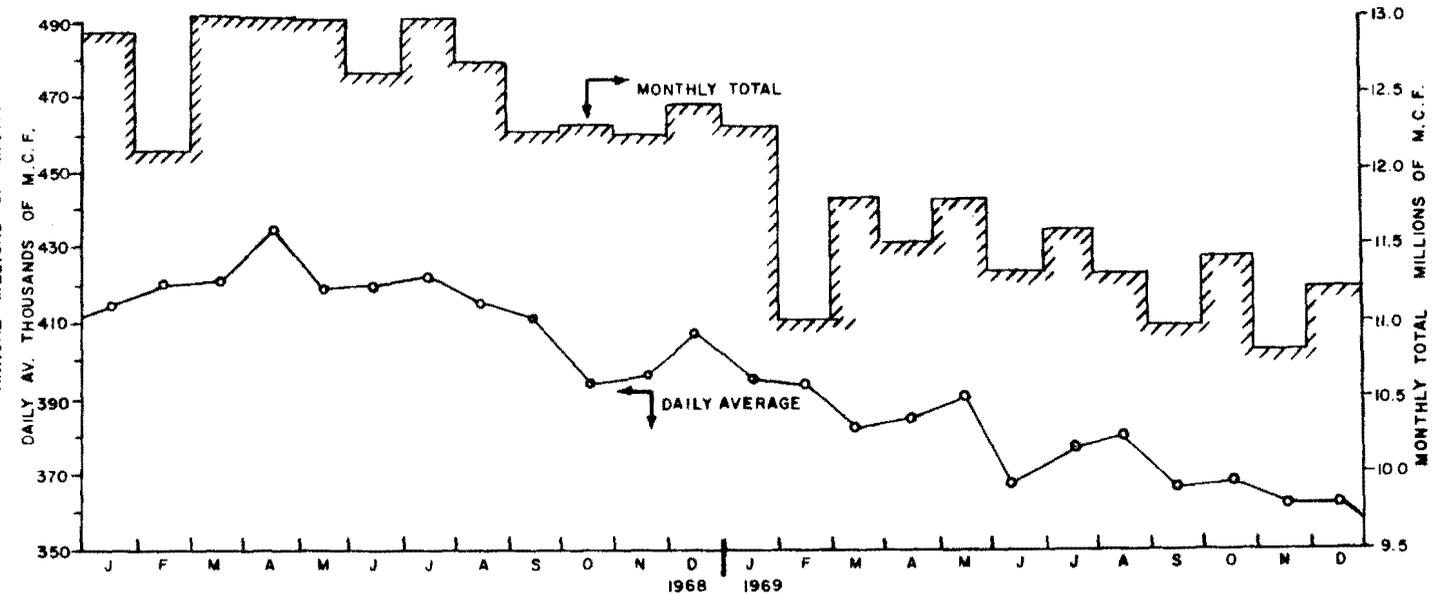
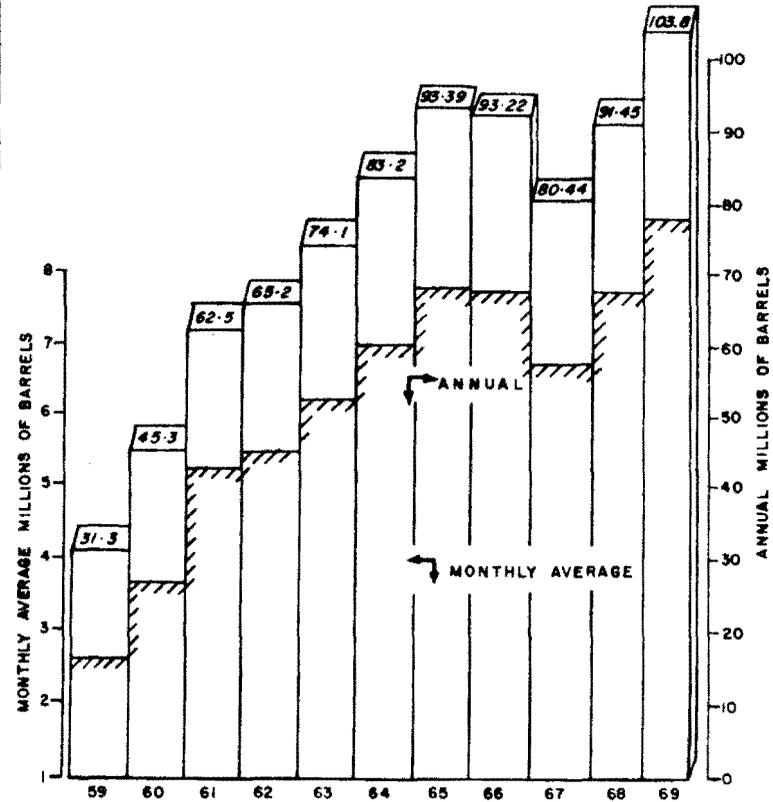


Fig XI

STATISTICS ON THE PETROLEUM INDUSTRY OF TRINIDAD & TOBAGO



CRUDE OIL IMPORTS

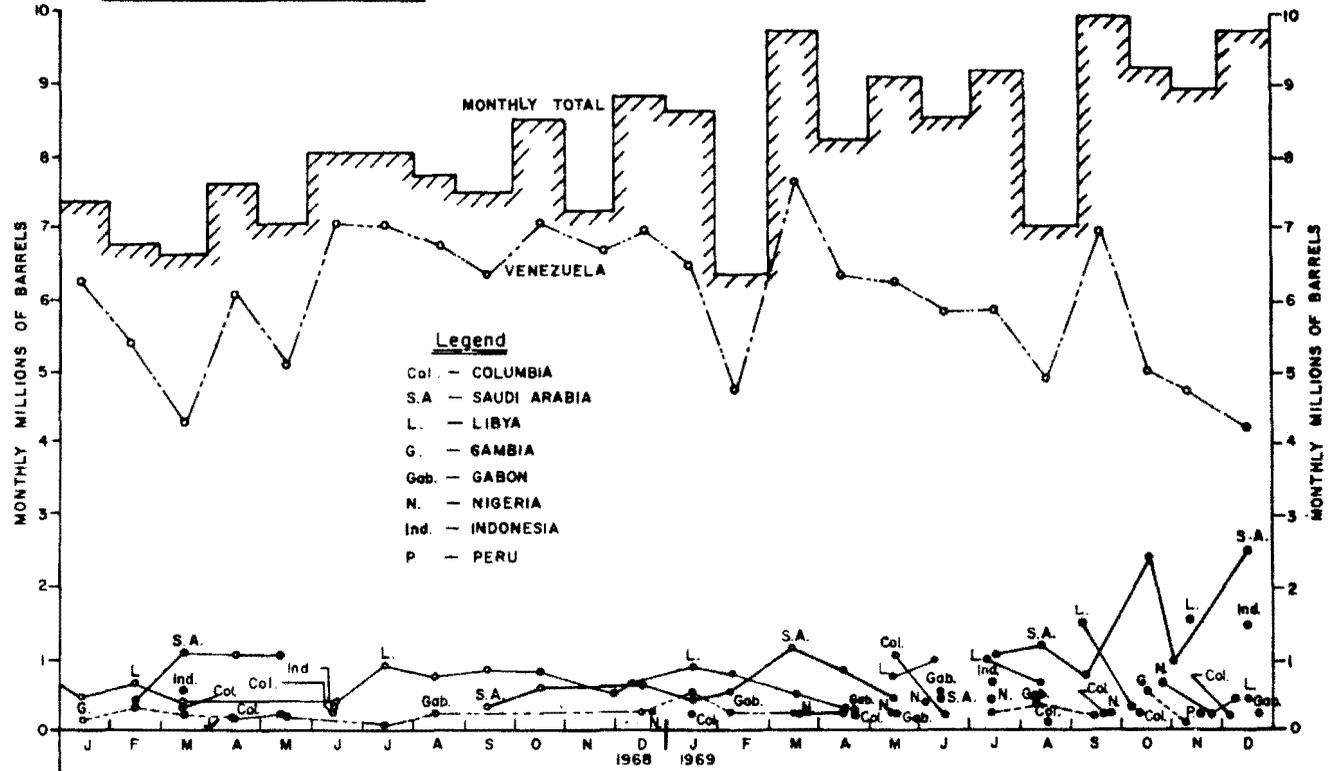
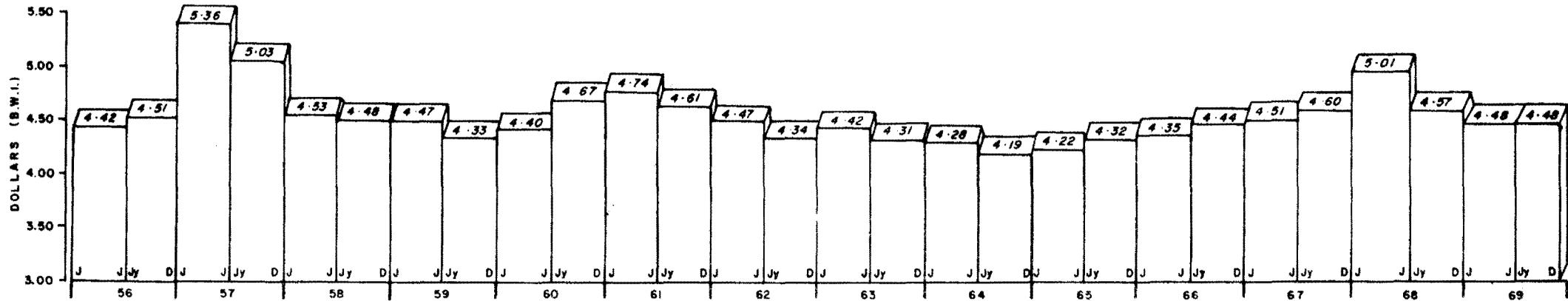


Fig XII

AVERAGE VALUE* (For Royalty Evaluation) OF A BARREL OF CRUDE OIL



* AS DETERMINED BY THE METHOD OUTLINED IN THE LAND (OIL MINING) (AMENDMENT) REGULATIONS, 1953

Fig XIII
TRINIDAD AND TOBAGO ANNUAL CRUDE OIL PRODUCTION

37 Total Production
 Marine Production (Marine based wells)
 Marine Production (Land based deviated wells)
 Land Production
 1908 Year

PRODUCTION	1908-1950	1951	1952	1953	1954	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969
Marine (Marine based wells)	-	-	-	-	-	34,996	237,351	495,173	2,088,024	4,272,920	7,554,776	11,113,056	14,551,684	17,328,298	18,981,062	18,091,200	20,184,850	24,081,998	28,089,192	27,702,808
Marine (Land based deviated wells)	-	30,807	253,579	804,823	1,069,797	1,399,138	1,989,952	2,242,405	2,101,663	2,148,836	1,825,457	1,871,904	1,721,342	1,496,521	1,316,988	1,274,705	1,265,185	1,177,923	950,066	724,151
Land	See Graph	20,811,909	21,004,101	21,541,100	22,559,532	23,461,671	26,701,465	31,326,369	33,165,362	34,497,030	32,977,097	32,782,810	32,603,118	29,853,451	29,432,948	29,493,032	34,153,449	39,734,661	37,864,648	28,991,834

