



Statistical Section

Annual Review

1962

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ADMINISTRATION REPORT OF THE PETROLEUM DEPARTMENT
1962



Honourable Minister of Industry, Commerce,
Tourism and External Communications.

I have the honour to submit the following report on the Oil and
Asphalt Industries for the year 1962.

THE OIL AND ASPHALT INDUSTRIES

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T H E O I L I N D U S T R Y 1 9 6 2

1. The Trinidad Oil Industry continued its growth during the year 1962. A comparison of the results obtained in 1962 with those obtained in 1961, showed that the crude oil production rose by 6.8% and the refinery throughput increased by 5.3%. Average drilling depth increased in the hope of finding new oil. However, no new fields were discovered. The proven oil reserves stood at 500 million barrels or 0.15% of the world's proven reserves. Trinidad and Tobago produced 0.5% of the world's crude oil production in 1962.

2. The highlights of the operations in the oil industry during 1962 are listed hereunder along with comparative data for the previous year.

	<u>1962</u>	<u>1961</u>
Total crude oil production (bbls.)	48,876,000	45,768,000
Daily average production (bbls./day)	133,906	125,391
Average No. of rigs operating	23	23
No. of wells completed	280	288
Producers completed, Oil and gas	255	245
Success Ratio	91%	85%
Footage drilled (feet)	1,506,187	1,426,002
Refinery throughput (bbls.)	109,256,000	103,755,000
Exports of refined products (bbls.)	89,880,242	83,772,759
Local consumption of refined products (bbls.)	15,316,368	17,712,962
Refined products obtained (bbls.)	105,932,632	100,971,983
Total contribution to Government by the Oil Industry	\$ 68,328,292	52,856,231

/3. Production

PRODUCTION

3. Crude oil production attained a total of 48.9 million barrels, an increase of 6.8 % over the figure for 1961. With the exception of T.N.A. Texaco, P.C.O.L. and T.C.O. all other companies showed a decline in production. Details of crude oil production, by operating companies, are given in Table IIIA.

4. Company production statistics are given in the following table:-

<u>COMPANY</u>	<u>1962</u>	<u>1961</u>	<u>% Change</u>
Apex Trinidad Oilfields Ltd.	3,168,978	3,196,506	- 0.8
Dominion Oil Ltd.	23,380	119,695	- 80.5
Kern Trinidad Oilfields Ltd.	898,900	962,111	- 6.6
Premier Consolidated Oilfields Ltd.	322,041	296,392	+ 8.7
Shell Trinidad Ltd.	5,576,966	6,449,822	- 13.5
Trinidad Canadian Oilfields Ltd.	1,226,305	1,168,094	+ 5.0
Trinidad Northern Areas	13,117,092	9,358,676	+ 40.2
Texaco Trinidad Inc.	18,375,284	17,944,961	+ 24.0
Trinidad Petroleum Development Company Ltd.	6,167,198	6,270,656	- 1.6
Jade.	-	859	-
	48,876,144	45,676,722	+ 6.8

5. The most significant increase in production was obtained in the Soldado field. The crude oil production increased by 3.76 million barrels or 40.2 % above the 1961 figure.

6. During the year under review flowing wells produced 71.6 % of the crude oil production; gas lift wells produced 11.0 %; pumping wells produced 14.0 %; plunger lift wells produced 3.2 %; and 0.6 % was produced by other methods. These figures are plotted for a number of years and are shown in Appendix B. An analysis of the monthly crude oil production figures, by methods, is shown in Table III.

7. The increase in the total crude oil produced during 1962 was derived by:-

- (a) Out-step drilling;
- (b) Rec Completions of old wells;
- (c) Application of improved methods of sand-controls, fracturing and well-stimulation
- (d) Fluid injection including Secondary recovery operations.

/Production.....

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8. Production cost per barrel of crude oil, including royalty payment, as established by the Certified Public Accountants Expert was within the following range during the year 1962.

WI \$2.14 to \$3.03

9. Graphs of annual crude oil production and average daily production per well are shown in Appendix A.

10. Natural Gas production amounted to 99,948,968,000 cubic feet.

The following table shows the Natural Gas Balance for the year 1962.

Method of Disposal	Quantities of Gas In Thousands of Cubic feet	% Disposal
Sales to companies	6,204,148	6.2
Replaced information	13,177,479	13.1
Converted to C.H.P.S	203,496	0.2
Used as fuel:		
(a) In fields	6,700,114	6.7
(b) In Refineries	17,114,091	17.1
Vented as surplus	44,101,284	44.1
Pipe-line losses and Unaccounted for	3,209,600	3.3
Not collected	9,238,756	9.3
TOTALS	99,948,968	100.0

Table IV gives details of production and disposal of natural gas.

11. A total of 193,807 barrels of natural gasoline was produced during the year 1962.

Crown oil rights accounted for 140,549 barrels and private oil rights produced 53,258 barrels.

MOVEMENT OF CRUDE OIL AND PRODUCTS

Details of Crude Oil Movement and Products are given in Table V. These can be summarised as follows:-

CRUDE OIL BALANCE

Derived Sources	Quantity in Millions of Barrels	Disposal	Quantity in Millions of Barrels
Stock 1st January	2.65	Exports	4.05
Production	49.07	Local Consumption	.05
Less Refinery Loss	<u>.31</u>	Delivered to Refinery	109.26
	48.76	Closing stock 31/12	3.22
Imports	65.17		
Total	116.58	Total	116.58

REFINED PRODUCTS BALANCE

Derived sources	Quantity in Millions of Barrels	Disposal	Quantity in Millions of Barrels
Stock 1st January	5.05	Exports	89.88
Crude from Fields	109.26	Bunkers	12.95
Less Refinery Loss	<u>3.33</u>	Local Consumption including Refinery fuel	2.38
	105.93	Stock on 31/12	6.03
Products Obtained	105.93		
Imports	.24		
Total	111.22	Total	111.22

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REFINING CAPACITY

19. The total refining capacity in 1962 was 109,255,918 barrels, reflecting an increase of 5.3% over the capacity of 1961. Imported Crude Oil accounted for 59.5% of the refinery throughput in 1962.

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There were three refining companies operating during the year. (1) Texaco refined 91,987,186 barrels of crude plus 1,734,835 barrels of other processed oils; Shell refined 17,257,035 barrels of crude oil, while T.P.D. did 50 batch type operations of distillation for a total of 11,697 barrels.

20. The capacities of Crude and product plants throughout the territory are as follows:-

P R O C E S S

	Capacity Bbls/day
1. Topping (Crude Distillation)	305,000
2. Cracking (Visbreaking)	25,000
3. Catalytic (Reforming)	24,000
4. Alkylation	2,500
5. Isomerisation	2,000
6. RE-run	12,000
7. Cracking (Catalytic)	28,000
8. Polymerisation	1,400
9. Vacuum Distillation	70,000
10. Bitumen	7,000
11. Clans Kiln (Sulphur)	25 (long tons/ day)

21. The only change in the capacity of refining plants came from the Vacuum Distillation Unit of Texaco whose capacity increased from 60,000 bbls. per day to 70,000 bbls. per day.

22. During 1962, Texaco completed 15% of their Cyclohexane Plant and 36% of their Lube Oil Plant. When completed the former will have a capacity of 652 bbls. per day and the latter 2,700 bbls. per day. Pioneer Status was granted to Texaco Trinidad Ltd., on May 10, 1962 for the manufacture of Benzene-Toluene concentrate and Cyclohexane.

THE ASPHALT INDUSTRY

23. The following tables show the quantities of natural Asphalt extracted from the Pitch Lake, and derived products exported, and sold locally.

NATURAL ASPHALT

	Tons	Tons
	1962	1961
Extracted by Works Department for local use	68,694	82,077
Extracted by the Trinidad Lake Asphalt Co.,	93,919	93,249
	<u>162,613</u>	<u>175,326</u>

DERIVED PRODUCTS MANUFACTURED BY THE COMPANY

<u>Exported</u>	Tons	Tons
	1962	1961
Grude Asphalt	-	-
Dried Asphalt	65,344	61,151
Cement Asphalt	4,251	9,793
	<u>69,605</u>	<u>70,944</u>

<u>Local Sales</u>	Tons	Tons
	1962	1961
Grude Asphalt	-	-
Dried Asphalt	413	255
Cement Asphalt	43	84
	<u>456</u>	<u>339</u>

CONTRIBUTION TO REVENUE AND LOCAL DISBURSEMENTS

24. Details of the disbursements of the Local Oil Industry are given in Tables VI and VII. Taxes paid to government amounted to \$68.3 million, an increase of 30.8% over 1961.

25. The following tables show the contribution of the Oil Industry under each Head of Revenue listed in the Territory's Estimates. Contributions to the Revenue of the Port Services and also of the Railway and Telegraph are shown separately in order to conform with the present form of presenting the Territory's Estimates of Revenues from these two services which were included in the Territory's total revenue in the past years. To facilitate comparison of figures over the past years, revenues are included in Table VI which is set up to show pure taxation as distinct from payments to Government Departments in return for various services.

CONTRIBUTION BY THE OIL INDUSTRY TO THE REVENUE OF THE COUNTRY IN 1962

	REVENUE HEAD IN COUNTRY'S ESTIMATES	REVENUE RECEIVED	CONTRIBUTION BY OIL INDUSTRY	PERCENTAGE CONTRIBUTION BY OIL INDUSTRY
(1)	Customs and Excise	52,460,267	1,852,871	3.53
(2)	Licences and Internal Revenue not otherwise classified	10,284,783	235,701	2.29
(3)	Taxes on Income	63,288,350	33,610,449	53.11
(4)	Fees and Payments for Specific services	1,200,979	64,682	5.39
(5)	County Council	2,166,734	1,049,366	48.43
(6)	Re-imbursments	1,237,008	57,692	4.66
(7)	Earnings of Government Departments (excluding Forests and Lands)	1,493,619	14,936	1.00
(8)	Post Office	2,898,863	54,169	1.87
(9)	Rent of Government Property	1,053,602	7,041	0.67
(10)	Interest	2,233,296	-	-
(11)	Miscellaneous	1,119,897	13,582	1.21
(12)	Forests, Land and Petroleum	20,466,404	21,040,455	
	TOTAL ORDINARY REVENUE	159,908,802	58,000,944	36.27
	<u>EXTRAORDINARY REVENUE</u>			
(13)	Commonwealth Development and Welfare Schemes	54,127	-	-
(14)	Premia on Leases (formerly land sales)	8,128,929	8,126,950	99.98
(15)	Loans to Public Bodies and Pension Contributions	5,561,386	-	-
(16)	Grants under C.D. and W. Organization	98,629	-	-
(17)	Extra-ordinary (Local and External Loans)	38,734,589	-	-
	TOTAL AS PER COLDRY'S FINANCIAL STATEMENT 1962	212,486,462	66,127,894	31.12
A.	Port Services	12,167,012	2,471,763	20.32
B.	Railway and Telegraph	1,442,414	142,035	9.85
C.	Telephone Service	3,838,847	307,918	8.02
	Services Total	17,448,273	2,921,716	16.75
	GRAND TOTAL	229,934,735	69,049,610	30.03

I M P O R T S

26. Imports of crude oil at 65,167,595 barrels accounted for 59.5% of the refinery throughput. The following tabulation shows a breakdown of imports.

Country	Production (barrels) 1962	% of 1962	Production (barrels) 1961	% change
Venezuela	29,118,315	44.7	31,262,315	- 6.8
Colombia	4,685,585	7.2	4,010,347	+ 16.8
Saudi Arabia	30,004,711	46.0	{	-
Egypt	<u>1,358,984</u>	<u>2.1</u>	<u>(27,237,142</u>	
Total imports	<u>65,167,595</u>	<u>100</u>	<u>62,509,804</u>	4.2

27. Imports of crude oil for 1962 from Venezuela decreased 6.8% from that of 1961, while imported crude oil from Saudi Arabia increased.

Imports of refined products are shown in the following table.

Products	1962 (Barrels)	1961 (Barrels)
Motor Spirit	2,411	47,926
Kerosene	-	674
Gas and Diesel oils	143,906	6,844
Fuel Oil (all grades)	62,381	105,102
Feed or blending stocks	4,202	33,635
Naphtha	28,226	-

28.

The imports of Motor Spirit, Fuel oil and Feed or Blending Stocks show remarkable decreases while Gas and Diesel oil increased, compared to figures for 1961. Table V (Item 3) gives details of imports.

EXPORTS OF PETROLEUM AND ITS PRODUCTS

29.

The value of Petroleum exports in 1962 was almost unchanged from that of the previous year, the increased volume exported just being offset by a drop in prices.

Table I (items 10 - 12) gives figures for the exports of Petroleum including the re-export of products obtained from imported crude, while Table V gives a detailed breakdown of refined products exported.

The following tabulation shows the contribution to the total value of the Territory's exports made by Petroleum and various agricultural products.

EXPORTS	% Increase or decrease as compared to 1961	1962		1961	
		\$	%	\$	%
Petroleum (including products from imported crude) and Petroleum Bitumen	+ 0.09	494,542,741	85.3	493,917,711	85.23
Cement	+ 111.9	2,522,043	0.4	1,190,303	0.22
Asphalt and its products	+ 13.6	3,024,379	0.5	2,661,352	0.46
Cocoa	+ 23.2	8,003,575	1.4	6,495,776	1.12
Sugar, Molasses and Rum	- 20.6	35,127,042	6.1	44,229,186	7.63
Coconuts, coconut oil etc.	+ 18.3	234,295	-	193,116	-
Coffee	- 24.4	1,074,831	0.2	1,421,023	0.26
Bitters	- 53.9	573,852	0.1	1,243,981	0.21
Fresh fruit and juices	+ 53.3	6,433,820	1.1	4,196,620	0.72
All others (including shirts)	+ 18.0	28,320,946	4.9	23,993,624	4.15
TOTAL	+ 0.02	579,657,531	100	579,547,692	100

ROYALTY ASSESSMENT

The Royalty assessed on the Crude oil, Natural gasoline and Natural gas produced on Crown Oil Mining Leases for each Half-yearly Royalty period during 1962, 1961 and 1960 is shown on the following table.

SOURCE OF REVENUE	ASSESSMENT FOR HALF-YEARLY PERIOD ENDING					
	31. 12. 62 \$ ¢	30. 6. 62 \$ ¢	31. 12. 61 \$ ¢	30. 6. 61 \$ ¢	31. 12. 60 \$ ¢	30. 6. 60 \$ ¢
Royalty on natural gas	116,724.47	94,027.86	97,003.11	90,400.37	90,328.82	92,100.39
Royalty on natural gasoline	45,392.88	42,526.21	42,860.48	46,795.11	44,912.88	47,932.46
Minimum rents not off-set by Royalty on crude oil	732,674.50	733,137.11	709,629.88	668,857.77	612,939.29	686,690.30
Royalty on crude oil	9,999,292.08	9,483,630.14	9,592,708.92	9,563,952.35	8,713,467.65	8,359,587.51
Half-yearly Totals	10,894,083.93	10,353,321.32	10,442,202.39	10,370,005.60	9,461,648.64	9,186,310.66
Yearly Totals	21,247,405.25		20,812,207.99		18,647,959.30	
Assessment Totals	20,795,523.71			19,831,654.24		
Drawback claimed	-	-	-	-	-	-

THE VOLUMES UPON WHICH THE ABOVE ASSESSMENTS WERE MADE WERE AS FOLLOWS

SUBSTANCE ASSESSED FOR ROYALTY	U N I T	HALF-YEARLY PERIOD ENDING					
		31. 12. 62	30. 6. 62	31. 12. 61	30. 6. 61	31. 12. 60	30. 6. 60
Natural Gas	Mcf	7,764,326	6,168,884	6,466,874	6,026,690	6,021,920	6,140,025
Natural Gasoline	Gals.	2,557,948	2,357,438	2,428,018	2,517,088	2,499,975	2,756,889
Crude Oil, Gross	Bbls.	23,083,532	21,287,237	20,883,145	20,824,841	18,724,599	19,059,808
Crude Oil, us d free of Royalty	Bbls.	77,912	76,408	64,734	55,020	57,894	62,292
Crude Oil, net	Bbls.	22,955,420	21,210,829	20,818,411	20,169,821	18,666,705	18,997,516
Crude Oil, Average Royalty value	\$/Bbls.	4.34	4.47	4.61	4.74	4.67	4.40

Note: Statistical volumes of gross production free of royalty etc. are mainly reported at 34.9726 Imperial Gallons per barrel but include some volumes reported at 35 Imperial Gallons per barrel.

Royalty quantities are all at 34.9726 Imperial Gallons per barrel.

33.

The data used to evaluate crude oil for Crown Royalty assessment for each of the last five half-yearly Royalty periods together with the Royalty rate on casing head Petroleum Spirit for each of these periods are shown in the following table.

P R O D U C T	Average price in B.W.I. currency per barrel of 34.9726 Imperial Gallons for the half year period ended				
	31. 12. 62	30. 6. 62	31. 12. 61	30. 6. 61	31. 12. 60
Bunker "C" Grade Fuel	3.449826	3.557788	3.763577	3.953258	3.913160
No. 2 Fuel	5.996471	6.113557	6.159975	6.398409	5.934147
43 - 47 D.I. Gas Oil	6.092258	6.203185	6.248813	6.489501	6.023343
48 - 52 D.I. Gas Oil	6.182181	6.292814	6.338626	6.579599	6.111855
53 - 57 D.I. Gas Oil	6.272103	6.382442	6.428438	6.669696	6.202707
70 - 72 Oct. M. Leaded Motor Gas	6.605403	6.710751	6.815023	6.832469	6.965981
Average middle rate for sight drafts on New York Premium in B.W.I. cents per \$1.00 U.S.	71.281250	70.720981	71.071739	71.614087	70.823641
Value of Tetra-ethyl lead in B.W.I. cents per millilitre	0.367751	0.394188	0.394563	0.396810	0.396810
Royalty in B.W.I. cents per gallon on casing head petroleum spirit	1.921436	1.933302	1.950210	1.955798	1.966753

The half-yearly volumes of products to which the above average prices for 1962 were applied respectively in calculating royalty on crude oil will be found in Table IX.

LOCAL SALES OF PETROLEUM PRODUCTS

Excisable sales of gasoline during 1962 amounted to 35,957,180 gallons, an increase of 6.9% over the figure for 1961. A total of 15,316,368 barrels of refined products or 14.4% of the total refined products was consumed locally. For further details of local consumption. See Table V (Item 7).

Accident Statistics 1962

COMPANY	Drilling and Production			Other Departments*			Total No. of Accidents
	Non Serious	Serious	Fatal	Non Serious	Serious	Fatal	
T.P.D.	2	-	-	-	-	-	2
Shell	24	-	-	24	-	-	48
Apex	-	-	-	-	-	-	-
P.C.O.L.	7	-	-	-	-	-	7
D.O.L.	-	-	-	-	-	-	-
T.N.A.	42	-	2	-	-	-	44
K.T.O.	-	-	-	-	-	-	-
T.T.I.	186	-	-	251	-	1	438
T.C.O.	-	-	-	-	-	-	-
B.P.	67	-	1	-	-	-	68
	<u>328</u>		<u>3</u>	<u>275</u>		<u>1</u>	<u>607</u>

*Excluding Refineries, Electrical, Machine and General
Work shops and Power Stations.

35. The total number of accidents reported for 1962 was 607. There were four fatal accidents during the year. A brief description of the fatal accidents follows:-

- (1) An electrician was electrocuted while connecting up a cable on an overhead hot 440-volt line.
- (2) A Drilling Derrickman fell from Decard Board whilst running into hole with drill pipe.
- (3) An Acting Production Headman was killed. While fitting a lifting-sub on to a tubing hanger, the well blew out: as a result, the gas under pressure lifted him approximately forty feet into the air.
- (4) A Driller was believed to have drowned, when the Offshore Drilling Barge on which he was working caught fire.

Extensive investigations were conducted by this Department into each of the fatal accidents, and appropriate recommendations made to preclude their recurrence.

LEGISLATION

36. The only Legislation which came into effect during the year 1962 was "The Petrochemicals Industry Development Act, No. 2 1962". This act deals with the manufacture of Petrochemicals such as Methanol, Cyclohexane, Synthetic resins etc. The manufacture of these approved products was granted pioneer status in 1962.

CROWN OIL MINING LEASES AND LICENCES

37. No new principal leases or licences were issued during 1962. However, a supplemental Submarine Licence was issued, increasing the Crown Oil Rights from 2,088,288 acres in 1961 to 2,092,690 acres in 1962. Marine Licences accounted for 5,032 acres while land leases decreased by 649 acres.

38. The following tables give a summary of the leasing activity during the year. Table X shows the change in company holdings.

SUMMARY OF LEASED OIL RIGHTS IN 1962

	A	R	P
Crown Oil Rights			
1. Principal Leases issued as at 1st January, 1963 (Crown Surface)	288,648	2	34
2. Principal Leased issued as at 1st January, 1963 (Private Surface)	91,313	0	35
3. Exploration Licences issued as at 1st January 1963 (Crown Surface)	1,044,656	0	00
4. Marine Licences issued as at 1st January, 1963 (Crown Surface)	759,386	0	00
5. Acreage under Lease and Licence (Total)	2,184,003	3	29
Private Oil Rights			
6. Private Oil Rights under Lease as at 1st January, 1963	115,466	1	04
7. Total Acreage of Oil Lands	2,299,470	0	33

SUMMARY OF LEASING AND LICENSING ACTIVITY DURING 1962

	No. of lease or licence	CROWN OIL RIGHTS - ACREAGE					
		CROWN			SURFACE		
		A	R	P	PRIVATE	SURFACE	
		A	R	P	A	R	P
Principal Leases as at 31st. December 1961	110	289,298	1	04	91,561	3	17
Principal Leases issued in 1962	-	-	-	-	-	-	-
Supplementary Leases issued in 1962	1	-	-	-	16	0	24
	110	289,298	1	04	91,578	0	01
Area surrendered in 1962	Partial	649	2	10	264	3	06
Leases as at 1st January 1963	110	288,648	2	34	91,313	0	35
Submarine Licences at 31st December 1961	6	754,334	0	00	-	-	-
Submarine Licences issued during 1962	Supp.	5,052	0	00	-	-	-
	6	759,386	0	00	-	-	-
Submarine Licences surrendered in 1962	-	-	-	-	-	-	-
Submarine Licences at 1st January 1963	6	759,386	0	00	-	-	-
Exploration Licences at 31st December 1961	2	1,044,656	0	00	-	-	-
Exploration Licences issued in 1962	-	-	-	-	-	-	-
Exploration Licences at 1st January 1963	2	1,044,656	0	00	-	-	-
TOTAL ACREAGE LEASED AND LICENSED	118	2,092,690	2	34	91,313	0	35

LEASES SURRENDERED DURING 1962

SURRENDERED LEASES	NO.	POSITION	CROWN OIL RIGHTS - ACREAGE					
			PRIVATE SURFACE			CROWN SURFACE		
			A	R	P	A	R	P
SHELL Reg. No. 4037/52	Partial	La Brea	264	3	06	649	2	10
TOTAL			264	3	06	649	2	10

SUBMARINE LICENCES ISSUED DURING 1962 (SUPPLEMENTAL)

SUPPLEMENTAL LICENCES		NO.	POSITION	CROWN OIL RIGHTS - ACREAGE		
REG. No.	Supp. to			CROWN SURFACE		
			A	R	P	
T.N.A. 883/63	1038/53	1	892	0	00	Territorial and High Seas Waters around the Island
T.N.A. 884/63	1038/53	1	4160	0	00	Territorial and High Seas Waters around the Island
TOTAL		2	5052	0	00	

Exploration Licences issued during 1962 - - -

Exploration Licences surrendered during 1962 - - -

LEASES ISSUED DURING 1962 (SUPPLEMENTAL)

SUPPLEMENTAL LEASES		NO.	POSITION	CROWN OIL RIGHTS - ACREAGE		
Reg. No.	Supp. to			PRIVATE SURFACE		
			A	R	P	
TEXACO 790/63	10283/56	1	16	0	24	Naparima, Savana Grande
TOTAL		1	16	0	24	

Fluid-Injection Operations in Trinidad & Tobago
during 1962

General

39 The total oil offtake from all fluid injection projects during 1962 was 3,833,649 barrels; this was 270,610 barrels less than the total for 1961.

Table XI presents a summary of statistics for fluid-injection operations over the period 1957 to 1962 and Fig. 1 provides a graphical representation of them. From these statistics, it is evident that gas injection maintained its 1961 level of activity, whereas, water-flooding, having reduced injection by more than 2 million barrels, produced some 300,000 barrels of oil less than in the previous year.

40 The details of the individual gas-injection and water-injection operations during 1962 are given in the tabulations XIIA and XIIB respectively. The locations of these projects are illustrated in Fig. 2.

41 During the year, field experiments in thermal oil-recovery methods were undertaken to determine the feasibility of its local application.

Gas Injection

42 A tabulation, by companies, of the results of gas-injection operations during 1962 is presented in Table XIII.

Texaco Trinidad Inc.

43 The above table shows that the Texaco Company alone accounted for 48.1 per cent of the island's total natural gas injection. In addition, this Company operated two projects, one of which involved recycling in a deep gas-condensate reservoir, on behalf of the T.C.O. Company at their Wilson Field.

44 Ninety-nine per cent of the total gas injected by Texaco was carried out at Forest Reserve Field. The average daily gas injection rate in this field was 16 million S.C.F. and the annual crude oil production of 2,043,122 barrels from these projects amounted to one-third of the Forest Reserve field's total. Three projects on this field, namely the U.C.R.A., the U.C.W.E and the U.C. 645. Sd., produced more than half-a-million barrels each during the year. Production and injection behaviour for these projects were considered normal and are shown along with similar statistics for the M.C. 586 and the F.S. Zone 8 projects in Fig. 3.

45 By employing standard scales for each project, reservoir performances are directly comparable.

British Petroleum (T'dad) Ltd.

46 The BP Company accounted for 37.6 per cent of the island's total gas injection activity. Successful results were obtained in the Moruga West area where some 244,000 barrels were produced from the project for an average daily injection rate of slightly less than one million S.C.F. Gas-injection in the form of pressure-maintenance was initiated early in this reservoir's productive history and aided by an active gravity drainage mechanism promises an exceptionally high ultimate oil recovery.

Shell Trinidad Ltd.

47 In the Penal Area, Shell discontinued its two gas-injection projects. In N.E. Catshill-Ortoire, however, a total of 165 million standard cubic feet of gas was injected into Cruse "N" Sands and 113,292 barrels of oil recovered. During the year, pressure decline was arrested in the reservoir's northern unit.

Trinidad Northern Areas

48 Trinmar injected 216 million S.C.F. of gas in the T.N.A.'s Soldado Marine field, Main Block, in an effort to maintain flowing production as long as possible and also increase its ultimate oil recovery. At the end of the year, initial reservoir response was considered satisfactory and two more injection wells were programmed to increase input gas volumes.

Trinidad Canadian Oil Company

49 A total of 1,273 million S.C.F. was injected by Texaco as operators for the T.C.O. Company in their deep condensate reservoir recycling project. Oil offtake from this project amounted to 96,753 barrels during the year. It is anticipated that recycling at a predetermined pressure in this unit will considerably reduce the danger of loss in condensate recovery which would have occurred as a result of the phenomenon of retrograde condensation as the reservoir pressure declined.

Water Injection

50 A tabulation of water-flooding operations by companies is listed hereunder.

Name of Company	Number of projects in operation at 31.12.62	Quantity of oil production from projects during 1962 (Barrels)	Quantity of water injected during 1962 (Barrels)
TEXACO	6	456,873	2,955,541
BP - T.P.D.	3	84,888	177,928
Grand Total	9	541,761	3,133,469

British Petroleum Trinidad Ltd.

51

During the year considerable difficulties were encountered with the pumping equipment at the Palo Seco Beach Plant and all water-injection operations were virtually suspended from May to December. In December, however, some 60,000 barrels of water were injected into three units.

Texaco Trinidad Inc.

52

At the end of 1962, Texaco had six full-scale water-injection projects in operation; three were in Gros-Morne Sands at Guayaguayare, two were at Forest Reserve in the Middle Cruse Sands and the Forest Sands, and one was located at Brighton in the Nariva Sands. The water-flooding histories during 1961 and 1962 of the Forest Reserve, Forest Sands - Zone 9.3, and the three Guayaguayare, Gros-Morne Sands projects were illustrated in Figure 4.

53

At Forest Reserve, where a successful pilot flood was converted into a full-scale 5-spot water-injection project, severe water-channelling, occasioned by permeability variation and reservoir inhomogeneity, as well as excessive sand-incursion in the producing wells, necessitated considerable costly well-remedial work and curtailed the annual water-injection by some 1.7 million barrels. The oil offtake from this unit was 273,000 barrels less than in 1961 and the water-oil ratios for the December months rose from 2.47 in 1961 to 5.63 in 1962.

54

All three projects at Guayaguayare were considered to be responding satisfactorily to water-injection. Total water-oil ratios for these projects rose slightly from 0.99 in 1961 to 1.21 in 1962. Production details for these projects are presented in the Tables hereunder:

Production Statistics for Water-Flood Projects at Guayaguayare in
Gros-Morne Sands

YEAR 1961

Names of Projects	Oil Produced (Barrels)	Water Produced (Barrels)
Gros-Morne Sand III	71,182	100,791
Gros-Morne Sands I & II	80,351	62,591
Gros-Morne Sand I	33,109	19,229
	184,642	182,611

The average water-oil ratio for the three projects was 0.989.

Year 1968

Names of Projects	Oil Produced (Barrels)	Water Produced (Barrels)
Gros-Morne Sand 111	53,684	80,383
Gros-Morne Sands 1 & 11	72,479	98,609
Gros-Morne Sand 1	35,323	16,781
	161,486	195,773

The average water-oil ratio for the three projects was 1.212.

55.

Thermal Recovery

During the year, extensive laboratory and pilot tests were carried out utilizing very modern thermal oil-recovery processes. Local reservoirs containing highly viscous crudes are considered to have yielded considerably less than ten per cent of the original oil in place under the primary depletion mechanism. Thermal oil recovery methods have been successfully field-tested in the U.S. and Venezuela. Preliminary tests in South Trinidad have indicated that thermal oil recovery may be economically feasible here too and further testing have been programmed by at least three companies for the coming year.

TABLE XI

SUMMARY OF INJECTION AND PRODUCTION DATA FOR FLUID INJECTION OPERATIONS
IN TRINIDAD & TOBAGO FOR PERIOD
1957 - 1962

YEARS	INJECTION STATISTICS				PRODUCTION STATISTICS				
	Number of Projects in Operations at the end of the years		Total Volume of Gas Injected into Gas Injection Projects during the years		Total Volume of Water Injected into Water Injection Projects during the year (Barrels)	Quantity of Oil Recovered during the year:		Total Oil Recovered from all Fluid Injection Projects during the year:	
	Gas Injection Projects	Water Injection Projects	In Million of Standard Cubic Feet.	As a Percentage of Island's Total Gas Production.		From Gas Injection Projects (Bbls)	From Water Injection Projects (Bbls)	In Barrels	As a Percentage of Island's Total Production.
1957	14	3	9,529	14.6	1,758,461	2,168,851	155,546	2,324,397	6.8
1958	20	5	10,653	13.5	2,325,402	2,764,484	336,626	3,101,110	8.3
1959	21	5	12,499	13.6	2,533,860	3,156,988	293,814	3,450,802	8.4
1960	25	6	10,947	11.2	4,489,619	2,741,221	517,974	3,259,195	7.7
1961	27	8	12,007	11.7	5,317,873	3,262,361	841,898	4,104,259	9.0
1962	28	9	13,178	13.2	3,173,808	3,275,082	541,761	3,816,843	7.8

TABLE XIII

GAS INJECTION STATISTICS BY COMPANIES

Name of Company	Number of Gas Injection Projects in operation as at 31.12.62	Quantity of Gas Injected during 1962 Millions of S.C.F.	Total Oil Produced from gas injection projects during 1962 (Barrels)	Total Oil Produced by the Company during 1962. (Barrels)
Texaco Trinidad Inc.	6	6,338	2,043,122	18,375,284
British Petroleum - Trinidad Petroleum Development	12	3,160	729,416	6,167,198
British Petroleum - Apex	6	1,794	221,123	3,168,978
T.C.O. (Operated by Texaco)	2	1,329	96,962	1,226,305
Shell Trinidad Limited	1	341	183,459	5,576,966
Trinidad Northern Areas	1	216	-	13,117,092
Premier Consolidated Oilfields Limited	-	-	-	322,041
British Petroleum - Kern Trinidad Oils	-	-	-	898,900
Dominion Oil Limited	-	-	-	23,380
GRAND TOTALS	28	13,178	3,274,082	48,876,144