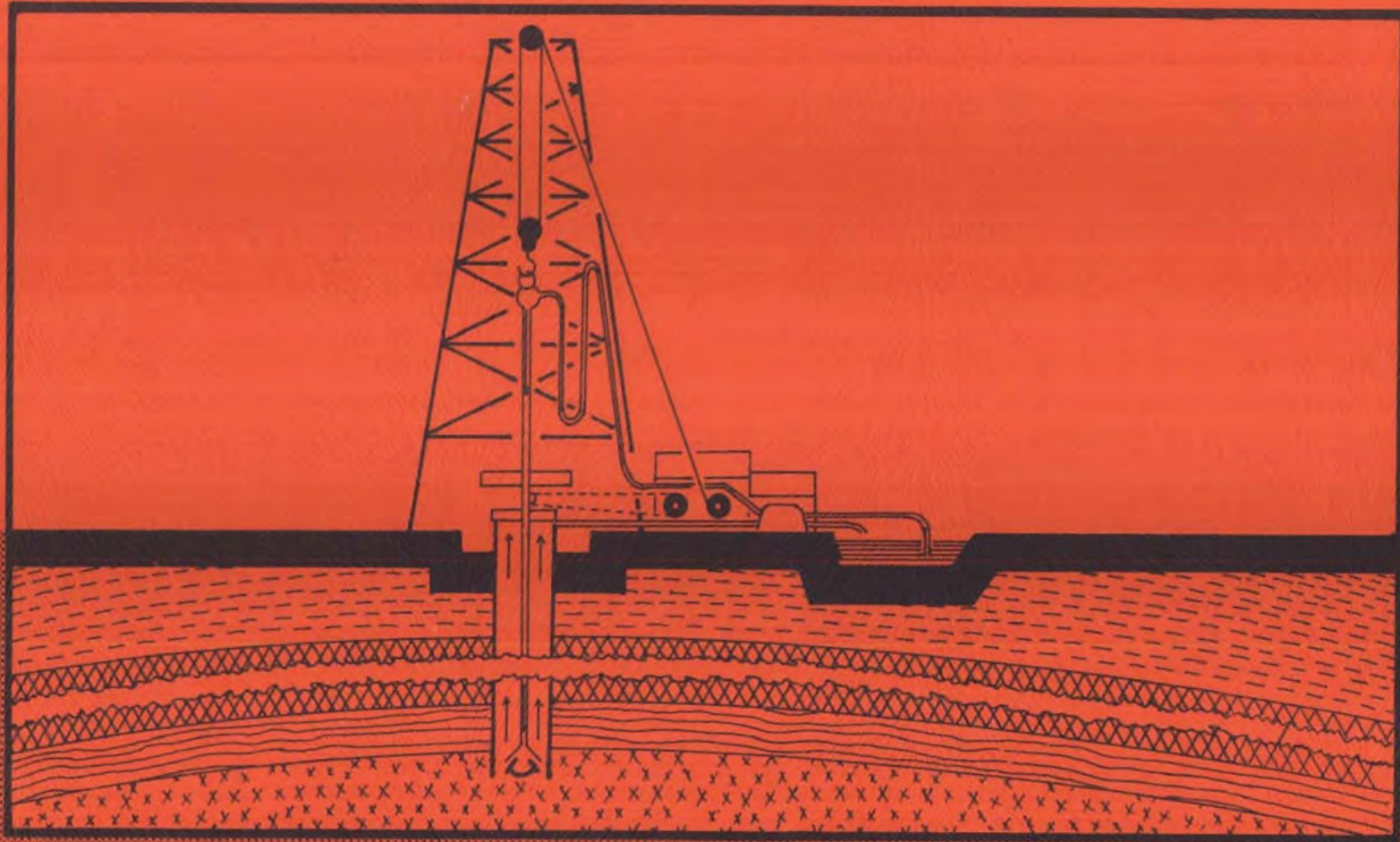




THE MINISTRY OF ENERGY, LABOUR, EMPLOYMENT  
AND MANPOWER RESOURCES (ENERGY DIVISION)

1987 ANNUAL REPORT



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## SECTION I

### 1. PETROLEUM EXPLORATION

#### 1.1 Geophysical Projects (Ministry of Energy)

The following projects were undertaken by the geophysical section during 1987:-

- (a) Block S-11, off the south coast was re-interpreted and three maps produced.
- (b) Computerization of the geophysical data base was completed and better storage facilities for our data were constructed. New forms have been designed for the reporting of geophysical activities by oil companies.
- (c) Members of the section served as committee members on the team appointed to set terms and conditions for the Competitive Bidding Order 1987.
- (d) Approval was obtained to store the Ministry's geophysical tapes at a location in Houston, Texas.
- (e) Three exploration wells were evaluated.
- (f) A study and re-mapping of selected open blocks off the east coast has been started.
- (g) A reservoir analysis of AMOCO's WEQB#1 well using seismic and well logs was started at GECO in Houston, Texas.

(h) Assistance was provided to the following agencies: Institute of Marine Affairs, Port Authority of Trinidad and Tobago, Airport Authority of Trinidad and Tobago.

(i) One member of the section attended the 57th annual SEG meeting, New Orleans and supervised the reservoir analysis study at GECO.

#### 1.2 Geophysical Surveys

Geophysical surveys were carried out by the following companies or agencies in 1987.

AMOCO: (i) AMOCO conducted a 405.2 line km of 3D seismic survey in North Teak 'B'.

(ii) Site surveys were carried out in the following areas: Teak-E, Samaan, N. SEG, W SEG-2X, Poul and WEQB#1.

TRINTOC (iii) TRINTOC conducted one vertical and two offset Vertical Seismic Profile (VSP) survey at Guayaguayare 659 exploratory well.

United States Geological Survey (iv) Utilizing the R/V Starella, the United States Geological Survey collected 1,786 line miles of gravity data over approximately 182 miles, offshore Trinidad and Tobago.

### 1.3 Exploration Drilling

During 1987 there were six exploration wells drilled as compared with nine in 1986 and fourteen in 1985. Four of these six wells were drilled on land by TRINTOC while Amoco Trinidad Oil Company drilled the remaining two in their marine acreage.

The Amoco Trinidad Oil Company exploration wells were West East Queen's Beach - 1 (WEQB-1) and Samaan A-7X while TRINTOC's wells were Springvale-1, Guayaguayare - 659, 660 and Antilles Ligoure Submarine-14 (ALS-14).

WEQB-1 reached a total measured depth of 14,629 feet, which was 371 feet short of the planned depth of 15,000 feet. The main objective of the well was to test the Pliocene section between 13,000 feet and 15,000 feet on a large domal structure developed below the Upper Pliocene unconformity.

WEQB-1 tested both natural gas and condensate from two horizons.

Additional hydrocarbon shows were encountered over the interval 13,940 feet to 14,000 feet but this interval could not be logged because of unstable wellbore conditions. WEQB-1 was plugged and abandoned at an estimated cost of \$42.976 million TT.

Samaan A-7X was spudded on December 16, 1987 to test the #2-Sand and the #4-Sand reservoirs. The well reached a total depth of 10,536 feet (measured depth) but the objective reservoirs were encountered wet. Samaan A-7X was plugged and abandoned on January 23, 1988 for an estimated cost of \$8.592 million TT.

Of the four (4) wells drilled on land, only ALS-14 can be considered a success. This well, which was classified as an outstep (Lahee's A-1) to Trinmar's East Soldado field encountered the objective Forest Sands oil-bearing. It was initially produced at 138 bopd. ALS-14 is believed to have proved up estimated reserves of 5 mm barrels of oil. The remaining three wells were unsuccessful. The wildcat Springvale-1 encountered the objective Springvale and Manzanilla sands wet. The new pool wildcat, Guayaguayare (GY) 659 and its replacement GY-660 did not encounter any hydrocarbon-bearing zones. The semi-exploratory well AS-125 and its replacement AS-126 were unable to reach the primary objective, the Underthrust Nariva Blanket sand, due to stuck pipe.

### 1.4 Geological Projects (Ministry of Energy)

#### i. Evaluation of South East Galeota Gas Field

In planning the future gas needs of the country a study was undertaken to evaluate the gas reserves of the South East Galeota (SEG) field. The SEG field is located about 5 miles east of Amoco's Cassia gas field and its discovery was based on the results of exploration wells, SEG 1 to 710.

#### ii. Samaan Study

A study was initiated to identify gas reserves (non-associated) in the Samaan field. The new 3-D seismic run over the field, along with data from wells east of the '9' fault were used in mapping and calculating reserves in the East Samaan field.

#### iii. Geological Review of the Nariva Block

In response to a proposal from Eurocan Ventures Limited for an exploration licence over the



Nariva Block, an inhouse review of the geology and prospectivity of the area was carried out.

The Nariva Block occupies a total of 92,500 acres of which 45,500 acres form part of the Nariva Swamp.

#### 1.5 Competitive Bidding Order - 1987

In November 1987, Cabinet agreed that a Competitive Bidding Order should be issued in respect of three blocks offshore Trinidad and Tobago, for petroleum exploration. These blocks were S-11, Lower Reverse 'L' and 'U'-shaped.

The closing date for the submission of bids was 15th March, 1988.

#### 1.6 Rationalization of Ex-Texaco Trinidad Inc. (Textrin)

In the Budget Speech of 1986, the Prime Minister and Minister of Finance and Planning revealed Government's intention to rationalize the industry as it relates to the producing areas of the nationally-owned operating companies. It was stated that the assets of Textrin which had been acquired by the Government through purchase and which were managed by TRINTOC with effect from February 28, 1985 would be shared between the nationally owned companies, TRINTOC and TRINTOPEC, taking full account of the advantages of rationalization as it relates to the producing areas.

The ex-TEXTRIN leases were allocated in 1987 as follows:

(a) The non-producing ex-Texttrin land areas -

#### TRINTOC

East Beach  
Rock Road  
West Beach (50%)  
Guayaguayare Bay  
S.E. Barrackpore  
Cap-de-Ville  
East Brighton  
Springvale

#### TRINTOPEC

Maloney  
East Goudron  
West Beach (50%)  
E. Morne Diablo  
N.E. Cedar Grove  
N.E. Lagoon Bouffe  
S.E. Kapur Ridge  
N.E. Moruga  
S.W. Moruga  
N.E. Tabaquite  
S.W. Tabaquite

(b) The producing fields:

i) TRINTOPEC - The Goudron, Tabaquite and Morne Diablo/Quinam fields.

ii) TRINTOC - All the remaining ex-Texttrin fields and a portion of TRINTOPEC's Moruga North field.

(c) All other land-based, ex-Texttrin producing areas were allocated to TRINTOC.

## 2. DEVELOPMENT DRILLING AND CRUDE OIL PRODUCTION

The total depth drilled in 1987 was 189 735 metres. This was a 14.6% decrease from the 1986 figure of 222 294 metres. There was also a decline in the number of well-completions, with 169 in 1986 and 160 in 1987.

For 1987, crude oil production in Trinidad and Tobago averaged 155,180 bopd. This represented a decline of 8.1% from the 1986 figure of 168,877 bopd. The only company to register any production increase was TRINMAR with a marginal 2.1% over their 1986 level. All other companies suffered declines. Total marine production averaged 115,415 bopd which represented 74.4% of the total 1987 production.

### 2.1 AMOCO TRINIDAD OIL COMPANY LIMITED (AMOCO)

Amoco Trinidad Oil Company experienced a considerable slowdown in activity during 1987. The number of operating rigs fell from five at the beginning of the year to three by May, the drilling rigs/PS #418 and DTI #130 having been demobilized. As a result, only nine wells were spudded during 1987 as compared to twenty-nine during the previous year. One of these was an exploration well, SA 7X. The exploration well WEQB #2, which was spudded in 1986 was completed in 1987 and proved a significant gas discovery.

The number of Ministry-approved workovers completed fell from forty seven in 1986 to thirty-one in 1987.

The decreased drilling and workover activity had a negative effect on crude oil production which

declined from 85,713 bopd in January to 66,034 bopd by December, averaging 73,974 bopd for the year. This decline is 15.7% less than the previous year's average. Production from the Cassia gas condensate wells contributed 0.5 mm barrels to the 1987 oil production effort.

Production from drilling activity increased marginally, while existing (old oil) production declined at a significant rate. Old oil production, which normally declines at 30-36% per annum was averaging a decline rate of approximately 50% for the first half of the year. This high decline rate was because of the failure, or high decline, of recently completed high-volume producers on Poui B and Teak C. Oil production on these two platforms declined by a total of 12,000 bopd from January to December. The combined effect of these factors caused the company to fail in achieving its projected oil production rate of 80,000 bopd for 1987.

### 2.2 TRINMAR LIMITED

Unlike 1986 when drilling was concentrated in South-West Soldado, drilling activity in 1987 was spread over the four fields North, Main, East and South-West Soldado.

No exploratory wells were drilled in 1987. The sole exploratory location, K19/LF-8, proposed since 1985, was drilled as a development well because of the rescheduling of locations in the forward drilling programme.

Seventeen development wells were spudded and sixteen completed as oil producers in 1987. These wells represented increases of 70% and 60% respectively above the figures for 1986. One spudded well was not completed because of mechanical problems.

The total depth drilled in 1987 was 28,681 m excluding 1,019 m of redrilled footage. This total footage represented 15.6% less than the figure recorded in 1986. Three drilling rigs were in use in 1987. These were the TG 145, the R. Womack and the Nealwell II. These rigs resulted in a maximum of 58 rig-days in May and a rig year average of 1.1. The average footage per rig day, however, decreased by 4.6% because of an increase of 20.8% in the number of rig days and a 15.6% increase in the total depth penetrated.

Crude oil production in 1987 increased by 2.1% to average 37,936 bopd. Total production for 1987 was 13,846,517 barrels. South-West Soldado was the only field with a significant production increase, i.e. 60.9%. All the other fields except Fortin Offshore showed production decreases. The most significant decrease was 11.7% experienced in the Soldado Main Field.

Of the company's total oil production, new oil from development drilling contributed 4.9%, secondary oil from the '8011' waterflood project 2.9% and oil from workover activity an additional 4.3%. In 1986 the respective contributions were 3.9%, 2.7% and 1.7%.

In 1987, four Ministry-approved workovers and fifty-five non-Ministry-approved workovers were performed compared to seven Ministry-approved and sixty-four non-Ministry-approved in 1986.

2.3 TRINIDAD AND TOBAGO PETROLEUM COMPANY LIMITED (TRINTOPEC)

TRINTOPEC operated a 2.03 rig year drilling programme, utilizing three drilling rigs for the first three months of 1987, before reducing this number to two for the remainder of the year. This reduction was

due to the company's financial position and limited availability of drilling locations.

In 1987, a total of eighty-four wells were spudded as compared to eighty-one in 1986. Of these wells, forty-four were non-thermal, while the remainder were thermal. This increase was a result of improved rig efficiency. In 1987, no exploratory drilling was done.

The company's workover schedule was reduced because of its workover selection technique, in order to minimize the number of high risk jobs. As in 1986, successful gravel packing and perforating techniques continued to enable the company to arrest the decline in its oil production on land.

During the second half of the year the number of workover rigs was reduced from twenty-one to sixteen.

Crude oil production for 1987 averaged 22,755 bopd. This figure was 0.9% or 215 bopd below that attained in 1986. During 1987, production peaked at 23,917 bopd in February, while the lowest production rate attained was 22,226 bopd in July.

Although the company's overall production rate decreased, thermal production continued to increase throughout 1987 to average 10,167 bopd.

2.4 TRINIDAD AND TOBAGO OIL COMPANY LIMITED (TRINTOC)

Four rigs were used during the year and a total of 33 wells was spudded, 41% less than in 1986. Of these, four were appraisal wells and twenty-nine were development, non-thermal wells. Total depth penetrated in 1987 was 160,826 feet, 29% less than in 1986. The average rate of penetration was 191 ft/rig day compared with 166.6 ft/rig. day in 1986. A 2.3

rig year programme of activity was achieved by TRINTOC compared with 3.7 rig years in 1986

Forty-one wells were completed in 1987 while forty-three wells were completed in 1986. The 1987 completions contributed 905 barrels of oil per day.

The number of Ministry-approved workovers done in 1987 was one hundred, which is thirty-one more than in 1986 but eight less than in 1985. Forty-nine of these were recompletions and these contributed 622 bopd of new oil.

TRINTOC produced 7,252,362 barrels of crude oil from 1,278 wells in 1987 at an average daily rate of 19,869 bopd. This represented a decrease from the 1986 average of 20,182 bopd. The contributions to total oil production in 1987 from development drilling, secondary production and the marine field were 7.7%, 14.2% and 2.5% respectively.

## 2.5 PREMIER CONSOLIDATED OILFIELDS LIMITED (PCOL)

One well, SFE 49 was spudded in December 1987 and 701 metres were drilled for the year. There were nine Ministry-approved workovers and 0.2 rig-years used in 1987.

In 1987 crude oil production from PCOL was 645 bopd.

## 3. SECONDARY AND ENHANCED OIL RECOVERY

During 1987, enhanced oil recovery operations in Trinidad and Tobago accounted for an average 23,929 barrels per day. This represented 15 percent of the country's total oil production of 56.64 million barrels.

Thermal recovery was the most successful enhanced oil recovery method employed, and further increases in thermal oil production were recorded during the year. Production reached 12,580 bopd from a total of fourteen active thermal schemes.

Oil production due to waterflooding operations remained at the previous year's level when it averaged 11,214 bopd.

Interest in establishing new enhanced oil recovery schemes continued during 1987 when two new schemes were commissioned. These brought the total number of enhanced oil recovery schemes to forty-one. In February, AMOCO commenced its second major waterflood project, the Samaan Waterflood. On land, TRINTOPEC initiated the Palo Seco 805 thermal project which is expected to yield 600 bopd at peak response.

### 3.1 WATER INJECTION

A total of 16.3 million barrels of water was injected into reservoirs associated with the waterflood schemes in Trinidad and Tobago. The volume injected was sixty-three percent above the 1986 figure and reflected the improved injection performance of AMOCO's Teak ACE waterflood project, following repairs to the injection system in 1986.

### 3.1.1 AMOCO

AMOCO injected 7.2 million barrels of water into five reservoirs in the Teak ACE Waterflood project and 2.1 million barrels of water into two reservoirs in the Samaan Waterflood project. The volume of water injected in the Teak area was a substantial increase of more than 100% over the previous year's figure. Despite the increased injection, however, oil production fell by 6.6% to 7,600 bopd. This behaviour is consistent with the fact that significant quantities of water were diverted to the small reservoirs in which injection had recently commenced and where full response to injection had not been achieved. In addition, greater injection rates could not have been achieved in the major producing reservoir because of an impairment to one of the injector wells.

### 3.1.2 TRINMAR

The volume of water injected by this company in 1987 was 4.2 million barrels, an increase of 9.5 percent on the previous year's. Oil production averaged 1,290 bopd, an increase of 7.5 percent on the previous year's production. The total volume of water injected into the reservoir up to December 31, 1987 was 32.8 million barrels, while the total amount of oil produced was 2,519,675 barrels.

### 3.1.3 TRINTOPEC

During 1987 0.788 million barrels of water were injected reservoirs in the Mackenzie and the Galeota Waterflood projects. There was no water injection in the Palo Seco and Coora fields, due to inadequate supplies of water.

During the year the company addressed the water shortage problem and carried out work on the establishment of a produced-water treatment plant. This plant is expected to provide 15,000 barrels per day of treated water.

Production from waterflooding operations averaged 958 bopd, and showed little change from 1986. The production was derived from ten waterflood projects, five of which are at Coora, two at Fyzabad and one each in the Galeota, Mackenzie and Palo Seco fields.

Offshore at the Galeota waterflood project, there was continued good response to waterflooding of the St. Hilaire Sands. Production averaged 604 bopd.

### 3.1.4 TRINTOC

TRINTOC injected water into five of its ten waterflood schemes during 1987. The volume of water injected was 1.96 million barrels, an increase of 96% on the previous year's. Oil production averaged 1,207 bopd and represented a significant increase of twenty-three percent on the previous year's. Average water cut was 66.8%.

At the Area IV Cruse G Waterflood, fill up has not been achieved, although there has been relatively good injection into the reservoir. Cumulative injection into the reservoir to date is 2.06 million barrels.

## 3.2 THERMAL RECOVERY

In 1987, there were fourteen thermal recovery projects in operation, one more than in 1986. Overall injection of steam increased by 11% to 20.1 million barrels, while production from the schemes increased

simultaneously by 8.5 % to 12,580 barrels of oil per day.

### 3.2.1 TRINTOPEC

TRINTOPEC continued to show improvement in its thermal recovery efforts, and employed a combination of huff and puff, and infill development drilling, to maximize the benefit derived from steam injection. As a consequence of good heating and improved production efficiency, oil production from the seven schemes averaged 10,167 bopd an increase of 9.8 % on the previous year's production of 9,287 bopd.

The Palo Seco thermal project continued to be the largest producer of thermal oil averaging 3,125 barrels of oil per day. Steam injection rates to the reservoir averaged 11,521 barrels of steam per day, resulting in an oil/steam ratio of 0.28. Steam quality was good and averaged 72 %. To improve the efficiency of the scheme, the company plans to inject steam to the D-sand unit within the scheme. This sand is the uppermost unit of the three sand member series and was not subjected previously to steam injection.

The Palo Seco 805 steamflood was commissioned in April 1987, utilizing five injectors. Steam injection rates averaged 2,000 bopd, while production was 100 bopd. At the Bennett Village Thermal project, oil production averaged 640 bopd an increase of 14.7 percent on the previous year's. The Central Los Bajos Thermal Scheme was expanded with the addition of four new steamflood patterns. Eleven new patterns are proposed for the scheme. Oil production averaged 1,619 bopd.

### 3.2.2 TRINTOC

TRINTOC increased the number of thermal schemes to six when in February 1987, the Parrylands Phase 1A

expansion was commissioned. This brought the number of thermal schemes to three, in the Parrylands area. Cyclic steam injection of the very viscous crude continued in this field in an attempt to reduce reservoir pressures and heat up the reservoir, before conversion to a continuous injection phase. All wells in the Pilot scheme which was established in 1981, have produced after the fourth cycle of injection. Production from this pilot project averaged 312 bopd. In the Phase 1 expansion project which was initiated during 1985, two cycles of injection were completed. Production averaged 105 bopd.

At the Point Fortin Area IV Cruse E steamflood, there continued to be good response to cyclic injection, and production averaged 241 bopd. Continuous injection continued at the Forest Reserve Project III and 8,900 barrels of steam per day were injected to realize an oil production rate of 1,570 bopd.

Overall, the oil production was 2,382 bopd, an increase of 6.3% on the 1987 production level. The steam injection rate was 12,140 barrels of steam per day, a decrease of 2.3% from 1986.

Premier Consolidated Oilfield Limited injected a total of 62,000 barrels of water as steam into eleven wells in their Fyzabad thermal project. Of these, seven were in the Fyzabad Thermal project pilot area and production from cyclic stimulation averaged 60 bopd. The other four were completed in the deeper Cruse formation. No response was obtained from injection to this reservoir. Failure of prepacked liners was reported as being responsible for the non-production of the four wells.

The company during 1987, registered a decline of 26.8% in secondary oil by producing at a rate of 60 bopd.

### 3.3 CARBON DIOXIDE INJECTION

No carbon dioxide was injected in 1987 because of corrosion within the pipeline system, however 135 bopd were produced from existing carbon dioxide projects.

## 4. NATURAL GAS

### 4.1 Production

Natural gas production during 1987 averaged 20.6 million cubic metres per day; a marginal decrease of 0.1% over the 1986 rate.

Amoco Trinidad Oil Company Limited (AMOCO) continued as the major producer of natural gas, accounting for 87.0% of total production; a 1.9% increase over the 1986 figure. Natural gas production from AMOCO fields - Cassia, Teak, Samaan and Poui - totalled 17.9 MMcm/d (9.2, 3.9, 3.0 and 1.7 MMcm/d respectively).

TRINMAR, the other marine-based producer, accounted for 6.3% of total natural gas production. This represented a 1.3% decrease when compared with the previous year.

The natural gas production from the land fields of the state-owned companies, TRINTOC AND TRINTOPEC, represented 6.7% of total production. TRINTOC's production rate of 0.8 MMcm/d represented a 9.8% decrease from 1986. TRINTOPEC however, achieved a production rate of 0.56 MMcm/d, a 3.5% increase over the production rate for 1986. Both companies continued to supplement their fuel needs with purchases from the National Gas Company (NGC). TRINTOC's purchases were for use in refinery operations and TRINTOPEC's were used primarily in areas of enhanced oil recovery.

### 4.2 Conservation

Low pressure gas from the Teak and Poui fields was compressed by NGC and made available for sales.

This operation contributed an additional 2.2 MMcm/d to the gas available for sales.

During 1987 NGC began the installation of additional compressors on the Teak Platform. These compressors will recover some 0.9 MMcm/d of low pressure gas now being flared. The facilities are expected to be commissioned during the second quarter of 1988.

#### 4.3 Utilization

Actual utilization for 1987 was 85.1% of total production. Overall utilization averaged 19.0 MMcm/d, and included quantities of re-compressed gas which were used for gas lift. This overall utilization showed an increase of 3.0% when compared to 1986. The oil companies accounted for 47.4% of overall consumption. The energy-based and small industrial users accounted for the remainder which was used both as fuel and as chemical feedstock.

AMOCO's gas lift requirements continued to increase during 1987 and averaged 5.8 MMcm/d, an increase of 18.4% when compared with that for 1986. Some of the gas used for gas lift was low pressure gas which had been collected and compressed by NGC. This significant increase in gas lift usage caused some concern and a gas lift optimization programme was effected by year's end. This exercise was designed to decrease the quantity of gas used for gas lift without causing any decrease in oil production.

Trinidad and Tobago Electricity Commission (T&TEC) utilized natural gas at a rate of 3.08 MMcm/d, a 4.4% increase over 1986. The necessity for an increased power supply to ISCOTT was the primary reason for the increased consumption of natural gas in this sector.

The manufacturers of fertilizers (FERTRIN, TRINGEN, FEDCHEM, TRINIDAD AND TOBAGO UREA COMPANY) accounted for 25.8% of the total volume of gas utilized. An average of 4.90 MMcm/d was used and represented a decrease of 0.8% over the previous year. The daily average consumption for FERTRIN was 2.56 MMcm/d. TRINGEN's consumption was 1.32 MMcm/d while FEDCHEM used 0.77 MMcm/d. The Trinidad and Tobago Urea Company accounted for 0.25 MMcm/d.

The Trinidad and Tobago Methanol Company utilized gas at a rate of 1.06 MMcm/d, the highest rate achieved since the plant began operations.

ISCOTT utilized 0.52 MMcm/d of natural gas. This represented a 26.8% increase over 1986 and was the highest level of consumption since the plant had been commissioned.

Gas production from TRINTOC's producing fields was supplemented by purchases from NGC to provide the fuel necessary for its refinery. Natural gas consumption in the refinery averaged 1.40 MMcm/d, an 11.4% increase when compared with 1986.

Trinidad Cement Limited and the other small consumers registered no changes in their total daily average consumption of natural gas. These companies purchased gas at a combined rate of 0.44 MMcm/d.



## 5. REFINING AND PETROCHEMICAL INDUSTRY

### 5.1 REFINING

The overall crude throughput of both refinery locations of Pointe-a-Pierre and Point Fortin during 1987 was 86,225 bpcd representing an increase of 5.3% over the previous year, due primarily to the processing of imported crudes. A total of 3,411,635 barrels of crude oil were imported during 1987 under processing agreements comprising 394,271 barrels of Canolimon, 74,898 barrels of Saramaca, 291,631 barrels of Facados, 592,621 barrels of reduced crude, 671,829 barrels of Mesa and 1,386,385 barrels of Antan crude.

### 5.2 NITROGENOUS FERTILIZERS AND METHANOL

Total production of ammonia during 1987 was 1 359 969 metric tons, a decrease of 2.8% over the previous year. Total exports during 1987 were 1 357 317 metric tons, a decrease of 3.8% below 1986.

At FERTRIN, the '01' unit produced a total of 400 477 metric tons of ammonia, an increase of 0.8% over 1986. The '02' unit produced 384 145 metric tons, a decrease of 3.5% below 1986. Total ammonia production at FERTRIN during 1987 was 784 592 metric tons, a decrease of 1.3% below 1986. Total exports of ammonia from Fertrin during 1987 were 768 057 metric tons of which 479 234 metric tons went to ship and the rest to the Trinidad and Tobago Urea company (TTUC).

At Federation Chemicals Limited (FEDCHEM), the Braun unit produced 211 234 metric tons of ammonia, a decrease of 7.9% from 1986. Total exports from FEDCHEM during 1987 were 228,562 metric tons, an increase of 12.3% over 1986. The TRINGEN II unit is

expected to commence production during the first quarter of 1988.

The Trinidad and Tobago Nitrogen Company Limited (TRINGEN) produced 364 143 metric tons of ammonia, a decrease of 2.9% below 1986. Total exports during 1987 were 360 698 metric tons, a decrease of 7.5% below 1986.

During 1987, the Trinidad and Tobago Methanol Company (TTMC) produced 424 292 metric tons of methanol, an increase of 28.3% over 1986. Total exports during 1987 were 425 714 metric tons, an increase of 34.9% over 1986.

The Trinidad and Tobago Urea Company (TTUC) during 1987, produced 443 376 metric tons of urea, a decrease of 3.5% below 1986 while total exports were 470,590 metric tons a decrease of 0.9% below 1986.

### 5.3 PRODUCTION AND EXPORTS OF FERTILIZERS 1986 - 1987 METRIC TONS

COMPANY	PRODUCT	PRODUCTION		EXPORTS	
		1986	1987	1986	1987
FEDCHEM	AMMONIA	229 393	211 234	203 450	228 562
TRINGEN	AMMONIA	375 028	364 143	389 829	360 698
FERTRIN	AMMONIA	795 133	784 622	818 055	768 057
SUB TOTAL		1 399 554	1 399 969	1 411 334	1 357 317
TTUC	UREA	490 311	443 376	474 815	470 590

TTMC METHANOL 330,762 424,292 315,396 425,714

#### 5.4 CONSUMPTION OF PETROLEUM PRODUCTS IN TRINIDAD AND TOBAGO

Overall domestic consumption of petroleum products declined by 2.6% in 1987. The consumption of fuel oil increased over the 1986 total of 1.3 million litres. However this increase was insignificant in smoothing a downward trend which has persisted for the past five years.

Motor gasoline sales declined by 1.5% over the 1986 total of 549.8 million litres, with similar trends for auto diesel (5.9%), aviation turbo fuel (19.5%), lubes and greases (9.6%), kerosines (2%) and bitumen (19.5%).

In 1987, motor gasoline comprised 66%, auto diesel 17.7% and LPG 10.6%, of the total domestic petroleum product consumption. Together, kerosines and aviation turbo fuel comprised only 2.8%. It is projected that with the general downturn in the economy and increases in retail product prices, little change in consumption patterns can be expected.

#### 5.5 DOMESTIC PETROLEUM PRODUCT CONSUMPTION (MILLION LITRES)

Product	1983	1984	1985	1986	1987
Motor Gasoline	523.1	535.8	543.8	549.8	541.7
Kerosines	19.1	15.8	13.3	10.1	9.9
Auto Diesel	206.8	187.2	180.4	153.9	144.9
Marine Diesel	4.6	2.9	0.3	0.1	0.1
L.P.G.	84.4	80.5	85.1	97.2	87.1
Aviation Gas.	0.6	0.6	0.5	0.5	0.5
Aviation Turbo Fuel	14.2	12.4	11.0	16.4	13.2
Fuel Oil	35.6	27.6	7.6	1.3	3.3
Lubes and Greases	11.2	10.3	10.3	12.5	11.3
Bitumen	24.0	21.5	17.2	11.3	9.1
TOTAL	923.6	895.3	869.5	843.1	821.0

## 6. SAFETY

In both oilfield and refinery operations during 1987, 369 accidents were reported to the Ministry of Energy. This figure includes the 136 accidents which occurred at the Point Fortin and Pointe-a-Pierre refinery locations, and represents a decrease of 57 or 13% when compared with last year's figure of 426.

Of the 233 accidents which occurred on the land and offshore producing fields, TRINTOC accounted for 76 accidents, TRINMAR reported 60 accidents, AMOCO reported 38, TRINTPEC 39 and NGC 20. The 233 reported accidents were 8% lower than the corresponding figure for 1986.

### 6.1 PERSONAL ACCIDENTS

Accidents were classified as serious and non-serious depending on the extent of the injury sustained. Serious personal accidents totalled 181 showing a decrease of 25% below last year's figure of 240. These accidents consisted mainly of deep cuts, lacerations, dislocations and low back injuries.

Non-serious accidents which amounted to 51 showed an increase of 43 over the figure for 1986. These accidents consisted mainly of abrasions, bruises and soft tissue injuries.

Approximately 7,976 man-days were lost as a result of both serious and non-serious accidents.

There was one fatality in 1987. This occurred on January 1st., 1987 during a crane operation on the George H. Galloway Marine Jack-up Unit in AMOCO.

### 6.2 NON-PERSONAL ACCIDENTS

Sixteen non-personal accidents were investigated by the Ministry during 1987. These accidents included tank fires, "blow-outs", crane boom failures and the toppling of production rigs. Four of these were classified as major accidents.

The first major accident occurred on February 10, 1987 while a contractor rig was recompleting TRINTOC's Well No. BP 526. During the course of the operation, a blowout occurred and the resultant pollution affected approximately fifty houses.

On February 21st 1987, a fire and an explosion took place at a power-oil tank on TRINMAR's platform #20 while that system was being commissioned. Another major accident that was investigated occurred on October 12, 1987 when a contractor rig toppled during a freak storm while it was rigged up on Palo Seco Well #304 in TRINTOC's licensed area. The rig was inactive at the time of the accident.

The fourth major accident occurred on November 20, 1987, when a double-pole winch was reaming a water well in TRINTOC's licensed area at Point Fortin. The "dead-man" anchors came out of the ground, the mast fell and it was severed at its lower end.

### 6.3 GENERAL

In an effort to provide more accurate and meaningful statistics on accidents that occur within the petroleum industry the Ministry introduced a new form: the MISC-3 report. Petroleum companies are now submitting a monthly summary report on 'Lost Time Accidents', days lost, frequency and severity rates.

*SECTION II*7 INDUSTRIAL MINERALS AND ENGINEERING GEOLOGY

Emphasis was placed on two areas of activity during 1987:

- (i) Performing routine exploratory, administrative and regulatory functions; and
- (ii) Attempting to update the existing quarries legislation and to establish a comprehensive set of policy guidelines for the industry.

7.1 EXPLORATORY ACTIVITY

Details of the exploratory work which was performed in 1987 are:

## A. CLAY

In 1987 The Ministry of Energy diversified its exploration thrust to include comprehensive evaluations of clay deposits and of pre-abandoned gravel areas and negotiations were resumed with Cariri to finalise a project contract for the testing of 500 clay samples from a 150 acre parcel at Turure, Valencia.

Negotiations were also held with Caroni Limited to do detailed evaluation of some of the vast clay resources known to be located on Caroni's Lands.

## B. SAND AND GRAVEL

(i) (Matura) - After two and a half years the sand and gravel survey at the Mora Trace in the Matura Forest was completed. In 1987 a total of 300 acres were surveyed with the identification of approximately 100 000 cubic meters of gravel which occurred essentially as uneconomic isolated pockets, one to two feet in thickness.

(ii) (Wallerfield)- A gravel evaluation survey was conducted on a 170-acre parcel, west of Orinoco Road, Wallerfield. From October to December, a total of 69 holes were drilled for a total footage of 1,566 feet. Sandy clays, with scattered pockets of gravel (one to two feet thick) were encountered in a few isolated holes.

7.2 REGULATORY

Ten investigations were conducted in 1987 and these fell into one of the following categories:

- (i) Encroachment upon State Lands

- (ii) Pollution of natural watercourses by quarry operators
- (iii) Unauthorised quarrying operations on State Lands
- (iv) Miscellaneous (Meetings, Royalty Payment, Investigations, complaints)

#### ENCROACHMENTS

Four cases of encroachment upon State lands were investigated. Evidence for two of the cases indicated that operators had entered upon State lands, destroyed forest and illegally extracted sand and gravel.

#### 7.3 POLLUTION

##### (i) Water Pollution:

In 1987 the operations along the Aripo River were the first to be investigated. Through the continued vigilance of the Mining Inspectorate of this Ministry, and aided by the dormancy of some operations, the problem of the pollution of the Aripo River can be considered to be under control.

The operators that actually pollute the Oropouche River and its tributaries were identified and called on to clean-up their operations.

River pollution was also a problem in the Diego Martin area. The operations at Capildeo's Quarry and Percy Daniel's Quarry were investigated and corrective

action recommended.

##### (ii) Dust Pollution

The perennial problem of dust pollution in the Ravine Sable and Claxton Bay areas was addressed by the Mining Inspectors.

#### 7.4 ROYALTY PAYMENTS

Royalties are paid by concessionaires on State Lands for material quarried. The following is a breakdown of Royalty collected and volume extracted in the various Counties.

##### (i) St. Andrew/St. David

At December 31, 1987 the total volume of sand and gravel won from State concessions in this county amounted to 82,552 cu. yd. This figure represented an increase of approximately 25% over the volume extracted in 1986. A sum of \$65,104.00 was collected by the Revenue Department. The total outstanding balance of uncollected revenue is now \$1,330,358.25.

##### (ii) St. George East

The total volume of sand and gravel extracted in the county of St. George East during the period January to

December 1987 was 28,395 cu. yd. The amount of royalty paid at their Revenue Office was \$56,790.00. However, the revenue outstanding from operators of this county stands at \$442,660.79.

(iii) St. Patrick

The total volume of porcellanite mined in this County was 3261.91 cu. meters and royalty collected by the Revenue Officer amounted to \$9,723.30

## 7.5 THE MINERAL RESOURCES POLICY

By the end of 1987, all the aspects of the industry that needed to be addressed by this document were identified and itemised. Subsequently, a draft format for the Policy was finalised and discussions are being held to delegate individual responsibilities for collection of data and the preparation of different sections of the document.

## 7.6 NEW CONCESSIONS

Despite a further slackening in the demand for construction aggregate in 1987, the Ministry continued to receive applications for quarry concessions on state lands. Most of the applications were for sand and gravel concessions in the Wallerfield, Valencia, Matura areas, although a few persons applied for sand quarries in Central Trinidad, Porcellanite Quarries in County St. Patrick and even argillite and clay deposits in isolated areas.

A total of thirty applications for quarry concessions were received. Of these however, only three were recommended to the Quarries Advisory Committee. This was due to the department's reluctance to approve applications for virgin lands at a time when demand is shrinking, environmental problems are escalating and many abandoned areas still contain economic deposits of gravel.

## 7.7 RENEWAL OF SAND AND GRAVEL AGREEMENTS

In 1987 the Unit recommended the renewal of three Sand and Gravel Agreements. When one considers that such renewals are mandatory for all concessions on State Lands, the impracticality of the existing system of renewals becomes obvious. This is one of the main areas to be addressed both by the draft legislation and the proposed policy.

## 7.8 SUPPORTIVE

In keeping with its policy of providing geological and geotechnical assistance to other government agencies upon request, the Unit was involved in the following supportive activities during 1987:-

- (i) An assessment of the aggregate potential of three different areas within a 600-acre estate at Grande Riviere was conducted from August to December for the Ministry of Food Production, Marine Exploitation, Forestry and the Environment.

- (ii) An assessment of certain volumetric parameters of a limestone body at La Pastora Estate, Lopinot was undertaken in December, following a request by the Valencia Division of the Town and County Planning Department.
- (iii) Attempts were made to locate alternative solid waste disposal sites in the Rio Claro area for the Mariva/Mayaro County Council.
- (iv) Attempts were made to locate appropriate beach sand deposits for special agricultural research projects being carried out by the Ministry of Food Production, Marine Exploitation, Forestry and the Environment.
- (v) Assistance was given to the Ministry of Works, Settlement and Infrastructure with respect to a landslide hazard at St. Barb's Road, Laventille.
- (vi) Soil stability advice was provided to the Town and Country Planning Department with respect to a proposed housing development at the Aripero well-site area in south-western Trinidad.

*SECTION III*8. GENERAL ADMINISTRATION

The administrative branch of the Ministry, which is responsible for providing the necessary administrative and managerial support services to the Ministry includes the following staff:-

- 1 Administrative Officer V
- 1 Administrative Officer IV
- 3 Administrative Officer II  
(including the officer attached to the Development Section, San Fernando).
- 1 Records Manager
- 2 Administrative Assistants
- 1 Clerk IV
- 1 Auditing Assistant

This staff has the responsibility for Personnel Management, Records Management, Registry, Office Management, and Internal Auditing.

8.1 PERSONNEL MANAGEMENT

In 1987 there was little activity in the staffing arrangements at both the professional and technical levels.

In January 1987, the Permanent Secretary, Mr. Trevor Boopsingh was transferred to the

Ministry of Energy, Labour, Employment and Manpower Resources (Labour). He was replaced by Mr. Reynold Rampersad, who was transferred from the Ministry of Industry, Enterprise and Tourism.

Four members of staff resumed duty at the Ministry after completion of study leave:-

- (1) Mr. Herbert Sukhu resumed duty as a Mining Inspector with effect from 22nd September, 1987.
- (2) Mr. Indar Narace resumed duty as Petroleum Inspector I with effect from 6th July, 1987.
- (3) Mrs. Joyce Lynch resumed duty as State Counsel I with effect from 15th October, 1987.
- (4) Mr. David Wilson resumed duty as Petroleum Engineer II with effect from 19th February, 1987.

8.2 TRAINING - 1987

The Ministry continued its policy to develop the skills, techniques and technology required for meeting the needs of the industry and for the development of its staff.

In-house training began in January with the Permanent Secretary lectures on "Petroleum Economics for Engineers and Geologists." delivered by the Permanent Secretary.



By the end of June several courses had been conducted by personnel of this Ministry. These included training in "How to use the Computer and the Software available", "A Workshop for Secretarial Personnel" and "An update Seminar for Members of Staff who joined the Ministry in 1982 - 1987".

In addition, the Ministry nominated one hundred and twenty-one staff members to attend various courses offered by the Central Training Unit.

## 9. REVIEW OF SUBSIDY/SURPLUS 1987

During 1987 the total subsidy on the sale of petroleum products was \$32,153,573 whilst the surplus income arising from such sale totalled \$17,584,503. 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, Labour, Employment and Manpower Resources, is deposited to the Consolidated fund.

In January 1987 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 1987, the market prices of petroleum products on which our ex-refinery prices were based remained at a depressed level, in spite of higher crude prices. (This reflects the timing difference between variations in crude prices and product prices). 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 accounts for 47.7 percent of the total subsidy.

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

1987, this subsidy constituted 38.6 percent of the total subsidy.

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

PRODUCTION LEVY PAYABLE BY COMPANIES

	Total Subsidy	Cents per/barrel	Surplus		Levy Paid	** Production for Levy Purposes	Levy per/bbl
1977	87,341,068	104.99	-	AMOCO	15,543,909.46	27,685,156	56.14
1978	93,636,718	111.42	-	TRINTOPEC	7,311,529.88	12,937,412	56.91
1979	178,295,170	227.36	-	TRINTOC	6,706,087.38	11,835,079	56.66
1980	286,628,408	368.84	-	TEXACO	<u>2,592,045.88</u>	<u>4,599,515</u>	<u>56.35</u>
1981	327,286,923	469.48	-	TOTAL	<u>32,153,572.60</u>	<u>57,057,162</u>	<u>56.35</u>
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				

\*\* Production is for the period December 1, 1986 to November 30, 1987.

## 10. LEGAL GROUP

The following activities were handled on a continuing basis, although some of these activities had been initiated in earlier years:

### 10.1 LEGISLATION

- a) Comments from organizations of persons in the Quarrying Industry on the draft Quarry Laws were received and were being evaluated so that the necessary amendments could be made.
- b) The draft Compressed Natural Gas Regulations are still with the Chief Parliamentary Counsel.
- c) Technical officers are in the process of preparing their comments on the Pollution Arbitration and Compensation Board. Since the Chief Parliamentary Counsel has requested more detailed instructions on the powers of the Board vis-a-vis a court of summary jurisdiction with respect to the conduct of hearings.
- d) The first draft of the document seeking to implement the recommendations contained in the report on all aspects of the domestic marketing of L.P.G. was received from the Office of the Chief Parliamentary Counsel and comments on the same are to be formulated.

### 10.2 LICENCES

Applications for Exploration and Production (Public Petroleum Rights) Licence on land were temporarily deferred as a result of the

rationalization exercise in respect of leases on land.

### 10.3 DEEDS

- (a) A draft Deed of Variation with respect to the extension of Exploration Licence No. 9051 of 1970 was forwarded to Amoco Trinidad Oil Company for verification.
- (b) The proposed deed to vary royalty provisions in Deed No. 4434 of 1970 (S.E.C.C.) was not prepared since no instructions were given to do so. A draft deed was circulated among the companies and the agreed draft was submitted to Cabinet.
- (c) The registration of three Exploration and Production (Public Petroleum Rights) Licences is being handled by the Chief State Solicitor's Department.

### 10.4 CONTRACTS executed during 1987 include:

Draft Oil Spill Agreement between Trinidad and Tobago and Venezuela.

### 10.5 GENERAL

- a) Research study was done on the safety and security of offshore installations since the repeal of the Oil Mining and Refining Ordinance Ch. 26 No. 3 as amended by the Petroleum Act Ch. 62:01.
- b) Advice on the issuance of Retail Marketing Licence to specified dealers.

## 11. PETROLEUM INSPECTORATE

During 1987 a committee comprising all Senior Technical Officers of the Operations Section and headed by the Director Operations (Ag) conducted an examination of the operations and functions of the section. Among the aims of this study was the optimization of manpower resources in order to achieve effective execution of the Ministry's statutory obligations.

11.1 Arising from this exercise, the Petroleum Inspectorate was reorganized as follows:-

- (a) Fiscalization and Galeota
- (b) Inspection Unit
- (c) Pipelines and Oil Loss
- (d) Refining and Petrochemical
- (e) Storage and Marketing

The specific duties of each section were detailed and are briefly summarized :

- (a) Fiscalization and Galeota  
(Formerly Fiscalization and Pollution)

This section is now responsible for the fiscalization of all oil and gas produced throughout the industry. At Galeota, there is now a continuous daylight coverage, a round-the-clock shipment coverage and the monitoring of other related duties.

- (b) Inspection Unit

This section will continue to be responsible for the safe operations and proper maintenance of production facilities in all companies. In addition, effluent monitoring and pollution abatement facilities have been included in the duties of this unit.

- (c) Pipelines and Oil Loss

This is a new section which monitors the pipeline activities, formerly handled by the Gas, Storage and Pipeline Sections, and the pollution activity of the former Fiscalization and Pollution Section.

The principal reason for the merging of these two areas of activity was the high incidence of oil losses resulting from pipeline failure. It was also agreed that the Ministry needed to update its pipeline information system and to establish regulatory guidelines which will help the industry attain and maintain the required standards.

- (d) Refining and Petrochemicals

This section will continue to conduct effluent monitoring programmes at Refineries and Petrochemical Plants and to inspect pollution abatement facilities associated with these plants.

- (e) Storage and Marketing

This section is responsible for the storage and marketing of all petroleum products in Trinidad and Tobago.

The duties of this section formerly included the fiscalization of gas sold to companies throughout the country, but this is now the responsibility of the Fiscalization and Galeota Section.

## 12. THE ENVIRONMENT

### 12.1 POLLUTION

The 245 oil spill incidents in 1987 were almost double the amount reported in 1986. This large increase in the number of spills is due to the fact that for 1987, in the case of TRINTOC, all spills greater than one barrel were reported, while in 1986 only spills of significant volumes of oil were reported. However, the amount of oil spilled in 1987 (13,609 barrels) was less than that spilled in 1986 (39,800 barrels). The percentage of oil recovered in 1987 - 80% also exceeded the 64% recovered in 1986, and as such the actual volume of oil lost to the environment was 1,887 barrels in 1987 while the quantity lost in 1986 was 14,200 barrels.

TRINTOC recorded 169 oil-loss incidents, of which leaks and equipment failure accounted for 69%, and overflows and blowouts for 26%. TRINTOPEC reported 36 oil-loss incidents of which leaks and equipment failure caused 39%, and overflows and blowouts made up 31%. TRINMAR had four oil loss incidents, with 57% being due to leaks and equipment failures, while 43% was due to overflows and blowouts. Both the National Gas Company and Amoco Trinidad Oil Company had spills which were due to overflows from pollution pits or sumps.

### 12.2 MARINE EMERGENCY MANAGEMENT

In January, the Planning Division of the Ministry of Finance in conjunction with the Canadian Coast Guard sponsored a one-week course in Marine Emergency Management. Four officers associated with the National Oil Spill Contingency Plan (NOSCP) from the Ministry of Energy attended the course.

The course was designed to prepare personnel to effectively and efficiently manage a major marine emergency. An important aspect of the course was the analysis of realistic case studies requiring management response to marine spills.

Topics covered during the course included the following:-

- (a) Pollution counter measures - an overview
- (b) Crisis Management
- (c) Response Organization
- (d) Contingency Planning
- (e) Public Relations
- (f) Administration and Pollution Laws

The Recommendations made by the participating team as a result of this course included the following:-

- (i) that the NOSCP members should be exposed to regular drills and simulation exercises to assess their responses to marine oil spills;
- (ii) that a review of the NOSCP should be conducted to include information on approved waste disposal sites, high pressure cleaning equipment usage and revised sensitivity data;
- (iii) that a committee should be appointed to examine the introduction of a Pollution Claims Fund.

### 12.3 TRINIDAD AND TOBAGO/VENEZUELA BILATERAL OIL SPILL COOPERATIVE AGREEMENT

During 1987, progress was made towards the finalization of a bilateral, oil spill agreement with the Government of Venezuela. Two meetings were held, one in Port-of-Spain and the other in Caracas. Draft agreements were tabled and studied. Mr. Hugh Hinds, Mr. Stanley Reid and Ms. Lynette Stephenson represented the Ministry at these meetings. It is anticipated that the final document will be ready for signature sometime in the second quarter of 1988.

The Trinidad and Tobago/Venezuela Oil Spill Agreement would encompass the following major objectives:-

- (i) Procedures for alerting the competent Venezuelan authorities.
- (ii) Plans for an integrated response action to minimize or reduce pollution in inter-territorial waters.
- (iii) Preparation of emergency plans to cope with possible accidents/incidents.
- (iv) Exchange of data, provision of technical assistance and training in marine environmental studies, evaluation of the NATIONAL OILSPILL

### 12.4 EVALUATION of the NATIONAL OILSPILL CONTINGENCY PLAN (NOSCP).

A technical expert, of the European Economic

Community, Mr. John Oestergaard was contracted by the Ministry in early January to carry out a six month assignment geared towards a re-evaluation and updating of the NOSCP. Mr. Oestergaard's tasks also included advice to the Ministry on hazardous materials contingency planning capability and the training of supervisors in spill clean-up activities and co-ordination.

Comprehensive documents comprising the report with its recommendations for change and a clean-up manual were presented to the Ministry on the completion of the technical assistance contract.

The recommendations in the report were then exhaustively studied by the Ministry's personnel and another document highlighting these officers' comments on the said report were also submitted for the consideration of Cabinet in 1988.

During the period of the contract, Mr. Oestergaard was involved in making field trips to the areas of the country experiencing pollution problems. Two one-day seminars organized by the Ministry and conducted by Mr. Oestergaard, were held in 1987. A wide range of participants from different companies heard lectures on the latest oil spill clean up and control technology.

### 12.5 ADMINISTRATION OF THE ENVIRONMENT

As an integral part of the LOME II aid agreement between the Government of Trinidad and Tobago and the European Economic Community, a training course on the Administration of the Environment was offered in September to four officers of this Ministry and three officers from Trinidad and Tobago Coast Guard. The Ministry of Energy was represented by Mr. Hugh C. Hinds, Controller of NOSCP, Messrs. Stanley Reid,

Allyson Gajraj and Oswald Adams, Assistant Controllers of the NOSCP

The course covered a range of topics delivered by experts in subjects related to the management systems used in the control and monitoring of oil and hazardous materials spills in the environment. Field trips were made to various laboratories and factories to discuss with scientists and engineers the techniques used in monitoring and handling oil and hazardous materials spills, especially as they may relate to the Trinidad and Tobago environment.

Participation in the course in Denmark has enabled the team of officers on their return to recommend in their report, policies which would contribute to reducing the risk of pollution in Trinidad and Tobago. Some of these recommendations include the following:-

- (i) The enactment of environmental legislation which would facilitate Governmental participation in international conventions, and bilateral agreements to combat marine pollution.
- (ii) Financing of a NOSCP Fund which could be used to offset pollution clean-up costs and claims in the event of a spill.
- (iii) Soliciting the services of research organizations such as CARIRI, Institute of Marine Affairs and NIHERST to ensure that research and development in the field of oil and hazardous materials control technology are expanded.

- (iv) The acquisition of dual purpose devices to facilitate airborne pollution surveillance by the airwing of the Ministry of National Security during the execution of their duties.

### 13. PETROLEUM TESTING LABORATORY

The Ministry's Petroleum Testing Laboratory analysed 971 samples during 1987. The effluent studies of the Trinidad and Tobago Methanol Company, FERTRIN and Trinidad and Tobago Urea Company which were initiated in 1986, were continued on a fortnightly basis. Ad hoc monitoring of the AMOCO and TRINTOPEC operations on the East Coast continued throughout 1987. Towards the middle of the year, however this programme was structured on a fortnightly basis. A one-month, intensive effluent monitoring programme was conducted at TRINMAR's main storage. Tests were also performed in the following areas -

- Natural gas analysis
- Royalty Lease Evaluations of Crude Oils
- Octane ratings of super gasolines and light fractions
- Analysis of gas oils, fuel oils and lubricating oils
- Effectiveness - testing of dispersants
- Testing of chemicals for oil field use approval
- Analysis of scale samples, voranol, asphalts, insecticides and other petroleum products
- Round-robin testing of petroleum products.

There has been an increase in the number of clients seeking consultancy services concerning the manufacture of petroleum products. In the past consultancy services consisted mainly of trouble

shooting and associated testing.

In 1987 the laboratory earned a total of \$140,210 from work performed for private clients.



#### 14. INFORMATION SERVICES

During 1987 there was great activity in the Library especially in the area of data entry into the bibliographical data base. 2,700 records were added to the data base in Port of Spain and 1,400 records at the San Fernando Office Library. Unfortunately, due to problems with the computer hardware, the library staff was unable to search the data base during the last quarter of the year. This situation is expected to be remedied early in 1988 with the provision of adequate disk storage. The latest version of the CDS/ISIS software program was received in December 1987.

A book vote of \$100,000.00 enabled the staff to maintain most of the subscriptions to journals and to acquire some new books and periodicals. Co-operation with other energy related libraries also helped, in that some material which the ministry was not able to purchase, was made available to staff.

##### Books received:

Purchased	90 titles	134 volumes
Gift	503 titles	542 volumes

##### Periodicals Issues received:

Purchased:	1292 titles	2123 volumes
Gift	1208 titles	1731 volumes

##### Periodicals Titles received:

Purchased	73
Gift	96

Articles Indexed: - 1664

##### Loans:

Books	-	636
Periodicals	-	398

14.1 A highlight during the year was the appointment of the Ministry's library as National Focal Point for the Caribbean Energy Information System (CEIS) and the Librarian III as liaison officer for Trinidad and Tobago. The CEIS is an information system funded by the International Development Research Centre, UNESCO and the Commonwealth Science Council, to support regional energy activities. It is expected to function as an integrated system with a regional focal point at the Scientific Research Council in Jamaica and national focal points in participating countries, inter-linking to form a network.

The Energy Librarians Group, an informal group of librarians in the energy sector will now be formalized under the auspices of the Caribbean Energy Information System.

During the year the staff of the Ministry's Library was increased and now consists of:-

- 1 Librarian III
- 1 Librarian I (for CEIS activities)
- 1 Library Assistant II
- 1 Library Assistant I
- 2 Clerk Typists 1 - (for data entry)

## 15. THE ENERGY PLANNING DIVISION

Generally 1987 was regarded as a calm year in the oil market. As such, this lull provided the opportunity same for the Energy Planning Division to regularize its activities and to put in place more monitoring controls; particularly in the expanded gas-based sector.

The activities undertaken by the Division included the following:-

### 15.1 POLICY MATTERS

(i) Preparation of an Energy Petroleum Policy of Trinidad & Tobago

A draft document was circulated for public comment. These comments were evaluated and the document is being re-drafted.

(ii) Policy On The Petrol Service Station Industry

A draft policy statement for the petrol service station industry was prepared and submitted to the National Petroleum Marketing Company for comments. These were evaluated and the policy is being finalized.

(iii) Revision Of The Petroleum Tax Legislation

Much attention was paid to the reviewing of proposals for petroleum tax legislation. This culminated in the pronouncements made in this regard in the 1988 Budget presentation.

(iv) Reorganization Of Role Of The Ministry of Energy And Energy State Companies

Proposals were put forward for the

restructuring and roles of both the Ministry of Energy and also state companies in the energy sector.

### 15.2 EVALUATION AND MONITORING OF PROJECTS

(i) Evaluation Of Projects

Officers of the Division participated in the evaluation of the following gas-based projects: the integrated ammonia/urea plant, the Point Fortin methanol plant and a proposed ethanol plant.

(ii) CYN Pilot Project

Work on the Compressed Natural Gas (CNG) Pilot Project continued to be monitored. Proposals for the construction of additional CNG stations have been submitted for evaluation.

(iii) Pricing

International events with respect to pricing of crude oils and market developments in the ammonia, urea, methanol and steel industries continued to be monitored.

### 15.3 REPORTS AND STUDIES

(i) Study On The Petroleum Sector Service Companies

A joint study was undertaken with the Central Bank to survey the sales and operations of companies serving the petroleum sector. The results of the survey are being finalized.

(ii) Report On The National Energy Balances

A document on the National Energy Balances of the Republic Of Trinidad and Tobago 1979 - 1983, was finalized and distributed. In addition work on the compilation and preparation of the annual national Energy Balances for 1984 - 1986 continued.

(iii) Meeting Summary

Summaries were prepared for the Fifth Meeting of Informal Group of Latin American and Oil Exporting Countries and also for the XVII Council of Experts and XVIII Meeting of the Ministers of the Latin American Energy Organization.

15.4 ROUTINE MATTERS

(i) Pricing Of Petroleum

There was continued monitoring of the prices of the export crudes and the on-going exercise to establish ex-refinery and wholesale prices of the refined products sold locally.

(ii) Issuing And Renewals Of Marketing Licences

Fees are collected annually from the petrol station dealers for the renewal and issuing of marketing licences. In 1987, licences were renewed for 195 stations. Five stations, four of which were located in South Trinidad, ceased operation.

## APPENDIX I

## SUMMARY OF EXPLORATORY AND SEMI-EXPLORATORY ACTIVITIES IN 1987

OPERATOR	WELL NAME	LOCATION	BASIS FOR LOCATION	LAHEE EXPLORATORY CLASS	DATE SPUDED	DATE COMPLETED	TOTAL DEPTH IN METRES	BIOLOGICAL OBJECTIVE	RESULT/REMARKS
AMOCO TRINIDAD OIL COMPANY LIMITED	WEST EAST QUEEN BEACH 1	WEQB-1	S&SSG	B1	86.11.02	87.03.10	4 459	PLIOCENE SEDIMENTS	ABANDONED - AFTER TESTING
	SAMAAN A 7X	SAMAAN A	S&SSG	A2C	87.12.16	-	1 558	PLIOCENE 2 AND 4 SANDS	DRILLING
TRINIDAD AND TOBAGO OIL COMPANY LIMITED	BARRACKPORE 532	B.10 FI-2	S&SSG	B1	86.12.13	87.04.06	1 965	INTERMEDIATE HERRERA SANDS	COMPLETED - OIL
	SPRINGVALE - 1	D.17 NK-12	S&SSG	C3	87.01.28	87.03.11	2 347	SPRINGVALE/ MANZANILLA FORMATION	ABANDONED - AFTER TESTING
	GUAYAGUAYARE - 659	H.19 CK-7	S&SSG	C2C	87.05.13	87.06.05	1 347	LOWER GROS MORNE SANDS	ABANDONED - DRY
	GUAYAGUAYARE - 660	H.19 CK-7	S&SSG	A2C	87.06.09	-	1 939	LOWER GROS MORNE SANDS	TESTING
	BRIGHTON ALS 14	F.14 NN-8	S&SSG	B1	87.08.01	87.12.02	2 642	FOREST SANDS	COMPLETED - OIL
	BRIGHTON AS 125	F.10 CB-5	S&SSG	C1	87.09.25	87.10.04	409	NARIVA SANDS	ABANDONED - DRY
	BRIGHTON AS 126	F.10 CB-5	S&SSG	A1	87.10.06	-	1 233	NARIVA SANDS	SUSPENDED

## APPENDIX II

## ANNUAL STATISTICS OF PRODUCTION, DRILLING, REFINING, EXPORTS AND IMPORTS 1987 - 1977

ITEM	UNIT	PERCENTAGE CHANGE 1987 OVER 1986	1987	1986	1985	1984	1983
1. CRUDE OIL	'000 BBL	-8.1	56,641	61,640	64,259	62,041	58,344
2. CASING HEAD GASOLINE (C.H.P.S.)	'000 BBL	-96.0	1	25	23	29	34
3. TOTAL CRUDE OIL AND NATURAL GASOLINE (1+2)	'000 BBL	-8.1	56,642	61,665	64,282	62,071	58,378
4. CRUDE OIL PRODUCTION - STATE OIL RIGHTS	'000 BBL	-8.6	54,098	59,176	61,845	59,734	55,988
5. CRUDE OIL PRODUCTION - PRIVATE OIL RIGHTS	'000 BBL	+3.2	2,543	2,464	2,414	2,308	2,356
6. TOTAL IMPORTS	'000 BBL	-29.1	5,527	7,797	3,852	6,774	8,133
7. IMPORTS OF REFINED PRODUCTS	'000 BBL	-63.2	2,115	5,742	3,609	6,428	8,133
8. IMPORTS OF CRUDE OIL FOR REFINING	'000 BBL	+118.7	3,412	1,560	243	346	0
9. IMPORTS OF OTHER OILS FOR REFINING AND BLENDING	'000 BBL	-100.0	0	495	0	0	0
10. TOTAL EXPORTS	'000 BBL	-4.2	55,749	58,175	60,345	61,294	57,715
11. EXPORT OF CRUDE OIL	'000 BBL	-13.7	28,370	32,867	35,358	32,518	31,065
12. EXPORTS OF REFINED PRODUCTS	'000 BBL	+8.2	27,379	25,308	24,987	28,776	26,650
13. RUNS TO STILL	'000 BBL	+5.1	31,472	29,936	29,673	28,147	27,178
14. DAILY REFINERY CAPACITY	BBL/DAY	0	305,000	305,000	305,000	305,000	305,000
15. NUMBER OF WELLS SPUDDED	AS STATED	-17.6	145	176	182	198	174
16. TOTAL NUMBER OF WELLS COMPLETED	AS STATED	-5.3	160	169	197	213	179
17. NUMBER OF DRILLING WELLS COMPLETED AS OIL WELLS	AS STATED	-12.8	116	133	156	165	162
18. NUMBER OF DRILLING WELLS ABANDONED	AS STATED	-16.7	15	18	14	17	13
19. TOTAL DEPTH DRILLED (ALL WELLS)	METRE	-14.6	189 735	222 294	199 402	206 830	183 797
20. DEPTH DRILLED ON STATE OIL RIGHTS	METRE	-15.8	184 620	219 246	192 149	200 438	163 533
21. DEPTH DRILLED ON PRIVATE OIL RIGHTS	METRE	+67.8	5 115	3 048	7 253	6 392	20 258
22. AVERAGE DEPTH OF COMPLETED WELLS (16)	METRE	-7.2	1 295	1 395	1 100	1 153	1 051
23. AVERAGE NUMBER OF WELLS PRODUCING	AS STATED	+1.5	3,256	3,209	3,167	3,142	3 140
24. AVERAGE NO. OF WELLS PRODUCED BY FLOWING	AS STATED	-9.1	320	352	325	319	344
25. AVERAGE NO. OF WELLS PRODUCED BY ARTIFICIAL LIFT	AS STATED	+2.8	2,936	2,857	2,842	2,823	2,796
26. AVERAGE DAILY PRODUCTION PER PRODUCING WELL	BARREL	-9.3	47.7	52.6	55.6	54.1	50.9
27. AVERAGE DAILY PRODUCTION PER FLOWING WELL	BARREL	-18.0	114.6	139.7	139.7	139.6	121.4
28. AVERAGE DAILY PRODUCTION PER ARTIFICIAL LIFT WELL	BARREL	-3.6	40.4	41.9	46.0	44.0	42.1
29. TOTAL VALUE OF DOMESTIC EXPORTS	'000\$	+6.7	5,178,962	4,854,712	5,120,719	5,044,400	5,431,684
30. TOTAL VALUE OF PETROLEUM PRODUCTS (ITEM 29)	'000\$	+6.2	3,748,392	3,528,661	4,191,329	4,168,910	4,632,967
31. TOTAL VALUE OF ASPHALT PRODUCTS	'000\$	+3.7	22,665	21,866	15,925	11,130	6,737
32. TOTAL NATURAL GAS PRODUCED	MILLION M <sup>3</sup>	-1.0	7 512	7 585	7 412	7 228	6 318
33. USED AS FUEL	MILLION M <sup>3</sup>	+3.8	3 311	3 190	2 957	2 552	3 102
34. REPLACED IN FORMATION	MILLION M <sup>3</sup>	0	0	0	0	0	0
35. LOSSES, NOT COLLECTED	MILLION M <sup>3</sup>	-36.9	94	149	261	249	214

## APPENDIX II—Continued

## ANNUAL STATISTICS OF PRODUCTION, DRILLING, REFINING, EXPORTS AND IMPORTS 1967 - 1977

ITEM	UNIT	1967	1968	1969	1970	1971	1972	1973
1. CRUDE OIL	*000 BBL	64,618	69,107	77,613	78,249	83,778	83,619	
2. CASING HEAD GASOLINE (C.H.P.S.)	*000 BBL	28	38	37	44	60	61	
3. TOTAL CRUDE OIL AND NATURAL GASOLINE (1+2)	*000 BBL	64,646	69,146	77,650	78,293	83,838	83,680	
4. CRUDE OIL PRODUCTION - STATE OIL RIGHTS	*000 BBL	62,215	66,602	74,879	75,399	80,701	80,612	
5. CRUDE OIL PRODUCTION - PRIVATE OIL RIGHTS	*000 BBL	2,403	2,505	2,734	2,850	3,077	3,007	
6. TOTAL IMPORTS	*000 BBL	27,046	39,047	55,309	51,631	56,817	67,441	
7. IMPORTS OF REFINED PRODUCTS	*000 BBL	3,654	440	0	0	0	1,681	
8. IMPORTS OF CRUDE OIL FOR REFINING	*000 BBL	23,392	38,607	55,309	51,631	56,817	65,760	
9. IMPORTS OF OTHER OILS FOR REFINING AND BLENDING	*000 BBL	0	0	0	0	0	0	
10. TOTAL EXPORTS	*000 BBL	87,667	95,511	113,493	113,105	126,604	140,753	
11. EXPORT OF CRUDE OIL	*000 BBL	37,462	42,519	46,075	46,282	54,008	50,936	
12. EXPORTS OF REFINED PRODUCTS	*000 BBL	50,205	52,992	67,418	66,823	72,596	89,817	
13. RUNS TO STILL	*000 BBL	55,105	63,345	78,343	82,857	85,882	99,536	
14. DAILY REFINERY CAPACITY	BBL/DAY	305,000	456,000	456,000	456,000	456,000	456,000	
15. NUMBER OF WELLS SPUDED	AS STATED	232	206	156	190	236	235	
16. TOTAL NUMBER OF WELLS COMPLETED	AS STATED	215	206	183	184	215	217	
17. NUMBER OF DRILLING WELLS COMPLETED AS OIL WELLS	AS STATED	169	161	140	144	170	170	
18. NUMBER OF DRILLING WELLS ABANDONED	AS STATED	26	14	19	40	45	47	
19. TOTAL DEPTH DRILLED (ALL WELLS)	METRE	252 936	239 609	205 492	380 592	272 826	281 116	
20. DEPTH DRILLED ON STATE OIL RIGHTS	METRE	220 747	220 806	189 869	374 350	263 344	268 841	
21. DEPTH DRILLED ON PRIVATE OIL RIGHTS	METRE	32 189	18 803	15 623	6 242	9 482	12 275	
22. AVERAGE DEPTH OF COMPLETED WELLS (16)	METRE	1 083	1 132	1 084	2 068	1 179	1 279	
23. AVERAGE NUMBER OF WELLS PRODUCING	AS STATED	3 372	3 408	3,351	3,399	3,275	3,148	
24. AVERAGE NO. OF WELLS PRODUCED BY FLOWING	AS STATED	392	392	397	516	507	428	
25. AVERAGE NO. OF WELLS PRODUCED BY ARTIFICIAL LIFT	AS STATED	2,980	3,016	2,954	2,883	2,768	2,720	
26. AVERAGE DAILY PRODUCTION PER PRODUCING WELL	BARREL	52.1	55.4	63.3	63.0	70.1	72.8	
27. AVERAGE DAILY PRODUCTION PER FLOWING WELL	BARREL	149.1	118.8	248.9	215.4	271.4	335.7	
28. AVERAGE DAILY PRODUCTION PER ARTIFICIAL LIFT WELL	BARREL	39.6	39.0	42.1	35.8	33.2	31.4	
29. TOTAL VALUE OF DOMESTIC EXPORTS	*000\$	7,118,368	9,025,898	9,715,719	6,175,213	4,810,025	5,188,987	
30. TOTAL VALUE OF PETROLEUM PRODUCTS (ITEM 29)	*000\$	6,491,617	8,051,501	9,127,773	5,715,496	4,379,188	4,787,280	
31. TOTAL VALUE OF ASPHALT PRODUCTS	*000\$	6,782	1,134	3,253	3,355	360	3,051	
32. TOTAL NATURAL GAS PRODUCED	MILLION M <sup>3</sup>	5 841	5 604	5 601	4 807	4 472	4 236	
33. USED AS FUEL	MILLION M <sup>3</sup>	2 842	941	2 283	2 039	1 960	1 783	
34. REPLACED IN FORMATION	MILLION M <sup>3</sup>	0	0	0.1	0.5	3.2	9.4	
35. LOSSES, NOT COLLECTED	MILLION M <sup>3</sup>	297	356	357	2 329	2 080	241	

## APPENDIX III

## SUMMARY OF DEVELOPMENT DRILLING IN TRINIDAD AND TOBAGO - 1987

FIELD, AREA OR DISTRICT	NUMBER OF OIL & GAS PRODUCERS COMPLETED	NUMBER OF ABANDONED WELLS	TOTAL COMPLETION	TOTAL DEPTH DRILLED IN METRES	NUMBER OF RIGS ACTIVELY DRILLING DEVELOPMENT WELLS ON 31st. DECEMBER, 1987
1	16(a)	0	16(a)	28 680	1
2	21(b)	1	22(b)	7 889	0
3	1	1	2	1 655	0
4	63(c)	6	69(c)	77 879	0
5	11(d)	0	11(d)	4 410	0
6	10	1	11	9 291	0
8	11	1	12	25 394	2
11	10(e)	1	11(e)	21 885	1
<b>TOTAL</b>	<b>143</b>	<b>11</b>	<b>154</b>	<b>177 083</b>	<b>4</b>

- (a) INCLUDES 2 WELLS COMPLETED OTHER  
(b) INCLUDES 10 STEAM INJECTORS - DEPTH 750 METRES  
AND 1 WELL COMPLETED OTHER  
(c) INCLUDES 12 STEAM INJECTORS - DEPTH 6 517 METRES  
(d) INCLUDES 3 STEAM INJECTORS - DEPTH 759 METRES  
(e) INCLUDES 1 WATER INJECTOR - DEPTH 659 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, Quinaa, 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, Samean, 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 - 1987  
(Depth drilled in metres)

MONTH	NEW WELLS STARTED	DRILLING WELLS COMPLETED												OLD WELLS				
		OIL & GAS PRODUCERS		INJECTION WELLS		ABANDONED						COMPLETED OTHER		TOTAL WELLS	TOTAL AGGR DEPTH	AGGR DEPTH PER WELL	RE- COMP LETED	ABAN- DONED
						AFTER TESTING		DRY HOLES		TECHNICAL CAUSES								
		NO.	AGGR DEPTH	NO.	AGGR DEPTH	NO.	AGGR DEPTH	NO.	AGGR DEPTH	NO.	AGGR DEPTH	NO.	AGGR DEPTH	NO.	AGGR DEPTH			
JANUARY	14	11	12 061	3	1 308	0	0	0	0	1	524	0	0	15	13 893	926	6	1
FEBRUARY	15	10	11 467	5	2 608	0	0	0	0	1	3 057	0	0	16	17 132	1 071	10	0
MARCH	15	10	11 162	0	0	2	6 806	0	0	0	0	0	0	12	17 968	1 497	11	0
APRIL	8	15	20 456	9	4 086	0	0	0	0	0	0	0	0	24	24 542	1 023	7	0
MAY	14	11	18 677	0	0	1	1 029	1	732	0	0	0	0	13	20 438	1 572	7	0
JUNE	11	6	9 343	0	0	0	0	2	2 795	0	0	2	2 947	10	15 085	1 509	9	1
JULY	8	8	10 968	2	2 611	0	0	0	0	1	313	0	0	11	13 892	1 269	10	0
AUGUST	9	10	15 855	0	0	0	0	1	1 600	0	0	0	0	11	17 455	1 587	11	0
SEPTEMBER	12	6	11 697	2	1 216	0	0	1	472	0	0	0	0	9	13 385	1 487	3	0
OCTOBER	12	11	16 451	3	2 103	0	0	3	2 391	0	0	1	792	18	21 737	1 208	7	1
NOVEMBER	12	8	12 771	1	701	0	0	1	655	0	0	0	0	10	14 127	1 419	7	1
DECEMBER	15	10	16 818	1	671	0	0	0	0	0	0	0	0	11	17 489	1 590	9	0
TOTAL 1987	145	116	167 726	26	15 304	3	7 895	9	8 645	3	3 894	3	3 739	160	207 149	1 295	97	4
TOTAL 1986	176	139	192 951	16	11 040	3	8 693	10	17 625	5	4 497	2	963	169	235 769	1 395	33	1

APPENDIX V  
MONTHLY ANALYSIS OF LAND AND MARINE DEPTH DRILLED - 1987  
(metres)

MONTH	STATE LAND	PRIVATE LAND	SUB-TOTAL LAND	MARINE	SUB-TOTAL STATE	TOTAL	RIG MONTHS	DAILY AVG. DEPTH	DAILY AVG. DEPTH/ RIG	MARINE % OF TOTAL DEPTH
JANUARY	10 513	1 390	11 903	6 542	17 055	18 443	9.30	595	64	35
FEBRUARY	14 089	0	14 089	1 172	15 261	15 261	8.69	545	63	8
MARCH	11 914	1 984	13 898	7 432	19 346	21 330	7.61	688	90	35
APRIL	9 139	281	9 420	4 080	13 219	13 500	6.67	450	67	30
MAY	11 031	0	11 031	5 799	16 830	16 830	8.74	549	62	34
JUNE	11 453	0	11 453	4 197	15 650	15 650	9.37	522	56	27
JULY	10 149	0	10 149	1 077	11 226	11 226	5.94	362	61	10
AUGUST	11 122	0	11 122	2 067	13 189	13 189	6.62	425	64	16
SEPTEMBER	9 997	759	10 756	5 262	15 259	16 018	7.34	534	73	33
OCTOBER	11 813	0	11 813	2 976	14 789	14 789	7.33	477	65	20
NOVEMBER	11 380	0	11 380	6 238	17 618	17 618	5.23	587	112	35
DECEMBER	9 586	701	10 287	5 592	15 178	15 879	5.90	512	87	35
TOTAL	132 186	5 115	137 301	52 434	184 620	189 735	88.74	520	70	28

APPENDIX VI  
CRUDE OIL PRODUCTION BY FIELDS, AREAS OR DISTRICTS - 1987

COMPANY, FIELDS AREAS OR DISTRICTS	DISCOVERY YEAR	TOTAL WELLS COMPLETED	ANNUAL PRODUCTION		CUMULATIVE PRODUCTION THROUGH DECEMBER, 1987 * 000 BARRELS
			1987	1986	
			BARRELS	BARRELS	
<b>TRINIDAD &amp; TOBAGO OIL CO. LTD.</b>					
BALATA EAST AND WEST	1952	75	143,190	119,095	3,215
CATSHILL	1950	134	122,823	139,024	23,027
INNISS	1956	41	38,970	41,477	6,213
ROCK DOME	1962	3	0	0	16
PENAL	1936	289	355,723	393,088	62,042
NEW DOME	1928	31	5,712	3,494	3,136
POINT FORTIN EAST	1929	168	0	274,683	26,353
SAN FRANCOISE	1929	27	8,328	9,153	5,979
AREA IV AND GUAPO	1963	192	484,094	500,419	38,709
PARRYLANDS 1-5	1913	508	608,484	603,153	40,127
POINT FORTIN CENTRAL	1916	233	632,234	761,165	20,276
POINT FORTIN WEST	1907	318	213,934	175,546	20,431
LOS BAJOS	1918	29	0	0	546
ERIN	1963	4	0	0	710
MAHAICA	1954	6	0	0	0
GUAYAGUAYARE	1902	699	631,132	565,916	86,477
TRINITY	1956	95	85,155	71,771	15,131
BARRACKPORE	1911	369	833,397	811,996	30,817
ORPOUCHE	1944	128	62,448	67,101	6,639
MORNE DIABLO/QUINAM	1926	92	17,004	33,568	7,694
FOREST RESERVE	1913	2,042	1,816,079	1,607,252	259,156
PALO SECO	1929	933	805,635	793,361	93,122
BRIGHTON	1903	620	247,309	279,807	72,675
PT. LIGOURE	1937	13	8,943	0	2,440
ERIN	1963	24	32,433	9,794	2,347
COUVA MARINE	1963	6	0	0	301
CRUSE	1913	150	15,599	17,697	25,908
WILSON	1936	82	67,033	72,924	19,985
TABAQUITE	1911	225	16,703	14,836	1,776
BALATA CENTRAL	1949	6	0	0	371
MAYARO		9	0	0	0
<b>TOTAL</b>		<b>7,551</b>	<b>7,252,362</b>	<b>7,366,320</b>	<b>875,619</b>

APPENDIX VI—continued  
CRUDE OIL PRODUCTION BY FIELDS, AREAS OR DISTRICTS - 1987

COMPANY, FIELDS AREAS OR DISTRICTS	DISCOVERY YEAR	TOTAL WELLS COMPLETED	ANNUAL PRODUCTION		CUMULATIVE PRODUCTION THROUGH DECEMBER, 1987
			1987	1986	
			BARRELS	BARRELS	
<b>TRINIDAD &amp; TOBAGO PETROLEUM CO.LTD.</b>					
FYZABAD/APEX QUARRY	1920-1938	1,039	1,507,531	1,387,722	170,550
GUARPO/BOODOOSINGH	1922	654	816,997	784,707	46,295
MORUGA EAST	1953	77	30,739	37,710	2,709
MORUGA NORTH	1956	23	3,918	1,337	1,038
MORUGA WEST	1957	129	18,316	42,997	9,196
COORA/QUARRY	1936	733	778,720	677,544	91,180
PALO SECO/ERIN/MC KENZIE	1926	1,576	3,138,219	3,292,527	117,001
NORTH MARINE	1956	19	0	0	1,269
GALEOTA	1963	105	1,069,486	1,213,102	15,218
CENTRAL LOS BAJOS	1973	231	933,390	944,039	8,488
ORPOUCHE	1973	3	5,887	6,783	269
BARRACKPORE	1977	4	2,478	2,872	108
<b>TOTAL</b>		<b>4,593</b>	<b>8,305,681</b>	<b>8,391,334</b>	<b>463,321</b>
<b>PREMIER CONSOLIDATED OILFIELDS LIMITED</b>					
SIPARIA	1957	5	8,525	11,954	872
SAN FRANCISQUE	1929	103	111,782	156,388	3,529
FYZABAD/ROODAL	1918	266	66,258	72,003	13,411
PALO SECO	1915	83	562	314	1,641
BARRACKPORE	1970	8	44,053	40,892	304
ICACOS	1955	11	4,333	4,551	488
DEFUNCT FIELDS	1954	19	0	0	323
<b>TOTAL</b>		<b>495</b>	<b>235,513</b>	<b>286,102</b>	<b>20,568</b>

APPENDIX VI—continued  
CRUDE OIL PRODUCTION BY FIELDS, AREAS OR DISTRICTS - 1987

COMPANY, FIELDS AREAS OR DISTRICTS	DISCOVERY YEAR	TOTAL WELLS COMPLETED	ANNUAL PRODUCTION		CUMULATIVE PRODUCTION THROUGH DECEMBER, 1987 * 000 BARRELS
			1987	1986	
			BARRELS	BARRELS	
<b>TRINIDAD NORTHERN AREAS</b>					
FOS/FT	1954	35	104,848	99,458	7,001
SOLDADO	1955	654	13,741,669	13,459,032	462,680
<b>TOTAL</b>		<b>689</b>	<b>13,846,517</b>	<b>13,558,490</b>	<b>469,681</b>
<b>AMOCO TRINIDAD OIL CO. LTD.</b>					
TEAK	1971	97	12,359,242	13,708,482	227,983
SAMARU	1971	52	4,708,907	4,796,291	174,129
POUI	1974	58	7,465,735	10,937,786	150,192
CASSIA	1973	10	2,219,486	2,428,102	10,531
MORA	1983	5	247,238	167,281	414
<b>TOTAL</b>		<b>222</b>	<b>27,000,608</b>	<b>32,037,942</b>	<b>563,249</b>
<b>GRAND TOTAL</b>		<b>13,550</b>	<b>56,640,681</b>	<b>61,640,188</b>	<b>2,392,438</b>

APPENDIX VII  
CRUDE OIL PRODUCTION BY MONTHS AND METHODS - 1987  
(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	330	1,456,244	142.4	505	2,571,197	164.2	2,328	1,124,174	15.6
FEBRUARY	319	1,138,295	127.4	524	2,436,203	166.0	2,345	990,136	15.1
MARCH	319	1,202,518	121.6	515	2,616,087	163.9	2,412	1,131,453	15.1
APRIL	310	1,142,119	122.8	520	2,568,062	164.6	2,344	1,075,703	15.3
MAY	323	1,159,154	115.8	541	2,628,663	156.7	2,387	1,111,893	15.0
JUNE	325	1,132,382	116.1	531	2,453,751	154.0	2,399	1,092,988	15.2
JULY	327	1,112,397	109.7	510	2,554,750	161.6	2,448	1,122,832	14.8
AUGUST	310	910,607	94.8	540	2,661,542	159.0	2,430	1,128,961	15.0
SEPTEMBER	323	998,252	103.0	532	2,418,148	151.5	2,412	1,064,386	14.7
OCTOBER	328	1,060,150	104.3	536	2,448,839	147.4	2,437	1,111,086	14.7
NOVEMBER	315	1,016,635	107.6	546	2,372,451	144.8	2,375	1,062,719	14.9
DECEMBER	308	1,042,070	109.1	550	2,386,668	140.0	2,388	1,129,946	15.3
TOTAL 1987		13,370,829			30,116,361			13,146,277	
AVERAGE 1987	320	36,632	114.6	529	82,511	155.9	2,392	36,017	15.1

Continued

APPENDIX VII  
CRUDE OIL PRODUCTION BY MONTHS AND METHODS - 1987  
(barrels)

MONTH	PLUNGER LIFT & OTHER METHODS			TOTAL NO. OF WELLS PRODUCING	TOTAL OIL PRODUCTION	DAILY AVG. B.O.P.D.		SALT WATER	
	NO. OF WELLS	PRODUCTION	DAILY AV. PER WELL			PER PRODUCING WELL	PRODUCTION	% OF TOTAL FLUID	
JANUARY	11	846	2.5	3,174	5,152,461	52.4	166,208	4,544,237	46.9
FEBRUARY	15	815	1.9	3,203	4,565,449	50.9	163,052	4,145,625	47.6
MARCH	15	802	1.7	3,261	4,950,860	49.0	159,705	4,651,501	48.4
APRIL	17	1,072	2.1	3,191	4,786,956	50.0	159,565	4,572,051	48.9
MAY	14	823	1.9	3,265	4,900,533	48.4	158,082	4,943,307	50.2
JUNE	19	806	1.4	3,274	4,679,927	47.6	155,998	4,700,573	50.1
JULY	19	630	1.1	3,304	4,790,609	46.8	154,536	4,821,316	50.2
AUGUST	14	279	0.6	3,294	4,701,389	46.0	151,658	4,776,007	50.4
SEPTEMBER	13	229	0.6	3,280	4,481,015	45.5	149,367	4,667,156	51.0
OCTOBER	15	321	0.7	3,316	4,620,396	44.9	149,045	4,603,443	49.9
NOVEMBER	13	339	0.9	3,249	4,452,144	45.7	148,405	4,607,444	50.9
DECEMBER	12	258	0.7	3,258	4,558,942	45.1	147,063	4,688,583	50.7
TOTAL 1987		7,220			56,640,681			55,721,243	
AVERAGE 1987	15	20	1.3	3,256	155,180	47.7	155,180	152,661	49.6

APPENDIX VIII  
ANALYSIS OF CRUDE OIL PRODUCTION BY OPERATING COMPANIES - 1987  
(barrels)

COMPANY	FLOWING			GAS LIFTING			PUMPING		
	AV. NO. OF WELLS	PRODUCTION	DAILY AV. PER WELL	AV. NO. OF WELLS	PRODUCTION	DAILY AV. PER WELL	AV. NO. OF WELLS	PRODUCTION	DAILY AV. PER WELL
AMOCO TRINIDAD OIL COMPANY LTD.	38	6,541,569	471.6	97	20,459,039	.577.9	0	0	0.0
PREMIER CONSOLIDATED OILFIELDS LTD.	3	50,013	45.7	0	0	0.0	81	181,603	6.1
TRINIDAD NORTHERN AREAS	64	3,704,991	158.6	242	8,594,766	97.3	61	1,546,760	69.5
TRINIDAD AND TOBAGO OIL COMPANY LTD.	124	2,083,337	46.0	187	1,037,983	15.2	928	4,127,719	12.2
TRINIDAD AND TOBAGO PETROLEUM COMPANY LTD.	91	990,913	29.8	4	24,573	16.8	1,322	7,290,195	15.1
TOTAL 1987	320	13,370,823	114.5	530	30,116,361	155.7	2,392	13,146,277	15.1
TOTAL 1986	352	17,952,388	139.7	485	30,449,848	172.0	2,356	13,220,390	15.4

Continued

APPENDIX VIII  
ANALYSIS OF CRUDE OIL PRODUCTION BY OPERATING COMPANIES - 1987  
(barrels)

COMPANY	PLUNGER LIFT & OTHER			AV. NO. OF WELLS OF WELLS PRODUCED	TOTAL OIL PRODUCED	DAILY AV. PER WELL	COMPANY'S PROD'N AS A % OF TOTAL PROD'N	SALT WATER	
	AV. NO. OF WELLS	PROD'N	DAILY AV. PER WELL					PRODUCTION	% OF TOTAL FLUID
AMOCO TRINIDAD OIL COMPANY LTD.	0	0	0	135	27,000,608	548.0	47.7	99,014,197	59.1
PREMIER CONSOLIDATED OILFIELDS LTD.	14	3,897	1	98	235,513	6.6	0.4	83,108	26.1
TRINIDAD NORTHERN AREAS	0	0	0	367	13,846,517	103.4	24.4	2,657,445	16.1
TRINIDAD AND TOBAGO OIL COMPANY LTD.	0	9,323	0	1,239	7,252,962	16.0	12.8	6,738,351	48.2
TRINIDAD AND TOBAGO PETROLEUM COMPANY LTD.	0	0	0	1,417	8,305,681	16.1	14.7	7,228,142	46.5
TOTAL 1987	14	7,220	1.4	3,256	56,640,681	47.7	100.0	55,721,243	49.6
TOTAL 1986	15	17,562	3.2	3,208	61,640,188	52.6	100.0	52,188,369	45.8

APPENDIX IX  
TOTAL AND DAILY AVERAGE CRUDE OIL PRODUCTION BY MONTHS FOR ALL COMPANIES - 1987  
(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	2,657,115	85,713	20,509	662	1,116,373	36,012	623,951	20,127	734,513	23,694
FEBRUARY	2,324,182	83,007	19,305	689	1,003,044	35,823	549,242	19,616	669,676	23,917
MARCH	2,421,912	78,126	22,087	712	1,174,909	37,900	612,844	19,769	719,108	23,197
APRIL	2,332,653	77,755	22,095	737	1,174,688	39,156	586,150	19,538	671,370	22,379
MAY	2,378,445	76,724	21,781	703	1,176,924	37,965	611,110	19,713	712,273	22,977
JUNE	2,234,690	74,490	19,510	650	1,140,844	38,028	608,268	20,276	676,615	22,554
JULY	2,256,163	72,779	20,238	653	1,199,213	38,684	625,976	20,193	689,019	22,226
AUGUST	2,168,315	69,946	18,536	598	1,181,803	38,123	629,642	20,311	703,093	22,680
SEPTEMBER	2,049,291	68,310	17,970	599	1,158,483	38,616	588,131	19,604	667,140	22,238
OCTOBER	2,096,506	67,629	18,022	581	1,196,460	38,595	614,467	19,822	694,941	22,417
NOVEMBER	2,034,284	67,809	16,978	566	1,148,526	38,284	575,512	19,184	676,844	22,561
DECEMBER	2,047,052	66,034	18,482	596	1,175,250	37,911	627,069	20,228	691,089	22,293
<b>TOTAL 1987</b>	<b>27,000,608</b>	<b>73,974</b>	<b>235,513</b>	<b>645</b>	<b>13,846,517</b>	<b>37,936</b>	<b>7,252,362</b>	<b>19,869</b>	<b>8,305,681</b>	<b>22,755</b>
<b>TOTAL 1986</b>	<b>32,037,942</b>	<b>87,775</b>	<b>286,102</b>	<b>784</b>	<b>13,558,490</b>	<b>37,147</b>	<b>7,366,320</b>	<b>20,182</b>	<b>8,391,334</b>	<b>22,990</b>

APPENDIX X  
LAND AND MARINE CRUDE OIL PRODUCTION - 1987  
(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	1,107,238	12,610	100,561	2,657,115	9,877,524	9,135	7,392	0	1,900	1,256,510
FEBRUARY	995,334	12,633	86,642	2,324,182	3,418,791	7,710	4,791	0	2,143	1,132,014
MARCH	1,164,944	11,857	94,775	2,421,912	3,693,488	9,965	5,591	0	2,126	1,239,690
APRIL	1,164,770	8,938	88,064	2,332,653	3,594,425	9,918	4,397	0	1,920	1,176,296
MAY	1,167,232	8,475	94,779	2,378,445	3,648,931	9,692	3,408	0	1,488	1,237,014
JUNE	1,132,403	9,541	87,860	2,234,690	3,464,494	8,441	5,212	0	1,759	1,200,021
JULY	1,189,331	8,386	88,834	2,256,163	3,542,714	9,882	3,452	0	1,521	1,233,040
AUGUST	1,171,815	10,698	89,851	2,168,315	3,440,679	9,988	3,521	0	1,635	1,245,566
SEPTEMBER	1,150,833	10,359	87,334	2,049,291	3,297,817	7,650	3,858	0	1,311	1,170,379
OCTOBER	1,188,215	10,451	88,067	2,096,506	3,383,239	8,245	2,273	2,665	1,382	1,222,592
NOVEMBER	1,142,081	11,990	81,629	2,034,284	3,269,984	6,445	3,302	3,579	1,790	1,167,044
DECEMBER	1,167,473	12,754	81,090	2,047,052	3,308,369	7,777	1,566	5,364	1,902	1,233,964
TOTAL	13,741,669	128,692	1,069,486	27,000,608	41,940,453	104,848	48,763	11,608	20,877	14,514,130

APPENDIX XI  
AVERAGE NO. OF PRODUCING WELLS LAND AND MARINE - 1987

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	350	27	54	134	565	12	20	0	9	2,568
FEBRUARY	354	29	54	133	570	13	17	0	9	2,594
MARCH	365	26	53	133	577	13	19	0	9	2,643
APRIL	356	23	53	134	566	13	14	0	9	2,589
MAY	357	27	53	136	573	13	19	0	9	2,651
JUNE	355	24	53	132	564	13	20	0	9	2,668
JULY	349	13	53	132	547	13	15	0	9	2,720
AUGUST	341	15	53	133	542	13	18	0	9	2,712
SEPTEMBER	349	20	53	136	558	12	16	0	9	2,685
OCTOBER	353	18	53	136	560	12	12	1	8	2,723
NOVEMBER	362	25	54	136	577	9	12	1	8	2,642
DECEMBER	363	29	54	136	582	13	9	1	8	2,645
AVERAGE	355	23	53	134	565	12	16	0	9	2,653



APPENDIX XII  
CRUDE OIL PRODUCTION BY LEASE - 1987  
(barrels)

MONTH	STATE LEASE			PRIVATE LEASE			STATE LEASE C.H.P.S.	PRIVATE LEASE C.H.P.S.	TOTAL C.H.P.S.
	NO. OF WELLS	PRODUCTION	DAILY AV. PER WELL	NO. OF WELLS	PRODUCTION	DAILY AV. PER WELL			
JANUARY	2,581	4,946,985	61.8	593	205,476	11.2	1,137	10	1,147
FEBRUARY	2,593	4,371,323	60.2	610	194,126	11.4	0	0	0
MARCH	2,656	4,723,049	57.4	605	227,811	12.1	0	0	0
APRIL	2,578	4,569,049	59.1	613	217,907	11.8	0	0	0
MAY	2,635	4,674,536	57.2	630	225,997	11.6	0	0	0
JUNE	2,655	4,472,024	56.1	625	207,903	11.1	0	0	0
JULY	2,680	4,574,142	55.1	624	216,467	11.2	0	0	0
AUGUST	2,671	4,482,398	54.1	623	218,991	11.3	0	0	0
SEPTEMBER	2,663	4,278,501	53.6	617	202,514	10.9	0	0	0
OCTOBER	2,687	4,405,847	52.9	629	214,549	11.0	0	0	0
NOVEMBER	2,648	4,255,836	53.6	601	196,308	10.9	0	0	0
DECEMBER	2,648	4,344,504	52.9	610	214,438	11.3	0	0	0
TOTAL 1987		54,098,194			2,542,487		1,137	10	1,147
AVERAGE 1987	2,641	148,214	56.1	615	6,966	11.3			

APPENDIX XIII  
CRUDE OIL PRODUCTION BY COMPANY LEASE - 1987  
(barrels)

COMPANY	STATE LEASE		PRIVATE LEASE	
	PRODUCTION	% OF TOTAL PRODUCTION	PRODUCTION	% OF TOTAL PRODUCTION
AMOCO TRINIDAD OIL COMPANY LIMITED	27,000,608	100.0	0	0
PREMIER CONSOLIDATED OILFIELDS LIMITED	26,491	11.2	209,022	88.8
TRINIDAD NORTHERN AREAS	13,846,517	100.0	0	0
TRINIDAD AND TOBAGO OIL COMPANY LIMITED	6,449,859	88.9	802,503	11.1
TRINIDAD AND TOBAGO PETROLEUM COMPANY LIMITED	6,774,719	81.6	1,530,962	18.4
TOTAL 1987	54,098,194	95.5	2,542,487	4.5
TOTAL 1986	59,176,584	96.0	2,463,604	4.0

APPENDIX XIV  
SUMMARY OF FLUID INJECTION IN TRINIDAD AND TOBAGO 1983 - 1987

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 <sup>3</sup> × 10 <sup>3</sup> )	WATER & OTH. FLUIDS (bb1)	STEAM (bb1)	WATER INJECTION PROJECTS (bb1)	THERMAL RECOVERY PROJECTS (bb1)	CARBON DIOXIDE PROJECTS (bb1)	ALL PROJECTS (bb1)	
1983	0	22	9	2	10 884	10,104,461	11,856,630	3,834,666	3,923,088	12,580	7,770,334	13.3
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	4,191,934	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	4,093,417	4,591,355	49,164	8,733,936	15.4

APPENDIX XV  
FLUID INJECTION OPERATIONS - 1987

WATER INJECTION

COMPANY	ACTIVE PROJECTS	WATER INJECTED (bb1)	OIL PRODUCED (bb1)	WATER PRODUCED (bb1)	GAS PRODUCED ( $\text{m}^3 \times 10^3$ )	WATER CUT %
AMOCO	2	9,294,177	2,794,213	782,463	35 479	21.88
TRINMAR	1	4,255,205	471,379	491,718	39 954	51.06
TRINTOC	10	1,961,512	440,705	886,797	21 862	66.80
TRINTOPEC	10	788,628	387,120	93,773	5 425	19.50
ALL COS	23	16,299,522	4,093,417	2,254,751	10 270	35.52

STEAM INJECTION

COMPANY	ACTIVE PROJECTS	STEAM INJECTED (bb1)	OIL PRODUCED (bb1)	WATER PRODUCED (bb1)	GAS PRODUCED ( $\text{m}^3 \times 10^3$ )	OIL/STEAM RATIO
TRINTOPEC	7	15,595,187	3,702,001	9,659,320	721	0.24
TRINTOC	6	4,431,096	869,389	3,554,811	15 596	0.20
PCOL	2	43,186	19,965	27,019	0	0.46
ALL COS.	15	20,069,469	4,591,355	13,241,150	16 317	0.23

CARBON DIOXIDE INJECTION

COMPANY	ACTIVE PROJECTS	CO2 INJECTED ( $\text{m}^3 \times 10^3$ )	OIL PRODUCED (bb1)	WATER PRODUCED (bb1)	GAS PRODUCED ( $\text{m}^3 \times 10^3$ )	GOR (scf/bbl)
TRINTOC	3	0	49,164	3,536	1 447	1,040
ALL COS.	3	0	49,164	3,536	1 447	1,040

APPENDIX XVI  
WATER INJECTION SUMMARY BY PROJECTS - 1987

COMPANY	FIELD	PROJECT	WATER INJECTION (bbl)	OIL PRODUCED (bbl)	WATER PRODUCED (bbl)	GAS PRODUCED (m <sup>3</sup> ×10 <sup>3</sup> )	WATER CUT %	
AMOCO	TEAK SAMARR *	A/C/E WATERFLOOD	7,167,642	2,794,219	782,469	35 479	23.35	
		FB. L & C	2,126,535	0	0	0	0	
	ALL	ALL	9,294,177	2,794,219	782,469	35 479	23.35	
TRINMAR	SOLDADO	8011 WATERFLOOD	4,255,205	471,379	491,718	39 954	51.05	
		ALL	4,255,205	471,379	491,718	39 954	51.05	
TRINTOC	CATSHILL	CO-90.BLK.24	138,099	32,150	4,840	279	13.08	
		N SAND	198,925	19,454	19,879	214	50.54	
		CO-30.BLK.38	336,165	1,520	36	11	2.319	
		Pt.F. Area IV	651,810	15,767	4,140	149	20.79	
	B'YARE	NAVETTE 007	0	80,930	137,531	19 971	62.95	
		NAVETTE 410	0	86,437	380,052	2 832	81.47	
		410 EXT.	0	19,086	39,166	620	67.23	
		307 WATERFLOOD	0	90,960	166,620	3 020	64.68	
	TRINITY	307 EXT.	0	9,246	4,416	304	32.32	
		SHALLOW HERRERA	636,513	85,155	130,117	462	60.44	
		ALL	ALL	1,961,512	440,705	886,797	21 862	66.80
	TRINTOPEC	COORA	CO/UC/100/1	0	6,958	8,838	121	55.95
CO/UC/110/1			0	0	0	0	0	
CO/UC/314/1			0	16,124	2,334	237	12.64	
CO/UC/317/1			0	6,978	6,449	104	48.03	
CO/UC/170/1V			0	2,701	559	46	17.14	
PS/UF/500/1			0	14,600	1,966	244	11.86	
PALO SECO		FM/UF/172/1	0	24,644	18,920	353	43.43	
		FM/UF/169/1	0	52,554	20,154	889	27.71	
MACKENZIE		MACKENZIE	150,776	37,299	5,222	544	12.28	
GALEOTA		GAL/HF/15/11	637,852	225,262	29,391	2 893	11.52	
		ALL	ALL	788,628	387,120	93,773	5 425	19.49
TOTAL		ALL	ALL	16,299,522	4,093,417	2,254,751	102 720	35.51

\* No Secondary oil produced in 1987.

APPENDIX XVII  
STEAM INJECTION SUMMARY BY PROJECTS - 1987

COMPANY	FIELD	PROJECTS	STEAM INJECTED (bb1)	OIL PRODUCED (bb1)	WATER PRODUCED (bb1)	GAS PRODUCED (m <sup>3</sup> ×10 <sup>3</sup> )	OIL/ST. RATIO
TRINTOPEC	APEX QUARRY		3,986,250	793,931	2,734,329	129	0.20
	FYZABAD		1,504,109	380,863	1,384,566	192	0.25
	GUAPO		2,758,285	532,495	1,551,835	38	0.19
	CENTRAL LOS BAJOS		1,925,687	591,197	699,031	160	0.31
	PALO SECO		4,102,101	1,140,596	3,036,789	192	0.28
	BENNETT V'GE		771,626	239,465	213,926	10	0.30
	PALO SECO 805		547,129	29,454	38,844		0.05
	ALL	ALL	15,595,187	3,702,001	9,659,320	721	0.24
TRINTOC	F.RESERVE	PROJECT 111	3,257,523	573,019	2,989,640	11 648	0.18
		PHASE 1 EXT.	235,977	45,664	179,455	1 063	0.19
	P.LANDS 'E'.	STEAMFLOOD	209,521	114,227	188,034	1 311	0.55
		PHASE 1. EXP.	257,567	39,389	103,461	601	0.15
		PHASE 1A. EXP.	246,460	8,937	19,142	245	0.04
	Pt.FORTIN	CRUSE 'E'	224,048	88,153	75,079	728	0.39
ALL	ALL	4,431,096	869,389	3,554,811	15 596	0.20	
PCOL	FYZABAD	FOREST	43,186	19,965	26,542	0	0.46
		CRUSE	0	0	477	0	0.00
	ALL	ALL	43,186	19,965	27,019	0	0.46
ALL COS.	ALL	ALL	20,069,469	4,591,355	13,241,150	16 318	0.23

CARBON DIOXIDE INJECTION

COMPANY	FIELD	PROJECT	INJECTION (m <sup>3</sup> ×10 <sup>3</sup> )	OIL PRODUCED (bb1)	WATER PRODUCED (bb1)	GAS PRODUCED (m <sup>3</sup> ×10 <sup>3</sup> )	GOR (scf/bbl)
TRINTOC	F.RESERVE	FOREST SDS.	0	22,110	2,743	560	895
		ZONE 5 SDS.	0	11,131	30	430	1,363
		UCWE	0	15,923	763	457	1,015
ALL COS.	ALL	ALL	0	49,164	3,536	1 447	1,040

APPENDIX XVIII  
NATURAL GAS PRODUCTION BY COMPANIES 1983 - 1987  
(Thousands Cubic Metres Per Day)

COMPANY	1983	1984	1985	1986	1987
AMOCO	13,828	16,445	17,332	17,715	17,897
TRINMAR	1,637	1,749	1,735	1,570	1,299
TRINTOPEC	705	604	588	578	558
TRINTOC	1,137	950	883	919	829
PCOL	4	2	3	4	3
TOTAL	17,311	19,750	20,541	20,780	20,580

APPENDIX XIX  
NATURAL GAS UTILIZATION 1983 - 1987  
(Million Cubic Metres/Day)

COMPANY		1983	1984	1985	1986	1987
<b>OIL COMPANIES</b>						
REFINERY (AS FUEL)	TRINTOC(P-A-P)	1.26	1.20	0.93	1.00	1.15
	TRINTOC( P/F)	0.29	0.26	0.28	0.24	0.25
		1.55	1.46	1.21	1.24	1.40
FIELD USE (AS FUEL)		1.00	0.97	0.96	1.02	1.15
PRODUCTION USE		3.06	4.70	4.76	6.40	6.46
	SUB-TOTAL	5.61	7.13	6.93	8.66	9.01
<b>NON-OIL COMPANIES</b>						
FERTILIZER MANUFACTURE	FEDCHEM	1.12	0.80	0.76	0.78	0.77
	FERTRIN	2.52	2.52	2.52	2.55	2.56
	TRINGEN	1.20	1.20	1.19	1.35	1.32
	TTUC	-	0.17	0.25	0.26	0.25
	FERTILIZER SUB-TOTAL	4.84	4.69	4.72	4.94	4.90
POWER GENERATION	TTEC	3.04	2.86	3.00	2.95	3.08
CEMENT MANUFACTURE	TRINIDAD CEMENT LIMITED	0.09	0.20	0.14	0.20	0.20
OTHER LARGE CONSUMERS	TTMC	0.00	0.63	0.91	0.84	1.06
	ISCOTT	0.34	0.29	0.26	0.41	0.52
SMALL CONSUMERS		0.17	0.17	0.22	0.23	0.24
	SUB-TOTAL	8.48	8.84	9.25	9.57	10.00
	GRAND TOTAL	14.09	15.97	16.18	18.23	19.01

APPENDIX XX  
ANNUAL STATISTICS FOR NATURAL GAS PRODUCTION AND UTILIZATION 1983 - 1987

	1983		1984		1985		1986		1987	
	MILLION M <sup>3</sup>	%	MILLION M <sup>3</sup>	%	MILLION M <sup>3</sup>	%	MILLION M <sup>3</sup>	%	MILLION M <sup>3</sup>	%
PRODUCTION	6 319	100	7 229	100	7 419	100	7 585	100	7 512	100
GOR (M3/M3)	681		733		741		775		834	
A. USED AS FUEL IN FIELDS	360	5.7	355	4.9	352	4.7	447	5.9	410	5.4
IN REFINERIES	552	8.7	594	7.4	440	5.9	453	6.0	513	6.8
IN OTHER INDUSTRIES	2 171	34.4	1 663	23.0	2 165	29.3	2 290	30.2	2 388	31.8
SUB TOTAL	3 083	48.8	2 552	35.3	2 957	39.9	3 190	42.1	3 311	44.0
B. OTHER COMPLETE UTILIZATION:										
USED AS PROCESS GAS	919	14.5	1 105	15.3	1 120	15.1	1 203	15.9	1 257	16.7
INJECTED INTO FORMATION										
CONVERTED TO C.H.P.S.	1	0	1	0	1	0	0	0	1	0
SUB TOTAL	920	14.5	1 106	15.3	1 121	15.1	1 203	15.9	1 258	16.7
C. VENTED										
AFTER USE OF PNEUMATIC ENERGY	1 121	17.7	1 715	23.7	1 731	23.0	1 890	24.9	1 820	24.0
WITHOUT USE	1 195	19	1 857	25.7	1 601	21.6	1 126	14.8	1 123	15.0
SUB TOTAL	2 316	36.7	3 572	49.4	3 332	44.6	3 016	39.7	2 943	39.0



## APPENDIX XXI

THE FOLLOWING TABLE SHOWS FOR THE YEARS 1985, 1986, 1987 THE QUANTITY OF ASPHALT EXTRACTED FROM THE PITCH LAKE AND THE QUANTITY OF DERIVED PRODUCTS WHICH WERE EXPORTED AND CONSUMED LOCALLY.

NATURAL ASPHALT	METRIC TONS		
	1985	1986	1987
...EXTRACTED BY MINISTRY OF WORKS FOR LOCAL USE	11 926	10 873	6 792
...EXTRACTED BY TRINIDAD LAKE ASPHALT COMPANY	21 349	24 109	20 997
<b>TOTAL</b>	<b>33 275</b>	<b>34 982</b>	<b>27 789</b>
DERIVED PRODUCTS MANUFACTURED BY THE COMPANY			
EXPORTS :-			
...CRUDE ASPHALT	0	0	0
...DRIED ASPHALT	20 258	18 904	22 020
...CEMENT ASPHALT	228	128	54
<b>TOTAL</b>	<b>20 486</b>	<b>19 032</b>	<b>22 074</b>
LOCAL SALES :-			
...CRUDE ASPHALT	2	0	0
...DRIED ASPHALT	429	230	215
...CEMENT ASPHALT	3 998	2 376	2 360
<b>TOTAL</b>	<b>4 429</b>	<b>2 606</b>	<b>2 575</b>

APPENDIX XXII  
DESTINATION OF EXPORTS OF CRUDE AND REFINED PRODUCTS FROM TRINIDAD AND TOBAGO - 1987  
(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 OILS	PETRO-CHEMICALS	ASPHALT	OTHER REFINED PRODUCTS
<b>NORTH AMERICA -</b>												
CANADA	214,028	0.80	0	0	0	0	0	214,028	0	0	0	0
U.S.A.	9,717,516	36.31	27,816,440	0	0	456,520	0	1,478,131	7,779,685	0	0	3,180
<b>TOTAL N.A.</b>	<b>9,931,544</b>	<b>37.11</b>	<b>27,816,440</b>	<b>0</b>	<b>0</b>	<b>456,520</b>	<b>0</b>	<b>1,692,159</b>	<b>7,779,685</b>	<b>0</b>	<b>0</b>	<b>3,180</b>
<b>CENTRAL AMERICA -</b>												
REPUBLIC OF PANAMA	12,504	0.05	0	0	9,351	0	0	799	2,354	0	0	0
GUATEMALA	28,798	0.11	0	0	0	0	0	0	0	0	28,798	0
OTHER C.A. (a)	445,243	1.66	0	0	27,898	303,883	0	113,462	0	0	0	0
<b>TOTAL C.A.</b>	<b>486,545</b>	<b>1.82</b>	<b>0</b>	<b>0</b>	<b>37,249</b>	<b>303,883</b>	<b>0</b>	<b>114,261</b>	<b>2,354</b>	<b>0</b>	<b>28,798</b>	<b>0</b>
<b>SOUTH AMERICA -</b>												
GUYANA	42,998	0.16	0	8,656	0	0	3,086	27,421	3,835	0	0	0
SURINAME	1,668,535	6.23	0	1,264	5,192	325,921	71,427	375,092	889,639	0	0	0
FRENCH GUIANA	904,447	3.38	0	18,215	0	207,823	102,055	292,891	273,220	0	10,243	0
OTHER S.A. (b)	536,357	2.00	0	0	0	0	0	0	536,357	0	0	0
<b>TOTAL S.A.</b>	<b>3,152,337</b>	<b>11.77</b>	<b>0</b>	<b>28,135</b>	<b>5,192</b>	<b>533,744</b>	<b>176,568</b>	<b>695,404</b>	<b>1,703,051</b>	<b>0</b>	<b>10,243</b>	<b>0</b>
<b>WEST INDIES -</b>												
BRITISH (c)	3,606,299	13.48	0	101,593	8,670	746,107	1,339,899	857,995	220,169	0	14,064	317,802
FRENCH (d)	996,767	3.72	0	36,619	8,310	319,670	184,524	263,768	145,595	0	38,281	0
NETHERLANDS (e)	65,763	0.25	0	0	0	6,650	0	8,400	47,695	0	3,018	0
HAITI	258,110	0.96	0	0	0	0	0	0	252,023	0	6,087	0
OTHER W.I. ISLANDS (f)	1,548,252	5.79	0	2,603	3,078	80,182	32,008	495,922	900,933	0	33,526	0
<b>TOTAL W.I.</b>	<b>6,475,191</b>	<b>24.20</b>	<b>0</b>	<b>140,815</b>	<b>20,058</b>	<b>1,152,609</b>	<b>1,556,431</b>	<b>1,626,085</b>	<b>1,566,415</b>	<b>0</b>	<b>94,976</b>	<b>317,802</b>
<b>EUROPE -</b>												
ITALY	1,457,899	5.45	0	0	0	0	0	0	1,457,899	0	0	0
ENGLAND	7,950	0.03	553,844	0	0	0	0	0	0	7,950	0	0
OTHER EUROPE (g)	582,906	2.18	0	0	0	0	0	0	582,906	0	0	0
<b>TOTAL EUROPE</b>	<b>2,048,755</b>	<b>7.66</b>	<b>553,844</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>2,040,805</b>	<b>7,950</b>	<b>0</b>	<b>0</b>
<b>OTHERS -</b>												
JAPAN	856,069	3.20	0	0	0	514,943	0	0	0	0	0	341,126
OTHERS*	3,204,222	11.97	0	0	0	0	769,795	463	2,368,387	2,570	13,416	49,591
<b>TOTAL OTHERS</b>	<b>4,060,291</b>	<b>15.17</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>514,943</b>	<b>769,795</b>	<b>463</b>	<b>2,368,387</b>	<b>2,570</b>	<b>13,416</b>	<b>390,717</b>
<b>TOTAL CARGOES</b>	<b>26,154,663</b>	<b>97.73</b>	<b>28,370,284</b>	<b>168,950</b>	<b>62,499</b>	<b>2,961,699</b>	<b>2,502,794</b>	<b>4,128,372</b>	<b>15,460,697</b>	<b>10,520</b>	<b>147,433</b>	<b>711,699</b>
<b>FOREIGN BUNKERS</b>	<b>606,140</b>	<b>2.27</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>375,131</b>	<b>231,009</b>	<b>0</b>	<b>0</b>	<b>0</b>
<b>TOTAL EXPORT</b>	<b>26,760,803</b>	<b>100</b>	<b>28,370,284</b>	<b>168,950</b>	<b>62,499</b>	<b>2,961,699</b>	<b>2,502,794</b>	<b>4,503,503</b>	<b>15,691,706</b>	<b>10,520</b>	<b>147,433</b>	<b>711,699</b>

Note : These figures are only for Trintoc

\* Countries not detailed

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

(b) Other S.A. : Argentina

(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. Barthelomy, St. Barths, St. Maarten.

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

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

(g) Other Europe : Rotterdam, Holland.

APPENDIX XXIII  
MOVEMENT OF REFINED PRODUCTS - 1987  
(all quantities in barrels)

PRODUCT	OPENING INVENTORY	PRODUCTION	IMPORTS	TRANSFERS	REC. FROM LOCAL COMPANIES	TOT. OPEN. INVENTORY & RECEIPTS	DISBURSE. TO LOCAL COMPANIES
L.P.G.	19,913	671,555	47,956	3,995	517,843	1,261,262	525,920
MOGAS - PREMIUM	190,750	3,693,898	0	17,869	3,312,668	7,215,185	3,156,996
MOGAS - REGULAR	44,157	2,715,685	0	188,856	79,541	3,028,239	258,429
MOGAS - UNFINISHED	323,239	679,584	0	(235,990)	0	766,833	1,276
NAPHTHA	330,261	(11,232)	0	50,654	333	370,016	599
AVIATION GASOLINE	4,799	65,706	0	(16)	3,441	73,930	3,461
AVIATION TURBINE FUEL	122,093	2,291,011	0	4,905	547,464	2,965,473	169,314
KEROSINE	62,848	891,673	0	36,342	33,481	1,024,343	462,284
WHITE SPIRITS	7,388	8,317	0	(82)	8,353	23,976	8,522
GAS OIL	554,621	4,487,209	794,944	119,233	1,017,866	6,973,872	1,006,621
MARINE DIESEL	31,026	121,177	0	(11,962)	12,259	152,499	10,010
FUEL OIL	1,296,443	19,027,357	1,056	(3,273,360)	51,532	17,103,028	35,504
LUBES & GREASES	66,494	76,628	36,454	1,952	92,266	1,027,549	40,830
ASPHALTIC PRODUCTS	26,933	217,510	0	6	74,257	318,706	56,749
PETROCHEMICALS	42,137	14,469	5,709	(1,082)	1,044	62,270	5,093
OTHER FINISHED PRODUCTS	18,209	175,238	0	(8)	0	193,439	374
UNFINISHED OILS	1,890,372	(4,615,109)	1,228,691	2,885,593	0	1,389,547	0
<b>TOTAL</b>	<b>5,031,682</b>	<b>30,510,670</b>	<b>2,114,810</b>	<b>(213,095)</b>	<b>5,752,347</b>	<b>43,950,168</b>	<b>5,741,982</b>

continued

APPENDIX XXIII  
MOVEMENT OF REFINED PRODUCTS - 1987  
(all quantities in barrels)

PRODUCT	LOCAL CONSUMPTION				EXPORTS		(GAIN)/ LOSS	CLOSING INVENTORY	TOT. CLOS. INVENT. & DISBURSE.
	OWN USE	RET. & CON. SALES	LOCAL BUNKERS	TOTAL	CARGOES	FOREIGN BUNKERS			
L.P.G.	321	543,434	0	543,755	168,950	0	13,998	8,639	1,261,262
MOGAS - PREMIUM	10,192	3,343,127	0	3,353,319	652,987	0	(32,392)	84,275	7,215,185
MOGAS - REGULAR	6	78,943	0	78,949	2,486,399	0	157	204,304	3,028,239
MOGAS - UNFINISHED	61	0	0	61	525,170	0	0	240,326	766,833
NAPHTHA	0	254	0	254	0	0	19	369,144	370,016
AVIATION GASOLINE	0	3,202	0	3,202	62,512	31	126	4,598	73,930
AVIATION TURBINE FUEL	128	112,950	0	113,078	2,300,505	282,978	1,849	97,748	2,965,473
KEROSINE	2,199	62,433	0	64,632	402,563	0	(3,088)	97,953	1,024,343
WHITE SPIRITS	68	8,517	0	8,585	113	0	(57)	6,812	23,976
GAS OIL	28,762	609,092	506,898	1,144,752	4,089,506	359,919	(6,032)	379,106	6,973,872
MARINE DIESEL	0	283	0	22,123	84,573	20,256	(327)	15,865	152,499
FUEL OIL	8,113	18,697	132,294	159,105	15,252,171	247,859	201	1,408,188	17,103,028
LUBES & GREASES	5,260	182,173	0	187,516	11,850	2,728	(152)	784,762	1,027,534
ASPHALTIC PRODUCTS	16	83,385	0	83,401	165,850	0	(264)	12,971	318,706
PETROCHEMICALS	5	1,403	0	1,540	14,061	0	75	41,501	62,270
OTHER FINISHED PRODUCTS	0	0	0	0	175,215	0	0	17,850	193,439
UNFINISHED OILS	0	0	0	0	72,887	0	0	1,316,644	1,389,531
<b>TOTAL</b>	<b>55,131</b>	<b>5,047,899</b>	<b>661,032</b>	<b>5,764,272</b>	<b>26,465,312</b>	<b>913,772</b>	<b>(25,887)</b>	<b>5,090,686</b>	<b>43,950,136</b>

APPENDIX XXIV  
SUMMARY OF CRUDE OIL ASSESSED FOR CROWN ROYALTY WITH PRICES AND ANALYSES - 1987  
(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)	2,850,957	54.88	156,474,290.28	15,647,429.05	180,810	6.34	1,580,464.91
GALEOTA	552,681	61.98	34,256,016.60	4,282,002.08	91,529	16.56	-
PCOL	13,418	56.47	757,696.01	75,769.59	1,172	8.74	16,652.16
ESTATE OF T. ROODAL	418	55.00	22,990.24	2,299.02	10	2.39	-
TRINTOC (PF)	1,193,646	56.45	67,375,461.17	6,737,546.11	131,056	10.98	4,534,743.05
TRINTOC (PAP)	1,997,900	57.65	115,172,827.08	11,517,282.73	254,511	12.74	3,520,320.30
TRINMAR	6,786,782	55.37	375,776,835.17	37,577,683.51	825,877	12.17	31,731,121.80
AMOCO	14,348,997	64.92	931,588,960.31	116,448,620.04	1,822,357	12.70	22,159,779.60
TOTAL	27,744,799	60.60	1,681,425,076.86	192,288,632.13	3,307,322	11.92	63,543,081.82

continued

APPENDIX XXIV  
SUMMARY OF CRUDE OIL ASSESSED FOR CROWN ROYALTY WITH PRICES AND ANALYSES - 1987  
(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)	-	-	26,088	461,982	488,070	17.12	2,182,077	76.54
GALEOTA	-	-	-	254,753	254,753	46.09	206,399	37.35
PCOL	-	-	1,260	2,264	3,524	26.26	8,722	65.00
ESTATE OF T. ROODAL	-	-	-	124	124	29.67	284	67.94
TRINTOC (PF)	78,906	-	12,473	178,387	269,766	22.60	792,824	66.42
TRINTOC (PAP)	42,108	92,143	496	432,596	567,343	28.40	1,176,046	58.86
TRINMAR	-	854,399	-	-	854,399	12.59	5,106,506	75.24
AMOCO	-	10,462,270	-	-	10,462,270	72.91	2,064,370	14.39
TOTAL	121,014	11,408,812	40,317	1,330,106	12,900,249	46.50	11,537,228	41.58

APPENDIX XXIV  
SUMMARY OF CRUDE OIL ASSESSED FOR CROWN ROYALTY WITH PRICES AND ANALYSES - 1987  
(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)	2,854,975	54.04	154,277,160.77	15,427,716.10	198,620	6.96	1,570,700.88
GALEOTA	516,805	64.20	33,181,140.93	4,147,642.61	83,693	16.19	-
PCOL	11,269	55.79	628,664.36	62,866.45	803	7.13	11,718.00
ESTATE OF T. ROODAL	322	55.40	17,838.61	1,783.86	9	2.80	-
TRINTOC (PF)	1,177,682	55.09	64,877,345.35	6,487,734.54	131,177	11.14	4,454,673.57
TRINTOC (PAP)	2,058,903	57.66	118,715,814.71	11,871,581.48	326,399	15.85	4,998,233.10
TRINMAR	7,059,735	53.65	378,775,915.56	37,877,591.56	876,303	12.41	33,800,288.76
AMOCO	12,651,611	68.64	868,455,989.33	108,556,998.67	1,645,327	13.01	25,595,157.00
TOTAL	26,331,302	61.48	1,618,929,869.62	184,433,915.27	3,262,331	12.39	70,430,771.31

continued

APPENDIX XXIV  
SUMMARY OF CRUDE OIL ASSESSED FOR CROWN ROYALTY WITH PRICES AND ANALYSES - 1987  
(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)	-	-	11,720	494,545	506,265	17.73	2,150,090	75.31
GALEOTA	-	-	-	239,778	239,778	46.40	193,334	37.41
PCOL	-	-	628	2,303	2,931	26.01	7,535	66.86
ESTATE OF T. ROODAL	-	-	-	95	95	29.50	218	67.70
TRINTOC (PF)	78,285	-	133,809	11,152	223,246	18.96	823,259	69.90
TRINTOC (PAP)	35,393	104,295	253	406,292	546,233	26.53	1,186,271	57.62
TRINMAR	-	802,755	-	-	802,755	11.37	5,380,677	76.22
AMOCO	-	9,227,116	-	-	9,227,116	72.93	1,779,168	14.06
TOTAL	113,678	10,134,166	146,410	1,154,165	11,548,419	43.86	11,520,552	43.75

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 1985 - 1987

SOURCE OF REVENUE	ASSESSMENT OF HALF YEARLY PERIODS ENDING:					
	31-12-87	30-6-87	31-12-86	30-6-86	31-12-85	30-6-85
ROYALTY OF NATURAL GAS (\$TT)	945,249	868,171	896,681	926,949	856,580	840,016
ROYALTY OF NATURAL GASOLINE (\$TT)	-	6,074	77,951	63,023	110,722	52,381
MINIMUM RENT NET OFFSET BY ROYALTY ON CRUDE OIL (\$TT)	3,916,750	3,904,724	3,710,524	3,915,973	3,102,544	3,212,216
ROYALTY ON CRUDE OIL (\$TT)	184,433,915	192,288,620	157,463,223	182,595,703	221,884,705	204,896,817
HALF YEARLY TOTAL (\$TT)	189,295,914	197,067,589	162,148,379	187,501,648	225,954,551	209,001,430
YEARLY TOTAL (\$TT)	386,363,503		349,650,027		209,001,430	

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

SUBSTANCE ASSESSED FOR ROYALTY	UNIT	31-12-87	30-6-87	31-12-86	30-6-86	31-12-85	30-6-85
NATURAL GAS	M.C.F.	61,796,587	57,878,041	59,778,748	61,796,587	57,105,334	56,001,081
NATURAL GASOLINE	I.B.	-	29,343	389,386	387,041	506,928	251,282
CRUDE OIL NET	BARREL	26,331,302	27,744,799	29,919,782	29,227,448	30,911,855	30,944,682
FIELD STORAGE VALUE PER BARREL	\$TT	61.48	60.60	45.47	54.23	62.25	56.88
ROYALTY PAYABLE PER BARREL	\$TT	6.15	6.06	4.55	5.42	6.22	5.69

THE DATA USED TO EVALUATE CRUDE OIL FOR CROWN ROYALTY ASSESSMENTS

PRODUCT	31-12-87	30-6-87	31-12-86	30-6-86	31-12-85	30-6-85
BUNKER 'C' GRADE FUEL (\$TT)	53.827402	56.545673	36.781109	44.298412	52.584921	57.104978
NO. 2 FUEL (\$TT)	77.811519	72.146585	56.945618	68.482264	79.539160	71.636449
43-47 D.I. GAS OIL (\$TT)	78.426176	72.761241	57.560275	69.096921	79.964520	72.046220
48-52 D.I. GAS OIL (\$TT)	78.615885	72.950950	57.749983	69.286629	80.095804	72.172692
53-57 D.I. GAS OIL (\$TT)	78.995302	73.330368	58.129401	69.666047	80.358372	72.425637
70-72 OCT. M HEADED MOTOR GAS (\$TT)	73.776084	74.776888	57.479688	69.718893	76.093305	72.544658
AVERAGE MIDDLE RATE FOR SIGHT DRAFT ON N.Y./T.T CURRENCY FOR U.S. \$1.00	3.6135	3.6135	3.6135	3.6135	2.409 *3.6135	2.409
VALUE OF TETRA ETHYL LEAD IN TT CENTS PER MILLILITRE	3.223244	2.778745	2.902166	2.796804	1.6419888	1.6593067
ROYALTY ON TT CENTS/GALLON ON NATURAL GASOLINE (C.H.P.S.)	21.167468	21.438063	16.479407	19.976708	21.772564	21.771953

\* Rate increase with effect from 18/12/85 due to devaluation of TT dollar

APPENDIX XXVI  
POLLUTION STATISTICS - 1987

COMPANY	NO. OF INCIDENTS	ESTIMATED QUANTITY SPILLED (barrels)	ESTIMATED QUANTITY RECOVERED (barrels)	ESTIMATED NET LOSS (barrels)	PERCENT RECOVERY
TRINTOC	169	7,600	6,281	1,319	82.6
TRINTOPEC	36	5,010	4,684	326	93.5
TRINMAR	14	705	622	83	88.23
P.C.O.L	1	234	140	94	59.83
ATOC	16	50	0	50	0
N.G.C	9	10	0	10	0
<b>Total</b>	<b>245</b>	<b>13,609</b>	<b>11,727</b>	<b>1,882</b>	<b>86.17</b>

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