

MINISTRY OF ENERGY, LABOUR, EMPLOYMENT

&

MANPOWER RESOURCES

(ENERGY DIVISION)

A N N U A L R E P O R T

1988

FOREWORD

The emergence of several signs during 1988 seem to indicate a healthy tightening up of the energy sector. Prominent among these were a slowing down in the rate of decline of crude oil production; increased efficiency of utilisation in the natural gas industry; more geophysical activity.

While production incentives offered by the government may have served as the first impetus in reducing the rate of decline of crude oil production, other initiatives have also been taken that should continue to militate against a declining trend in the future. There have been two rounds of bids for seven blocks of unlicensed marine acreage. Attention has also been turned to the deeper horizons on land. Concurrently Trintocpec has been considering some novel approaches for the augmentation of its production - like private lease operatorships for its marginal wells and the farming out of some of its shallow land

acreages. Trintoc and Trinmar have also been pursuing some projects involving the enhanced recovery of heavy oils.

There has been encouraging dynamism on both the supply and demand sides of the natural gas industry. On the supply side substantial initiatives have been taken by Amoco in gas lift optimisation; in the recompression of low pressure natural gas by Amoco and NGC for further use, in lieu of venting; and the development of a new gas field by a local company, Trintomar. On the demand side a studied effort has been maintained to identify and evaluate possible projects whereby the country's gas reserves can be monetized.

The Ministry wishes to acknowledge all those who participated in the activities of the Energy Sector during 1988; in particular those who, in any way, contributed to the preparation of this report.

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GEOPHYSICAL SURVEYS

In 1988 geophysical activity in the industry was at its highest since 1985. Surveys were conducted both on land and offshore - most of these being of an exploratory nature. The companies which carried out surveys were Amoco Trinidad Oil Company, Trintopec, Trintomar and Intera Technologies Ltd of Canada.

AMOCO

Amoco conducted proprietary geophysical surveys over open and licensed east coast areas. These included 3 482 line km of gravity and magnetic and 2 774 line km of deep (10 seconds) two-way time seismic and normal penetration (6 seconds) seismic. Site surveys were carried out over 4 sites: Arima - 91 km; NW Teak - 91 km; Poui deep - 59 km and Offshore Pt Citron - 65 km.

TRINTOPEC

Trintopec conducted seismic surveys on land and offshore. On land, 148 km of seismic were acquired in Morne Diablo/Quinam and Maloney. Offshore, 1834 km of seismic were acquired in the South Marine area. Over the same area, and along the same tracks, 849 km of shallow penetration seismic,

gravity, magnetic and sidescan sonar data were also collected in this survey.

TRINTOMAR

Trintomar conducted site surveys along their 10" pipelines route and on their platform location.

INTERA

Intera Technologies Limited of Calgary, Alberta, Canada, conducted an airborne synthetic aperture radar (SAR) survey of the island of Trinidad. Six (6) lines were flown at a spacing of 20 km from east to west at an altitude of 8 230 m, each one yielding an image strip 46 km wide. The data will be useful in mapping surface geological features. The survey was conducted on a speculative basis for sale to interested parties.

GEOPHYSICAL PROJECTS

Preparation of the data package for blocks 88-2, 3, 4&5;

Out of a total of 6 000 km of seismic data in these four blocks, 3 000 km were chosen to be sold in the data package. The date ranged in age from early 1960's to 1985 and from single fold to 60 fold.

IN HOUSE INTERPRETATION OF THE BLOCKS FOR THE SECOND BID ROUND

All members of the geophysical section were involved in the seismic re-mapping of these blocks. Blocks 88-2 and -5 were completed and 88-3 and -4 were at an advanced state of completion.

REPROCESSING OF THE SEISMIC DATA IN BLOCKS 88-2, 3, 4&5

Discussions were held with several geophysical contractors with respect to the reprocessing of the seismic data in Block 88-2,3,4&5 and at the end of the year negotiations were being finalized with Western Geophysical. Several oil companies indicated interest in reprocessing and a few were given permission to reprocess select lines.

ACQUISITION OF A GEOPHYSICAL WORK STATION

The Ministry, along with the representatives of TRINTOC, TRINTOPEC and TRINMAR held discussions with the following companies concerning purchasing of a Geological/ Geophysical work station and software: Western Geophysical, Graphic Science, GECO, Sierra, digi-data, IBM, Dynamic Graphics, Cogniseis, Land mark, Daniel Geophysical and J.S. Nolen. Pecten has offered as part of the bid package for Block 6, a Land Mark IV Work station with paper interpretation. The Ministry has accepted. This Work station is to be jointly operated by the Ministry and the local oil companies.

EXPLORATORY DRILLING

AMOCO

In 1988 Amoco continued its obligatory 15-month exploration drilling programme and spudded two wells - the same quantity as in 1987.

Samaan A-17

Samaan A-17 was designed on the basis of the 1986 3-D seismic data acquired over the area. The well was drilled to 10,500 feet to evaluate productive Pliocene sands similar to that encountered in the Samaan fields. It encountered the sands as expected. It was completed - flowing 1,360 bopd.

Arima-1

In December, 1988 Arima-1 was spudded 3.5 miles west of the Teak 'A' Platform to test for productive sands similar to that encountered in the Teak field. The location was developed on the basis of the recent Northwest Teak 3-D data. In March 1989 the well was completed at a drill depth of 12,682 feet. The objective section was poorly developed as only 34 feet of net sand was penetrated. The well tested an average of 1,800 bopd and analysis indicated a reservoir of very limited extent. At year's end it has been temporarily suspended. Though uneconomic,

Arima-1 did indicate the presence of hydrocarbons west of the developed Teak field.

Samaan A-7X

Samaan A-7X which was spudded in December, 1987 was completed in 1988. The well was designed to extend the limits of productivity north of the Samaan 'A' Platform. The objectives were the '2' and '4' sands which are prolific producers in the Samaan field. The well reached a drill depth of 10,536 feet and encountered the objective sands wet since the Reverse fault which was crucial to accumulation was not present.

TRINMAR

In 1988, Trinmar resumed its exploration drilling programme which had been suspended since 1984. Four wells were drilled during the period - two extension tests, S-646 and S-648 and two Deeper Pool Tests, S-643 and S-649.

Soldado-643

Soldado-643 was developed on the basis of the 3-D seismic data acquired over the area by Western Geophysical in 1985. The well was designed to test for a Lower Cruse Channel Sand, distinct from that encountered in updip wells, S-567 and S-611 in the same fault block. The well was drilled to 11,075

feet and encountered the objective sands wet. Development plans which were already underway for the area had to be shelved while the area is being re-evaluated.

Soldado-646

Soldado-646, northwest of the S-367 cluster in the East Soldado field was drilled to 5,700 feet to test an untested fault block, upthrown and adjacent to the highly productive S-367 to S-623 fault block. This well was designed on the basis of Trinmar's 1981, 1976 and 1967 2D seismic data. Sand development was less than expected. Only 55 feet net oil sand was encountered as compared to the 75 feet predicted. Initial production of 100 bopd was also less than expected. Because of the poor results obtained, plans for the drilling of two further wells in the fault block have been shelved.

Soldado-648

Soldado-648 was designed to test the well developed heavy oil sands of Pliocene I, II and Upper Pliocene II age, encountered in S-484 and S-498 in a new fault block to the northwest in the field. The well was drilled to 8,050 feet and encountered the objectives but at structurally different depths from prediction. However, the net oil sand was close to forecast.

Soldado-659

Soldado-659 was located approximately 2,400 feet east of the Trinidad-Venezuela boundary and 1,900 feet updip of the Venezuelan well, POSA 86-A-1 which encountered good sand development. The objectives in the well were the 50 and 57 Marker Sands of the Springvale Formation which are prolific producers in the Platform 23 and 18 areas, six and one quarter miles due east in the North Soldado field. Success at this location would have opened up a vast area for exploration. The well was drilled to 4,900 feet but failed to encounter any resistive sands.

TRINTOC

Trintoc's exploration programme showed a drastic reduction when compared with the previous year's activity. During 1988 only one exploratory well was spudded - GU-660, an outstep extension well spudded in 1987 which was completed in January 1988.

Barrackpore-552

Barrackpore 552 was drilled to a depth of 8,609 feet to extend the productive limits of the Intermediate Herrera Sands west of BP-512 which encountered good oil sand development and production rates. The objective sands were penetrated as predicted. One hundred and fifty (150) feet of net oil bearing shallow Herrera Sands and 375 feet of net oil sands

in the Intermediate Herreras were encountered. IP from the Intermediate Herrera Sand was 533 bopd. BP-552 has successfully extended the productive limits of the Intermediate Herrera Sands to the west and further outsteps drilling in this area is contemplated.

GU-660

GU-660 which was suspended in July 1987 was completed in January 1988. This well was a replacement location for exploration well GU-659 which had encountered the objective Lower Gros Morne Sands, well developed but wet. Having been drilled to 6,361 feet, GU-660 encountered well developed thick reservoir sands in the objective section. Approximately 60 feet of net oil sand greater than 5 ohms were recorded in the objective section. The Lower Cruse Formation was not penetrated. Initial Production was 35 bopd but production quit after three days indicating a very limited reservoir.

TRINTOPEC

In 1987, Trintopec did not register any exploration footage. The 1988 performance is also disappointing as only a single well was drilled in the South Erin Field.

South Erin-91

South Erin-91 was drilled to a total depth of 6,039 feet to evaluate Forest and Cruse Sands on the northern flank of the Northern Range Anticline. It penetrated well developed but wet Lower Forest and Upper Cruse sand and was abandoned as a dry hole. The results indicate that the east-west trending fault, mapped west of the South Erin field, was not sealing as interpreted and that no oil could be trapped against it.

Prospects for further exploration drilling exists further north and downdip of South Erin-91 where east-west faults should provide entrapment. A detailed evaluation of the north flank of the Southern Range Anticline in the South Palo Seco and Erin areas is currently being conducted to identify exploration prospects.

PREMIER CONSOLIDATED OILFIELDS LIMITED

The company did not register any exploration drilling footage for 1988, thereby remaining unchanged from the previous year.

Geological Studies Undertaken by Companies

Only two (2) companies undertook major geological studies during 1988. These were ATOC and Trintopec. Amoco conducted palaentological, micro-

palaentological, paleobathymetric and palaeo-environment studies on several wells on the North and the East Coasts. Stable isotope analyses were conducted on some of the samples prepared for palaeo analyses.

The Company also did stratigraphic and structural field studies in the Central Range with a view to gaining a better understanding of the stratigraphic relationships and structural styles in preparation for the upcoming round of bids for open acreage offshore East Coast.

Trintopec conducted a technical evaluation of three (3) offshore blocks: the S-11, V-shaped and lower reversed L-shaped blocks. The company also did a geological interpretation of the South Marine Lease based on recently acquired seismic data. They also did a detailed evaluation of the hydrocarbon potential of Trinidad and Tobago. The results appeared very interesting but additional work needs to be done before any exploration locations can be firmed up.

Geological studies of the Ex-Texttrin Tabaquite and Goudron leases, as well as the Maloney and Morne Diablo areas, were also done.

In addition, the evaluation of the Deep Land Pre-Upper Miocene horizons was also completed.

COMPETITIVE BIDDING FOR PETROLEUM EXPLORATION AND PRODUCTION

In 1988, activities in the Petroleum Section of the Geological Department were concerned mainly with the implementation of the first and second bidding rounds. The major activities associated with these bidding rounds were as follows:

FIRST BIDDING ROUND

- prepare a review of the geology of each block;
- obtain and distribute Competitive Bidding Orders to prospective clients;
- inform the major oil companies through letters and advertisements in journals and newspapers of the upcoming bid round;
- prepare and forward data packages to purchasers;
- assist in the revision of the Exploration and Production Licence;
- held discussions with representatives of oil companies visiting the Ministry of Energy on matters relating to the current bid round.

SECOND BIDDING ROUND

- prepare geological maps on each block;
- assist in drafting terms and conditions for leasing of each block;
- draft Competitive Bidding Order;
- hold discussions with companies interested in the bid round.

In early 1987, in an effort to reverse the steady decline in crude oil production which had occurred since peaking in 1978, the Government announced that unlicensed blocks would be made available for petroleum exploration, and that the allocation would be accomplished through Competitive Bidding.

In the first phase of Competitive Bidding the following three blocks off the East Coast of Trinidad were included:

Block S-II

Block Lower Reverse 'L' Shaped

Block 'U' Shaped

The Competitive Bidding Order outlining the terms and conditions under which the blocks would be offered was issued in early 1988. The closing date for the submission of bids was March 31, 1988.

The offer of sale was quite successful. Eighteen (18) companies purchased the data packages at

US\$25,000 each. Bids were received in respect of Block S-11 and the 'U' Shaped. After the evaluation was completed, the successful bidders were announced in August 1988.

These were:

Block S-II: Joint Venture of Mobil (70%) and Trintopac (30%)

Block Lower Reverse 'L'; Joint Venture of Pecten (50%) and Trintoc (50%).

Negotiations between the above companies and the Ministry of Energy for the issue of the necessary Exploration and Production Licences are well advanced and should be finalised by mid-1989. Exploration activities are expected to commence shortly thereafter, to be spudded in early 1990.

Second Round

As a result of the tremendous interest generated in the first bidding round, the Government, in December 1988, agreed to embark on a second round of competitive bidding. The following four blocks were included in this bidding round.

Blocks 88-2, 88-3, 88-4 and 88-5.

Data on these blocks are currently available for sale at the following cost:

- US\$25,000 per block
- US\$75,000 for all four blocks.

As at the end of 1988, eleven (11) companies had purchased data packages on the various blocks. The Competitive Bidding Order to give effect to this bidding round has been drafted and is to be forwarded to the Chief Parliamentary Counsel for vetting.

CRUDE OIL PRODUCTION AND DEVELOPMENT DRILLING ACTIVITY

CRUDE OIL PRODUCTION

The rate of decline of the country's oil production decreased significantly due to production incentives granted by the Government in 1988. Trinidad and Tobago's crude oil production averaged 150,839 bopd, a decrease of 2.8% from 1987. By comparison, total production declined by 8.1% between 1986 and 1987. Trinmar Limited and Premier Consolidated Oilfields Limited recorded production increases of 1.1% and 18.1% respectively. Trintoc maintained its

production rate, while Amoco's production decreased by 5.3%. There was an average decline rate of 15.7% between 1986 and 1987.

Marine production averaged 111,370 bopd, thereby accounting for 73.8% of the country's production.

The country's newest oil company, Trinidad and Tobago Marine Petroleum Company Limited (TRINTOMAR), was formed in 1988 to develop gas reserves off the east coast of Trinidad. By year's end, they had not begun operations.

Amoco Trinidad Oil Company Limited (ATOC) ATOC experienced an overall 5.3% drop in crude oil production to average 70,085 bopd. However, as a result of a successful drilling and workover programme performed following the granting of incentives by the State, production actually rose from 65,915 bopd in January 1988 to 74,493 bopd in December, 1988. It is estimated that these programmes contributed over 12,000 bopd in incremental oil to the company's production. In spite of this, all fields except Samaan experienced decline in oil production. The smallest and nearest field to shore, Mora, continues to be disappointing, registering a 36.6% decline in 1988.

Trinidad Northern Areas (TRINMAR)

TRINMAR increased its oil production marginally to 38,361 bopd. Oil production from both South East

Soldado and East Soldado increased by 18% and 7% respectively due mainly to drilling activity. Production from Main Field and North Soldado declined by 9% and 3% respectively. Major factors which mitigated against production increases were:-

- delays in the commissioning of Block Station 25 in South West Soldado.
- inefficiencies in the gas-lift gas supply system and
- lower than predicted production from drilling activity.

The Trinidad and Tobago Petroleum Company Limited (TRINTOPEC)

TRINTOPEC experienced a decline in oil production for yet another year. During 1988, oil production declined by 4.4% to 21,751 bopd. Increases due to thermal injection and recompletions were offset by declines of 13.4% and 18.1% respectively in non-thermal land production and marine Galeota production.

Factors impacting negatively on oil production were:-

- lower drilling activity than expected, and
- lower workover activity than expected, especially offshore.

The company's land production was 19,350 bopd of which 10,945 bopd was due to thermal injection. Marine production was 2,401 bopd.

The Trinidad and Tobago Oil Company Limited (TRINTOC)

TRINTOC was successful in maintaining its production rate at 19,880 bopd in spite of declines in workover oil and the lower than expected production from thermal schemes. The negative impact of these declines was offset by a successful drilling programme in the Barrackpore field and larger volumes of condensate recovered at Guayaguayare from the National Gas Company's gas transmission system.

Premier Consolidated Oilfields Limited (PCOL) PCOL increased its production by 18.1% to an average of 762 bopd as a result of a successful drilling programme. Production peaked at 903 bopd in September after the completion of two wells. Production from the company's Fyzabad thermal project averaged 45 bopd.

DRILLING ACTIVITY

Drilling activity in Trinidad and Tobago decreased during 1988, with a total depth drilled of 177 630 metres, compared with 189 734 metres in 1987. Rig utilization declined by 15.8% from 88.7 rig-months in 1987 to 74.7 rig-months in 1988. Exploration and semi-exploration drilling accounted for 15 140

metres or 8.5% of total depth drilled; development thermal drilling accounted for 24 690 metres or 13.9% and the remaining 137 800 metres was due to non-thermal development drilling.

A total of 152 wells was completed in 1988, 1.9% less than that for 1987. In the marine areas, 49 wells were completed. These consisted of 41 oil producers, 7 abandonments and 1 other. On land, 103 wells were completed. Of these 69 were oil producers, 22 steam injectors and 12 abandonments.

Thus overall completions consisted of 110 oil producers, 22 injectors, 19 abandonments and 1 other.

Amoco Trinidad Oil Company (ATOC)

ATOC employed three rigs in its drilling operations. One exploration well and 14 development wells were spudded, and accounted for 18.8 rig-months. This was exclusive of time spent by these rigs on re-drills and other jobs. Thus drilling activity in terms of rig-months spent on drilling declined by 18.6%. However, total depth penetrated actually increased by 34.1% to 31 855 metres.

Development drilling was concentrated mainly in Samaan A and C, and Teak 'C' platforms. Arima #1 was the lone exploration well spudded.

Trinidad Northern Areas (TRINMAR)

TRINMAR drilled 56 128 metres as compared with 28 680 metres in 1987, an increase of 95.7%. Exploration depth was 9 060 metres or 16.1% of the total. Rig-months increased 69.7% to 22.5 rig-months. Two rigs were used almost continuously throughout the year on drilling activity which was concentrated in the Southwest Soldado and North Soldado fields. A total of 30 wells was spudded, of which 4 was exploratory/semi-exploratory.

Trinidad and Tobago Petroleum Company Limited (TRINTOPEC)

TRINTOPEC experienced a severe decline in drilling activity during 1988. Total depth drilled during 1988 declined by 45% to 48 315 metres, of which 1 841 metres was exploratory. Rig utilization decreased by 51.5% to 11.8 rig-months. Trintopec spudded 52 wells of which 28 were thermal development wells, 23 were non-thermal development wells and 1 was exploratory.

Trinidad and Tobago Oil Company Limited (TRINTOC)

TRINTOC also suffered a decline in drilling activity in 1988. Depth drilled declined by 21.6% to 38 450 metres, of which 2 624 metres was exploratory and 8 645 metres thermal development. Forty-one wells were spudded, of which one was exploratory and 18 thermal development wells. The company's rig-utilization decreased by 25.9% to 20.6 rig-months. However, four rigs were utilized in

drilling operations for varying periods during 1988.

Premier Consolidated Oilfields Limited (PCOL) PCOL drilled a total depth of 2 822 metres in 1988 compared with 701 metres during 1987. Four non-thermal development wells were spudded in the San Francique area. Rig-utilization increased from 0.2 to 1.1 rig-months.

SECONDARY AND ENHANCED OIL RECOVERY OPERATIONS

Secondary and Enhanced oil recovery operations in Trinidad and Tobago realized a total production of 8.9 million barrels of oil during the year. The importance of this aspect of the petroleum sector is illustrated by the sustained production volume of 24,552 barrels of oil per day which is 16.1 % of total oil produced by the country.

There continues to be more waterflood projects (23) than steam projects (15). Despite this, however, production from the steam projects, which averaged 13,270 bopd, still continues to be greater than that from the waterflood projects which averaged 11,282

bopd. Three carbon dioxide floods contributed an average of 141 bbl of oil daily.

Waterflood activities recorded a marginal decrease in production whilst steam flooding and carbon dioxide flood recorded marginal increases. No new projects were initiated in 1988.

WATER INJECTION

An average of 45,269 bbl of water was injected daily into (23) water injection projects in Trinidad and Tobago. This was some 0.5% less than that injected in 1987 accounting for some 16.6 million barrels over the year.

Oil produced by this method was recorded at 11,282 bbl daily, down from 11,772 of the previous year.

AMOCO

Amoco's injection of 9.31 million barrels of water into the Teak and Samaan field reservoirs, conceded a 2.2% declivity in volume when compared with the previous year. The 25,436 bbl of water injected daily, contributed to an oil production of 8,690 bopd, up 5.6% over the 1987 figure. Five wells drilled in the Samaan field year to bolster the injecting capacity, were converted to producers instead. Production from the Teak field recorded a 3.16% decrease whilst production from the 5 new

wells in the Samaan field provided a 701 bopd (133.3%) production increase. An 11% wane in the water-cut of the Samaan field's production is directly attributable to the five new producing wells.

TRINMAR

Although this company increased its injection volume for the year to 4.5 million barrels, 5.1% greater than the 1987 figure, production decreased by 574 bopd (44.5%). This significant shortfall resulted from problems in the gas lift-gas system in the 8011 area. As at 31st December 1988, the cumulative volume of water injected was 37,327,893 bbl.

TRINTOPEC

During 1988 Trintopec injected a total of 0.634 million barrels of water into its offshore Galeota field reservoir. Injection of water into all its land based projects was discontinued pending the completion of a treatment plant for produced water. The plant is anticipated to be on-stream in March, 1989. As a result overall injection rate diminished by 19.5%.

Waterflood operations yielded an average 679 bbl of oil daily with contributions coming from 9 of its projects. All the projects recorded a drop in production, particularly in Galeota where 415 bopd

were produced which was 32.7% less than that produced in 1987.

TRINTOC

Water was injected in only four of the Company's ten reservoirs during the year. Overall a total of 2.20 million barrels was injected, an increase of 1.5% over the previous year. Oil production was sustained at 1,246 bopd, a slight marginal increase over 1987.

Despite the good injectivity, poor response from the Area IV Cruse "G" waterflood endorsed the fact that fill-up of the reservoir has not been achieved. In fact little response to water flooding has been observed to date.

The Catshill Co-30 Blk 24 had its volume of injected water increased by 152.8% bwpd. However, the production responded with only a 9 bopd increase.

STEAM INJECTION

A total of 20.9 million barrels of steam was injected into the 16 steam injection projects during 1988. This represented a 3.5% increase in the volume of steam injected and aided in the achievement of an average oil production from steam injection of 13,270 bbl daily, a 4.7% improvement on that for 1987.

TRINTOPKC

This company continues to lead in this type of recovery by producing 10,895 bopd, 7.4% more than that recorded for 1987. This figure represents 82.1% of the thermal oil produced by this country.

Palo Seco thermal scheme maintained its leading position with an average daily production of 3,592 bbl recording a 14.9% increase. An improved oil/steam ratio of 0.35 was achieved in the scheme and this to a large extent was responsible for the improved oil production profile observed. The water cut in this scheme was 64.3%. Although injection into the D-sand has begun, no increase in production is accredited to this since insufficient reservoir fill-up, and the accompanying heating have yet been obtained. There was a slight decrease in the overall volume of steam injected into this project.

In the Central Los Bajos project, the Huff and Puff method of steam injection stimulation continued in the North West Expansion. 1,716 barrels of oil were produced daily and this represented an increase of 5.9% over the figure of 1987. This rate of production was achieved in spite of the surface breakthrough in CL-97 and the blow out on CL-155. There was a slight decrease in the volume of steam injected into the Apex Quarry project in 1988. The volume decreased from 10,921 to 10,513 bwpd. Phase

I patterns displayed signs of watering out. Production fell by 197 bopd to 1978 bopd.

In the Guapo project, production climbed from 1,459 bopd to 1,834 bopd. Contributing in no small measure to this increase was the reactivation of 15 wells, and four new wells - three offtake and one injector.

The Fyzabad and Bennett Village projects recorded production levels of 1,104 bopd and 671 bopd respectively, being increases of 61 and 31 bbl of oil daily over 1987.

Palo Seco 805 improved its production from 81 bopd in 1987 to 216 bopd in 1988. Injection in well PS-1343 which caused break out in the adjoining PCOL lease was put back on production.

TRINOC

Thermal Oil production by this company averaged 2,324 bopd, some 144 bopd less than that produced in 1987. With the exception of Parrylands 'E' and Parrylands Phase Ia expansion, all schemes recorded declining production. In the Forest Reserve acreage where Project III, and Phase I extension and Phase I West extension are located, high water cuts were obtained despite oil/steam ratios of 0.20 and 0.08.

During the year under review an average daily volume of 13,517 bbl of steam was injected.

In 1988, 14 new wells were drilled for the Forest Reserve Phase I West Extension. Four new wells were also drilled in the Pt. Fortin Cruse E steam project.

PREMIER CONSOLIDATED OIL FIELDS LIMITED

Premier Consolidated Oilfields injected a total of 53,936 bbl of steam into 5 of its wells (4th cycle) for one month, after which the steam generator was in-operational for the rest of the year. The project yielded 51 bopd, down 9 barrels from the 1987 figure of 60.

The company re-gravel-packed 4 wells in the project and it is anticipated that all wells will be put to steam.

CARBON DIOXIDE

No carbon dioxide was injected into petroleum reservoirs in Trinidad and Tobago during 1988. However a daily average of 141 bbl of oil was recovered from three projects. With the completion of the line systems imminent, it is anticipated the injection of carbon dioxide would recommence during 1989.

NATURAL GAS

PRODUCTION

Natural gas production during 1988 averaged 20.3×10^6 cubic metres per day (m^3/day) - a decrease of 3.3% from the 1987 production rate.

Amoco was again the major producer, accounting for 84.5% of the country's total production. Amoco's production rate was $17.2 \times 10^6 m^3/day$, a drop of 4.0% from last year's average. Natural gas production from the Cassia, Teak, Samaan and Poui fields was 10.5, 4.6, 1.3 and 0.8 million cubic metres per day respectively.

The other contributors to total gas production were Trinmar 9.1%, Trintoc 3.9% and Trintopec 2.5%.

Trinmar produced an average of $1.8 \times 10^6 m^3/day$ of natural gas, an increase of 6.2% over last year's figure.

Trintoc produced natural gas at an average rate of $0.8 \times 10^6 m^3/day$ a decrease of 4.3% from the 1987 production rate.

Trintopec produced an average of $0.5 \times 10^6 m^3$ a decrease of 9.7% from the production rate in 1987.

CONSERVATION

The National Gas Company of Trinidad and Tobago Limited (NGC) continued to compress low pressure, associated gas from the Teak and Poui fields, making available an additional $2.5 \times 10^6 m^3/day$ of high pressure gas for sales. This represents an increase of 13.6% over the figure for the previous year. This increase can be attributed to the additional production from the new SOLAR compressors installed on NGC's Teak platform. These units were commissioned in April this year and averaged $0.4 \times 10^6 m^3/day$ for year.

The compressors on the Poui platform supplied high pressure gas at a rate of $1.2 \times 10^6 m^3/day$, the same as last year, with the remaining $0.9 \times 10^6 m^3/day$ supplied by the original compressors on the Teak platform.

UTILIZATION

Overall gas utilization* for 1988 was $18.5 \times 10^6 m^3/day$ or 90.9% of total production and 5.5% more than the utilization rate last year. The oil companies accounted for 44.2% of overall usage with $6.7 \times 10^6 m^3/day$ used for gas lifting and fuel consumption at the refineries and in the producing fields averaging 1.2 and 1.1 million cubic metres per day respectively. With the successful implementation of a gas lift optimization programme,

Amoco's gas lift requirements fell by 22.4% to average 4.5×10^6 m³/per day. As a result of the considerable savings achieved by this exercise, additional high pressure gas was available to the NGC for sales to the ever expanding pool of industrial consumers. The gas lift requirements at Trinmar, Trintopec and Trintoc were 1.4, 0.5 and 0.4 million cubic metres per day respectively. Gas used as fuel in the producing fields by Amoco, Trinmar, Trintopec and Trintoc averaged 0.1, 0.1, 0.6 and 0.3 million cubic metres per day respectively.

During 1988 the NGC established natural gas supplies to three (3) additional consumers. These were:- Tringen II, Agos Ltd and Mecalfab Ltd. With these new additions, the NGC is now responsible for the distribution of natural gas to a total of sixty-six (66) consumers.

Trinidad and Tobago Electricity Commission (T&TEC) consumed 16.2% of total gas utilized, increasing by 6.8% to 3.29×10^6 m³/day. This was due to mainly to increased power requirements at ISCOTT and the additional requirement for Tringen II.

• Overall utilization = Total Production - Gas vented without use

The manufacture of nitrogenous fertilizers accounted for 29.4% of the total volume utilized. With product prices strong and Tringen II now on-stream, an average of 5.97×10^6 m³/day was used representing an increase of 21.8% over the previous year. Consumption of natural gas in this sector was distributed as follows:- Fertrin - 2.69, Fedchem - 0.82, Tringen I - 1.36, Tringen II - 0.82 and Urea - 0.28 million cubic metres per day.

The Trinidad and Tobago Methanol Company Limited utilized gas at a rate of 0.99×10^6 m³/day a decrease of 6.6% from the all-time high achieved last year.

Iscoff increased its gas take by 19.2% to 0.62×10^6 m³/day. This was the highest level of consumption achieved since start-up.

Trinidad Cement Limited and the fifty-five (55) small consumers purchased gas at rates of 0.2 and 0.26 million cubic metres per day respectively.

REFINING AND PETROCHEMICAL INDUSTRY

REFINING

The overall crude throughput at both refineries during 1988 was 86,281 bpcd which was only marginally different from the 1987 total of 86,088. During 1988 the average throughput of the Pointe-a-Pierre refinery was 64,981 bpcd whilst that at the Point Fortin refinery was 21,300 bpcd, respectively representing a decrease of 2.6% and an increase of 8.6% over 1987. Crude oil import during 1988 was 2,699,846 bbl. An additional 279,659 bbl of reduced crude was imported.

IMPORTS OF REFINED PRODUCTS

LPG	400
Mogas	490,603
Avgas/Jet	4,957
Gas Oil (hvy)	627,334
Naphtha	243,697
Reduced Crude	279,659

At the Pointe-a-Pierre refinery, the major operational occurrence over 1988 was the Testing and

The following table gives the average daily throughput for both the Pointe-a-Pierre and Point Fortin refineries.

AVERAGE DAILY REFINERY THROUGHPUT

1976 - 1988

YEAR	POINT FORTIN (bbl/d)	POINTE-A- PIERRE (bbl/d)	TOTAL (bbl/d)
1976	54,994	206,274	321,268
1977	55,124	217,555	272,679
1978	51,398	183,866	235,264
1979	51,638	175,367	227,005
1980	50,325	163,703	214,028
1981	39,628	133,917	173,545
1982	50,061	100,897	150,958
1983	12,580	61,890	74,440
1984	16,943	59,952	76,895
1985	25,450	56,010	81,460
1986	17,889	63,955	81,444
1987	19,450	66,638	86,088
1988	21,300	64,981	86,281

Inspection on the FCCU during the period 14/3/88 to 23/6/88 during which the concept of riser cracking

was introduced to the FCCU reactor with the primary objective of improving the product yield from the FCCU. Processing agreements continued at this refinery during 1988 with Saramaca, Canolimon and Antan being the main imported crudes. During 1988, there was a continuation of the transfer of semi

refined products between refineries in order to optimise the unique characteristics of each refinery.

At the Point Fortin refinery, the crude distiller CDIII operated as per programme. The unit generally ran for about 2 weeks/month on completion of the respective monthly target.

<u>REFINERY OUTPUT</u>			
	<u>1988</u>	<u>1987</u>	
LPG	479,280	761,555	-37
Mogas	6,337,769	8,511,418	-25.5
Av Gas	18,020	65,706	-72.5
Aviation			
Turbine Fuel	2,656,641	2,294,860	+15.8
Kerosene	917,633	887,423	+ 3.4
Gas/Diesel			
Oil	4,795,645	4,608,384	+ 4.1
Lubes	14,182	76,628	-81.4
Fuel Oil	19,011,708	19,234,821	- 1.1
Petro-			
Chemicals	13,999	13,489	+ 3.7
Asphaltic			
Product	147,819	124,599	+18.6
Other Fin/			
Unfin. Prod.	-3,094,046	-4,598,338	-32.7
TOTAL	30,819,849	31,980,525	

<u>CRUDE OIL IMPORTS</u>		
	<u>1988</u>	<u>1987</u>
(bbl)		
Canolimon	632,256	387,271
Saramaca	264,490	74,898
Forcados	1,773,100	291,631
Reduced Crude	279,659	592,621
Mesa	-	671,829
Antan	-	1,386,385

NITROGENOUS FERTILIZERS AND METHANOL

Total production of Ammonia for 1988 was 1 687 562 tonnes which was 26% more than that for 1987. This huge increase was mainly due to the coming on stream of the Tringen II Plant. Also contributing to this increase was the additional production obtained as most of the ammonia plants exceeded design capacity with high plant utilization.

Ammonia exports increased directly with the increased production for 1988. Exports totalled 1 360 616 tonnes which represented an increase of 26% when compared to 1987 exports.

One of the major manufacturers of ammonia, Fertrin, produced 836 706 tonnes for 1988, which was 49.6% of the country's total ammonia production, and which exceeded the company's 1987 production by 6.6%. Export sales from Fertrin were 558 779 tonnes, an increase of 16.6% when compared with the 1987 figure, while the local sales were 311 655 tonnes an increase of 7.9%. At the Federation Chemicals Complex, the Braun Unit produced 235 090 tonnes, an increase of 1.1% over 1987 production. Exports also increased by 15% in 1988 to 263 789 tonnes.

Tringen I also had a good year, producing 391 105 tonnes compared with the 1987 production of 364 143 tonnes. This increase in production was because of fewer maintenance problems than in 1987. Exports however, increased by a mere 4% to 376 708 tonnes. Tringen II started up in February, 1988 with commercial production commencing on May 20th, 1988. The plant was designed to produce 1 360 MT/day utilizing 38.8 MMBTU/MT of natural gas. The unit produced 224 661 tonnes and exported 161 340 tonnes of product.

In 1988, the Urea Plant produced 538 018 tonnes of granular urea, exceeding its 1987 production by 18.7%. This increase in production was as a result of properly maintained equipment and effective preventative maintenance programmes which allowed improved performance. Total sales during 1988 were 551 523 tonnes an increase of 17.2% and of this total, 543 185 tonnes were exported while 8 338 tonnes were sold locally.

A significant milestone for the Urea Plant was the achievement of the two million tonnes of production on December 24th, 1988.

The Methanol Plant produced 396 002 tonnes, a decrease of 6.6% from the previous year's production. Production was reduced mainly because of problems encountered in the heat exchangers.

Total exports were 382 146 tonnes, a corresponding decrease of 10.7%.

ACCIDENTS

During 1988, three hundred and twenty seven (327) accidents were reported to the Ministry of Energy. This figure includes the one hundred and fifty six (156) which occurred at Trintoc's Pointe a Pierre and Point Fortin refineries and represents a decrease of forty two (42) or 11.4% when compared with last year's figure of three hundred and sixty nine (369).

Of the one hundred and seventy one (171) accidents which occurred on the land and off-shore producing fields Trintoc accounted for fifty (50), Trinmar forty nine (49), Trintopec forty six (46), Amoco seventeen (17) and National Gas Company nine (9). The one hundred and seventy one (171) reported accidents are 26.6% lower than the corresponding figure for 1987.

Fifty four percent (54%) of the accidents occurred during production operations, 20% in engineering related activities and 16% in drilling operations.

PERSONAL ACCIDENTS

Accidents were classified as serious and non-serious depending on the extent of the injury sustained. Serious accidents totalled one hundred and forty eight (148), showing a decrease of 18% compared with last year's figure of one hundred and eighty one (181). These accidents consisted mainly of dislocations, deep cuts and bruises, lacerations, burns and fractures.

Non-serious accidents which amounted to twenty three (23), showed a marked decrease of 54% below the figure for 1987. These accidents consisted mainly of bruises, soft tissue injuries and abrasions.

Approximately 37,734 days were lost as a result of both serious and non-serious accidents. These do not include refinery related accidents.

A total of eight (8) fatalities were recorded for the Petroleum Industry in 1988. Six were in the producing sector and two in the refinery.

It is noted that even though the number of accidents were considerably lower than in 1987, the number of serious (L.T.A.) accidents had increased.

POLLUTION INCIDENTS

In 1988, 234 incidents of pollution were reported. Some 12,206 bbl of crude oil escaped into the environment and 10,183 bbl were recovered. Table 2 shows a comparison of the situation with respect to pollution in 1987 and 1988.

Trintoc, with 163 reported incidents experienced the greatest number of oil spills. The majority of these oil spills were due to trunk, pump and pipeline leaks. The company recovered 4,327 bbl (80.5%) of the estimated 5,378 bbl of crude oil which escaped during the year.

Trintopec reported 23 oil spill incidents and achieved considerable success in recovering escaped oil during the year. Of the estimated 6,398 bbl spilled, 5,591 bbl (87.4%) were recovered.

NGC experienced 23 oil spill incidents with an estimated net loss of 64 bbl of crude oil while Amoco Trinidad Oil Company reported 19 oil spill incidents offshore Point Galeota with an estimated net loss of 81 bbl of crude oil.

Trinmar reported 5 oil spill incidents offshore Point Fortin with an estimated net loss of 17 bbl of crude oil while Premier Consolidated Oil Company

spilled 268 bbl of crude oil, with a recovery of 265 bbl of crude in one oil spill incident.

POLLUTION STATISTICS

Company	No. of Incid	Est. Qnty. Spill (bbl)	Est. Recvy. (bbl)	Est. Net (bbl)	% Recvy
TRINTOC	163	5,378	4,327	1,051	80.5
TTPCL	23	6,398	5,591	807	87.4
TNA	5	17	nil	17	nil
N.G.C.	23	64	nil	64	nil
ATOC	19	81	nil	81	nil
PCOL	1	268	265	3	98.9
TOTAL	234	12,206	10,183	2,023	83.4

COMPARISON OF POLLUTION STATISTICS

	1987	1988	% Change in 1988
Spill Incidents	245	234	- 4.49
Oil Spilled (bbl)	13,609	12,206	-10.31
Oil Recovered (bbl)	11,727	10,183	-13.17
Oil Lost (bbl)	1,882	2,023	+ 7.49

POLLUTION RELATED ACTIVITIES

Committees

The Pollution Guideline Committee was established in June, 1988 by the Ministry of Energy. Its aim is to set up guidelines for oil and grease pollution levels in the oil industry which will then be adopted as regulations under the Petroleum Act.

The Committee to Approve the Use of Oilfield Chemicals was established in June 1988 for the purpose of making recommendations with regards to the use of oilfield chemicals by the local oil

industry. The terms of reference of the committee are:

Review of applications for the approval of oilfield chemicals for use by the local petroleum industry.

Review of applications for approval of oilfield chemicals for field testing and the determination of the conditions for the execution of field tests.

Monitoring of all activities relating to the use of all oilfield chemicals used by the local petroleum industry.

During the year eleven new chemicals were added to the list of approved chemicals for use in oil production.

NOSCP Group/Tobago House of Assembly

On May 20, 1988 the NOSCP group under the chairmanship of Mr. Hugh Hinds (Controller) initiated talks with members of the Tobago House of Assembly so that a relationship could be established between the two bodies. In that way activities could be co-ordinated for combatting major oil spills in the vicinity of Tobago. This was essential due to the sensitivity of the reef, fisheries sites and bathing beaches which make up the shoreline of Tobago.

National Oil Spill Contingency Plan Operations Group

The National Oil Spill Contingency Plan (NOSCP) group held one meeting on January 26th, 1988. At that meeting, matters related generally to the administration of the environment and specifically to oil pollution control and clean-up were discussed. A decision was also made to hold another Oil Spill seminar in 1988 to highlight the activities of the NOSCP group.

World Maritime Day

The Contingency Plan (NOSCP) officers participated in the programme of activities for World Maritime Day, which was celebrated on Thursday 22nd September, 1988. The major activity for the day was the mounting of an Exhibition to portray the theme, "Shipboard Management for Maritime Safety and Pollution Prevention".

On display at the Ministry's booth were maps, oil spill clean-up videos, a slide presentation on the tanker collision off Tobago, an oil containment boom, sorbent materials and equipment for measuring the efficiency of dispersants.

Another activity taking place during the exhibition was an oil spill clean-up demonstration which took place in the Port-of-Spain harbour adjacent to the shed which housed the exhibition. The demonstration

was co-ordinated by one of the Assistant Controllers of the NOSCP and two Coast Guard Officers.

1988 Oil Spill Pollution Control Seminar and Exposition

On November 17, 1988 the Ministry of Energy with the assistance of the Institute of Marine Affairs and the Coast guard held its second Oil Spill Pollution Control Seminar and Exposition. The programme for the seminar included both presentation of scientific papers, an exhibition and an oil spill clean-up demonstration. Its main purpose was to sensitize the national community about the effects of oil pollution and to disseminate information on the role of the state and other agencies in combatting oil spills. Participation in the seminar was open to the general public and attendees included representatives from companies involved in production, refining and marketing of petroleum and its products, oilfield chemical suppliers, oilfield service contractors and other governmental agencies.

The papers presented were entitled

- Oil Pollution within the Petroleum Sector.
- Results of a Petroleum Hydrocarbon survey in Tobago Coastal Waters.

- Control of Hazardous substances used in Petroleum/Energy-Based Industries.
- A Review of Analytical Techniques employed in Oil Spill Identification.
- Biological Treatment of Oily Wastes.
- Managing Hazardous Materials Spills.

THE PETROLEUM TESTING LABORATORY

The laboratory analysed one thousand, two hundred and forty-eight (1,248) samples in 1988. This was a twenty-nine (29%) percent increase over the samples handled in 1987 (971 samples). Tests were performed in the areas of natural gas analysis, lubricating oils, pollution monitoring, royalty lease evaluations, oil field chemicals for Ministry's approval, octane ratings of gasolines and light fractions and on a wide range of petroleum and petroleum products.

Effluent studies of the Methanol, Fertrin and Urea Plants as well as the Galeota operations of the Amoco and Trintopec continued on a fortnightly basis. The Ministry's Inspectors initiated studies of the outfalls of the various production areas in

the South and these samples were submitted to the laboratory for analysis on a scheduled basis.

Due to complaints by motorists about the quality of gasolines, a continuous programme of monitoring of service stations and bonds was initiated in 1988. Necessary samples were taken by the Petroleum Inspectors.

Emoluments received from private service contracts for 1988 amounted to one hundred and thirty-one thousand, two hundred and seventy (\$131,270.00) dollars.

INDUSTRIAL MINERALS AND ENGINEERING GEOLOGY

In keeping with the objectives of the Ministry of Energy the Quarry Unit has placed its emphasis on two main areas in 1988

- Efficient execution of its regulatory and exploration functions as well as offering technical advice to Ministries other Government Agencies and the public at large.

- The formulation of a comprehensive and dynamic minerals policy that would encourage the development within the constraints of effective regulation and control.

EXPLORATORY ACTIVITY

The year 1988 saw a reduction in exploration done by the Ministry because of a shortage of funds for the procurement of much needed tools and a redirection of manpower resources to assist with investigations and other technical matters.

CLAY

In 1988 there was a continuation of the evaluation of the clay resources of Trinidad. An area of land, three hundred and seventy three acres in size, belonging to Caroni (1975) Limited, was assessed. This land is located at Lothians Road, Princes Town. The evaluation was conducted over a four-month period, with a two week preliminary field reconnaissance done by geologists prior to the actual evaluation. A survey grid had to be done before auguring could commence. During the evaluation forty-five holes were drilled to an average depth of thirty-seven feet. The information acquired showed the deposit to be 568,750 cu.ft. in volume. At the time of writing results of other physical and chemical tests were being awaited.

SAND AND GRAVEL

Because of the over-supply situation affecting sand and gravel, only one evaluation of this nature was undertaken. This assessment was done in the forested Plantation Road area in Valencia. The project covered one hundred and sixty-four acres and some one hundred and forty-four holes were drilled to an average depth of twenty-two feet. Site access proved difficult, and interpretation of results has indicated that there are no economic deposits available to a depth of twenty-two feet.

REGULATORY

During 1988 the number of operating quarries in Trinidad declined forty-four percent from one hundred and twenty-three to fifty-four. This reduction in activity has provided the Ministry of Energy with an opportunity to consider ways to rectify the short-comings of the present administrative system.

A total of twelve investigations was completed. These fell into the following categories:-

- Encroachment upon State Lands by operators
- Pollution of the Environment by Quarries
- Unauthorized Quarrying Operations

RESOURCE MANAGEMENT PORTFOLIO

Nineteen eighty-eight was an extremely busy year as far as the RESOURCE MANAGEMENT PORTFOLIO was concerned. The Quarries Unit started an aggressive thrust to modernize an outdated system, and to produce a dynamic policy that would have the capacity to change with the industry. As such members of the Quarries Unit focussed upon the following:

- Bringing about change in the Quarry Advisory Committee (Q.A.C.) so as to give effective control of this body to the Ministry of Energy.
- Drafting a comprehensive document that would serve to inform the Minister as well as to provide a basis for discussion leading to the further evolution of the Mineral Resource Policy.
- Improving the enforcement of the Quarry Laws and Regulations in keeping with Policy Proposals.
- The establishment of an interim agreement for operators being granted concessions on State Lands, and the finalisation of terms and conditions for use of state land quarries by County Councils.

New Concessions

As usual, the Ministry received several applications from individuals seeking to open quarries. Most of these were for sand and gravel or clay.

Of these applications, four were granted concessions by Cabinet, and a further three were submitted by the Quarries Advisory Committee (Q.A.C.) to Cabinet for approval.

All lands approved by the Q.A.C. were previously worked lands and were awarded on the basis of carefully considered special circumstance. The total acreage given out amounted to 180 acres. All other applications and renewals were deferred pending the establishment of a comprehensive policy.

Supportive

In keeping with its policy of providing geological and geotechnical assistance to other government agencies upon request, the unit in 1988 was involved in the following:

- Processing of private land applications for Town and Country Planning Division.
- A comprehensive classification of all quarries in Trinidad and Tobago with a map showing the location of quarries in Trinidad.

- Field Trips by the Q.A.C., St. Andrew/
St. David County Council to Oropouche and
other areas.
- Meetings of the River Pollution Committee (St.
Andrew/St. David).

ACTIVITIES OF THE ENERGY PLANNING DIVISION

The major routine activities undertaken by the
Division included:

- Assisting with the determination of
crude prices for taxation and the
determination of ex-refinery product
prices for the local market;
- Issuing and renewing of retail marketing
licences for service stations;
- Monitoring of the international oil
market and economic conditions;
- Preparing petroleum revenue projections;
- Establishing an information system for
petrochemical products;

- Preparation of the Annual National Energy
Balance;
- Liaising with regional energy organizations;
- Participating in negotiations with major oil
companies for the finalization of petroleum
agreements;
- Evaluation of fiscal incentives introduced in the
1988 Budget;
- Evaluation of energy-based projects.

In addition to these on-going assignments, staff of
the Division participated in the development of a
draft energy sector plan and the sectoral
contribution to the draft medium term macro-economic
planning framework and as well prepared research
papers on relevant aspects of the local and
international petroleum industry.

The Division also established a system for
monitoring the implementation of energy-based
projects in 1988.

DOMESTIC CONSUMPTION OF PETROLEUM PRODUCTS

Total domestic consumption of petroleum products declined by 4.0% in 1988 to 788.3 million litres. Despite the increases in consumption of lubes and greases, aviation turbo fuel and L.P.G. of 9.7%, 2.3% and 0.9% respectively, this downward trend continued, as it had over the previous five years.

Motor gasoline sales declined by 5.5% over the 1987 total of 541.7 million litres, with similar trends for fuel oil (12.1%), auto diesel (1.4%), kerosines (10.1%) and bitumen (16.5%).

In 1988, motor gasoline comprised 64.9%, auto diesel 18.1% and L.P.G. 11.2% of the total domestic petroleum product consumption. Together, kerosines and aviation turbo fuel comprised only 2.8%. Not much improvement can be expected in the consumption pattern of petroleum products, given the prevailing economic climate.

Domestic Petroleum Product Consumption

(Million Litres)

Product	1984	1985	1986	1987	1988
Motor					
Gasoline	535.8	543.8	549.8	541.7	511.8
Kerosines	15.8	13.3	10.1	9.9	8.9
Auto					
Diesel	187.2	180.4	153.9	144.9	142.9
Marine					
Diesel	2.9	0.3	0.1	0.1	0.1
L.P.G.	80.5	85.1	97.2	87.1	87.9
Aviation					
Gasoline	0.6	0.5	0.5	0.5	0.3
Aviation					
Turbo Fuel	12.4	11.0	16.4	13.2	13.5
Fuel Oil	27.6	7.6	1.3	3.3	2.9
Lubes &					
Greases	10.3	10.3	12.5	11.3	12.4
Bitumen	21.5	17.2	11.3	9.1	7.6
TOTAL	895.3	869.5	843.1	821.0	788.3

REVIEW OF SUBSIDY/SURPLUS

During 1988 the total subsidy on the sale of petroleum products was \$23,034,063 whilst the surplus income arising from such sale totalled \$29,332,503. The subsidy on petroleum products is governed by the Petroleum Product Subsidy Act 1974 and arises when the cost of product or the reference price is higher than the fixed wholesale price. However, as a result of fluctuations in the market prices of petroleum products, there are times when the wholesale price is higher and as a result there is surplus income. This income is collected by the Trinidad and Tobago National Petroleum Marketing Company (NPMC), and, through the Ministry of Energy, is deposited to the Consolidated fund.

During 1988 there was an increase in the excise duty on premium and regular gasoline and consequently an increase in the wholesale and retail prices of these products. Moreover, during early 1988, the market prices of petroleum products on which our ex-refinery prices were based remained at a depressed level. Hence for the period January to June, there was no subsidy in respect of the major liquid petroleum products.

The subsidy on the sale of LPG is 15 cents per pound and accounted for 67.5 percent of the total subsidy.

The subsidy/surplus over the past eleven years is as follows:-

	<u>Total Subsidy</u>	<u>Cents per/barrel</u>	<u>Surplus</u>
1978	93,636,718	111.42	-
1979	178,295,170	227.36	-
1980	286,628,408	368.84	-
1981	327,286,923	469.48	-
1982	345,694,250	533.15	-
1983	155,616,925	265.83	-
1984	31,807,120	52.00	23,655,533
1985	36,187,980	56.09	23,550,359
1986	49,357,585	80.52	60,450,410
1987	32,153,573	56.85	17,584,503
1988	23,034,063	42.11	29,332,503

Since 1975 auto diesel has been sold to the National Fisheries Company at a highly subsidized rate. The intent of such action was to make the fuel available to the fishermen at a low price and thereby assist in the development of the Fishing Industry. In 1988, this subsidy constituted 19.3 percent of total subsidy. The decrease from the previous year reflected the low activity level of the National Fisheries Company.

DATA BANK / MICROFILM OPERATION

Microfilm

During 1988 there was a continuation in our efforts to produce archival quality microfilm. This included checks of existing microfilm and refilming sub-standards frames. The system of duplicating to microfiche (which is used in the working copy) was reviewed and replaced. A more economical system is now employed whereby the microfilm is duplicated in roll format. The duplicate roll is jacketed while the original film is properly labelled and archived as a roll. In this new system, nothing is discarded on updating (whereas previously, old microfiche had

to be discarded on updating) and so wastage of money and materials is reduced.

This year the Ministry expects to have a working system in place for the usage of microfiles in both our Port of Spain and San Fernando offices. Initially these microfiles will be for well files only but consideration is being given to convert other data (e.g. monthly production data) to this format. This will contribute considerably to the reduction in the storage space requirements in the Ministry.

Databank

With the advent of micro-computers in the Ministry, the conversion of data (especially the production data), from the Petroleum Data Base (created by Gaffney, Cline and Associates) to the micro-computer-based format was initiated. During 1988, these efforts were continued after a period of non-activity. The Computer Centre at the University of the West Indies was approached and they made some preliminary attempts in this regard. Because of their limitations of their resources, however the Ministry was obliged to look elsewhere. At present, approaches are being made to the Central Statistical Office since they have hardware to accommodate us.

Production data were identified as a top priority area for computerization and along these lines, a

multi-pronged approach at achieving this has been adopted. One of these involved downloading data from a Company's database into a Ministry production database. After discussions with the Company they offered to submit the data on a magnetic cartridge. Additionally, we are considering making approaches to Trinidad and Tobago Oil Company (TTOC), Trinidad Northern Areas (TNA) and the Trinidad and Tobago Petroleum Company Limited (TTPCL). Consideration was given to institute a system of accessing some companies' data via terminals in the Ministry which will be "on line" to their databases. Unfortunately, little progress was made in this regard, nevertheless, the Ministry's plans in capturing the on-land production data are along these lines.

Another approach at production data computerization is being made by a team which was set up to undertake the computerization of data in the Ministry. They have been requested to develop a system to handle:

- the flow of production data starting from the companies down throughout the system;
- the conversion of this data into information formatted to satisfy the needs of the different sections in the

Ministry, (as well as non-Ministry users).

A very significant step was taken in 1988 when a committee was set up to develop a draft policy/plan for computerization in the Ministry. The deliberations of this committee are continuing in 1989, and it is anticipated that the draft document would be available by the third quarter of 1989.

During 1988, the Ministry barely managed with the existing hardware at our disposal. Plans to purchase a mini computer in 1988 did not materialize for various reasons, chief among those being limited financial resources. Especially irritating was the poor performance of the Local Area Network (LAN). At present the use of the LAN system is restricted to word processing. Various cost-effective alternatives are being evaluated for acquiring more much-needed hardware.

The effect of wear and tear on our aging computer hardware was evident in the relatively high repairs and maintenance costs incurred (16% of total expenditure for databank and microfilm sections). For 1989 the Ministry will therefore have to evaluate the pros and cons of entering into a maintenance contract with a computer repair company. The other facet of the replacement/repair problem is the evolution of the technology and our need to keep abreast of it. Because we are in an era of

financial austerity, we will need to develop "optimum" growth paths re computerization.

INFORMATION SERVICES

Report on the Library

The major activity for 1988 was the moving of the library to Riverside Plaza. This exercise occupied the entire staff from July to September.

Unfortunately it involved moving from an area of 1,600 sq ft into an area less than 1/3 the size. The staff however, with great ingenuity and dedication, managed to fit all the material and most of the equipment into the space allocated. Services were suspended for about two months.

In spite of this disruption and some downtime of the computer due to failure of the hard disk, 4,700 records were entered into the bibliographic data base, which at the end of the year contained 5,846 records. A new version of the CDS/ISIS software was received in November 1988.

With an allocation of \$100,000.00 for the purchase of books and periodicals, 122 new books were acquired and 40 periodical subscriptions were

maintained; 238 books and 36 periodical titles were received as gifts. Two thousand and forty-two (2,042) books were catalogued and classified during the year, thus almost eliminating the backlog in the area. Six hundred and thirty-nine (639) books and 500 periodicals were loaned and the library staff handled 600 indepth queries. Fifteen hundred and ninety-six articles from periodicals were indexed.

Activities related to the Ministry's role as National Focal Point for the Caribbean Energy Information System included attendance by the Librarian III of the first meeting of co-ordinators in Jamaica in June 1988. Subsequently, a meeting was held locally to introduce participants of the system to the numeric and bibliographical modules of the system. Data was sent to the Regional Focal Point in Jamaica in December 1988.

The staffing of the library remains the same: 2 Librarians, 2 Library Assistants and 2 Clerk Typists.

PERSONNEL MANAGEMENT, TRAINING AND REGISTRY

For the year under review the Registry and Personnel Divisions of the Ministry provided as much of the necessary administrative and managerial support services as was conveniently possible. Members of the staff need to be credited for the efficient discharge of their responsibilities in spite of inconveniences caused by siting of the Energy Division from Salvatori building to Riverside Plaza. It was a tedious task and movement of office equipment and supplies coupled with the unavailability of telephones, disrupted work (in no uncertain way).

PERSONNEL MANAGEMENT

Major activities in the staffing arrangements of the professional and technical levels in 1988 are as follows:-

In February, the Permanent Secretary, Mr. Reynold Rampersad was transferred to the Prime Minister's office and Mr. Rupert Mends, Chief Technical Officer was promoted to the post of Permanent Secretary.

Two members of staff resumed duty at the Ministry after satisfactory completion of studies abroad:-

- Mr. Patrick Vincent resumed in his substantive post of Petroleum Engineer II on 24th May, 1988. He was granted a Technical Assistant Award for a period of 29 months to enable him to pursue a course of studies in Petroleum and Natural Gas Engineering at Pennsylvania State University.
- Mr. Andrew Jupiter, Senior Petroleum Engineer, resumed duties on 4th January, 1988 after satisfactory completion of his course of studies. He was granted full pay study leave for a period of two years to enable him to pursue studies in Mineral Engineering Management at the Pennsylvania State University.
- Senior Energy Analyst, Mr. Rodney Appleton went into retirement effective 30th December, 1988. Mr. Appleton assumed duty with the Ministry (Petroleum and Mines) as an Economist III on 1st September, 1965.

On the question of our personnel records, the Personnel Division was able to update its records in 1988. Information on all staff members has been put on computer. This we feel will boost the efficiency of the Energy Division. The area which caused the most concern to Personnel Management in 1988 was

centered around acting appointments. Officers were complaining that they were not being paid their acting allowance even though they were performing the duties of the higher post. This situation arose because in most instances the Director of Personnel Administration sought additional information on the proposed acting arrangements.

TRAINING

The Ministry of Energy became a Division of the Ministry of Energy, Labour, Employment and Manpower Resources in 1987. Because of this change, the Energy Division in preparing its In-house Training Programme, especially those dealing with computers, decided to include the staff of the Labour Division.

In 1988, the Ministry's in-house training in the Port of Spain office was adversely affected because of the relocation of its office to the Riverside Plaza. This, coupled with the traditional tendency of staff to take their vacation leave over the period July to September, led to the curtailment of most of the training effort during the second half of the year.

In-house Training

Both "class room type" sessions and "hands-on" sessions were employed in the Ministry's in-house training programme during 1988.

In February, thirty members of staff from the Labour Division attended lectures entitled "The Introduction of Micro computers" and "Introduction to PC-DOS".

In March, the librarian lectured to technical officers on "The Use of the Library"; while in April and May courses entitled "Fundamentals of Geophysics for Engineers and Geologists"; "Programming in Basic" and "Law for the Layman" were started - but were not completed for reasons stated earlier.

Secretaries also benefited from the training programme when a word processing course, "Word Perfect," was put on. Eight typists attended a course on "How to use the Cheque Machine".

In the San Fernando Office the following courses were conducted for various categories of the staff:-

- Introduction to Micro computer
- Introduction to PC-DOS

- Introduction to Word Processing
- PFS Write
- Introduction to Lotus
- Lotus - Intermediate Skills

CTU Training Courses

During the year, the Energy Division took advantage of courses offered by the Central Training Unit by sending their personnel from almost all the sections to appropriate courses held by the Unit. Some course titles were:

Human Relations/Communication Skills
 The Effective Supervisor
 Time and Self Management
 Stress and the Manager
 Training in Project Formulation, Evaluation and Implementation: Module I Techniques of Project Appraisal (An Economical and Financial Analysis)
 Service Begins with Me
 AIDS in the Work Place

Overseas Training

In June 1988, two officers from the Energy Planning Division attended a two-week course entitled

"Energy Planning for the English Speaking Caribbean" hosted by OLADE in Barbados.

Later in the year, the Senior Mechanical Engineer attended a one week workshop on Regional Oil Spill in Puerto Rico under UNEP, and a two-week course on Non-destructive Testing in Argentina under the auspices of the Bureau of Standards.

REGISTRY

In 1988, there was much emphasis on streamlining systems and procedures in the Registry similar to the previous year. In the absence of Ms. Derrick, Administrative Assistant, who was transferred to the San Fernando office, the former Permanent Secretary directed that the Records Manager assist the acting officer with the management of the Registry and the supervision of staff members.

Work commenced on the updating of the Registry Manual in the San Fernando office by Ms. Derrick. It is anticipated that this exercise will be completed in 1989.

Overall, the functioning of the Registry was improved during 1988. This is borne out by the fact that there have been fewer complaints of inefficiency than during the previous year.

APPENDIX I
SUMMARY OF EXPLORATORY AND SEMI-EXPLORATORY ACTIVITIES IN 1988

OPERATOR	WELL NAME	LOCATION (LINKS)	LAHEE EXPLORATORY CLASS	DATE SPUDDED	DATE COMPLETED	TOTAL DEPTH IN METRES	GEOLOGICAL OBJECTIVE	RESULT/REMARKS
AMOCO	SAMAAN A 7X	270,409N 785,883E	C2C	87.12.16	88.01.23	1 248	2 AND 4 SANDS	ABANDONED - DRY
	SAMAAN A 17	270,409N 785,883E	B1	88.01.24	88.02.22	3 190	PLIOCENE SANDSTONES	COMPLETED - OIL
	ARIMA 1	171,666N 760,491E	A2C	88.12.24	-	367	PLIOCENE SANDSTONES	DRILLING
TRINMAR	SOLDADO 643	139,600N 049,800E	C2C	88.04.19	88.05.27	3 376	LOWER CRUSE	ABANDONED - DRY
	SOLDADO 646	197,375N 207,618E	B1	88.05.31	88.06.17	1 737	S 367 MAIN SAND	COMPLETED - OIL
	SOLDADO 648	199,125N 159,800E	B1	88.06.19	88.07.27	2 454	PLIOCENE AND MIOCENE	COMPLETED - OIL
	SOLDADO 659	214,950N 069,950E	C2C	88.11.15	88.11.30	1 494	SPRINGVALE	ABANDONED - DRY
TRINTOPEC	SOUTH ERIN 91	123,827N 260,271E	C1	88.03.12	88.03.31	1 841	LOWER FOREST, UPPER AND MIDDLE CRUSE	ABANDONED - DRY
TRINTOC	GUAYAGUAYARE 660	157,801N 589,445E	B2C	87.06.09	88.01.18	1939	LOWER GROS MORNE	COMPLETED - OIL
	BARRACKPORE 552	198,864N 412,216E	B1	88.03.26	88.05.24	2 624	INTERMEDIATE HERRERA	COMPLETED - OIL

APPENDIX II

ANNUAL STATISTICS OF PRODUCTION, DRILLING, REFINING, EXPORTS AND IMPORTS 1988 - 1978

ITEM	UNIT	PERCENTAGE CHANGE 1988 OVER 1987	1988	1987	1986	1985	1984
1. CRUDE OIL	'000 BBL	-2.5	55,208	56,641	61,640	64,259	62,041
2. CASING HEAD GASOLINE (C.H.P.S.)	'000 BBL	-100	0	1	25	23	29
3. TOTAL CRUDE OIL AND NATURAL GASOLENE (1+2)	'000 BBL	-2.5	55,208	56,642	61,665	64,282	62,071
4. CRUDE OIL PRODUCTION - STATE OIL RIGHTS	'000 BBL	-3.2	52,377	54,098	59,176	61,845	59,734
5. CRUDE OIL PRODUCTION - PRIVATE OIL RIGHTS	'000 BBL	+11.3	2,831	2,543	2,464	2,414	2,308
6. TOTAL IMPORTS	'000 BBL	-21.2	4,354	5,527	7,797	3,852	6,774
7. IMPORTS OF REFINED PRODUCTS	'000 BBL	-17.2	1,751	2,115	5,742	3,609	6,428
8. IMPORTS OF CRUDE OIL FOR REFINING	'000 BBL	-25.0	2,560	3,412	1,560	243	346
9. IMPORTS OF OTHER OILS FOR REFINING AND BLENDING	'000 BBL	+19.4	43	36	495	0	0
10. TOTAL EXPORTS	'000 BBL	-2.3	54,489	55,749	58,175	60,345	61,294
11. EXPORT OF CRUDE OIL	'000 BBL	-4.1	27,205	28,370	32,867	35,358	32,518
12. EXPORTS OF REFINED PRODUCTS	'000 BBL	-0.3	27,284	27,379	25,308	24,987	28,776
13. RUNS TO STILL	'000 BBL	-0.8	31,206	31,472	29,936	29,673	28,147
14. DAILY REFINERY CAPACITY	BBL/DAY	0	305,000	305,000	305,000	305,000	305,000
15. NUMBER OF WELLS SPUNDED	AS STATED	-2.1	142	145	176	182	198
16. TOTAL NUMBER OF WELLS COMPLETED	AS STATED	-4.4	153	160	169	197	213
17. NUMBER OF WELLS COMPLETED AS OIL WELLS	AS STATED	-0.9	110	111	133	156	165
18. NUMBER OF WELLS ABANDONED	AS STATED	+26.7	19	15	18	14	17
19. TOTAL DEPTH DRILLED	METRE	-6.4	177,631	189,735	222,294	199,402	206,830
20. DEPTH DRILLED ON STATE OIL RIGHTS	METRE	-9.1	167,746	184,620	219,246	192,149	200,438
21. DEPTH DRILLED ON PRIVATE OIL RIGHTS	METRE	+93.2	9,885	5,115	3,048	7,253	6,392
22. AVERAGE DEPTH OF COMPLETED WELLS (16)	METRE	+2.9	1,333	1,295	1,395	1,100	1,153
23. AVERAGE NUMBER OF WELLS PRODUCING	AS STATED	-0.1	3,252	3,256	3,209	3,167	3,142
24. AVERAGE NO. OF WELLS PRODUCED BY FLOWING	AS STATED	+3.4	331	320	352	325	319
25. AVERAGE NO. OF WELLS PRODUCED BY ARTIFICIAL LIFT	AS STATED	-0.5	2,921	2,936	2,857	2,842	2,823
26. AVERAGE DAILY PRODUCTION PER PRODUCING WELL	BARREL	-2.7	46.4	47.7	52.6	55.6	54.1
27. AVERAGE DAILY PRODUCTION PER FLOWING WELL	BARREL	+0.6	115.2	114.5	139.7	139.7	139.6
28. AVERAGE DAILY PRODUCTION PER ARTIFICIAL LIFT WELL	BARREL	-4.5	38.6	40.4	41.9	46.0	44.0
29. TOTAL VALUE OF DOMESTIC EXPORTS *	'000\$	+2.7	5,320,886	5,178,962	4,854,712	5,120,719	5,044,400
30. TOTAL VALUE OF PETROLEUM PRODUCTS (ITEM 29) *	'000\$	-13.2	3,252,182	3,748,392	3,528,661	4,191,329	4,168,910
31. TOTAL VALUE OF ASPHALT PRODUCTS *	'000\$	+7.4	24,350	22,665	21,866	15,925	11,130
32. TOTAL NATURAL GAS PRODUCED	MILLION M ³	-1.0	7,438	7,512	7,585	7,412	7,228
33. USED AS FUEL	MILLION M ³	+6.2	3,515	3,311	3,190	2,957	2,552
34. REPLACED IN FORMATION	MILLION M ³	0	0	0	0	0	0
35. LOSSES, NOT COLLECTED	MILLION M ³	+31.6	246	187	149	261	249

* Source : Central Statistical Office

ANNUAL STATISTICS OF PRODUCTION, DRILLING, REFINING, EXPORTS AND IMPORTS 1978 - 1988

ITEM	UNIT	1983	1982	1981	1980	1979	1978
1. CRUDE OIL	'000 BBL	58,344	64,618	69,107	77,613	78,249	83,778
2. CASING HEAD GASOLINE (C.H.P.S.)	'000 BBL	34	28	38	37	44	60
3. TOTAL CRUDE OIL AND NATURAL GASOLINE (1+2)	'000 BBL	58,378	64,646	69,146	77,650	78,293	83,838
4. CRUDE OIL PRODUCTION - STATE OIL RIGHTS	'000 BBL	55,988	62,215	66,602	74,879	75,399	80,701
5. CRUDE OIL PRODUCTION - PRIVATE OIL RIGHTS	'000 BBL	2,356	2,403	2,505	2,734	2,850	3,077
6. TOTAL IMPORTS	'000 BBL	8,133	27,046	39,047	55,309	51,631	56,817
7. IMPORTS OF REFINED PRODUCTS	'000 BBL	8,133	3,654	440	0	0	0
8. IMPORTS OF CRUDE OIL FOR REFINING	'000 BBL	0	23,392	38,607	55,309	51,631	56,817
9. IMPORTS OF OTHER OILS FOR REFINING AND BLENDING	'000 BBL	0	0	0	0	0	0
10. TOTAL EXPORTS	'000 BBL	57,715	87,667	95,511	113,493	113,105	126,604
11. EXPORT OF CRUDE OIL	'000 BBL	31,065	37,462	42,519	46,075	46,282	54,008
12. EXPORTS OF REFINED PRODUCTS	'000 BBL	26,650	50,205	52,992	67,418	66,823	72,596
13. RUNS TO STILL	'000 BBL	27,178	55,105	63,345	78,343	82,857	85,882
14. DAILY REFINERY CAPACITY	BBL/DAY	305,000	305,000	456,000	456,000	456,000	456,000
15. NUMBER OF WELLS SPUNDED	AS STATED	174	232	206	156	190	236
16. TOTAL NUMBER OF WELLS COMPLETED	AS STATED	179	215	206	183	184	215
17. NUMBER OF DRILLING WELLS COMPLETED AS OIL WELLS	AS STATED	162	169	161	140	144	170
18. NUMBER OF DRILLING WELLS ABANDONED	AS STATED	13	26	14	19	40	45
19. TOTAL DEPTH DRILLED (ALL WELLS)	METRE	183 797	252 936	239 609	205 492	380 592	272 826
20. DEPTH DRILLED ON STATE OIL RIGHTS	METRE	163 539	220 747	220 806	189 869	374 350	263 344
21. DEPTH DRILLED ON PRIVATE OIL RIGHTS	METRE	20 258	32 189	18 803	15 623	6 242	9 482
22. AVERAGE DEPTH OF COMPLETED WELLS (16)	METRE	1 051	1 083	1 132	1 084	2 068	1 179
23. AVERAGE NUMBER OF WELLS PRODUCING	AS STATED	3 140	3 372	3 408	3,351	3,399	3,275
24. AVERAGE NO. OF WELLS PRODUCED BY FLOWING	AS STATED	344	392	392	397	516	507
25. AVERAGE NO. OF WELLS PRODUCED BY ARTIFICIAL LIFT	AS STATED	2,796	2,980	3,016	2,954	2,883	2,768
26. AVERAGE DAILY PRODUCTION PER PRODUCING WELL	BARREL	50.9	52.1	55.4	63.3	63.0	70.1
27. AVERAGE DAILY PRODUCTION PER FLOWING WELL	BARREL	121.4	149.1	118.8	248.9	215.4	271.4
28. AVERAGE DAILY PRODUCTION PER ARTIFICIAL LIFT WELL	BARREL	42.1	39.6	39.0	42.1	35.8	33.2
29. TOTAL VALUE OF DOMESTIC EXPORTS *	'000\$	5,431,684	7,118,368	9,025,898	9,715,719	6,175,213	4,810,025
30. TOTAL VALUE OF PETROLEUM PRODUCTS (ITEM 29) *	'000\$	4,692,967	6,491,617	8,051,501	9,127,773	5,715,496	4,379,188
31. TOTAL VALUE OF ASPHALT PRODUCTS *	'000\$	6,737	6,782	1,134	3,253	3,355	360
32. TOTAL NATURAL GAS PRODUCED	MILLION M ³	6 318	5 841	5 604	5 601	4 807	4 472
33. USED AS FUEL	MILLION M ³	3 102	2 842	941	2 283	2 039	1 960
34. REPLACED IN FORMATION	MILLION M ³	0	0	0	0.1	0.5	3.2
35. LOSSES, NOT COLLECTED	MILLION M ³	214	297	356	357	2 329	2 080

* Source : Central Statistical Office

APPENDIX III

SUMMARY OF DEVELOPMENT DRILLING IN TRINIDAD AND TOBAGO - 1988

FIELD, AREA OR DISTRICT	NUMBER OF OIL PRODUCERS COMPLETED	NUMBER OF ABANDONED WELLS	TOTAL COMPLETION	TOTAL DEPTH DRILLED IN METRES	NUMBER OF RIGS ACTIVELY DRILLING DEVELOPMENT WELLS ON 31st. DECEMBER, 1988
1	24 (a)	2	26 (a)	47 068	2
2	11 (b)	1	12 (b)	8 982	0
3	2	1	3	3 275	0
4	44 (c)	3	47 (c)	42 452	1
5	24 (d)	3	27 (d)	12 462	0
6	0	1	1	396	0
8	10 (e)	2	12 (e)	16 120	1
11	12	2	14	27 050	0
13	2	0	2	1 494	0
TOTAL	129	15	144	159 299	4

(a) INCLUDES 1 WELL COMPLETED OTHER

(b) INCLUDES 5 STEAM INJECTORS - DEPTH 2 487 METRES

(c) INCLUDES 1 STEAM INJECTOR - DEPTH 671 METRES

(d) INCLUDES 16 STEAM INJECTORS - DEPTH 7 240 METRES

(e) INCLUDES 1 STEAM INJECTOR - DEPTH 1 478 METRES

APPENDIX IIIA

KEY TO AREA - NUMBER ON APPENDIX III

AREA NUMBER	DESCRIPTION
1	Soldado, North Marine, Couva Marine, Manicou, (Gulf of Paria Block 1)
2	Pt. Ligoure, F.O.S., Area IV and Guapo, Point Fortin West and Central, Parrylands Cruse, Guapo, Boodoosingh
3	Brighton (Land and Marine), Vessigny, Merrimac
4	Palo Seco, Los Bajos, Erin, Central Los Bajos, Mackenzie
5	Forest Reserve, Fyzabad, Point Fortin East, New Dome, San Francique, Apex Quarry
6	Quarry, Coora, Quinam, Morne Diablo
7	Oropouche
8	Penal, Barrackpore, Wilson, Siparia
9	Moruga North and West, Rock Dome, Inniss, Trinity, Catshill, Balata, Bovallius
10	Guayaguayare, Moruga East
11	Galeota, Teak, Samaan, Poui, Cassia, Dolphin (Block 6), Diamond Prospect, East Coast, Reverse 'L' East, Reverse 'L' West, Mora
12	South Marine (South Coast)
13	Tabaquite, Point-a-Pierre
14	Icacos, South West Peninsula
15	North Coast Marine Area

APPENDIX IV
MONTHLY ANALYSIS OF DRILLING AND WORKOVER ACTIVITY - 1988
(Depth drilled in metres)

MONTH	DRILLING WELLS COMPLETED												OLD WELLS					
	NEW WELLS STARTED	OIL & GAS PRODUCERS		INJECTION WELLS		ABANDONED				COMPLETED OTHER		TOTAL WELLS	TOTAL AGGR DEPTH	AGGR DEPTH PER WELL	RE- COMP LETTED	ABAN- DONED		
						AFTER TESTING		DRY HOLES									TECHNICAL CAUSES	
						NO.	AGGR DEPTH	NO.	AGGR DEPTH								NO.	AGGR DEPTH
JANUARY	17	13	14,995	0	0	0	0	2	5,436	1	1,690	0	0	16	22,121	1,383	7	0
FEBRUARY	12	15	18,210	1	671	0	0	0	0	0	0	0	0	16	18,881	1,180	16	0
MARCH	18	15	17,146	0	0	0	0	2	3,700	0	0	0	0	17	20,846	1,226	18	0
APRIL	9	9	12,049	1	460	0	0	1	716	0	0	0	0	11	13,225	1,202	20	0
MAY	9	11	18,258	0	0	0	0	1	3,376	0	0	0	0	12	21,634	1,803	16	2
JUNE	13	6	11,088	0	0	0	0	2	3,399	2	3,523	0	0	10	18,010	1,801	6	1
JULY	10	4	6,248	0	0	0	0	1	365	0	0	0	0	5	6,613	1,323	7	0
AUGUST	15	9	15,521	0	0	0	0	1	1,458	0	0	0	0	10	16,979	1,698	11	0
SEPTEMBER	12	8	13,059	5	2,342	0	0	1	396	0	0	0	0	14	15,797	1,128	4	1
OCTOBER	10	4	8,629	8	4,377	0	0	2	3,235	0	0	0	0	14	16,241	1,160	5	0
NOVEMBER	7	8	9,817	6	2,461	0	0	2	4,317	0	0	0	0	16	16,595	1,037	5	0
DECEMBER	10	8	14,614	2	828	0	0	0	0	1	340	1	1,172	12	16,954	1,413	9	0
TOTAL 1988	142	110	159,634	23	11,139	0	0	15	26,398	4	5,553	1	1,172	153	203,896	1,333	124	4
TOTAL 1987	145	116	167,726	26	15,304	3	7,835	9	8,645	3	3,894	3	3,739	160	207,143	1,295	97	4

APPENDIX V
MONTHLY ANALYSIS OF LAND AND MARINE DEPTH DRILLED - 1988
(metres)

MONTH	STATE	PRIVATE	SUB-TOTAL	MARINE	SUB-TOTAL	TOTAL	RIG MONTHS	DAILY AVG. DEPTH	DAILY AVG. DEPTH/ RIG	MARINE % OF TOTAL DEPTH
	LAND	LAND	LAND	STATE						
JANUARY	10,255	0	10,255	7,957	18,212	18,212	6.71	587.5	87.6	43.7
FEBRUARY	8,987	884	9,871	6,623	15,610	16,494	6.73	568.8	84.5	40.2
MARCH	10,394	2,466	12,860	10,534	20,928	23,394	7.70	754.6	98.0	45.0
APRIL	7,452	1,177	8,629	4,467	11,919	13,096	6.00	436.5	72.8	34.1
MAY	6,847	623	7,470	7,841	14,688	15,311	6.19	493.9	79.8	51.2
JUNE	6,803	0	6,803	5,842	12,645	12,645	5.46	421.5	77.2	46.2
JULY	4,032	0	4,032	6,712	10,744	10,744	6.53	346.6	53.1	62.5
AUGUST	4,206	1,771	5,977	9,135	13,341	15,112	7.66	487.5	63.6	60.4
SEPTEMBER	4,608	1,894	6,502	7,871	12,479	14,373	6.47	479.1	74.0	54.8
OCTOBER	5,417	777	6,194	7,295	12,712	13,489	5.69	435.1	76.5	54.1
NOVEMBER	5,094	0	5,094	5,578	10,672	10,672	4.66	355.7	76.3	52.3
DECEMBER	5,668	293	5,961	8,128	13,796	14,089	4.93	454.5	92.2	57.7
TOTAL	79,763	9,885	89,648	87,983	167,746	177,631	74.73	485.3	77.9	49.5

APPENDIX VI
CRUDE OIL PRODUCTION BY FIELDS, AREAS OR DISTRICTS - 1988

COMPANY, FIELDS AREAS OR DISTRICTS	DISCOVERY YEAR	TOTAL WELLS COMPLETED	ANNUAL PRODUCTION		CUMULATIVE PRODUCTION THROUGH DECEMBER, 1988
			1988	1987	
			BARRELS	BARRELS	
TRINIDAD & TOBAGO OIL CO. LTD.					
BALATA EAST AND WEST	1952	75	122,922	143,190	3,338
CATSHILL	1950	134	115,458	122,823	23,143
INNISS	1956	41	25,392	38,970	6,238
ROCK DOME	1962	3	0	0	16
PENAL	1936	289	362,118	355,723	62,404
NEW DOME	1928	31	4,096	5,712	3,140
GRAND RAVINE (a)	1929	168	253,511	253,004	26,860
SAN FRANCISQUE	1929	27	4,439	8,328	5,983
AREA IV AND GUAPO	1963	192	426,890	484,094	39,136
PARRYLANDS 1-5	1913	508	584,079	608,484	40,711
POINT FORTIN CENTRAL	1916	239	538,269	632,234	20,814
POINT FORTIN WEST	1907	319	182,147	213,934	20,613
LOS BAJOS	1918	29	0	0	546
ERIN	1963	4	0	0	710
MAHAICA	1954	6	0	0	0
GUAYAGUAYARE	1902	700	776,132	631,132	87,253
TRINITY	1956	95	87,306	85,155	15,218
BARRACKPORE	1911	381	1,111,282	833,397	31,928
OROPOUCHE	1944	128	71,646	62,448	6,711
MORNE DIABLO/QUINAM (b)			4,601	17,004	
FOREST RESERVE	1913	2,061	1,456,792	1,563,075 (c)	260,360 (d)
PALO SECO	1929	937	758,562	805,635	93,881
BRIGHTON	1903	621	228,542	247,309	70,474 (e)
PT. LIGOURE	1937	15	72,112	8,943	2,512
ERIN	1963	24	9,364	32,433	2,356
COUVA MARINE	1963	6	0	0	301
CRUSE	1913	150	14,525	15,599	25,923
WILSON	1936	82	58,136	67,033	20,043
TABAQUITE (f)			1,017	16,703	
BALATA CENTRAL	1949	6	0	0	371
MAYARO		9	0	0	0
TOTAL		7,280	7,269,338	7,252,362	870,983

(a) This was previously Pt. Fortin East

(b) Lease acquired by Trintopec

(c) Revised

(d) Revised

(e) Revised

(f) Lease acquired by Trintopec

continued

APPENDIX VI
CRUDE OIL PRODUCTION BY FIELDS, AREAS OR DISTRICTS - 1988

COMPANY, FIELDS AREAS OR DISTRICTS	DISCOVERY YEAR	TOTAL WELLS COMPLETED	ANNUAL PRODUCTION		CUMULATIVE PRODUCTION THROUGH DECEMBER, 1988
			1988	1987	
			BARRELS	BARRELS	

TRINIDAD & TOBAGO					
PETROLEUM CO.LTD.					

FYZABAD/APEX QUARRY	1920-1938	1,042	1,377,975	1,507,531	171,928
GUAPO/BOODOOSINGH	1922	659	896,247	816,997	47,191
MORUGA EAST	1953	77	23,593	30,739	2,732
MORUGA NORTH	1956	23	4,752	3,918	1,043
MORUGA WEST	1957	129	18,911	18,316	9,215
COORA/QUARRY	1936	733	673,736	778,720	91,854
PALO SECO/ERIN/MC KENZIE	1926	1,593	3,162,531	3,138,219	120,163
NORTH MARINE	1956	19	0	0	1,269
GALEOTA	1963	105	879,940	1,069,486	16,098
CENTRAL LOS BAJOS	1973	259	899,774	933,390	9,388
ORPOUCHE	1975	3	4,712	5,887	274
BARRACKPORE	1977	4	7,136	2,478	115
MORNE DIABLO/QUINAM (a)	1926	93	9,255		7,708
TABAQUITE (b)	1911	227	5,603		1,783

TOTAL		4,966	7,964,165	8,305,681	480,761

PREMIER CONSOLIDATED					
OILFIELDS LIMITED					

SIPARIA	1957	5	8,102	8,525	880
SAN FRANCIQUE	1929	108	165,404	111,782	3,694
FYZABAD/ROODAL	1918	266	58,178	66,258	13,469
PALO SECO	1915	83	3,774	562	1,645
BARRACKPORE	1970	8	42,475	44,053	347
ICACOS	1955	11	4,994	4,333	493
DEFUNCT FIELDS	1954	19	0	0	323

TOTAL		500	282,927	235,513	20,851

(a) Lease acquired from Trintoc

(b) Lease acquired from Trintoc

continued

APPENDIX VI
CRUDE OIL PRODUCTION BY FIELDS, AREAS OR DISTRICTS - 1988

COMPANY, FIELDS AREAS OR DISTRICTS	DISCOVERY YEAR	TOTAL WELLS COMPLETED	ANNUAL PRODUCTION		CUMULATIVE PRODUCTION THROUGH DECEMBER, 1988 ' 000 BARRELS
			1988	1987	
			BARRELS	BARRELS	
TRINIDAD NORTHERN AREAS					
FOS/FT	1954	35	93,920	104,848	7,095
SOLDADO	1955	684	13,946,722	13,741,669	476,627
TOTAL		719	14,040,642	13,846,517	483,722
AMOCO TRINIDAD OIL CO. LTD.					
TEAK	1969	99	11,515,815	12,359,242	239,499
SAMAAN	1971	65	4,939,907	4,708,907	179,069
POUI	1974	58	7,004,373	7,465,735	157,196
CASSIA	1973	10	2,033,410	2,219,486	12,564
MORA	1982	6	157,553	247,238	572
TOTAL		238	25,651,058	27,000,608	588,900
GRAND TOTAL		13,703	55,208,130	56,640,681	2,445,217

APPENDIX VII
CRUDE OIL PRODUCTION BY MONTHS AND METHODS - 1988
(barrels)

MONTH	FLOWING			GAS LIFT			PUMPING		
	NO. OF WELLS	PRODUCTION	DAILY AV. PER WELL	NO. OF WELLS	PRODUCTION	DAILY AV. PER WELL	NO. OF WELLS	PRODUCTION	DAILY AV. PER WELL
JANUARY	298	1,056,933	114.4	562	2,364,893	135.7	2,412	1,117,327	14.9
FEBRUARY	298	972,734	112.6	546	2,235,232	141.2	2,381	1,057,484	15.3
MARCH	314	1,110,329	114.1	561	2,318,332	133.3	2,449	1,156,434	15.2
APRIL	309	1,078,361	116.3	537	2,299,194	142.7	2,416	1,077,267	14.9
MAY	318	1,104,973	112.1	549	2,401,013	141.1	2,393	1,113,109	15.0
JUNE	323	1,104,139	113.9	540	2,278,400	140.6	2,410	1,061,261	14.7
JULY	336	1,203,061	115.5	552	2,452,407	143.3	2,384	1,106,010	15.0
AUGUST	339	1,162,345	110.6	535	2,482,479	149.7	2,409	1,078,441	14.4
SEPTEMBER	352	1,227,627	116.3	547	2,360,667	143.9	2,319	1,035,973	14.9
OCTOBER	352	1,247,919	114.4	551	2,482,407	145.3	2,291	1,050,731	14.8
NOVEMBER	369	1,298,136	117.3	533	2,317,376	144.9	2,280	999,863	14.6
DECEMBER	369	1,385,004	121.1	549	2,394,125	140.7	2,229	1,011,512	14.6
TOTAL 1988		13,951,561			28,386,525			12,865,412	
AVERAGE 1988	331	38,119	115.2	547	77,559	141.8	2,365	35,151	14.9

Continued

APPENDIX VII
CRUDE OIL PRODUCTION BY MONTHS AND METHODS - 1988
(barrels)

MONTH	OTHER METHODS			TOTAL NO. OF PRODUCING WELLS	TOTAL OIL PRODUCTION	DAILY AVG. PER PRODUCING WELL	B.O.P.D.	SALT WATER	
	NO. OF WELLS	PRODUCTION	DAILY AV. PER WELL					PRODUCTION	% OF TOTAL FLUID
JANUARY	11	252	0.7	3,283	4,539,405	44.6	146,432	4,808,675	51.4
FEBRUARY	11	219	0.7	3,236	4,265,669	45.5	147,092	4,459,369	51.1
MARCH	4	113	0.9	3,328	4,585,208	44.4	147,910	4,593,210	50.0
APRIL	13	276	0.7	3,275	4,455,098	45.3	148,503	4,434,958	49.9
MAY	16	350	0.7	3,276	4,619,445	45.5	149,014	4,534,214	49.5
JUNE	5	50	0.3	3,278	4,443,850	45.2	148,128	4,158,786	48.3
JULY	10	194	0.6	3,282	4,761,672	46.8	153,602	4,469,946	48.4
AUGUST	9	396	1.4	3,292	4,723,661	46.3	152,376	4,446,899	48.5
SEPTEMBER	7	786	3.7	3,225	4,625,053	47.8	154,168	4,355,046	48.5
OCTOBER	8	779	3.1	3,202	4,781,836	48.2	154,253	4,716,633	49.7
NOVEMBER	6	576	3.2	3,188	4,615,951	48.3	153,865	4,299,126	48.2
DECEMBER	12	641	1.7	3,159	4,791,282	48.9	154,557	4,403,285	47.9
TOTAL 1988		4,632			55,208,130			53,680,147	
AVERAGE 1988	9	13	1.4	3,252	150,842	46.4	150,842	147,069	49.3

APPENDIX VIII
ANALYSIS OF CRUDE OIL PRODUCTION BY OPERATING COMPANIES - 1988
(barrels)

COMPANY	FLOWING			GAS LIFTING			PUMPING		
	AV. NO. OF WELLS	PRODUCTION PER WELL	DAILY AV.	AV. NO. OF WELLS	PRODUCTION PER WELL	DAILY AV.	AV. NO. OF WELLS	PRODUCTION PER WELL	DAILY AV.
AMOCO TRINIDAD OIL COMPANY LTD.	41	6,505,698	433.5	95	19,145,360	550.6	0	0	0.0
PREMIER CONSOLIDATED OILFIELDS LTD.	5	117,261	64.1	0	0	0.0	82	161,034	5.4
TRINIDAD NORTHERN AREAS	72	4,170,394	158.3	246	8,142,440	90.4	61	1,727,808	77.4
TRINIDAD AND TOBAGO OIL COMPANY LTD.	122	2,297,910	51.5	205	1,097,364	14.6	895	3,874,064	11.8
TRINIDAD AND TOBAGO PETROLEUM COMPANY LTD.	91	860,298	25.8	1	1,361	3.7	1,327	7,102,506	14.6
TOTAL 1988	331	13,951,561	115.2	547	28,386,525	141.8	2,365	12,865,412	14.9
TOTAL 1987	320	13,370,823	114.5	530	30,116,361	155.7	2,392	13,146,277	15.1

Continued

APPENDIX V111
ANALYSIS OF CRUDE OIL PRODUCTION BY OPERATING COMPANIES - 1988
(barrels)

COMPANY	OTHER		AV. NO. OF WELLS	TOTAL OIL DAILY PRODUCED	AV. PER WELL	COMPANY'S PROD'N AS A % OF TOTAL PROD'N	SALT WATER	
	AV. NO. OF WELLS	PROD'N PER WELL					PRODUCTION	% OF TOTAL FLUID
AMOCO TRINIDAD OIL COMPANY LTD.	0	0	136	25,651,058	516.7	46.5	36,142,867	58.5
PREMIER CONSOLIDATED OILFIELDS LTD.	9	4,632	96	282,927	8.1	0.5	81,814	22.4
TRINIDAD NORTHERN AREAS	0	0	379	14,040,642	101.5	25.4	2,706,134	16.2
TRINIDAD AND TOBAGO OIL COMPANY LTD.	0	0	1,222	7,269,338	16.3	13.2	6,444,776	47.0
TRINIDAD AND TOBAGO PETROLEUM COMPANY LTD.	0	0	1,419	7,964,165	15.4	14.4	8,304,556	51.0
TOTAL 1988	9	4,632	3,252	55,208,130	46.4	100.0	53,680,147	49.3
TOTAL 1987	14	7,220	3,256	56,640,681	47.7	100.0	55,721,243	49.6

APPENDIX IX
TOTAL AND DAILY AVERAGE CRUDE OIL PRODUCTION BY MONTHS FOR ALL COMPANIES - 1988
(Production in barrels)

MONTH	AMOCO TRINIDAD OIL CO. LTD.		PREMIER CONSOLIDATED OILFIELDS LTD.		TRINIDAD NORTHERN AREAS		TRINIDAD & TOBAGO OIL CO. LTD.		TRINIDAD & TOBAGO PETROLEUM CO. LTD.	
	PRODUCTION	B.O.P.D	PRODUCTION	B.O.P.D	PRODUCTION	B.O.P.D	PRODUCTION	B.O.P.D	PRODUCTION	B.O.P.D
JANUARY	2,043,362	65,915	21,987	709	1,179,295	38,042	611,814	19,736	682,947	22,031
FEBRUARY	1,926,103	66,417	19,253	664	1,111,013	38,311	579,118	19,970	630,182	21,730
MARCH	2,064,812	66,607	22,143	714	1,202,389	38,787	609,291	19,655	686,573	22,148
APRIL	2,028,289	67,610	21,159	705	1,174,567	39,152	578,672	19,289	652,411	21,747
MAY	2,108,037	68,001	22,191	716	1,197,930	38,643	598,496	19,306	692,791	22,348
JUNE	2,038,566	67,952	24,266	809	1,139,202	37,973	574,046	19,135	667,770	22,259
JULY	2,219,571	71,599	23,735	766	1,214,301	39,171	614,663	19,828	689,402	22,239
AUGUST	2,213,293	71,397	22,917	739	1,188,530	38,340	625,835	20,188	673,086	21,712
SEPTEMBER	2,161,087	72,036	27,503	917	1,156,534	38,551	616,885	20,563	663,044	22,101
OCTOBER	2,288,966	73,838	26,841	866	1,177,737	37,992	622,643	20,085	665,649	21,473
NOVEMBER	2,249,706	74,990	25,104	837	1,119,606	37,320	605,013	20,167	616,522	20,551
DECEMBER	2,309,266	74,492	25,828	833	1,179,538	38,050	632,862	20,415	643,788	20,767
TOTAL 1988	25,651,058	70,085	282,927	773	14,040,642	38,362	7,269,338	19,862	7,964,165	21,760
TOTAL 1987	27,000,608	73,974	235,513	645	13,846,517	37,936	7,252,362	19,869	8,305,681	22,755

APPENDIX X
LAND AND MARINE CRUDE OIL PRODUCTION - 1988
(barrels)

MONTH	MARINE				TOTAL MARINE	DEVIATED FROM SHORE				LAND
	TNA: SOLDADO	TRINTOC: A.B.M.	TRINTOPEC: GALEOTA	AMOCO		TNA: F.O.S.	TRINTOC: A.S.	TRINTOC: A.L.S	TRINTOPEC: GUAPO	
JANUARY	1,171,628	13,185	81,753	2,043,362	3,309,928	7,667	1,406	5,263	1,615	1,213,526
FEBRUARY	1,104,393	14,610	75,973	1,926,103	3,121,079	6,620	1,143	5,232	1,477	1,130,118
MARCH	1,195,002	10,400	79,701	2,064,812	3,349,915	7,387	2,054	5,839	1,412	1,218,601
APRIL	1,168,081	8,535	74,600	2,028,289	3,279,505	6,486	1,398	5,619	1,260	1,160,830
MAY	1,188,985	13,484	76,113	2,108,037	3,386,619	8,945	1,558	5,655	1,041	1,215,627
JUNE	1,131,553	12,752	71,224	2,038,566	3,254,095	7,649	1,594	5,262	1,101	1,174,149
JULY	1,206,154	10,863	76,213	2,219,571	3,512,801	8,147	1,708	5,581	1,045	1,232,390
AUGUST	1,179,847	11,442	73,728	2,213,293	3,478,310	8,683	2,191	5,313	1,312	1,227,852
SEPTEMBER	1,148,974	12,951	67,559	2,161,087	3,390,571	7,560	2,207	5,471	1,217	1,218,027
OCTOBER	1,169,541	14,868	69,273	2,288,966	3,542,648	8,196	2,150	5,222	1,963	1,220,657
NOVEMBER	1,110,903	15,355	65,788	2,249,706	3,441,752	8,703	1,429	5,883	1,794	1,156,390
DECEMBER	1,171,661	13,723	68,015	2,309,266	3,562,665	7,877	1,595	11,772	1,964	1,205,409
TOTAL	13,946,722	152,168	879,940	25,651,058	40,629,888	93,920	20,433	72,112	17,201	14,373,576

APPENDIX XI
AVERAGE NO. OF PRODUCING WELLS LAND AND MARINE - 1988

MONTH	MARINE				TOTAL MARINE	DEVIATED FROM SHORE				LAND
	TNA: SOLDADO	TRINTOC: A.B.M.	TRINTOPEC: GALEOTA	AMOCO		TNA: F.O.S.	TRINTOC: A.S.	TRINTOC: A.L.S	TRINTOPEC: GUAPO	
JANUARY	368	32	54	134	588	13	11	1	8	2,662
FEBRUARY	358	32	48	137	575	12	12	1	8	2,628
MARCH	371	25	49	137	582	13	14	1	9	2,709
APRIL	373	19	49	137	578	13	10	1	9	2,664
MAY	367	28	49	133	577	13	11	1	9	2,665
JUNE	362	23	49	129	563	13	14	1	9	2,678
JULY	367	25	50	133	575	13	11	1	8	2,674
AUGUST	366	23	50	134	573	13	8	1	9	2,688
SEPTEMBER	366	27	47	136	576	13	15	1	9	2,611
OCTOBER	366	31	46	139	582	13	16	1	9	2,581
NOVEMBER	363	28	47	140	578	14	12	2	9	2,573
DECEMBER	367	27	47	143	584	14	11	2	9	2,539
AVERAGE	366	27	49	136	578	13	12	1	9	2,639

APPENDIX XII
CRUDE OIL PRODUCTION BY LEASE - 1988
(barrels)

MONTH	STATE LEASE			PRIVATE LEASE		
	NO. OF WELLS	PRODUCTION	DAILY AV. PER WELL	NO. OF WELLS	PRODUCTION	DAILY AV. PER WELL
JANUARY	2,669	4,321,912	52.2	614	217,493	11.4
FEBRUARY	2,615	4,055,855	53.5	621	209,814	11.7
MARCH	2,687	4,353,600	52.3	641	231,608	11.7
APRIL	2,652	4,240,459	53.3	623	214,639	11.5
MAY	2,646	4,391,896	53.5	630	227,549	11.7
JUNE	2,651	4,223,878	53.1	627	219,972	11.7
JULY	2,659	4,532,270	55.0	623	229,402	11.9
AUGUST	2,661	4,480,365	54.3	631	243,296	12.4
SEPTEMBER	2,616	4,365,517	55.6	609	259,536	14.2
OCTOBER	2,596	4,517,036	56.1	606	264,800	14.1
NOVEMBER	2,576	4,365,545	56.5	612	250,406	13.6
DECEMBER	2,546	4,528,660	57.4	613	262,622	13.8
TOTAL 1988		52,376,993			2,831,137	
AVERAGE 1988	2,631	143,107	54.4	621	7,735	12.5

APPENDIX XIII
CRUDE OIL PRODUCTION BY COMPANY LEASE - 1988
(barrels)

COMPANY	STATE LEASE		PRIVATE LEASE	
	PRODUCTION	% OF TOTAL PRODUCTION	PRODUCTION	% OF TOTAL PRODUCTION
AMOCO TRINIDAD OIL COMPANY LIMITED	25,651,058	100.0	0	0
PREMIER CONSOLIDATED OILFIELDS LIMITED	26,671	9.4	256,256	90.6
TRINIDAD NORTHERN AREAS	14,040,642	100.0	0	0
TRINIDAD AND TOBAGO OIL COMPANY LIMITED	6,239,082	85.8	1,030,256	14.2
TRINIDAD AND TOBAGO PETROLEUM COMPANY LIMITED	6,419,540	80.6	1,544,625	19.4
TOTAL 1987	52,376,993	94.9	2,831,137	5.1
TOTAL 1986	54,098,194	95.5	2,542,487	4.5

APPENDIX XIV
SUMMARY OF FLUID INJECTION IN TRINIDAD AND TOBAGO 1981 - 1988

YEAR	NO.OF PROJECTS IN OPERATION AT END OF YEAR				INJECTION VOLUMES			OIL PRODUCED BY WELLS UNDER PROJECT INFLUENCE				OIL EXPRESSED AS A PERCENTAGE OF COUNTRY'S TOTAL PRODUCTION
	GAS	WATER	STEAM	CARBON DIOXIDE	NATURAL GAS M m ³	WATER & OTHER FLUIDS (bbl)	STEAM (bbl)	WATER INJECTION PROJECTS (bbl)	THERMAL RECOVERY PROJECTS (bbl)	CARBON DIOXIDE PROJECTS (bbl)	ALL PROJECTS (bbl)	
1984	0	23	9	2	33 902	15,205,143	12,445,527	4,339,531	3,953,109	27,738	8,320,378	13.4
1985	0	22	10	2	1 734	11,694,141	15,759,473	4,324,372	4,191,334	19,432	8,535,138	13.3
1986	0	23	14	3	17 781	10,193,598	14,336,669	4,313,640	4,667,356	18,924	8,999,920	14.6
1987	0	23	13	3	0	16,299,522	20,026,283	3,895,346	4,571.390	49,164	8,515,900	15.0
1988	0	23	15	3	0	16,568,454	21,673,422	4,129,212	4,935,876	51,606	9,116,694	16.5

APPENDIX XV
SECONDARY AND ENHANCED OIL RECOVERY OPERATIONS - 1988

WATER INJECTION

COMPANY	ACTIVE PROJECTS	WATER INJECTED (Bwpd)	OIL PRODUCED (Bopd)	WATER PRODUCED (Bwpd)	GAS PRODUCED 10 ³ M ³	WATER CUT %
AMOCO	2	25,436	8,640	4,497	199	34.2
TNA	1	12,254	717	995	154	58.1
TTPCL	10	1,706	679	288	15	29.8
TRINTOC	10	5,873	1 246	2,507	64	66.8
ALL.COS	23	45,269	11,282	8,287	432	42.3

STEAM INJECTION

COMPANY	ACTIVE PROJECTS	STEAM INJECTED (Bspd)	OIL PRODUCED (Bopd)	WATER PRODUCED (Bwpd)	OIL/STEAM RATIO
TTPCL	7	45,554	11,111	16,715	0.24
TRINTOC	8	13,517	2,324	8,633	0.17
PCOL	1	146	51	55	0.35
ALL COS.	16	59,217	13,486	25,403	0.23

CARBON DIOXIDE INJECTION

COMPANY	ACTIVE PROJECTS	CO2 INJECTED (10 ³ M ³)	OIL PRODUCED (Bopd)	WATER PRODUCED (Bwpd)	GAS PRODUCED (10 ³ M ³)	G.O.R
TRINTOC	3	0	141	1	0.04	983
ALL COS.	3	0	141	1	0.04	983

APPENDIX XVI
WATER INJECTION SUMMARY BY PROJECTS - 1988

COMPANY	FIELD	PROJECT	WATER INJECTION (Bwpd)	OIL PRODUCED (Bopd)	WATER PRODUCED (Bwpd)	GAS PRODUCED 10 ³ M ³	WATER CUT %	
AMOCO	TEAK SAMAAN	A/C/E WATERFLOOD	19,396	7,413	2,340	83	24.0	
		FB 5&6	6,040	1,227	2,157	116	63.7	
	ALL	ALL	25,436	8,640	4,497	199	34.2	
TRINMAR	SOLDADO	8011 WATERFLOOD	12,254	717	995	154	58.1	
	ALL	ALL	12,254	717	995	154	58.1	
TRINTOC	CATSHILL	CO-30.BLK.24	1,274	126	67	1	34.6	
		N SAND	680	39	46	0	54.2	
		CO-30.BLK.38						
	Pt.FORTIN G'YARE	CRUSE 'G'	1,481	37	16	0	30.2	
		NAVETTE 007	0	268	400	43	59.9	
		NAVETTE 410	0	217	958	7	81.6	
		410 EXT.	0	62	194	2	75.8	
		307 WATERFLOOD	0	234	484	8	67.4	
	TRINITY	307 EXT.	0	24	14	1	37.0	
		SHALLOW HERRERA	2,439	239	327	1	57.8	
ALL	ALL	5,873	1,246	2,507	64	66.8		
TRINTOPEC	COORA	CO/UC/100/1	0	7	20	0	74.0	
		CO/UC/110/1	0	0	0	0		
		CO/UC/314/1	0	13	4	0	25.4	
		CO/UC/317/1	0	13	8	0	38.0	
		CO/UC/170/1V	0	0	0	0		
	PALO SECO	PS/UF/500/1	0	34	5	1	13.9	
	FYZABAD	FM/UF/172/1	0	41	10	1	19.1	
		FM/UF/169/1	0	100	68	2	40.3	
	MACKENZIE	MK/UF/48/1	0	56	5	1	8.6	
	GALEOTA	GAL/HF/15/11	1,706	415	168	9	28.8	
	ALL	ALL	1,706	679	288	15	29.8	
	TOTAL	ALL	ALL	45,269	11,282	8,287	432	42.3

APPENDIX XVII
STEAM INJECTION SUMMARY BY PROJECTS - 1988

COMPANY	FIELD	PROJECTS	STEAM INJECTED (Bspd)	OIL PRODUCED (Bopd)	WATER PRODUCED (Bwpd)	WATER CUT %	OIL/STEAM RATIO
TRINTOPEC	QUARRY		10,513	1,978	2,769	58.3	0.19
	FYZABAD		3,995	1,104	1,877	63.0	0.28
	GUAPO		7,786	1,834	3,027	62.3	0.24
	CENTRAL LOS BAJOS		7,937	1,716	1,887	52.4	0.22
	PALO SECO		10,372	3,592	6,465	64.3	0.35
	BENN. V'GE		2,951	671	503	42.9	0.23
	P.S 805		2,001	216	186	46.3	0.11
ALL	ALL		45,554	11,111	16,715	60.1	0.24
TRINTOC	F.RESERVE	Project 111	7,684	1,500	7,080	82.5	0.20
		Ph.1 West Ext	1,252	0	0	0.0	0.00
		Phase 1 Ext.	624	52	283	84.5	0.08
	P.LANDS'E'	Steamflood	708	371	679	64.7	0.52
		Phase 1. Exp.	921	98	194	66.5	0.11
	Pt.FORTIN	Phase 1a. Exp	952	114	108	48.6	0.12
		Cruse 'G'	1,235	181	289	61.5	0.15
		Cruse 'E'	142	9	1	11.5	0.06
ALL	ALL		13,517	2,324	8,633	78.8	0.17
PCOL	FYZABAD	Thermal 1	146	51	55	51.9	0.35
	ALL	ALL	146	51	55	51.9	0.35
ALL COS.	ALL	ALL	59,217	13,486	25,403	65.3	0.23

CARBON DIOXIDE INJECTION

COMPANY	FIELD	PROJECT	INJECTION (10 ³ M ³)	OIL (Bopd)	WATER (Bopd)	GAS (10 ³ M ³)	G.O.R
TRINTOC	F.RESERVE	Forest Sds.	0	32	1	0.01	682
		Zone 5 Sds.	0	45	1	0.03	1180
		UCWE	0	64	0	0.00	993
ALL COS.	ALL	ALL	0	141	1	0.04	983

APPENDIX XVIII
 NATURAL GAS PRODUCTION BY COMPANIES
 (Thousand Cubic Metres/Day)

COMPANY	1984	1985	1986	1987	1988
AMOCO	16 445	17 332	17 715	17 897	17 182
TRINMAR	1 749	1 735	1 570	1 739	1 846
TRINTOPEC	604	588	578	558	504
TRINTOC	950	883	913	823	787
P.C.O.L.	2	3	4	3	3
TOTAL	19 750	20 541	20 780	21 020	20 322

APPENDIX XIX
NATURAL GAS UTILIZATION (1984 - 1988)
(Million Cubic Metres/Day)

		1984	1985	1986	1987	1988
REFINERY (AS FUEL)	Trintoc(P-a-P) Trintoc(P/F)	1.20 0.26	0.93 0.28	1.00 0.24	1.15 0.25	0.92 0.26
Sub-Total		1.46	1.21	1.24	1.40	1.18
FIELD USE (AS FUEL)	(All Companies)	0.97	0.96	1.02	1.15	1.07
PRODUCTION USE *	(All Companies)	4.70	4.76	6.40	6.46	6.73
OIL COMPANY UTILIZATION TOTAL		7.13	6.93	8.66	9.01	8.98
FERTILIZER MANUFACTURE	Fedchem Fertrin Tringen Tringen 11 Urea	0.80 2.52 1.20 0.17	0.76 2.52 1.19 0.25	0.78 2.55 1.35 0.26	0.77 2.56 1.32 0.25	0.82 2.69 1.36 0.28
	Fertilizer Sub-Total	4.69	4.72	4.94	4.90	5.97
POWER GENERATION	T & TEC	2.86	3.00	2.95	3.08	3.29
CEMENT MANUFACTURE	Trinidad Cement Limited	0.20	0.14	0.20	0.20	0.20
OTHER LARGE CONSUMERS	Methanol Iscoff	0.63 0.29	0.91 0.26	0.84 0.41	1.06 0.52	0.99 0.62
SMALL CONSUMERS		0.17	0.22	0.23	0.24	0.26
TOTAL		15.97	16.18	18.23	19.01	20.31

* - NB: Includes re-compressed gas used for gas lifting.

APPENDIX XX

ANNUAL STATISTICS FOR NATURAL GAS PRODUCTION AND UTILIZATION 1984 - 1988

	1984		1985		1986		1987		1988	
	MILLION M ³	%	MILLION M ³	%	MILLION M ³	%	MILLION M ³	%	MILLION M ³	%
PRODUCTION	7 229	100	7 413	100	7 585	100	*7 672	100	7 438	100
GOR (M3/M3)	733		741		775		834		834	
A. USED AS FUEL IN FIELDS	355	4.9	352	4.7	447	5.9	410	5.3	390	5.2
IN REFINERIES	534	7.4	440	5.9	453	6.0	513	6.7	431	5.8
IN OTHER INDUSTRIES	1 663	23.0	2 165	29.3	2 290	30.2	2 388	31.1	2 712	36.5
SUB TOTAL	2 552	35.3	2 957	39.9	3 190	42.1	3 311	43.2	3 533	47.5
B. OTHER COMPLETE UTILIZATION:										
USED AS PROCESS GAS	1 105	15.3	1 120	15.1	1 203	15.9	1 257	16.4	1 479	19.9
INJECTED INTO FORMATION	-	-	-	-	-	-	-	-	-	-
CONVERTED TO C.H.P.S.	1	-	1	-	-	-	1	-	-	-
SUB TOTAL	1 106	15.3	1 121	15.1	1 203	15.9	1 258	16.4	1 479	19.9
C. VENTED										
AFTER USE OF PNEUMATIC ENERGY	1 715	23.7	1 731	23.0	1 890	24.9	1 894	24.7	1 738	23.4
WITHOUT USE	1 857	25.7	1 601	21.6	1 126	14.8	1 123	14.6	675	9.1
SUB TOTAL	3 572	49.4	3 332	44.6	3 016	39.8	3 017	39.3	2 413	31.8

* Revised 1987 Figure

APPENDIX XXI

ASPHALT EX THE PITCH LAKE - PRODUCTION, EXPORTS AND LOCAL CONSUMPTI
FOR THE PERIOD 1986 - 1988

NATURAL ASPHALT	METRIC TONS		
	1986	1987	1988
...EXTRACTED BY MINISTRY OF WORKS FOR LOCAL USE	10 873	6 792	2 454
...EXTRACTED BY TRINIDAD LAKE ASPHALT COMPANY	24 109	20 997	21 609
TOTAL	34 982	27 789	24 063
DERIVED PRODUCTS MANUFACTURED BY THE COMPANY			
EXPORTS :-			
...CRUDE ASPHALT	0	0	0
...DRIED ASPHALT	18 904	22 020	18 979
...CEMENT ASPHALT	128	54	187
TOTAL	19 032	22 074	19 166
LOCAL SALES :-			
...CRUDE ASPHALT	0	0	0
...DRIED ASPHALT	230	215	230
...CEMENT ASPHALT	2 376	2 360	1 118
TOTAL	2 606	2 575	1 348

APPENDIX XXII
DESTINATION OF EXPORTS OF CRUDE AND REFINED PRODUCTS FROM TRINIDAD AND TOBAGO - 1988
(all quantities in barrels)

COUNTRY	TOTAL REFINED PRODUCTS	% OF TOTAL EXPORTS	CRUDE PETROLEUM EXPORTS	L.P.G.	AVIATION GASOLENE	MOTOR GASOLENE	KEROSENE & AVIATION TURBINE FUEL	GAS & DIESEL OILS	FUEL OIL	PETRO-CHEMICALS	ASPHALT	LUBES & GREASES	WHITE SPIRIT
NORTH AMERICA -													
CANADA	218,567	0.80	0	0	0	0	0	218,567	0	0	0	0	0
U.S.A.	10,194,659	37.37	27,204,909	0	0	577,403	220,964	2,029,514	7,364,222	2,556	0	0	0
TOTAL N.A.	10,413,226	38.17	27,204,909	0	0	577,403	220,964	2,248,081	7,364,222	2,556	0	0	0
CENTRAL AMERICA -													
REPUBLIC OF PANAMA	1,138	0.00	0	0	0	0	0	294	844	0	0	0	0
GUATEMALA	11,365	0.04	0	0	0	0	0	0	0	0	11,365	0	0
OTHER C.A. (a)	16,168	0.06	0	0	8,959	7,209	0	0	0	0	0	0	0
TOTAL C.A.	28,671	0.10	0	0	8,959	7,209	0	294	844	0	11,365	0	0
SOUTH AMERICA -													
GUYANA	16,888	0.06	0	0	0	1,988	694	12,757	0	0	1,449	0	0
SURINAME	1,970,351	7.22	0	0	0	252,309	54,456	229,722	1,429,991	0	3,625	248	0
FRENCH GUIANA	1,154,008	4.23	0	3,235	0	235,386	160,817	402,383	340,242	0	11,945	0	0
OTHER S.A. (b)	1,273,562	4.67	0	0	0	0	0	0	1,273,562	0	0	0	0
TOTAL S.A.	4,414,809	16.18	0	3,235	0	489,683	215,967	644,862	3,043,795	0	17,019	248	0
WEST INDIES -													
BRITISH (c)	2,866,566	10.51	0	83,151	2,155	943,881	948,096	773,320	78,632	0	23,196	13,726	409
FRENCH (d)	1,201,082	4.40	0	34,492	2,938	378,911	324,800	234,331	178,716	0	46,894	0	0
NETHERLANDS (e)	1,057,513	3.88	0	0	0	7,050	0	9,379	1,024,965	0	16,119	0	0
HAITI	227,289	0.83	0	0	0	0	0	0	227,289	0	0	0	0
OTHER W.I. ISLANDS (f)	2,598,096	9.52	0	1,981	2,381	138,874	159,830	24,907	2,243,786	0	26,337	0	0
TOTAL W.I.	7,950,546	29.14	0	119,624	7,474	1,468,716	1,432,726	1,041,937	3,753,388	0	112,546	13,726	409
EUROPE -													
ITALY	383,251	1.41	0	0	0	0	0	0	383,251	0	0	0	0
ENGLAND	369,111	1.35	0	0	0	0	0	0	369,111	0	0	0	0
OTHER EUROPE (g)	26,622	0.10	0	0	0	0	0	0	0	26,622	0	0	0
TOTAL EUROPE	778,984	2.86	0	0	0	0	0	0	752,362	26,622	0	0	0
OTHERS -													
JAPAN	5,207	0.02	0	0	0	0	0	0	0	5,207	0	0	0
OTHERS*	2,868,542	10.51	0	0	0	398,870	1,002,546	201,004	1,263,481	2,641	0	0	0
TOTAL OTHERS	2,873,749	10.53	0	0	0	398,870	1,002,546	201,004	1,263,481	7,848	0	0	0
TOTAL CARGOES	26,459,985	96.98	27,204,909	122,859	16,433	2,941,881	2,872,203	4,136,178	16,178,092	37,026	140,930	13,974	409
FOREIGN BUNKERS	823,675	3.02	0	0	50	0	440,852	132,754	248,308	0	0	1,711	0
TOTAL EXPORT	27,283,660	100	27,204,909	122,859	16,483	2,941,881	3,313,055	4,268,932	16,426,400	37,026	140,930	15,685	409

* Countries not detailed

(a) Other C.A. : Honduras, Nicaragua, Mexico

(b) Other S.A. : Argentina, Uruguay

(c) British : Antigua, Anguilla, Barbados, Bequia, Carriacou, Dominica, Grand Cayman, Grenada, Jamaica, Montserrat, Nevis, St. Kitts, St. Lucia, St. Vincent.

(d) French : Guadeloupe, Martinique, St. Barthelemy, St. Barths, St. Maarten.

(e) Netherlands : Saba, St. Eustatius, Aruba, Curacao

(f) Other W.I. Islands : Bahamas, Bermuda, Tortola, Virgin Gorda, Virgin Islands, Mustique, Puerto Rico, Cuba, Dominican Republic.

(g) Other Europe : Rotterdam, Holland.

APPENDIX XXIII
MOVEMENT OF REFINED PRODUCTS - 1988
(all quantities in barrels)

PRODUCT	OPENING INVENTORY	PRODUCTION	BLENDING	IMPORTS	REC. FROM LOCAL COMPANIES	REFINERY TRANSFERS	OTHER RECEIPTS	TOTAL OPENING INVENTORY AND RECEIPTS
L.P.G	8,623	598,109	0	84,951	473,772	17	0	1,165,472
MOGAS - PREMIUM	84,276	4,051,724	(50)	0	3,076,887	(98)	0	7,212,739
MOGAS - REGULAR	204,304	1,105,731	50	490,603	118,288	0	0	1,918,976
MOGAS - UNFINISHED	207,740	515,915	0	0	0	0	0	723,655
NAPHTHA	401,623	(291,968)	0	243,697	0	(1,093)	0	352,259
AVIATION GASOLINE	4,598	18,023	0	2,412	2,874	0	0	27,907
KEROSINE/AV TURBINE	195,702	3,574,284	(245)	0	571,286	151	0	4,341,178
WHITE SPIRIT	6,812	5,514	(164)	0	7,460	0	0	19,622
GAS OIL	379,107	4,740,591	(1,157)	609,447	903,771	(374)	1,667	6,633,052
MARINE DIESEL	15,854	55,053	(925)	2,918	3,717	635	0	77,252
FUEL OIL	1,142,407	16,097,688	1,000	3,897	38,651	(17,953)	2,088	17,267,778
LUBES	75,784	14,182	(1,113)	43,375	51,476	0	849	184,553
GREASES	791	0	651	847	0	0	0	2,289
ASPHALTIC PRODUCTS	12,971	215,040	0	0	61,119	0	252	289,382
PETROCHEMICALS	59,458	37,738	(13)	0	5,691	0	0	102,874
OTHER FINISHED PRODUCTS	5	55	1,966	0	0	0	0	2,026
UNFINISHED PRODUCTS	1,582,425	(424,775)	0	311,925	0	32,097	0	1,501,672
TOTALS	4,382,480	30,312,904	0	1,794,072	5,314,992	13,382	4,856	41,822,686

continued

APPENDIX XXIII
MOVEMENT OF REFINED PRODUCTS - 1988
(all quantities in barrels)

PRODUCT	LOCAL CONSUMPTION			DISBURSE. TO LOCAL COMPANIES	EXPORTS		*GAINS/LOSS	CLOSING INVENTORY	TOT. CLOS. INVENT. & DISBURSE.	
	OWN USE	RET. & CON.	LOCAL BUNKERS		CARGOES	FOREIGN BUNKERS				
L.P.G	436	545,576	0	546,012	473,776	122,859	0	5,108	17,717	1,165,472
MOGAS - PREMIUM	11,107	3,101,588	0	3,112,695	3,076,897	867,882	0	(22,241)	177,506	7,212,739
MOGAS - REGULAR	1	117,577	0	117,578	116,917	1,582,733	0	157	101,591	1,918,976
MOGAS - UNFINISHED	37	0	0	37	1,393	491,266	0	0	230,959	723,655
NAPHTHA	8	0	0	8	357	0	0	0	351,894	352,259
AVIATION GASOLINE	0	213	2,585	2,798	2,895	16,433	50	101	5,630	27,907
KEROSINE/AV TURBINE	2,344	56,258	88,738	147,340	571,284	2,872,211	440,852	(3,994)	313,485	4,341,178
WHITE SPIRIT	0	7,127	0	7,127	7,464	409	0	(57)	4,679	19,622
GAS OIL	25,681	563,839	338,555	928,075	905,456	4,110,902	96,473	(5,472)	597,618	6,633,052
MARINE DIESEL	0	0	572	572	3,714	25,288	36,281	(277)	11,674	77,252
FUEL OIL	3,080	7,536	36,387	47,003	37,958	16,178,633	248,308	(403)	756,279	17,267,778
LUBES	5,198	74,171	0	79,369	51,126	13,897	1,711	(176)	38,626	184,553
GREASES	0	1,225	0	1,225	0	77	0	56	931	2,289
ASPHALTIC PRODUCTS	95	60,381	0	60,476	62,498	140,927	0	(365)	25,846	289,382
PETROCHEMICALS	5	5,797	0	5,802	5,671	37,026	0	0	54,375	102,874
OTHER FINISHED PRODUCTS	0	2,013	0	2,013	0	0	0	0	13	2,026
UNFINISHED PRODUCTS	0	0	0	0	0	0	0	0	1,501,672	1,501,672
TOTALS	47,992	4,543,301	466,837	5,058,130	5,317,406	26,460,543	823,675	(27,563)	4,190,495	41,822,686

* () = Loss

APPENDIX XXIV
SUMMARY OF CRUDE OIL ASSESSED FOR CROWN ROYALTY WITH PRICES AND ANALYSES - 1988
(FOR HALF YEARLY ASSESSMENT PERIOD ENDING 30th JUNE)

COMPANY	NET ROYALTY PRODUCTION (barrel)	FIELD STORAGE VALUE		ROYALTY PAYABLE	GASOLINE		LEAD
		Per Barrel	Dollar		Barrel	%	
TRINTOPEC (LAND)	2,788,751	42.05	117,279,168.71	11,727,916.90	160,912	5.77	1,169,041.46
GALEOTA	459,364	54.60	25,081,616.08	3,135,202.01	60,830	13.24	0.00
PCOL	12,069	44.55	537,657.50	53,765.74	1,086	9.00	9,525.60
ESTATE OF T. ROODAL	463	44.49	20,598.07	2,059.81	11	2.38	0.00
TRINTOC (PF)	1,112,309	43.75	48,660,612.37	4,866,061.25	118,480	10.65	3,962,285.08
TRINTOC (PAP) *	1,990,396	47.12	93,783,095.66	9,378,309.56	309,381	15.55	4,934,507.04
TRINMAR	7,004,396	42.62	298,538,466.97	29,853,846.70	888,641	12.69	31,354,854.72
AMOCO	12,209,169	59.45	725,889,054.74	90,736,131.85	1,587,777	13.00	24,534,061.44
TOTAL	25,576,917	51.21	1,309,790,270.10	149,753,293.82	3,127,118	12.23	65,964,275.34

* Estimated

continued

APPENDIX XXIV
SUMMARY OF CRUDE OIL ASSESSED FOR CROWN ROYALTY WITH PRICES AND ANALYSES - 1988
(FOR HALF YEARLY ASSESSMENT PERIOD ENDING 30th JUNE)

COMPANY	GAS OIL				TOTAL GAS OIL	%	FUEL OIL	
	53 - 57	48 - 52	43 - 47	# 2 FUEL			Barrel	%
TRINTOPEC (LAND)	0	1,620	4,512	457,748	463,880	16.63	2,163,959	77.60
GALEOTA	0	0	0	223,815	223,815	48.72	174,719	38.04
PCOL	0	0	610	2,177	2,787	23.09	8,196	67.91
ESTATE OF T. ROODAL	0	0	0	137	137	29.59	315	68.03
TRINTOC (PF)	66,745	0	133,225	0	199,970	17.98	793,859	71.37
TRINTOC (PAP) *	34,179	108,380	0	374,617	517,176	25.98	1,163,839	58.47
TRINMAR	0	799,867	0	0	799,867	11.42	5,315,888	75.89
AMOCO	0	8,705,849	0	0	8,705,849	71.31	1,915,543	15.69
TOTAL	100,924	9,615,716	138,347	1,058,494	10,913,481	42.67	11,536,318	45.10

* Estimated

APPENDIX XXIV
SUMMARY OF CRUDE OIL ASSESSED FOR CROWN ROYALTY WITH PRICES AND ANALYSES - 1988
(FOR HALF YEARLY ASSESSMENT PERIOD ENDING 31st DECEMBER)

COMPANY	NET ROYALTY PRODUCTION (barrel)	FIELD STORAGE VALUE		ROYALTY PAYABLE	GASOLINE		LEAD
		Per Barrel	Dollar		Barrel	%	
TRINTOPEC (LAND) *	2,750,888	44.22	121,654,746.03	12,165,474.61	164,607	5.98	2,686,201.14
GALEOTA	420,576	59.69	25,102,839.42	3,137,854.93	62,676	14.90	0.00
PCOL *	14,007	48.67	681,661.47	68,166.15	1,270	9.07	10,029.60
ESTATE OF T. ROODAL	583	46.28	26,978.84	2,697.89	15	2.57	0.00
TRINTOC (PF)	1,084,109	45.50	49,321,770.63	4,932,117.05	108,786	10.03	4,100,219.98
TRINTOC (PAP) *	2,032,279	50.70	103,034,111.34	10,303,411.14	349,421	17.19	6,203,674.84
TRINMAR	7,036,246	44.39	312,327,084.82	31,232,708.48	832,310	11.83	29,250,969.30
AMOCO	13,441,889	64.46	866,416,504.45	108,302,063.05	1,755,250	13.06	29,400,359.94
TOTAL	26,780,577	55.21	1,478,565,697.00	170,144,493.30	3,274,335	12.23	71,651,454.80

* Estimated

continued

APPENDIX XXIV
SUMMARY OF CRUDE OIL ASSESSED FOR CROWN ROYALTY WITH PRICES AND ANALYSES - 1988
(FOR HALF YEARLY ASSESSMENT PERIOD ENDING 31st DECEMBER)

COMPANY	GAS OIL				TOTAL GAS OIL	%	FUEL OIL	
	53 - 57	48 - 52	43 - 47	# 2 FUEL			Barrel	%
TRINTOPEC (LAND) *	0	2,191	3,255	475,466	480,912	17.48	2,105,369	76.54
GALEOTA	0	0	0	198,267	198,267	47.14	159,633	37.96
PCOL *	0	0	642	2,820	3,462	24.71	9,275	66.22
ESTATE OF T. ROODAL	0	0	0	173	173	29.68	395	67.75
TRINTOC (PF)	62,557	0	124,541	0	187,098	17.26	788,225	72.71
TRINTOC (PAP) *	19,606	127,721	0	389,296	536,623	26.41	1,146,235	56.40
TRINMAR	0	774,602	0	0	774,602	11.01	5,429,334	77.16
AMOCO	0	4,888,013	5,030,717	0	9,918,730	73.79	1,767,909	13.15
TOTAL	82,163	5,792,527	5,159,155	1,066,022	12,099,867	45.18	11,406,375	42.59

* Estimated

APPENDIX XXV
THE ROYALTY ASSESSMENT ON CRUDE OIL, NATURAL GASOLINE AND NATURAL GAS PRODUCED
ON STATE OIL MINING LEASES FOR EACH HALF-YEARLY PERIOD DURING 1986 - 1988

SOURCE OF REVENUE	ASSESSMENT OF HALF YEARLY PERIODS ENDING:					
	31-12-88	30-6-88	31-12-87	30-6-87	31-12-86	30-6-86
ROYALTY OF NATURAL GAS (\$TT)	\$1,051,557	\$995,564	\$945,249	\$868,171	\$896,681	\$926,949
ROYALTY OF NATURAL GASOLINE (\$TT)	-	-	-	\$6,074	\$77,951	\$63,023
MINIMUM RENT NET OFFSET BY ROYALTY ON CRUDE OIL (\$TT)	\$3,936,053	\$3,906,985	\$3,916,750	\$3,904,724	\$3,710,524	\$3,915,973
ROYALTY ON CRUDE OIL (\$TT)	\$170,144,493	\$149,753,294	\$184,433,915	\$192,288,620	\$157,463,223	\$182,595,703
HALF YEARLY TOTAL (\$TT)	\$175,132,103	\$154,655,843	\$189,295,914	\$197,067,589	\$162,148,379	\$187,501,648
YEARLY TOTAL (\$TT)	\$329,787,946		\$386,363,503		\$349,650,027	

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

SUBSTANCE ASSESSED FOR ROYALTY	UNIT	31-12-88	30-6-88	31-12-87	30-6-87	31-12-86	30-6-86
NATURAL GAS	M.C.F.	\$70,103,903	\$66,370,943	\$61,796,587	\$57,878,041	\$59,778,748	\$61,796,587
NATURAL GASOLINE	I.G.	0	0	-	\$29,343	\$389,386	\$387,041
CRUDE OIL NET	BARREL	\$26,780,577	\$25,576,917	\$26,331,302	\$27,744,799	\$29,919,782	\$29,227,448
FIELD STORAGE VALUE PER BARREL	\$TT	55.21	51.21	61.48	60.60	45.47	54.23
ROYALTY PAYABLE PER BARREL	\$TT	5.52	5.12	6.15	6.06	4.55	5.42

THE DATA USED TO EVALUATE CRUDE OIL FOR CROWN ROYALTY ASSESSMENTS

PRODUCT	31-12-88	30-6-88	31-12-87	30-6-87	31-12-86	30-6-86
BUNKER 'C' GRADE FUEL (\$TT)	40.729208	39.821963	53.827402	56.545673	36.781109	44.298412
NO. 2 FUEL (\$TT)	71.358915	67.721854	77.811519	72.146585	56.945618	68.482264
43-47 D.I. GAS OIL (\$TT)	72.056202	68.336510	78.426176	72.761241	57.560275	69.096921
48-52 D.I. GAS OIL (\$TT)	72.271414	68.526219	78.615885	72.950950	57.749983	69.286629
53-57 D.I. GAS OIL (\$TT)	72.701839	68.905636	78.995302	73.330368	58.129401	69.666047
70-72 OCT. M HEADED MOTOR GAS (\$TT)	81.013697	70.456997	73.776084	74.776888	57.479688	69.718893
AVERAGE MIDDLE RATE FOR SIGHT DRAFT ON N.Y./T.T CURRENCY FOR U.S. \$1.00	3.6135 4.265935*	3.6135	3.6135	3.6135	3.6135	3.6135
VALUE OF TETRA ETHYL LEAD IN TT CENTS PER MILLILITRE	4.333877	3.572101	3.223244	2.778745	2.902166	2.796804
ROYALTY ON TT CENTS/GALLON ON NATURAL GASOLINE (C.H.P.S.)	23.219106	20.206557	21.167468	21.438063	16.479407	19.976708

* Rate increase w.e.f. 17/8/88 due to devaluation of the TT Dollar

FIGURE 1

DEPTH DRILLED 1987 - 1988

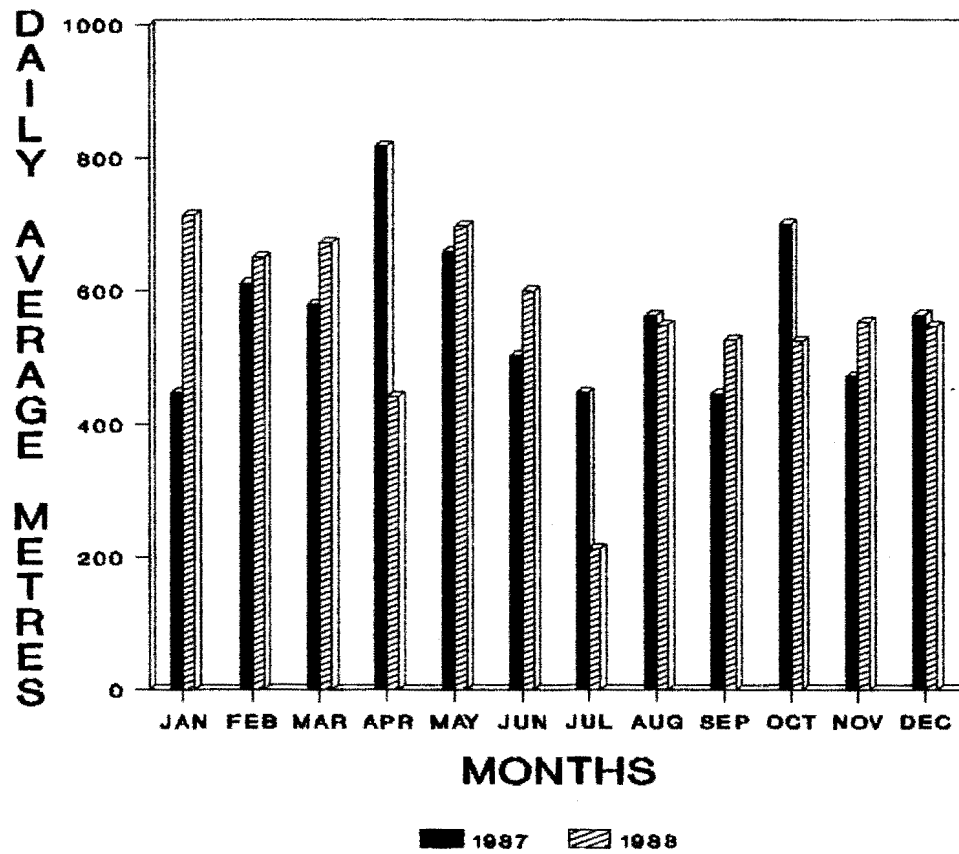


FIGURE 2

CRUDE OIL 1987-1988

Daily Average Production

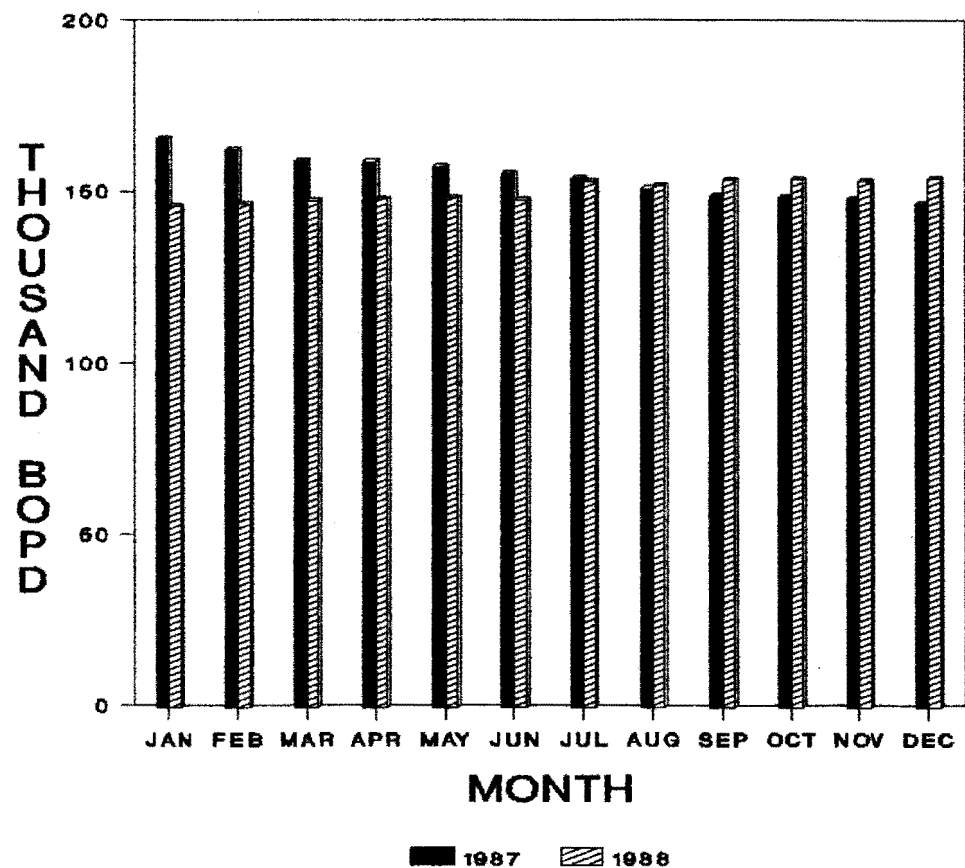


FIGURE 3

NATURAL GAS 1987-1988

Daily Average Production

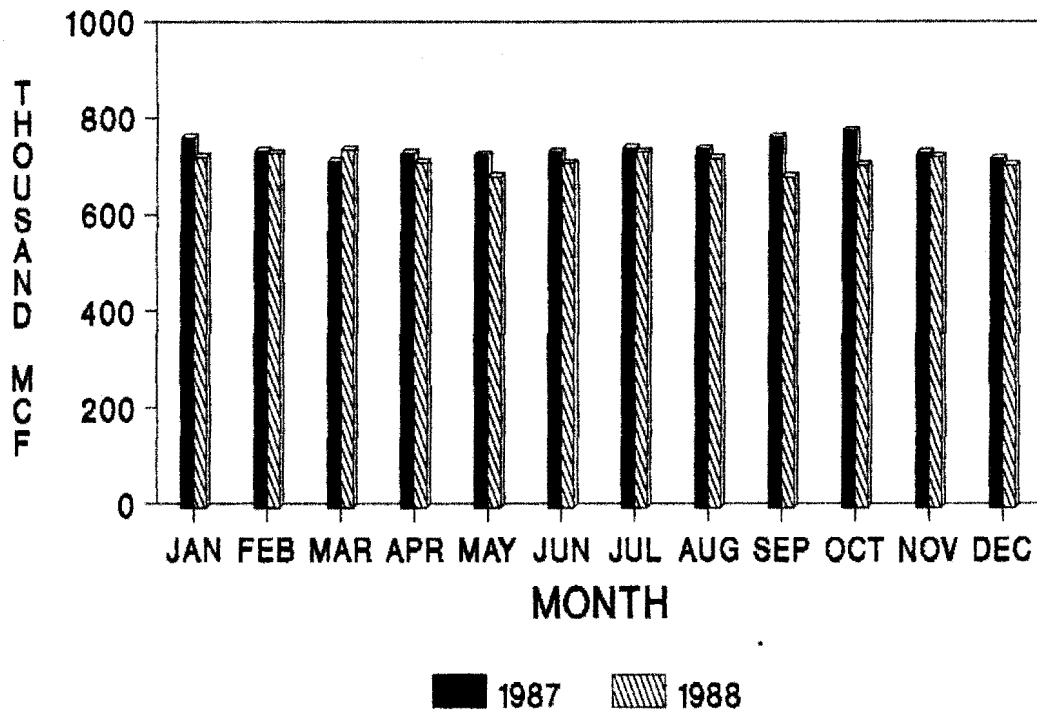


FIGURE 4 REFINERY 1987-1988
Daily Average Throughput

