# **PETROLEUM DIVISION**



# **DEPARTMENT OF PETROLEUM AND ENERGY**

# **2007 ANNUAL REPORT**

# ON

# PETROLEUM ACTIVITY IN PAPUA NEW GUINEA

Compiled by the Exploration Branch

February 2008

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#### PREFACE

This Annual Report contains a summary of events and information about activities directly related to the exploration, development and production of petroleum in Papua New Guinea for the year 2007. The events and information contained within are sourced from reports furnished by the operating petroleum companies to the Petroleum Division of the Department of Petroleum and Energy as the regulator, promoter and monitor of petroleum activities in the country. Also covered, and equally important, are corresponding non-technical information regarding licence management, policy, legal and landowner issues directly related to the petroleum activities. Confidential information, however, has been excluded. All cost and expenditure values are quoted in US dollars to ensure consistency, but where necessary, the Kina currency is used for simplicity.

The report serves to provide a continuous and summarized review of the petroleum activities in Papua New Guinea.

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# TABLE OF ABBREVIATIONS

AFE	Appropriation for Expenditure
APF	Agogo Production Facility
APDL	Application for Development Licence
APPL	Application for Petroleum Prospecting Licence
APRL	Application for Petroleum Retention Licence
BBL	Barrel
BCF	Billion Cubic Feet
BHA	Bottom Hole Assembly
BHP	Bottom Hole Pressure
BOPD	Barrels of Oil Per Day
BRT	Below Rotary Table
BWPD	Barrels of Water Per Day
CPF	Central Production Facility (Kutubu)
DA	Development Agreements
DEC	Department of Environment and Conservation
EIC	Expenditure Implementation Committee
EPT	Extended Production Testing
EWT	Extended Well Test
FEED	Front End Engineering Design
GM	Gobe Main Field
GPCSA	Gas Project Cooperation Sharing Agreement
Ft	Feet
GOR	Gas Oil Ratio
GPF	Gobe Production Facility
ILG	Incorporated Land Groups
KB	Kelly Bushing
km	Kilometer
llG	Local Level Government
ING	Liquefied Natural Gas
LPG	Liquefied Petroleum Gas
LTC	Land Titles Commission
M	Thousand
MD	Measured Depth
MM	Million
MMSCF	Million Standard Cubic Feet
MMSCED	Million Standard Cubic Feet per Day
MMSTB	Million Stock Tank Barrels
MRDC	Minerals Resources Development Company
MOA	Memorandum of Agreement
NFC	National Executive Council
NGL	Natural Gas Liquids
NWM	North-West Moran Filed
OGOC	Original Gas-Oil Contact
OOIP	Original Oil In Place
OPEC	Organization of Petroleum Exporting Countries
OSI	Oil Search Limited
OWOC	Original Water-Oil Contact
P&A	Plugged and Abandoned
PCR	Petroleum Cost Reporting
PDI	Petroleum Development Licence
P1	Peta Joules
P1V	Porgera Joint Venture Limited
1.54	

PLL	Pipeline Licence
PLT	Production Logging Tool
PPL	Petroleum Prospecting Licence
PRL	Petroleum Retention Licence
RMT	Reservoir Monitoring Tool
RR	Rig Released
SEG	South-East Gobe Field
SEM	South-East Mananda Field
SS	Sub-Sea
STB	Stock Tank Barrel
STB/D	Stock Tank Barrel per Day
ST	Sidetrack
STOIIP	Stock Tank Oil Initially In Place
TCF	Trillion Cubic Feet
TD	Total Depth
TVD	True Vertical Depth
US \$	United States Dollar

# **2007 MONTHLY HIGHLIGHTS**

January	<ul> <li>Juha 5 appraisal well drilled by Oil Search Ltd in PRL 2 on behalf of Operator</li> <li>PNG Gas Project studies concluded</li> </ul>
February	<ul> <li>Elk Trend Seismic Survey Conducted in PPL 238 by SPI Interoil</li> <li>Elk 2 exploration well drilled by SPI Interoil</li> <li>Kutubu &amp; Moran wells shut-in; Production at 9,000 average</li> </ul>
March	<ul> <li>Cores acquired from Juha 5 appraisal well</li> <li>Mosa Deep and Libano Seismic Survey conducted by Oil Search Ltd</li> </ul>
April	<ul> <li>Oil prices above US\$70/bbl</li> <li>Application deadline for Licensing Round</li> <li>Initiation of Exxon-led LNG Project</li> <li>Proposal for the LNGL project by InterOil Ltd</li> <li>Juha 4 appraisal well drilled by Oil Search Ltd in PRL 2 on behalf of Esso (Operator)</li> </ul>
Мау	<ul> <li>Douglas 1 gas and condensate discovery</li> <li>Abau Oil Seep Sampling was conducted</li> <li>PPL 295 was awarded to Aequs Oil &amp; Gas (PNG) Ltd</li> </ul>
June	Guavi Seismic Survey conducted by Oil Search Ltd in PPL 240 and PRL 8
July	Normal Operations
August	<ul> <li>Arakubi 1A exploration well drilled by Oil Search Ltd in PDL 2</li> <li>PPL 287 was awarded to Potts Limited (subsidy of Papua Petroleum Ltd)</li> </ul>
September	<ul> <li>Oil Search Rigs 101 and 103 arrive in PNG</li> <li>Oil prices above US\$80/BBL</li> </ul>
October	<ul> <li>Korobosea-1 exploration well drilled by Oil Search Ltd in PPL 240</li> <li>Stanley Seismic Survey Conducted in PRL 4 by Austral Pacific Ltd</li> <li>Oil Search Rig 101 arrived in PNG.</li> <li>Arakubi 1AST1 drilled by Oil Search Ltd in PPL 219</li> </ul>
November	<ul> <li>Oil prices above US\$90/BBL</li> <li>Mining and Petroleum Seminar by Chamber of Mines and Petroleum</li> <li>Oil Seep Investigation conducted by Papua Petroleum Ltd in PPL 285</li> </ul>
December	At year-end Asset Database reached over 78,500 records

#### Section 1.0 SUMMARY

The Division regulated 38 petroleum prospecting licences, 5 petroleum development licences, 3 pipeline licences, 11 petroleum retention licences and 1 petroleum processing facility licence during the reporting year. Two new licences were awarded, one within the North New Guinea Basin and one in the Papuan Basin. Eight licences are operating within the North New Guinea Basin, 1 in the Cape Vogel Basin and the remaining licences operating within the Papuan Basin.

This year saw a decrease in some petroleum exploration activities particularly in the acquisition of geological and geophysical surveys and airborne gravity and magnetic surveys compared to the previous year. However, there was an increase in the number of exploration wells drilled this year as opposed to the past year. Five wildcat exploration wells were drilled; they were the Elk 2 and Korobosea 1 wells drilled in the Foreland area, and the Arakubi 1A and Arakubi 1A ST1 and the Kutubu 2 wells located in the Fold belt. All the exploration wells were water-wet although hydrocarbon shows were observed in Elk 2. There were two appraisal wells drilled, Juha 4 and Juha 5 and a gas column was intersected in Juha 4. Only 2 development wells, the UDT 7 and the UDT 7 ST1 were drilled in the USano Block in the Foldbelt.

In 2007, the Kutubu field's oil production averaged 13,271 BOPD, whilst the Moran oil field averaged 19,552 BOPD and the Gobe fields averaged 9,026 BOPD. The North West Moran EPT produced 547,808 BBLs. The Hides gas field produced 4.840 BCF of gas in 2007.

PNG's Licensing Round, which commenced in 2006 with a Ministerial reservation of some 107,000/sq.kms in and around the Gulf of Papua, came to a close when applications were invited on 1 March 2007 with deadline for submission set as 13 April 2007. Only one application was received from Oil Search Limited for one of the reserved blocks (Block J).

The Petroleum Division continued its role as the regulator, promoter and monitoring agent of the petroleum industry. The Division ensured that all exploration, development and production activities were carried out within the provisions of the Oil and Gas Act of 1998 and Oil and Gas Regulations of 2002.

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# Section 2.0 LICENCE MANAGEMENT

#### 2.1 Licensing Year 2007

Thirty eight Petroleum Prospecting Licences (PPLs), five Petroleum Development Licences (PDLs), three Pipeline Licences (PLLs), eleven Petroleum Retention Licences (PRLs) and one Petroleum Processing Facility Licence (PPFL) were active between January to December 2007.

The number of licences operating in 2007 slightly increased with the award of two new PPLs, PPL 287 in the Papuan Basin and PPL 295 in the North New Guinea Basin respectively. No applications were refused during the reporting year.

There were no licence surrenders in 2007. Thirteen new applications were received and are pending reviews. Four applications were "withdrawn" at the request of their respective applicants. Of the remaining applications, twelve are for the grant of a PPL, while the remaining is for a Petroleum Development licence (APDL 6) to facilitate the development of the newly discovered North West Moran oil field.

There are eight licences outside of the Papuan Basin; PPLs 245, 248, 249, 252, 258, 281 and 295 are situated in the North New Guinea Basin, whilst PPL 257 is situated in the Cape Vogel Basin. The remainder of the above Petroleum licences are all situated in the Papuan Basin.







Figure 2.2 Petroleum Licence Statistics for years 1986 – 2007

Figure 2.3 Petroleum Blocks/Area Statistics for years 1986 – 2007



## Section 3.0 EXPLORATION AND DRILLING

The total number of surveys conducted this year decreased when compared to the previous year. Only five surveys were conducted in various licences. Four of these surveys were seismic surveys, conducted onshore in the Papuan Basin. Only one geological survey was conducted during the reporting year. There were no gravity or magnetic surveys carried out in 2007. **Tables 3.1** and **3.2** contain the summaries of all the field surveys for the year.

#### 3.1 Geological Field Mapping

One geological survey was undertaken in the reporting year. The Mosa Deep and Libano Geological Survey was conducted by CSIRO on behalf of Oil Search Ltd and comprised a total of 83.75/km. **Table 3.1** displays information on the geological survey and a graphical representation of geological surveys since 1995 is shown in **Figure 3.1**.

Table 3.1:	Geological :	Surveys
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Licence/ Permit	Operator	or Geographic / Name/ Tectonic Area Contractor		Line Length - km	Cost US\$
PPL 219 / PDL 2	Oil Search Ltd	Southern Highlands Province Papuan Basin, Onshore	MOSA DEEP & LIBANO GEOLOGICAL SURVEY CSIRO	83.75	Costs included in Seismic Survey Costs
TOTAL	•			83.75km	



Figure 3.1: Yearly Geological Surveys

#### 3.2 Geophysical Field Surveys

Four geophysical surveys were conducted during the year, which is a decrease compared to the previous year. All of these surveys were reflection seismic surveys and were conducted onshore in various licences. There were no gravity, magnetic or airborne surveys conducted during the reporting year. The surveys are

summarized in **Table 3.2** and the graphical representations of the yearly seismic and aeromagnetic surveys since 1996 are shown in **Figures 3.2a**, **3.2b** and **3.3**. In addition **Figure 3.4** displays survey line length statistics dating from 1986 to 2007.

The objective of the *Libano-Mosa Deep Seismic Survey* was to better-define the subsurface structure and exploration risk for the Libano South, Mosa Deep and NW Mosa leads in order to mature these features as potential future drilling targets. A total length of 101.43 line-kilometers was acquired.

The *Elk Trend Seismic Survey's* objective was to define optimal seismic parameters to image the Puri Limestone. A line length of 223.3 line-kilometers was acquired.

The *Guavi River Seismic Survey* was aimed at better defining the subsurface structures of the Kimu gas discovery in PRL 8 and leads around the Korobosea Prospect in PPL 240. A total line length of 164.18 line-kilometers was acquired.

The *Stanley Seismic Survey* aimed to define the extent and reservoir architecture of the Stanley structure in PRL 4. A total length of 44.32 line-kilometres was acquired.

Licence Area	Operator	Geographic Area	Name/Survey Type/Contractor	Line Length Km	Cost (US\$)			
SEISMIC SURVEYS								
PPL 219 / PDL 2 <b>Onshore</b>	Oil Search Ltd	Southern Highlands Province	Libano-Mosa Deep Survey Oilmin	101.43km	8.21M			
PPL 238 Onshore	SPI InterOil Ltd	Gulf Province	Elk Trend Seismic Survey Oilmin	223.3km	19.455			
PPL 240 / PRL 8 <b>Onshore</b>	Oil Search Ltd	Western Province	Guavi River 2007 Seismic Survey Velseis Pty Ltd	164.18km	6.78M			
PRL 4 Onshore	Austral Pacific Energy Ltd	Western Province	Stanley Seismic Survey MLSC	44.32km	1.838M			
TOTAL		·		533.23km	US\$36.283M			

Table 3.2: Geophysical and Aeromagnetic Surveys



Figure 3.2a: Yearly Onshore Seismic Survey Length





Figure 3.3: Yearly Aeromagnetic Survey Length





#### Figure 3.4: Field Survey Line Length Statistics from 1986 to 2007

# 3.3 Drilling Activities

#### 3.3.1 Summary of Exploration & Appraisal Wells

There were five onshore exploration wells and three appraisal wells drilled in 2007, namely Elk 2, Arakubi 1A, Arakubi 1A ST1, Korobosea 1, Kutubu 2, Juha 4, Juha 4 ST1, and Juha 5 respectively. Elk 2 well was water-wet with traces of Hydrocarbon. A well test was conducted to determine reservoir deliverability to further assist in the appraisal of the Elk structure. The well was plugged and suspended awaiting further analysis from the next planned well, Elk 4. Results from Arakubi 1A exploration well also indicated water-wet reservoirs. It was decided was to test the updip potential with a sidetrack option. This resulted in the drilling of Arakubi 1A ST1 well, which also indicated water-wet reservoirs. Kutubu 2 exploration well was a problematic dry well and it was plugged and abandoned.

Juha 4 appraisal well experienced several drill string twist-offs. The well was plugged back and sidetracked as Juha 4 ST1, which intersected a gas column. Juha 5 appraisal well in the same field intersected water and it was plugged and abandoned.

The total footage drilled by the five wells was 45,266ft (13,797m) at a total unaudited cost of US\$ 91.5MM. **Figure 3.5** is a graphical representation of all exploration wells and discovery well statistics from years 1986 to 2007.

#### Elk 2

Elk 2, located in the Gulf Province, was a conventional well drilled by SPI Ltd in its PPL 238 licence area. The well is located about 4.7 km north of the Elk 1 gas discovery well and was planned to intersect the gas-water contact. Drilling commenced on 9 February 2007 and total depth (TD) of 10,922ft (3,329m MD) was reached on 18 August 2007. The well was dry and found to be mostly water-wet with scattered traces

of oil. The well was nevertheless tested to determine reservoir deliverability to assist in the appraisal of the Elk structure. The well was plugged and suspended, and the rig was released on 6 October 2007. The total unaudited cost was US\$28.3MM.

#### Arakubi 1A

Arakubi 1A well was located in the Southern Highlands Province in PDL 2 licence area operated by Oil Search Limited. The well was a vertical well having the same objectives as the abandoned Arakubi 1 well. The well was spudded on the 30 August 2007 and drilled to TD at 10,568ft (3,221m MD) on 3<sup>rd</sup> October 2007. The well was dry and found to be water-wet. It was decided to plug back and sidetrack updip. The total unaudited well cost was US\$9.1MM

#### Arakubi 1A ST1

On 18 October 2007, Arakubi 1A well was plugged back and sidetracked up-dip of the reservoir at 5,131ft (1,564m MD). TD of 10,499ft (3,200m MD) was reached on 2 November 2007. The well was dry and it was plugged and abandoned. The rig was released on 11 November 2007 with a total unaudited stage cost of US\$6.8MM.

#### Korobosea 1

Oil Search Limited drilled Korobosea 1 exploration well located in Western Province in the PPL 240 licence area. The well was spudded on 22 October 2007 and continued drilling to TD at 7,201ft (2,195mMD) with hardly any problems and completed drilling in 30 days. All reservoir sections intersected were dry, containing mostly water and the well was plugged and abandoned and the rig released on 26 November 2007. The dry cost was US\$15.4MM.

#### Kutubu 2

Kutubu 2 exploration well was located in the Southern Highlands Province in PPL 219 licence area operated by Oil Search Limited. This vertical well was spudded on 13 March 2007. It was a high-pressure well and experienced several major hole problems. Nevertheless, the primary target reservoir was reached and found to be dry. The secondary target was abandoned due to severe hole problems and difficult drilling. The well was plugged and abandoned after reaching TD at 6076ft (1,852m MD) below the primary target. The rig was released on 27 June 2007 with a total well cost of US\$31.9MM.

#### Juha 4

Juha 4 appraisal well is located in Western Province in PRL 2 licence area operated by Exxon Mobil. The well was spudded on 24 April 2007 and drilled to 3,278ft (1,000m MD) and experienced several drill pipe twist-offs, which were suspected, be from pipe fatigues. The well was plugged back leaving a fish in the hole and sidetracked. The total unaudited cost of the original hole was US\$13.5MM

#### Juha 4 St1

Juha 4 ST1 was a mechanical sidetrack from the Juha 4 from 3,009ft (917m MD) and drilled to 10,794ft (3,290mMD). Gas was discovered and it was plugged and suspended. The rig was released on 9 August 2007 with a total sidetrack cost of US\$9.5MM.

#### Juha 5

Juha 5 appraisal well is located in Western Province in PRL 2 licence area operated by Exxon Mobil. The well was spudded on 23 December 2006. It was drilled to TD at 11,982ft (3652mMD) and the well was dry. All the reservoir sections were water wet and the well was plugged and abandoned. The rig was released on 5 April 2007 with a total well cost of US\$58.4MM; increased cost was the result of extended period required for the rig move.

WELL I.D.	LICENSEE	LICENCE	SPUD	R.R. DATE	T.D.	RESULT	COST	SIDETRACK
			DATE		(m.MD)		US\$	ТҮРЕ
							(Million)	
Elk 2	SPI	PPL 238	9/02/07	6/10/07	3,329	Dry	28.27	NA
Arakubi 1A	Oil Search	PDL 002	30/08/07	10/10/07	3,221	PB & ST	9.09	NA
Arakubi 1A ST1	Oil Search	PDL 002	18/10/07	11/11/07	3,200	Dry	6.83	Geological
Korobosea 1	Oil Search	PPL 240	22/10/07	26/11/07	2,195	Dry	15.38	N/A
Kutubu 2	Oil Search	PPL 219	13/03/07	27/06/07	1,852	Dry	31.90	NA
Juha 4	Exxon Mobil	PRL 002	24/04/07	21/05/07	1,000	PB & ST	13.50	Mechanical
Juha 4 ST1	Exxon Mobil	PRL 002	24/05/07	9/08/07	3,290	Gas	9.55	N/A
Juha 5	Exxon Mobil	PRL 002	23/12/06	5/04/07	3,652	Dry	58.36	N/A

Table 3.3: Exploration and Appraisal Well Summary

Figure 3.5: Exploration and Appraisal Well Statistics – 1986 to 2007



#### 3.3.2 Summary of Development Wells

There were only two development wells drilled in 2007, including one sidetrack, in the Usano Block, in Kutubu. These two wells are UDT 7 and UDT 7 ST1 wells. The UDT 7 well got differentially stuck and it was decided to sever the drill string and do a mechanical sidetrack. UDT 7 ST1 was the sidetrack to go around the severed bottom hole assembly. The well was completed as an oil producer. The total development cost for the two wells was US\$25.1MM

#### UDT 7

UDT 7 development well was a conventional deviated well located in the Southern Highlands Province in PDL 2 licence area operated by Oil Search Limited. The well was spudded on 5 November 2006. After drilling for seventy-four days, the drill string got differentially stuck at 10,955ft (3,339m MD). It was decided to sever the bottom hole assembly with radioactive source, plug back and mechanically sidetrack the well. The well was plugged back and ready for sidetrack on 18 January 2007. Total well cost for this well was US\$15.1MM.

#### UDT 7 ST1

This well was a mechanical sidetrack of UDT 7 ST1. The well was sidetracked on 18 January 2007 and reached a TD of 10,203ft (3,110m MD). The well was completed as an oil producer and the rig was released on 12 February 2007. The total well stage cost was US\$10.6MM.

WELL I.D.	LICENSEE	LICENCE	SPUD	R.R.	T.D.	RESULT	COST US\$	SIDETRACK
			DATE	DATE	(m.MD)		(Million)	ТҮРЕ
UDT 7	Oil Search	PDL 2	5/11/06	18/01/07	3,346	PB & ST	15.07	NA
UDT 7 ST1	Oil Search	PDL 2	18/01/07	12/02/07	3,110	Oil	10.58	Mechanical

#### Table 3.4: Development Well Summary

#### 3.4 PNG Petroleum Drilling History

The Papuan Basin is currently the most explored and developed of the five petroleum basins in PNG. The Papuan Basin has had a total of just over **350** wells drilled to date, since the commencement of exploration in PNG. With the exception of the historic Marienberg well in the Sepik, all discoveries have been in the Papuan basin. **Table 3.5** contains a summary of all the discoveries to date (in the Papuan Basin) and **Figure 3.6** illustrate the number of wells drilled from 1995 to 2006.

ORIGINAL	ORIGINAL	FIELD	DISCOVERY	CURRENT	CURRENT	TYPE OF	EXISTING WELLS	PROVINCE
LICENCE/ PERMIT	OPERATOR		YEAR	LICENCE/ PERMIT	OPERATOR	DISCOVERY	IN FIELD	
Permit 37	Island Exploration	Barikewa	1958	PRL 9	Barracuda	Gas	2	Gulf
Permit 37	APC	Bwata	1960	PPL 237	InterOil	Gas/ Condensate	1	Gulf
Permit 12	APC	Iehi	1960	PPL 189	Barracuda	Gas	1	Gulf
Permit 39	Phillips	Uramu	1968	PPL 188	Oil Search	Gas	1	Gulf
Permit 42	Phillips	Pasca	1968	PPL 234	Oil Search	Gas/ Condensate	3	Gulf
PPL 18	Niugini Gulf Oil	Juha	1983	PRL 2	Esso	Gas/ Condensate	5	Western
PPL 17	Chevron	Iagifu - Hedinia	1986	PDL 2	Oil Search	Oil / Gas	47	SHP
PPL 27	BP	Hides	1987	PDL 1 PRL 12	Esso	Gas/ Condensate	4	SHP / Western
PPL 100	Chevron	SE Hedinia	1987	PDL 2	Oil Search	Gas	5	SHP
PPL 82	IPC	Pandora	1988	PRL 1	Talisman	Gas	2	Gulf
PPL 100	Chevron	Usano	1989	PDL 2	Oil Search	Oil	2	SHP
PPL 100	Chevron	Agogo	1989	PDL 2	Oil Search	Oil	1	SHP
PPL 27	BP	Angore	1990	PRL 3	Esso	Gas/ Condensate	1	SHP
PPL 81	BP	Elevala	1990	PRL 5	Santos	Gas/ Condensate	1	Western
PPL 101	Chevron	P'nyang	1990	PRL 3	Esso	Gas/ Condensate	2	Western
PPL 81	BP	Ketu	1991	PRL 5	Santos	Gas/ Condensate	1	Western
PPL 56	Command	SE Gobe	1991	PDL 3	Oil Search	Oil / Gas	11	SHP / Gulf
PDL 2	Chevron	SE Mananda	1991	PDL 2	Oil Search	Oil / Gas	5	SHP
PPL 82	Mobil	Pandora B	1992	PRL 1	Talisman	Gas	1	Gulf
PPL 100	Chevron	Gobe Main	1993	PDL 4	Oil Search	Oil / Gas	6	SHP
PPL 138	BP	Paua	1995	PPL 233	Esso	Oil	1	SHP
PDL 2, PPL161/138	Chevron	Moran	1996	PDL 2, PDL 5	Oil Search Esso	Oil	4	SHP
PPL 157	Santos	Stanley	1999	PRL 4	InterOil	Gas	1	Western
PPL 193	Oil Search	Kimu	1999	PRL 8	Oil Search	Gas	2	Western
PDL 4	Chevron	Saunders	2002	PDL 4	Oil Search	Oil	1	Gulf
PPL 160	Santos	Bilip	2002	PPL 190	Oil Search	Oil	1	Gulf
PPL 235	Rift Oil	Douglas	2006	PPL 235	Rift Oil	Gas/ Condensate	1	Gulf
PPL 238	InterOil	Elk	2006	PPL 238	Interoil	Gas/ Condensate	3	Gulf

Table 3.5:Summary of Discoveries to Date

# Figure 3.6: Chart Showing Total Yearly Development & Exploration Wells



# Section 4.0 PRODUCTION

## 4.1 PNG Production Summary

Papua New Guinea had a good year in production however oil production continues to decline with a 2% decrease from 2006, while a 3% increase was delivered by associated<sup>1</sup> gas production. A total of 16,813,961 BBL of oil was produced in 2007 at an average daily production rate of 46,066 BOPD. **Figure 4.1** illustrates the production for 2007 of oil and gas from all the production fields in PNG. **Figure 4.7a** shows the actual production of oil in PNG to date and the production forecast to 2026 while **Figure 4.7b** shows the yearly oil and gas production since 1991.





#### 4.2 HIDES

During the year, **Hides** produced a total of 4840.380 MMSCF of gas. The total liquid production was 122,513.27 BBL of condensate, which yielded 72,830.24 BBL of naphtha, 22,453.62 BBL of diesel and 8,163.44 BBL of residue. See **Figure 4.2a**.

The major setback at the Hides Gas plant during the year was the shutdown of operations at Porgera. As a result, gas to PJV during the month of January was on a reduced load. In April, PJV Power-station was on low load due to maintenance work being done at Porgera. In July a fallen transmission line disrupted electricity transmission to the mine. As a result of all these events, the year's production was not as comparable to the previous year. Routine checks, preventative maintenance and maintenance to the micro-stills and other process equipment was on going through out the year. The pipeline inspection and pigging operations were also on-going during the year. See **Figure 4.2a** for a comparison of Gas and Liquid Production of 2007 in BBLS and **Figure 4.2b** for the percentage break-up of liquid production for 2007.

	GAS			LIQUID						
MONTH	Total Production	Total sales	Condensate	Naphtha	Diesel	Residue				
	(MMSCF)	(MMSCF)	(BBL)	(BBL)	(BBL)	(BBL)				
January	204.618	204.618	4,889.70	3,310.80	1,120.92	236.46				
February	308.166	308.166	7,448.21	4,796.80	1,553.96	458.16				
March	433.777	433.777	10,463.73	10,047.32	1,606.49	425.89				
April	365.618	365.618	8,821.78	4,556.81	1,448.41	372.36				
Мау	328.540	328.540	7,824.70	4,542.70	1,406.01	439.99				
June	357.404	357.404	8,554.58	4,720.57	1,575.62	368.81				
July	452.993	452.993	10,460.94	4,909.27	1,639.15	470.72				
August	390.227	390.227	9,898.67	5,349.56	1,702.68	432.65				
September	380.706	380.706	8,983.22	5,923.51	2,055.68	475.89				
October	385.000	385.000	10,836.67	5,159.60	1,890.11	480.50				
November	390.698	390.698	9,216.01	4,663.14	1,703.29	559.65				
December	457.607	457.607	11,020.04	5,870.33	2,171.99	626.07				
TOTALS	4,455.354	4,455.354	108,418.25	63,850.42	19,874.32	5,347.16				

Note: Total condensate is not equal to total sum of liquid products, some condensates were sent direct to the PJV turbines.



Figure 4.2a. Hides Gas Vs Liquid Monthly Production (2007).



#### Figure 4.2b. Pie chart showing the percentage of Hides fields Liquid Production in 2007

#### 4.3 KUTUBU

Kutubu produced a total of 4,877,607 BBLs in 2007 at an average daily production rate of 13,271 BOPD. The production decrement this year was caused by a scheduled ten-day field shut down to carry out repairs to the CPF flare header. The repair work was scheduled to take 14 days but was completed in ten days, although problems restarting the CPF compressors delayed the resumption of normal production. **Figure 4.3** gives a graphical representation of the production history of Kutubu since 1991.

	MONTHLY	MONTHLY	CUMULATIVE OIL	CUMULATIVE GAS	AVG. DAILY	AVG.DAILY
MONTH	OIL PRODUCTION	GAS PRODUCTION	PRODUCTION	PRODUCTION	OIL RATE	GAS RATE
	BBL	MSCF	BBL X 1000	MMSCF	BOPD	MSCFD
JANUARY	465,247	6,600,865	302,511	1,035,872	15,008	212,931
FEBRUARY	23,625	3,780,342	302,748	1,039,725	844	135,012
MARCH	486,199	6,339,176	303,234	1,046,064	15,684	204,490
APRIL	444,561	5,994,788	303,678	1,052,059	14,819	199,826
MAY	445,272	6,292,162	303,820	1,052,012	14,364	202,973
JUNE	433,648	6,144,988	304,557	1,064,496	14,455	204,833
JULY	454,949	6,486,137	305,012	1,070,982	14,676	209,230
AUGUST	440,058	6,474,818	305,452	1,077,457	14,195	208,865
SEPTEMBER	434,678	6,361,756	305,887	1,083,819	14,489	212,059
OCTOBER	433,600	6,558,980	306,321	1,090,378	13,987	211,580
NOVEMBER	404,128	6,474,556	306,725	1,096,853	13,471	215,819
DECEMBER	411,102	6,566,719	307,136	1,103,419	13,261	211,830
MONTHLY AVERAGE	406,422	6,172,941			13,271	202,454
YEARLY TOTALS	4,877,067	74,075,287				

Table 4.2: Kutubu Monthly Oil Production



Figure 4.3. Kutubu Oil Production History Since October 1991

#### 4.4 GOBE AND SOUTH EAST GOBE

In 2007 the Gobe fields produced a total of 3,295,044 BBL at an average rate of 9,026 BOPD. **Figure 4.4a** shows the daily production history of the Gobe fields and how the production is slowly declining. South East Gobe produced far more than the Gobe Main field by more than a million barrels this year. See **Figure 4.4c** shows a comparison of the yearly oil production of the Gobe Main and South East Gobe fields since 1998 while **Figure 4.4d** gives the monthly production from these fields for 2007.

**Gobe Main** (GM) produced a total of 905,695 BBL of oil and a total volume of associated gas of 15,577,932 MMSCF. Gobe Main produced oil at an average rate 2,479 BOPD. See **Figure 4.4b**.

**South East Gobe** (SEG) produced a total of 2,389,349 BBL of oil averaging at 6,547 BOPD. There were no major operation hiccups, which saw a steady production from PDL 4.



Figure 4.4a: Daily Oil Production History for Gobe Main & South East Gobe Since 1998.

# **GOBE MAIN**

	MONTHLY	MONTHLY	CUMULATIVE OIL	CUMULATIVE GAS	AVG. DAILY	AVG.DAILY
MONTH	OIL PRODUCTION	GAS PRODUCTION	PRODUCTION	PRODUCTION	OIL RATE	GAS RATE
	BBL	MSCF	BBL X 1000	MMSCF	BOPD	MSCFD
JANUARY	79,719	1,311,848	136,489	108,137	2,572	42,318
FEBRUARY	61,489	1,197,622	102,809	109,335	2,196	42,772
MARCH	65,577	1,118,625	97,583	110,454	2,115	36,085
APRIL	77,246	1,124,880	101,345	111,579	2,575	37,496
MAY	77,291	1,194,176	106,418	112,773	2,493	38,522
JUNE	80,436	1,098,785	101,446	113,872	2,681	36,626
JULY	88,799	1,236,478	102,138	115,144	2,864	39,886
AUGUST	86,587	1,414,260	107,934	116,558	2,793	45,621
SEPTEMBER	75,791	1,389,992	102,470	117,948	2,526	46,333
OCTOBER	76,398	1,522,663	112,687	119,471	2,464	49,118
NOVEMBER	66,265	1,421,704	103,165	120,893	2,209	47,390
DECEMBER	70,097	1,546,899	120,063	122,440	2,261	49,900
MONTHLY AVERAGE	75,475	1,298,161			2,479	42,672
YEARLY TOTAL	905,695	15,577,932				

Table 4.3a. Gobe Main Monthly Production



## SOUTH EAST GOBE

 Table 4.3b.
 South East Gobe Monthly Production

	MONTHLY	MONTHLY	CUMULATIVE OIL	CUMULATIVE GAS	AVG. DAILY	AVG.DAILY
MONTH	OIL PRODUCTION	GAS PRODUCTION	PRODUCTION	PRODUCTION	OIL RATE	GAS RATE
	BBL	MSCF	BBL X 1000	MMSCF	BOPD	MSCFD
JANUARY	226,411	2,126,990	34,769.42	155,282.30	7,304	68,613
FEBRUARY	191,062	2,039,073	34,960.48	157,321.37	6,824	72,824
MARCH	202,334	2,359,609	35,162.81	159,680.98	6,527	76,116
APRIL	194,445	2,170,907	35,357.26	161,851.88	6,482	72,364
MAY	196,262	2,373,917	35,553.52	164,225.80	6,331	76,578
JUNE	193,310	2,256,777	35,746.83	166,482.58	6,444	75,226
JULY	207,729	2,212,288	35,954.56	168,692.07	6,701	71,364
AUGUST	207,478	1,561,178	36,550.39	94,089.37	6,693	50,361
SEPTEMBER	194,931	2,135,095	36,356.97	172,987.50	6,498	71,170
OCTOBER	193,417	2,026,182	36,550.39	175,013.68	6,239	65,361
NOVEMBER	186,898	2,067,778	36,737.28	177,082.46	6,230	68,926
DECEMBER	195,072	2,142,845	36,932.36	179,225.30	6,293	69,124
MONTHLY AVERAGE	199,112	2,122,720			6,547	69,835
YEARLY TOTAL	2,389,349	25,472,639				



Figure 4.4c. Graph showing Comparison of the Yearly Oil Production Graph from SEG & GM



Figure 4.4d. Graph showing 2007 Oil Production between Gobe Main and SEG

#### 4.5 MORAN AND NORTHWEST MORAN

The total **Moran** oil field production for 2007 was 7,696,659 BBLs and the total associated gas produced from the Moran field was 28,859,711 MSCF. Oil production from Moran fields averaged 19,552 BOPD, which was a 10% decrease compared to 2006 of 20,539 BOPD. **Figure 4.5b** shows the monthly oil production and occasional decreases in production due to a 10-day planned shutdown of the Agogo Production Facility (APF) from 10 -19 February, and downtime on the Moran 11 well due to hydrates on the gas lift line and issues with the methanol injection pump. Production also declined towards the end of the year mainly due to increased downtime from Moran 2X, Moran 1 and Moran 10 wells. **Figure 4.5a** indicates a steady increase in production since 1998 brought about by depressurization of the Moran field with Agogo for injection, which is compared to North West Moran (NWM) oil production since 2004.

**North West Moran** oil field produced oil at an average rate of 1487 BOPD. In 2007 total oil production from NW Moran EPT was 547,808 BBLs and associated gas production was 686,091 MSCF. On 29 December, after a 4-month extension to the current NWM EPT permit was granted by the Department, the NWM1X production choke was reduced to target a BHP decline of 10-15psi/day. Approval was given to extend the current EPT permit from 29 December 2007 to 30 April 2008. See **Figure 4.5c.** 



Figure 4.5a. Yearly Oil Production History for Moran and North West Moran (NWM)

	MONTHLY	MONTHLY	CUMULATIVE OIL	CUMULATIVE GAS	AVG. DAILY	AVG.DAILY
MONTH	OIL PRODUCTION	GAS PRODUCTION	PRODUCTION	PRODUCTION	OIL RATE	GAS RATE
	BBL	MSCF	BBL X 1000	MMSCF	BOPD	MSCFD
JANUARY	688,353	2,237,327	41,790	112,497	22,205	186,444
FEBRUARY	422,484	1,314,786	42,213	113,811	15,089	46,957
MARCH	679,537	2,317,045	42,892	116,128	21,921	74,743
APRIL	643,488	2,432,254	43,536	118,561	21,450	81,075
MAY	650,321	2,633,056	44,186	121,194	20,978	84,937
JUNE	589,904	2,373,396	44,776	123,567	19,663	79,113
JULY	540,224	2,327,065	45,316	125,894	17,427	75,067
AUGUST	608,626	2,796,534	45,925	128,690	19,633	90,211
SEPTEMBER	585,848	2,420,514	46,511	131,111	19,528	80,684
OCTOBER	629,393	2,491,400	47,140	133,602	20,303	80,368
NOVEMBER	562,884	2,354,999	47,703	135,957	18,763	78,500
DECEMBER	547,789	2,475,244	48,251	138,432	17,671	79,847
MONTHLY AVERAGE	595,738	2,347,802			19,552	86,495
YEARLY TOTALS	7,148,851	28,173,620				

Table 4.4:Moran Monthly Production

Figure 4.5b. Graph Showing the 2007 Oil Production for Moran Field



	MONTHLY	MONTHLY	CUMULATIVE OIL	CUMULATIVE GAS	AVG. DAILY	AVG.DAILY
MONTH	OIL PRODUCTION	GAS PRODUCTION	PRODUCTION	PRODUCTION	OIL RATE	GAS RATE
	BBL	MSCF	BBL X 1000	MMSCF	BOPD	MSCFD
JANUARY	0	0	913.4	1,229.4	0	0
FEBRUARY	0	0	913.4	1,229.4	0	0
MARCH	0	0	913.4	1,229.4	0	0
APRIL	0	0	913.4	1,229.4	0	0
MAY	0	0	913.4	1,229.4	0	0
JUNE	1,363	2,208	914.8	1,231.6	44	71
JULY	91,489	113,825	1,006.3	1,345.5	2,951	3,672
AUGUST	84,988	102,015	1,091.3	1,447.5	2,742	3,291
SEPTEMBER	71,047	95,405	1,162.3	1,542.9	2,368	3,180
OCTOBER	81,752	95,646	1,244.1	1,638.5	2,637	3,085
NOVEMBER	92,781	116,600	1,336.8	1,755.1	3,093	3,887
DECEMBER	124,388	160,392	1,461.2	1,915.5	4,013	5,174
YEARLY AVERAGE	45,651	57174.25			1,487	1,863
YEARLY TOTALS	547,808	686,091				

Table 4.5North West Moran Monthly Production

Figure 4.5c. NWM Monthly Oil Production Graph



#### 4.6 SOUTH EAST MANANDA

The **South East Mananda** (SEM) field has been on normal production with only minor disruptions from landowners since it was brought on line twenty-two months ago. This year, it has produced a total production of 945,190 BBL of oil with an average rate of 2,590 BOPD. Total associated gas produced from the South East Mananda field was 5,318,152 MSCF with an average monthly rate of 14,462 MSCF.

The Agogo Production Facility (APF) was planned to shutdown for maintenance in February, hence all SEM wells were shut-in from  $10^{\text{th}} - 19^{\text{th}}$  whilst slickline work was conducted on SEM 1x, 3 and 5 wells to install a gas lift orifice in the mandrels in the three wells. However, throughout the year, all SEM wells have been flowing under normal operations.

See **Table 4.6a** for tabulated statistics and **Figures 4.6a and 4.6b** for graphical representation and history of oil production in SEM.

	MONTHLY	MONTHLY	CUMULATIVE OIL	CUMULATIVE GAS	AVG. DAILY	AVG.DAILY
MONTH	OIL PRODUCTION	GAS PRODUCTION	PRODUCTION	PRODUCTION	OIL RATE	GAS RATE
	BBL	MSCF	BBL	MSCF	BOPD	MSCFD
Jan	109,979	574,890	883,923	3,362,181	3,548	18,545
Feb	52,813	302,322	936,735	3,664,503	1,886	10,797
Mar	91,206	455,193	1,027,941	4,119,696	2,942	14,684
Apr	98,178	490,469	1,126,119	4,610,165	3,273	15,822
Мау	94,098	496,181	1,129,011	4,651,153	3,035	16,006
Jun	82,551	471,086	1,302,768	5,577,432	2,752	15,703
Jul	65,572	428,479	1,368,340	6,005,911	2,115	13,822
Aug	75,979	459,878	1,444,319	6,465,789	2,451	14,835
Sep	83,100	466,366	1,527,419	6,932,155	2,770	15,044
Oct	74,917	458,418	1,602,336	7,390,573	2,417	14,788
Nov	63,985	412,549	1,666,322	7,803,122	2,133	13,752
Dec	52,813	302,322	1,737,180	8,245,185	1,704	9,752
YEARLY AVERAGE	78,766	443,179			2,585	14,462
YEARLY TOTALS	945,191	5,318,153				

#### Table 4.6: South East Mananda Monthly Production



Figure 4.6a. South East Mananda (SEM) Monthly Oil Production Graph



*Figure 4.6b. Graph showing South East Mananda (SEM) Oil Production History since 2006* 



Figure 4.7a: Yearly Oil Production Showing History and Forecast

# 4.7 OTHERS

Table 4.7:

# Yearly Oil and Gas Production since 1991

YEAR	KU	TUBU	GOBE	MAIN	S. E.	GOBE	NWM	1 ЕРТ	S.E. MA	NANDA	мо	RAN	TOTAL PR	ODUCTION
	OIL	GAS	OIL	GAS	OIL	GAS	OIL	GAS	OIL	GAS	OIL	GAS	OIL	GAS
	(BBL)	(MSCF)	(BBL)	(MSCF)	(BBL)	(MSCF)	(BBL)	(MSCF)	(BBL)	(MSCF)	(BBL)	(MSCF)	(BBL)	(MSCF)
1991	68,162	84,532											68,162	84,532
1992	19,314,212	16,951,949											19,314,212	16,951,949
1993	45,883,975	49,059,949											45,883,975	49,059,949
1994	44,077,868	58,666,246											44,077,868	58,666,246
1995	36,344,233	61,184,516											36,344,233	61,184,516
1996	38,640,602	65,343,500											38,640,602	65,343,500
1997	27,592,364	66,960,036											27,592,364	66,960,036
1998	18,926,771	69,562,381	3,568,005	8,568,296	3,539,421	6,718,805					3,445,286	6,403,723	29,479,483	91,253,205
1999	15,210,458	77,238,216	6,109,245	12,333,827	6,402,314	15,032,976					4,298,414	8,519,774	32,020,431	113,124,793
2000	11,985,875	77,528,038	5,497,312	11,665,081	4,827,260	16,112,863					3,124,070	7,048,093	25,434,517	112,354,075
2001	9,607,802	75,276,974	2,635,005	11,873,584	4,548,431	13,280,821					4,244,244	9,492,554	21,035,482	109,923,933
2002	7,759,851	77,897,708	1,961,814	11,488,765	3,697,018	12,788,514					3,144,086	8,120,984	16,562,769	110,295,971
2003	7,355,608	82,912,796	1,772,286	11,105,424	3,397,974	18,884,792					4,921,071	15,431,663	17,446,939	128,334,675
2004	6,552,222	84,791,755	1,446,375	12,125,889	2,621,193	21,378,237					4,874,683	17,899,235	15,494,473	136,195,116
2005	7,091,513	86,475,178	1,111,074	13,408,486	2,684,188	22,474,800	238,220	294,085			6,041,000	17,120,764	17,165,995	139,773,313
2006	5,626,802	80,521,971	1,065,855	10,753,194	2,815,576	23,912,103	675,193	928,125	774,171	2,788,621	6,820,077	19,322,347	17,777,674	138,226,361
2007	4,877,067	74,075,287	905,695	15,577,932	2,389,349	25,472,639	547,808	686,091	945,191	5,318,153	7,148,851	28,173,620	16,813,961	149,303,722
TOTAL	306,915,385	1,104,531,032	26,072,666	118,900,478	36,922,724	176,056,550	1,461,221	1,908,301	1,719,362	8,106,774	48,061,782	137,532,757	421,153,140	1,547,035,892

Figure 4.7b. Yearly Oil and Gas Production since 1991



# Section 5.0 RESERVES

All the petroleum reserves discovered to date are located in the Papuan Basin, both onshore and offshore. The table below provides an update on the oil reserves figures for PNG.

			Recovery	Ultimate	Cum. Oil Prod	Remaining
Field	Category	OOIP	Factor	Recovery	as Of DEC 2007	Reserves
		MMSTBO		MMSTB	MMSTB	MMSTB
	1P		0.54	337.771	301.055	35.055
	2P		0.557	347.933		45.921
Kutubu	3P	624.973	0.585	365.482		61.821
	1P	185.853	0.458	85.011	41.102	43.064
	2P	227.046	0.485	110.045		67.993
Moran	3P	345.024	0.377	130.132		88.117
	1P		0.25	40.921	34.543	6.378
	2P		0.265	43.311		8.768
SE Gobe	3P	163.613	0.312	51.06		16.517
	1P		0.345	28.809	25.173	3.636
Gobe	2P		0.371	30.992		5.819
Main	3P	83.5	0.428	35.73		10.557
	1P	27.921	0.079	2.197	0.774	1.423
SF	2P	27.921	0.120	3.355		2.581
Mananda	3P	27.921	0.149	4.170		3.396

Table 5.1: PNG Oil Reserves

NB. Saunders field within PDL 4 is now shut in due to limited production of crude oil.Cumulative production from this field was only 24 000 BBLs.

## 5.1 Kutubu Reservoir Engineering (PDL 2)

Reservoir engineering work in 2007 was mainly aimed towards identifying drilling and work over opportunities as well as a total remapping – of the Kutubu field. This has been brought forward from work in 2006 in which the Operator determined that the future of this field would be driven by two major efforts: - studies to identify infill drilling opportunities and workovers.

A summary of the top priority studies as identified by the Operator include the:

1. Usano & SE Main Block Toro Study

Work has been based on a revised geological model with the results from productive UDT 7ST1 and further more planning of two wells for this section of Kutubu.

2. Usano Main Block (Hedinia 8X Block)

Work has been focused on the drilling of more wells to add further drainage to the eastern end of this block. A geological model was constructed and simulation work is underway to progress optimum well locations.

3. UDT 7ST1

New well on which monitoring has been on going, however production from the well continues to be good at solution GOR conditions (1800 stb/d).

4. UDT3AST1

Work has been focused on trying to access the considerable bypassed oil in the vicinity of the wells.

5. UDT4A /UDT6A Area

Planning for a drilling in this area in the later stages of Usano drilling. A quick-look simulation model has been built for this area. Work is progressing.

6. Iagifu, Hedinia and I3X8X block re-mapping Project

This project has been progressed to Phase Two where individual prospects are now being evaluated.

7. Hedinia Digimu

Geological modeling and simulation models have been constructed ready for simulation work to begin.

8. Central Kutubu

Work is continuing on the IDTA prospect

9. Iagifu 3x/8X

IDT 11 and its failed Work Over has increased the need for a Iagifu re-drill

10. Agogo Remapping

This project aims to generate infill-drilling opportunities in the Toro, Digimu, Hedinia and Iagifu sands. Ongoing seismic processing, and completion of well correlation has brought the project to the re-mapping phase, upon completion subsequent reservoir simulation will be undertaken to identify targets.

11. Kutubu Water re-injection

As the fields produce more and more water, appropriate swing well candidates are being considered for conversion to water injectors. This work is on going.

The ongoing work from the top priority studies has provided the operator with work plans and further infill development strategies that will extend oil production from this field. It has also been realized that the work continued from 2005 with regards to the studies and evaluation work using the MPLT (Memory Production Logging Tool) and MPNN (Memory Production Neutron-Neutron) has greatly assisted the Operator in this respect by identifying candidate wells within the Kutubu field that may require well work to target bypassed oil bearing sands.

In addition non-rig well work such as fishing operations, zone changes and SBHP's continue to assist the operator in its efforts to maintain Kutubu production.

The chart below illustrates the production for Kutubu in terms of the forecast and actual rates.



Figure 5.1(a): Kutubu Reserves Forecast (2P) and Actual Rates (Agogo inclusive)

Figure 5.1(b): Kutubu Oil Rates for 2007



The graph above shows the production rates achieved for Kutubu in 2007. Average production was 13,903BBLs/D. The sharp drop in Feb 2007 was due to a 10 day shut down at the Central Processing Facility Flare Header.

## 5.2 Gobe Reservoir Engineering (PDL 4)

Gobe reservoir engineering work for 2007 as with 2006 has been limited mainly to continued swing well optimization and well optimization to encourage optimum production during the natural decline stage and rising GOR. The operator has been provided approval from the DPE for a four-month period to increase

gas flare rates from the approved 3MMSCFD to 13MMSCFD. This increase in the flare consent resulted in increases in production due to the fact that target swing wells are kept longer on-line.

#### **Production Optimization Program**

The swing well program continues to be the main ongoing study. Gauges are being used to gather the FLP and tubing head pressure on selected wells during flowing and shut in periods, to aid in optimizing the swing well cycles for these wells. However, it must be mentioned that DPE approvals to increase flare allowances at the Gobe Production Facility combined with the above-mentioned study compliment increases in production.

#### Specific Summary for each month

#### Studies/Evaluation Programs

These operations are confined to specific wells in the South-East Gobe and Gobe Main areas. The Operator highlights each well that may require well work such as:

- Sand bailing because of sand build up at the perforations
- Fishing operations requiring the use of a Rig
- Wax build-up on certain wells
- Re-perforations

These operations are highlighted and are contingent to the presence of a rig within the Gobe area or the fact that these planned operations are hindered by Regulatory implications with regards to the possible exceeding of allowable gas flaring upon undertaking of the individual well work.

The operator is also monitoring water disposal wells as to the injectivity and the rate at which water is being re-injected to optimally produce remaining oil from this declining field.

## Saunders

This small satellite field, to the Gobe fields, the Saunders field remains shut-in for an extended period after a cumulative production of only 24,000BBLs. The figure below represents the oil rates achieved for the Gobe field in 2007.



Figure 5.2: Gobe Production Forecast and Actual Rates for 2007

The Gobe Field Performance forecast is taken from 2006 Annual Reserves Report!

# 5.3 Moran Reservoir Engineering (PDL 5)

In 2007, Moran production continues to be flowed through the EWT and EPT lines to alleviate producing wells. Gas injection rates are continually being optimized to maintain injection rates at or above 80mmscf/d.

Reservoir engineering work included the review of data to identify when the producing and injection zones of wells should be optimally changed and normal well work to optimize production such as zone changes. The Moran well-lift performance models were fine tuned as ongoing work in preparation for updating the flowline model (GAP models) to eventually optimise production. The Moran reservoir simulation and history matching work is ongoing. Also a review of the gas injectivity performance was undertaken to see if the injectivity into the Moran reservoir could be improved, and ultimately result in increased oil production.

#### **NW Moran**

Pressure data on the North-West Moran 1 well was continually monitored and reviewed until 30<sup>th</sup> June 2007 when the well was brought on line. Inter-well pressure monitoring is continually being undertaken to decide optimal time to undertake a zone change between the Digimu to the Toro. Studies are being carried out to determine what effects this well has on production from the other producing into the Moran EPT line and also studies to determine when this well will require gas lift support for reservoir simulation model for Moran has been updated to include this well.



Figure 5.3(a): Moran Production Rates for 2007

The Moran geo-model has been updated to assist the operators in terms of optimizing production and determining infill-drilling opportunities. Simulation studies have been undertaken to test different scenarios with gas injection into Moran field and the resulting effects on production attained from the field. As well as that, the operator has begun choking back high GOR wells such as Moran 10 to reduce backpressure on constant producers. Normal pressure build-up tests to understand pressure are being used to get oil to surface.

Some discrepancies in production rates actually received have been due to:

- 1. Problems with the gas injection well Moran 8 where a wax build-up being experienced in the tubing. This problem is currently being worked on with wax inhibition trials.
- 2. Hydrates formation in Moran 2 ST2 C1 and C2.
- 3. Compressor shut-downs

#### North West Moran

Reservoir engineering work on this section of the Moran field remains within production of oil while observing pressure decline within acceptable levels and also the use of gas lift where necessary. Zone changes at the NW Moran 1 have ensured good rates from this well.

#### 5.4 SE Mananda Reservoir Engineering (PDL 2)

First oil was extracted from this field on the 27<sup>th</sup> March 2006. The field is producing from SEM 1X, SEM 4X and SEM 5X. This field is currently producing an average of about 600BBLs/d of oil. Hydrates as well as sand continue to be an issue and the operator has in place contingencies to mitigate or handle these two issues.

As this field was initially forecasted to produce at rates of 10,000 BBLs/d it is highly unlikely that these rates will ever be realized. There continues to be problems with hydrates formation and effective gas lift to

the wells to assist production. As a direct result of the appraisal wells drilled and the decrease in available reserves there has been a resultant decrease in Post drilling reserves figures for this field.

Currently the Operator is undertaking a review of its geo-model and using this model to incorporate into the reservoir simulator for history matching. This will then be used to determine optimum procedures to produce the reserves available for production.



Figure 5.4: SE Mananda Forecast and Actual Production Rates

#### 5.5 Gas Fields

Hides is a large onshore gas field, located in the central Papuan Foldbelt. Minor production for gas sales to the Porgera Gold Mine for electricity commenced in late 1991. Minor amounts of condensate are also refined on site and sold locally. Full field development of Hides and other fields are contingent upon the viability of markets as envisaged gas export projects such as the PNG LNG Project are developed. **Table 5.2** gives a summary of all known gas fields.

Table 5.2: PNG Gas Fields

						Ga	s Reserve	s	Cond	ensate Res	serves
Field	Discov. Year	Туре	STOIIP MMBO	STCIIP MMBO	GIIP BCF	1P BCF	2P BCF	3P BCF	1P MMB	2P MMB	3P MMB
Pandora	1988	Gas	-	-	1,110	511	644	893	-	-	-
Pasca	1968	Gas	-	29	435	-	160	160	-	6	6
Uramu	1968	Gas	-	-	178	-	92	122	-	-	-
Kimu	1999	Gas	-	-	4	-	3		-	-	-
Barikewa	1958	Gas	-	-	759	-	605	692	-	-	-
lehi	1960	Gas	-	-	104	-	11	72	-	-	-
Bwata	1960	Gas/Cond	-	-	139	48	66	128	-	-	-
Gobe	1992		257	_	708	-	_	476	-	-	-
Kutubu	1986		552	-	2,166	-	_	1,522	-	-	-

Moran	1996		259	-	539	147	219	377	-	-	-
SEMananda	1991	Oil/Gas	84	-	307	-	-	221	-	-	-
Angore	1990	Gas/Cond	-	100	6,951	-	3,328	5,881	-	5	33
Hides	1987	Gas/Cond	-	182	9,584	3814	5,371	7,513	57	101	300
Juha	1983	Gas/Cond	-	269	5,293	638	1,536	3,805	32	38	90
Elevala	1990	Gas/Cond	-	35	611	-	433	526	-	3	15
Ketu	1991	Gas/Cond	-		704	-	18	585	-	-	16
Pnyang	1990	Gas/Cond	-	23	3,439	-	1,160	2,554	-	9	16
TOTAL			1,152	638	33,031	5,158	13,646	25,367	89	162	470

#### 5.6 Forecast Production Profiles

The figure below represents forecast oil production from 2007 to the end of field life for the current producing fields – Kutubu, Moran, Gobe Main, SE Gobe, SE Mananda and Agogo fields.

The Kutubu curve shows that this field is expected to plateau at current rates due to Operator's current work programs and the benefits attained from work undertaken in 2003 and 2005.

The Gobe field is on a steeper decline as can be expected with Gobe Main nearing its expected field life and economic limits. SE Gobe is expected to reach its end of field life in 2025. This remains to be seen with infill drilling and well work optimization.

Moran oil field was expected to attain its plateau production rates in October 2006 with increased gas injection rates and planned development wells to be drilled. The forward projection sees this field becoming the more prominent field taking over the reigns from the declining Kutubu field.

The graph displays the expected production declines for the Kutubu, Gobe and Moran, SE Gobe SE Mananda and Agogo fields.





# Section 6.0 SPECIAL PROJECTS

#### 6.1 LICENSING ROUND

Oil Search Limited in a joint venture with Nippon Oil Exploration, applied for an application for Petroleum Prospecting Licence (PPL) over Block "J" which covered both onshore areas and parts of the offshore waters of the Gulf of Papua.

The PNG Licensing Round was launched by the Government in September 2006 by the Petroleum and Energy Minister in Singapore. The Minister announced that the opening date for applications would be 1 March 2007 and close 13 April 2007. This was followed by a roadshow in various cities, including London, Calgary, Houston, and Perth in order to market and "sell" this Licensing Round and data packages that resulted from a major seismic contractor conducting a large non-exclusive survey in offshore Gulf of Papua areas not previously covered by seismic data. This was undertaken as a scientific consent provided by the Government. This seismic survey acquired over 12,000kms over a four-month period in early 2006.

A recent major regional study based upon this new data identified a possibility of a variety of new Palaeozoic to Recent play types. These significantly improved the prospectivity as well as questioning previously established ideas about the area.

The Application was the only one received by the Department of Petroleum & Energy, despite fifteen companies purchasing the data. The application was reviewed and at year-end, the Minister was yet to make his decision. **Appendix 2** shows the map of the reserved blocks of the licensing round.

#### 6.2 ASSET DATABASE PROJECT

The Petroleum Asset Data Base (AssetDB) Project was an incentive of the Gas Development and Utilisation Technical Assistance Project funded by the World Bank to properly manage and safeguard more than 70,000 items of petroleum data in the Department's physical repositories. The Project commenced in June 2002 and lapsed at the end of September 2006. However, the project was further extended for another year with a team engaged under Short Term Contracts of Employment.

The project utilizes a specialized petroleum asset management software system known as AssetDB to integrate and consolidate different databases and physical repositories within the Department, into a single and centrally located database. AssetDB is a physical records management software package designed by Schlumberger to assist oil companies manage their exploration and production physical records. This is intended to enhance efficiency in management and quality control of the data contained therein.

The project is envisioned to assist in the promotion of PNG's potential in the oil and gas industry by allowing public access to the country's valuable petroleum eventually by the World Wide Web. It includes establishing an integrated Data Base Management System (DBMS) using various geological, database and Internet technologies.

Since its inception, the project has embarked on bar-coding physical data types and populating the database with their records. This will be followed by data transcription of all physical data sets to electronic format, which will be made available for public referencing via a web interface, and this will be known as the "Decision Point". This *Decision Point* will be for purposes such as enticing potential foreign oil companies to invest in the oil and gas industry in the country.

AssetDB Project has three phases. In the order of priority and pursuant to the Project TOR:

- Phase 1 bar-coding of all petroleum related hard copy reports existing in the Petroleum Division;
- Phase 2 digitizing of all hard reports to be converted to electronic documents and;
- Phase 3 online availability of PNG petroleum data on the World Wide Web.

The current volume of data in the AssetDB has reached over 78,500 records. This comprises well data (logs and samples); seismic data (surveys, lines, and field data); field samples; illustrations (drawings and diagrams); published and unpublished documents. At the end of 2007, Phase One was virtually completed as all the data held in the main physical storage areas, had all data captured and respective records in AssetDB had been populated.

However, one data set that still requires full data capture and accessioning is that of the well samples in the Coreshed. Plans have already been made to capture data from the well samples into the database.

AssetDB Project tasks have been incorporated as daily duties of some of the geoscience staff to provide for continuity of the project. This will ensure that new data that enters petroleum archive is also capture into AssetDB. The officers concerned will also continue to upload other existing data that have not been captured yet into AssetDB.

# Section 7.0 POLICY

There are a number of separate disciplines dealt with by the Policy Branch. Herewith are some of the major tasks in which the Branch was involved in 2007.

#### 7.1 White Paper on Downstream Processing of PNG Gas

The draft White Paper on Downstream Petroleum Processing of natural gas presents the Government's intention to encourage and promote downstream petroleum processing and value-added activities in the country. This is aligned with the Government's overall desire to encourage export-based industries, which is consistent with the Medium Term Development Strategy (MTDS) of the Government.

The policy sets out three interconnected strategies:

The *first strategy* is to encourage the development of a major export-based natural gas project such as the PNG LNG Project currently mooted by ExxonMobil and partners. The policy was initially formulated with the view to support gas development and commercialization by piggybacking on the now abandoned PNG Gas Project, which targeted gas exports to Australia. The realization of the PNG LNG Project will see the development of gas reserves in the central highlands of PNG and transportation via a pipeline to the coast near Port Moresby, where the gas will be liquefied in an LNG plant and subsequently exported to markets. This project has the potential of being the largest commercial investment in PNG and a catalyst for further commercialization of gas resources.

The *second strategy* is to ensure the PNG LNG Project facilitates the development of the domestic processing industries that utilizes natural gas as a feedstock. This may include but not be restricted to LPG fractionation, methanol, DME, ammonia, urea, synthetics and LNG production.

The *third strategy* is to expand gas-fired electricity as a means to supply energy that is affordable, reliable and sustainable, which is necessary to fuel growth in the national economy.

The White Paper was formulated with its focus on the PNG Gas Project as the foundation project to underpin domestic gas development and utilization. However, since that project was abandoned in late 2006, the White Paper has been reviewed in light of the current PNG LNG Project. The paper is expected to be presented to Parliament in 2008 by the Minister for Petroleum and Energy.

#### 7.2 Fiscal Incentives

The Economics Unit played a significant role in the Government's decision to introduce the new fiscal incentives towards the end of 2002. The incentives included the reduction of Corporate Income Tax on oil projects from the standard rate of 50% for projects developed before 2001, and 45% for projects developed after 2001 to just 30% with the complete removal of Additional Profit Tax (APT). The incentives are effective for a five-year period, commencing from 1 January 2003 to 31 December 2007.

For companies to qualify for the incentives, they must apply for, and be awarded a PPL in that five-year period, and that any discoveries emanating from these licenses must be the subject of a development licence on or before 2017.

#### 7.3 Financial Analysis

The Policy Branch as part of its ongoing activities continues to assist in the review, evaluation and analysis of applications for petroleum prospecting licenses. The Branch reviews, evaluates and analyses the financial statements of oil companies applying for a new license, renewal or variation of a licence. Submission of financial reports of companies applying for a licence is required as part of the application. This information is reviewed and evaluated in line with the applicants' work programs. This assists the Branch to establish whether or not the applicant has adequate finances at its disposal to implement the work programs over the life of the licence tenure. The views and recommendations formed from the analysis are provided to the Petroleum Advisory Board.

#### 7.4 PNG LNG Project Financing

#### 7.4.1 State's Participation in the Project

The Government has approved the exercise of a 22.5% equity participation option available to the State in respect to the development of the Hides gas/condensate field (PDL-1). As Hides gas will represent approximately 70% of the PNG LNG Project, the PNG equity interests in Hides will reduce by about a third when measured as equity in the PNG LNG Project. When current landowner and provincial government equity interests in Kutubu, Gobe and Moran are also taken into account, the total PNG participation interest in this integrated project would be approximately 19.9% but the State is currently negotiating with the licensees to acquire 22.5% interest.

The PNG LNG Project is currently advancing towards signing the Gas Agreement, a significant project milestone that would pave the way for entering a decision on FEED (Front-end Engineering and Design) studies. Project construction is targeted for third or final quarter of 2009.

#### 7.4.2 Financing

All discussions and negotiations in relation to the financing of the State's participating interest in the PNG LNG Project are led by the Department of Treasury. This is currently an on-going activity.

From current calculations based on the US\$12 billion project capital cost, the State would require more than US\$2.4 Billion to participate in the PNG LNG Project. The Government had approved the setting aside of K600MM (about US\$200MM) from the 2005, 2006 and 2008 Budgets towards equity requirements with the balance of equity requirements to be sourced externally.

#### 7.5 Legal Issues

This has been a very challenging year for the branch. Major activities include the LNG proposal by Exxon and Oil Search which is poised to come on stream, in conjunction with the Governments plan to develop and commercialize the country's vast gas resources; the MOA Projects Funding; Establishment of EIC guidelines and procedures; Oil and Gas Act amendments to cushion and push for the development of the gas fields; court proceedings.

#### 7.5.1 Amendments to Oil and Gas Act

In 2006, amendments proposed to the Oil and Gas Act were specific to the PNG Gas Project to give comfort to the project sponsors on the security of tenure and their ability to carry out early works. The security of the tenure is vital for the financing aspect of the project, hence it is important that the changes were made in the Act to provide that surety and ultimately, comfort to potential financiers of the Gas project. Provisions were also made or a single development forum to be held for the PNG Gas Project Cooperation and Sharing Agreement (GPCSA) and the distribution of the benefits arising from the development of the PNG Gas Project to project area landowners and affected Local Level Governments and affected Provincial Governments.

Two other important changes to the Act considered as necessary for the delivery of the Gas project were the changes relating to additional rights of entry of a licensee and the introduction of provisions relating to the pre-submission of information.

Other amendments introduced by entities were in particular to **Sections 43, 44 and 45 of the Oil and Gas Act**. The amendments were focused on the terms of a Petroleum Retention License and its tenure. By virtue of the amendments, the tenure of the extension of a PRL has been reduced from 5 years to 1 year. The intent is to obligate existing and intending Petroleum Retention Licensees to carry out work programs as per their licence conditions. These amendments are yet to be gazetted.

#### 7.5.2 Gas Agreement Amendment

The project as envisaged in the original PNG Gas Project Agreement executed on 6 June 2002, has changed considerably; hence changes are required to update the Gas Agreement. The restated Gas Agreement remains outstanding.

#### 7.5.3 Gas Project Co-operation and Sharing Arrangements

The Department is reviewing alternatives of managing the LNG related benefits. The GPCSA is one of the options currently under revision.

#### 7.5.4 State Agreements/MOAs/DAs

To date all MOAs for Hides, Kutubu, Gobe and Moran are outstanding. There are two new MOA inclusions to be signed in 2008 that will include South East Mananda MOA and the North West Moran (PDL 6) Development Agreement (DA). These respective MOAs and DA are the founding and governing basis of relationship between the State, the Provincial Governments and Landowners as stakeholders and beneficiaries of the petroleum and gas projects.

It is under those MOAs and DA that the State commits to certain infrastructure developments and other related benefits, in return of their support and participation in the development of the project but foremost it is a requirement of law to have this undertakings as MOA and DA before the commencement of project development. To date all MOAs and DA are pending review. It is through this review process that we reach alignment and consensus of all stakeholders in terms of maximizing our participation and optimizing our benefits as a nation.

#### 7.5.5 Regulations

The DPE has formulated Regulations based on Legislative Council advice and which are currently in their draft stages. These include:

- 1) Expenditure Implementation Committee Regulation
- 2) Forms Regulations
- 3) Processing Facilities Regulations
- 4) Social Mapping Regulations
- 5) Gas Well Head Value Regulations
- 6) Petroleum Well Head Regulations

#### 7.5.6 Litigation/Court Cases

In terms of litigation, the majority of all matters before the courts are landowner-related. Most issues contended pertain to leadership with respect to beneficiary entities and benefit distributions. Courts cases are managed through the Solicitor General's Office and/or various law firms who provide the Department's legal representation in Court, after proper endorsement and authorization from the Office of the Attorney General pursuant to the Attorney Generals Act.

Presently, the Department does not have the litigation capacity, primarily because the role of the Legal Services is more an advisory role to all Stakeholders. Beginning this year, the Department has embarked on an aggressive approach to litigation matters, and enhancing and encouraging our in-house lawyers to run our cases. This approach we believe puts us in a position to advocate, enhance, develop and establish oil and gas jurisprudence in PNG.

The two most publicized court proceedings since 2007 were the EIC JUDICAL REVIEW COURT PROCEEDINGS and the NW WEST MORAN EPT CHALLENGE.

In both matters, the Department managed to ensure compliance and due administration of government policies and objectives. Both proceedings were not only litigious, but also live threatening, putting coordinators and lawyers of the Department under immense pressure, but the Department succeeded. It is challenging to ensure project security, landowners' support, protect the integrity of the Oil & Gas Act and our policies, and maintain investor's confidence that the State as regulator can manage its issues no matter what the frontier of oil and gas related arena we may enter or have entered.

How we do that? We cannot say it has to be experienced. The Branch will no doubt better its objectives and views with the subsequent appointment of new Assistant Director. We are looking forward to the exciting challenges that 2008, will bring with the LNG phase of the gas development as well as other petroleum related development.

#### 7.6 Environment

As the regulator of the country's oil and gas industry, the Department has prioritized environmental protection as one of its key monitoring roles, in line with Papua New Guinea's Fourth National Constitutional Goal on Environmental Protection and Sustainable Development. It has an Environment Unit which monitors Health, Safety and Environment aspects of oil and gas exploration and development, to ensure compliance with environmental guidelines in key national legislations such as; the Oil and Gas Act, the Environment Act, the Industrial Health, Safety and Welfare Act and Best Industrial Practices, observed generally in the industry.

#### 7.6.1 Environmental Monitoring

#### SEG Assessment

No major environmental audits were undertaken this year, however there was a field visit to assess the South East Gobe (SEG) environmental compensation demand on infield roads and several wellheads (SEG 12, 13 and 14) to verify claims of damages in buffer zones and overcast works. This was done primarily for the Petroleum Warden's re-determination. Some pictures from SEG assessment are provided below.



Fig 7.1 Overcast material at SEG 13 Wellhead



Fig 7.2 Vegetation re-growth at SEG 13 wellhead

#### Oil Spill Response Exercise-Kopi

The Unit participated in Oil Search's Oil Spill Response Exercise conducted at Kopi on 31 October 2007. The exercise showcased the Operator's Spill Response capability through exhibition of new spill combat equipment, revisitation of response coordination mechanisms and personnel training. The highlight of the exercise involved an imaginary spill combat at the Kikori Jetty, in which equipment such as air-less booms, skimmers, compressors and portable spill recovery tanks, were successfully tested.



Fig 7.3 Preparation of booms at Kikori Jetty Source: Rockv Roe (OSL)



Fig 7.4 Secondary boom deployment manovouer Source: Rockv Roe (OSL)

#### 7.6.2 Environmental Issues – 2007 Summary

Assessment of environmental damage claims is the dominant environmental issues. The major cases involved the South East Gobe (SEG) Environmental Compensation claim and the Gese/Yakerabo Creek Contamination.

#### SEG Environmental Compensation Claim

This issue involved a K3.8 million environmental compensation claim by SEG landowners, alleging underpayments for vegetation damages, traditional land occupation and damages to cultural amenities. The issue was brought to the Petroleum Warden for re-determination in mid-2007. The Environment Unit was heavily engaged with site assessments, analysis of compensation reports (Operator and Landowners) and the compilation of an assessment report for the Petroleum Warden. The unit also accompanied the Petroleum Warden to the actual re-determination, held at Moro in November 2007. The Petroleum Warden's Decision is now with the State.



Fig.7.5 SEG Landowner making point at the hearing



Fig.7.6 Mr. Kabano of OSL presenting the company's report

Gese and Yakerabo issue, involved contamination of drinking water, fish mortality, aquatic plant mortality and general water quality changes, allegedly by drilling fluid discharge from the Kutubu 2X drilling operations (located north-west of Lake Kutubu). Both the Operator and landowner groups undertook separate assessment studies. The Environment Unit reviewed all reports and liaised with the concerned landowners, Oil Search and Department of Environment of Conservation (DEC). It facilitated a meeting, allowing landowners to present their report on the 16 November 2007 and participated in a press conference held by Oil Search on the 22 November 2007. DEC has planned to investigate further while DPE, sees two scientific reports as sufficient (not requiring a third one), but importantly, the allegations by landowners have not been adequately substantiated. DPE's final position is that a consensus between the parties has to be reached outside the confines of the reports conducted.

#### 7.6.3 Environment Liaison

The Unit continues to liaise with the Industry, the landowners and other government Departments on environmental issues/matters. Those involving the industry and landowners have been highlighted above accept for those with DEC. Preliminary contacts have been established with DEC to have our participation in the Climate Change and Green House Gas Inventory Training Workshop, scheduled for early 2008. This training would enable the unit to conduct GHG Inventory in the Petroleum Industry and provide data, needed by DEC's Climate Change Office. In addition the Unit has managed to secure data on PNG's Protected Areas from DEC, which will be incorporated in Petroleum Licence Maps as environmental references.

#### 7.6.4 Environment Policy / Internal Developments

#### Internal HSE Policy Proposal

The unit has proposed an internal Health Safety and Environment Policy, which it hoped to circulate a draft by mid January 2008. The objective is to implement basic occupational health, safety and environment practices at workplace and to make DPE one of the few government departments with such a policy and overall commitment towards safety at workplace. One of our officers has completed a three level certificate course in Safety and First Aid in September 2007, which has improved the Department's capacity to implement such objectives and monitor HSE issues in the Industry.

#### Internal HSE Audit

In line with an Internal HSE Policy, the unit has plans to do an internal audit on waste management practices, workplace risk and hazards, occupational hazards and basic awareness to staff, commencing January 2008. A draft work program has been done, while initial efforts on safety signage have begun.

#### Electricity Industry Policy-HSE Component

Subsequent to NEC Decision No.271/2006, the Department of Petroleum and Energy, through its Energy Division has been assigned to draft an Electricity Industry Policy (EIP) for NEC approval. The Unit, has

assisted in provision of information on Health, Safety and Environmental requirements towards the draft and will continue to assist in finalization of other regulatory requirements, including the Department's newly assigned role as the Technical Regulator of PNG's electricity industry.

#### Environment Information on DPE Webpage

The Department collated information for inclusion in its webpage (still under construction). A summary of environmental monitoring performance of the Petroleum Industry has been compiled and supplied for this webpage.

# 7.7 Economics

# 7.7.1 Oil Prices

International crude oil prices started trading well above US\$55 per barrel at the beginning of the year and continued an upward trend throughout the year and ended at historical record heights above US\$100 per barrel. Even though there were fluctuations, prices remained within this range throughout the year. The prices are forecasted to remain in this range in 2008.

Because of the world commodity market volatility, the crude oil prices are continuously affected by many factors. The 2007 record high prices were attributed to factors such as the paper oil speculators, geopolitical events in the Middle East - especially the Iran nuclear situation, Iraq situation, Pakistani strike, disruptions during the contentious Nigerian Presidential election, the Venezuelan presidency referendum and natural disasters in the US and Australia. It is forecasted that world oil prices would remain well above US\$75.00 a barrel during the first quarter of 2008 on this range as a result of some of the factors above.

Month (2007)	Average Price	Average Price	Average Price
	(US\$/bbl)	US\$/bbl	US\$/bbl
	Kutubu	Tapis	Dubai
January	53.69	56.45	51.32
February	62.89	65.02	55.19
March	67.81	68.21	58.52
April	70.94	70.73	63.69
May	73.89	75.16	64.27
June	75.57	75.90	65.86
July	75.36	76.08	69.47
August	69.68	70.90	67.00
September	78.59	80.30	72.79
October	84.46	86.11	76.91
November	94.31	97.43	86.54
December	98.67	100.85	85.82
2007 Average	75.48	76.92	68.13

Table 7.1: Tapis and Kutubu Movements



Figure 7.7 Petroleum Price Index

The high oil price was good for oil producing countries as suppliers earned high revenues, which can offset the natural decline in production of crude oil. However, it is the opposite for the consuming countries as higher prices inflate the price of the goods that are made from or depend on crude oil as the cost of producing would increase which would be passed onto consumers through increase prices, especially fuel prices.

## 7.7.2 PNG Crude Oil Export and Revenue

PNG benefited from these high oil prices as it increased the revenue (earnings) from its crude oil exports. Oil production from Kutubu, Moran, Gobe and SE Mananda oil fields totaled almost 16.92 million barrels of oil during the year. With an APPI Kutubu annual averaged price of US\$75.48 per barrel, gross revenue from oil exports was almost US\$1.277 billion for the year and with an average exchange rate of 0.3508 gross revenue in Kina equivalent was K3.641 billion.

#### 7.7.3 Royalty

Section 158 of the Act permits the Minister for Petroleum and Energy to determine the value of petroleum after considering any information provided by the licensee or any other information that the Minister deems as relevant. Following the determination of the value, and in accordance with Section 159 of the same Act, various discussions and agreements are reached between the State, the Operator of the Joint Venture and the Project Area Landowners, the operator pays 2% of the wellhead value of all petroleum produced from the area to the State as Royalty.

Moreover, in accordance with Section 168 of the Act and further subject to Section 169, the State grants a royalty benefit to the project area landowners, affected Provincial Governments and the affected Local Level Governments. The royalty benefit is distributed among these parties in line with the distribution formula they have previously agreed upon.

In 2007, the developers paid a total royalty of K48.174MM to the State for the project area landowners, the affected Local Level Governments and the affected Provincial Governments.

#### 7.7.4 North West Moran Project Economic Model

North West Moran (NWM) commenced EPT on 16 September 2005 and ceased on 15 September 2006. The Department granted a further 3-month extension, which expired on 16 December 2006.

Oil Search Ltd has submitted an application for a PDL over NWM. As of July 2006, the total accumulated production from NWM under the EWT was 613, 172 BBL.

The same terms of royalty applied on Moran PDL5 may apply on NWM under EPT. Although it is producing under EPT from PPL219, in pursuant to Section 159, royalty should be paid to the State 2% royalty of the above barrels of oil produced. Therefore, applying the prevailing prices, royalty for the period September 2005 to July 2006 is some K574,900. This should be held by the Operator of PPL 219 in a suspense account to be backdated when a PDL is granted by the state. Under the EWT, there is no current development agreement.

The Economic Unit was advised to look at two possible scenarios regarding the North West Moran Oil project. These options were:

- 1. Stand alone Project This would allow NWM to be developed as a single project (PDL6). However, the economic indicators were not favorable due to a limited oil reserve.
- 2. NW Moran PDL 6 unitized with PDL5 Moran. This would significantly improve the overall production of the oil reserves and extend the life of the production.

A Development Forum is required under the Act before the Department can grant a Petroleum Development Licence. To this end, the Department advised the developer, Oil Search Ltd to proceed with Option Two and a Development Forum was held in Kimbe, however certain issues remain unresolved, thus a Forum proper was deferred to a later date.



# Figure 7.8Representation of Royalty paid per Project in 2007<br/>(% Only)

Table 7.2Royalty Data paid per Project in 2007

Project Area	Kina Amount (MM)
Kutubu	20.46
Moran	19.96
Gobe	11.48
Hides	0.52
Total	52.42

The royalty paid in 2007 was higher than 2006 receipts due to higher prices and increased production from the Moran petroleum development project.





## Section 9.0 CONCLUSIONS

Exploration activities slightly dropped pace this year. Respective Operators undertook significantly less field activities than in previous years however more exploration wells were drilled despite no discovery being made. With the five-year tax incentives window (2003 – 2007) ending, more licence applications were made during the year in the hopes of obtaining prospecting licences and benefit from the incentives. Licensees who took advantage of this opportunity have commenced active fieldwork. Aggressive development drilling programs have enabled the sustained life of the fields despite their natural decline.

The Ministerial reservation of blocks (107,000 sq.km) of large portion of offshore areas in and around the Gulf of Papua proposed exciting times ahead for the local industry with a Licensing Round hosted from September 2006 to April 2007. The Licensing Round came to a close with only one application received from Oil Search Limited for the reserved block designated Block J.

The PNG LNG Project led by ExxonMobil is progressing towards the signing of the Gas Agreement between the State and the developers, a significant milestone to the Project. The signing of the Agreement would allow for the Project to proceed into FEED (Front-End-Engineering-Design) stage. The Project construction is proposed for the third and fourth quarter of 2009.

With the oil and gas industry embarking on LNG Projects, PNG now has a potential for developing its gas resources and selling them in markets around the world. This step will boost the interest for foreign interests and investments in the country particularly relating to exploration, development and production of oil and gas.

#### APPENDIX 1: PETROLEUM EXPLORATION STATISTICS

	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008 est
NEW PPL's GRANTED	12	16	6	5	4	5	5	8	1	7	6	5	9	4	3	2	1	10	8	10	9	2	8
PPL's EXPIRED, SURRENDERED OR	2	4	1	E	2	12	0	12	6	2	5	2	£	2	1	4	4	0	E	0	0	0	0
CANCELLED	3	4	1	5	2	12	8	13	6	3	2	3	2	3	1	4	4	9	5	0	0	0	0
TOTAL NUMBER OF PPL's	21	33	38	38	40	33	30	25	20	24	25	22	27	28	27	23	17	18	26	29	36	38	46
TOTAL NUMBER OF PPL BLOCKS						2684	2143	1283	995	1130	1395	1372	1494	1535	1508	1066	1020		2136		3215	3226	3706
TOTAL AREA UNDER LICENCE (KM <sup>2</sup> )						228140	182155	109055	84575	96050	118575	116620	126990	130475	122148	90610	87308	89991	185604	84159	260415	261306	300186
NEW PDL's GRANTED	0	0	0	0	2	0	0	0	0	0	2	0	0	0	0	1	0	0	0	0	0	0	1
PDL's EXPIRED, SURRENDERED OR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CANCELLED	0	0	0	0												-	-	-	-	-	-	-	,
TOTAL NUMBER OF PDL's	0	0	0	0	2	2	2	2	2	2	4	4	4	4	4	5	5	5	5	5	5	5	6
IOTAL NUMBER OF PDL BLOCKS	0	0	0	0	16	16	16	16	16	16	21	21	21	21	21	22	22	22	22	22	22	22	23
NEW PLL'S GRANTED	0	0	0	0	2	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL PLL'S GRANTED	0	0	0	0	2	2	2	2	2	2	3	3	3	3	3	3	3	3	3	3	3	3	3
NEW PRL's GRANTED		0	0	0	0	0	0	0	0	0	0	0	1	0	4	0	5	0	1	0	0	0	0
TOTAL NUMBER OF PRL's		0	0	0	0	0	0	0	0	0	0	0	1	1	5	5	8	11	11	11	11	11	11
APPROXIMATE EXPENDITURE	K45M	K74M	K116M	K149M	K225M	K170M	K80M	K60M	K70M	K117M	K190M	K258M	K120M	K144M	K157M	K238M	K194M	K110M	K70M	K80M	K285M	K508	TBA
EXPLORATION WELLS DRILLED	3	7	10	27	21	11	7	4	10	4	5	9	5	5	2	0	3	2	2	3	3	5	8
DISCOVERY WELLS	2	3	6	14	9	5	4	2	2	1	2	2	2	1	0	0	2	1	3	0	2	0	4
NEW FIELD DISCOVERIES	1	2	2	1	4	3	2	1	0	0	1	0	0	1	0	0	2	2	2	1	2	0	2
CUMULATIVE FIELDS	9	11	13	14	18	21	23	24	24	24	25	25	25	26	26	26	28	30	30	24	32	32	34
CUMULATIVE WELLS	148	155	165	192	213	224	231	235	245	249	254	263	268	273	275	275	278	285	287	290	293	298	306
% SUCCESS RATE	6.1	7.1	7.0	7.2	0.5	0.4	10.0	10.2	0.8	0.6	0.8	0.5	0.3	0.5	0.5	0.5	10.1	10.5	10.5	10.2	10.0	10.7	11.1
GEOLOGICAL	0.1	/.1	1.9	1.5	0.5	7.4	10.0	10.2	9.0 1	9.0	9.0	9.5	9.5	9.5	9.5	9.5	10.1	10.5	10.5	10.5	10.9	0	3
GEO LINE KMS								4	4	869	738	674	53.85	63 35	158.4	16	117.5	175	1	120	140.45	0	TRA
									2	7	250	2	33.85	1	158.4	0	0	1/5	0	120	149.45	0	1DA 0
AIR/AEROMAG									21706	02004	27204	22202	10571	1	0	0	0	5076	0	(202.1	9	0	0
AIR/AEROMAG LINE KMS	2	7	0	14	16	,	0	2	31/90	93094	27294	33383	10571	2	0	0	0	3076	0	0292.1	35207.8	0	0
SEISMIC	3	,	8	14	15	6	8	3	1	3	1	6	~ ~ ~	2	4	4	3	2	4	4	8	4	6
SEIS LINE KMS ONSHORE	208	423	700	1630	2901	744	751	43	35	361	82	321.14	28.2	142	147	109.8	49.75	36	124	247.15	587.66	533.23	TBA
SEIS LINE KMS OFFSHORE	229	4769	1878	1139	2576	661	879	2425	12568	0	0	0	5390	0	0	0	0	0	0	0	12972.38	0	TBA
SEISMIC TOTAL	437	5192	2578	2769	5477	1405	1630	2468	12603	361	82	321.14	5418.2	142	147	109.8	49.75	36	124	247.15	13560.04	533.23	TBA
						3.7	5.8	7.9	9.2	9.6	13.5	11.5	13.3	13.1	12	14	10.2	14	11				

NOTES

(a)

(c)

PPL is a	Petroleum Prospecting Licence
PDL is a	Petroleum Development Licence
PPL is a	Pipeline Licence
PRL is a	Petroleum Retention Licence

(b) Figures at year end

Excludes development wells but includes extension discoveries and purposeful sidetracks drilled and completed in calendar year 986 = IAGIFU 1987 = SE HEDINIA, HIDES 1988 = HEDINIA, PANDORA 1989 = AGOGO 1990 = ANCORE, ELEVALA, PNYANG, USANO 1991 = KETU, SE MANANDA, SE GOBE 1992 = GOBE ZX, PANDORA B 1993 = GOBE MAIN 1996 = MORAN 1996 = KIMU 2002 = SAUNDERS, BILIP 2006 = ELK, DOUGLAS

(d)



#### **APPENDIX 2: PETROLEUM LICENCE MAP**

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#### APPENDIX 3: LICENSING ROUND MAP



# .....

LICENCE NO.	BASIN	ON/OFF SHORE	PROVINCE	DATE GRANTED (Expiry)	NO. OF BLOCKS	LICENSEES (Op=operator)	% INTEREST HELD	CONTACT ADDRESS
(A = Applicati (O = Offered)	on) (R = Refuse)	(E = Extensior ) (S = Surrer	1) 1der)    (1 block = 81 sqk	(m approx')				
、	、	,   . 	, , <u> </u>					
				PEIROLEU	M PROSPEC	HING LICENCES (PPLs)		
188 (E)	Papuan	On/Off	Gulf	30 Apr 2003 (29 Apr 2008)	57	Oil Search Ltd (Op) - Gedd (PNG) Ltd -	90.00% 10.00%	Oil Search Ltd P.O Box 842 Port Moresby, N.C.D Ph: 322 5599 Fax: 322 5566 / 322 5588
190 (E)	Papuan	On	Gulf & Southern Highlands	20 July 2007 (19 July 2013)	11	Oil Search Ltd (Op) Murray Petroleum Co. Ltd Cue PNG Oil Co. Pty Ltd	62.56% 26.50% 10.95%	See PPL 188
219 (E)	Papuan	On	Southern Highlands	15 Feb 2006 (14 Feb 2011)	18	Orogen Exploration Inc. Ampolex (Highlands) Ltd Merlin Petroleum Company Oil Search Ltd Oil Search (PNG) Ltd (Op)	12.50% 18.733% 8.75% 35.02% 25.00%	See PPL 188
233	Papuan	On	Southern Highlands	11 Jun 2003 (10 June 2009)	12	Esso Highlands Ltd (Op) Oil Search (PNG) Ltd	27.50% 52.50%	Esso Highlands Ltd P.O Box 118 Port Moresby, N.C.D Ph: 322 2111 Fax: 320 3457
234	Papuan	Off	Gulf	25 Jul 2003 (24 Jul 2009)	32	Oil Search Ltd	100.00%	See PPL 188
235	Papuan	On	Western	29 Aug 2003 (28 Aug 2009)	34	Rift Oil PLC	100.00%	Level 8, Pacific Place P.O Box 1159, Musgrave St, Port Moresby, N.C.D Ph: 321 2003 Fax: 321 2847 <u>Or</u> P.O Box 17-258, 284 Karori Rd Wellington, New Zealand Ph: 64 4 476 2717 Fax: 64 4 476 0120
236	Papuan	On/Off	Gulf/Central	28 Mar 2003 (27 Mar 2009)	107	SPI (210) Interoil (Op)	100.00%	Interoil Limited P.O Box 1971 Port Moresby, N.C.D

	APPENDIX 4: THE INDEPENDENT STATE OF PAPUA NEW GUINEA PETROLEUM LICENCES AS AT 30 DECEMBER 2007											
•••••			•••••									
LICENCE NO.	BASIN	ON/OFF SHORE	PROVINCE	DATE GRANTED (Expiry)	NO. OF BLOCKS	LICENSEES (Op=operator)	% INTEREST HELD	CONTACT ADDRESS				
(A = Applicati (O = Offered)	on) (E (R = Refuse)	E = Extension (S = Surren	) der) (1 block = 81 sqk	(2/p2)) km approx')								
								Ph: 320 2632/2663 Fax: 320 2599				
237	Papuan	On/Off	Gulf	28 Mar 2003 (27 Mar 2009)	77	SPI (220) Interoil (Op)	100.00%	See PPL 236				
238	Papuan	On	Gulf/Chimbu/EHP/ Morobe	7 Mar 2003 (6 Mar 2009)	198	SPI (208) Interoil (Op)	100.00%	See PPL 236				
239	Papuan	On	Western	19 May 2004 (18 May 2010)	41	Oil Search Ltd (Op)	100.00%	See PPL 188				
240	Papuan	On	Western & Gulf	19 May 2004 (18 May 2010)	36	Oil Search Ltd (Op) Gedd (PNG) Ltd Horizon Oil International Ltd	70.00 % 10.00 % 20.00 %	See PPL 188				
244	Papuan	Off	Gulf	25 Feb 2005 (24 Feb 2011)	33	Talisman Oil Ltd (Op) Oil Search Ltd Interoil Australia (SPI 200) Ltd	35.00 % 50.00 % 15.00 %	Talisman Oil Limited Beltway Office Park Building A, 8 <sup>th</sup> Floor J1. T.B. Simatupang No. 41 Jakarta 12550 Ph: (6221) 782 1001 Fax: (6221) 782 2002				
245	Papuan	On	Gulf	17 Sep 2003 (16 Sep 2009)	125	Invicta Oil and Gas (Op) Cheetah Oil and Gas Limited	90.00% 10.00%	1500-885 W.Georgia Street Vancouver, BC, V6C 3E8 Ph: 1-403-860-0116				
246	Papuan	On	Gulf	15 Oct 2003 (14 Oct 2009)	27	Invicta Oil and Gas (Op) Cheetah Oil and Gas Limited	90.00% 10.00%	See PPL 245				
248	Nth New Guinea	On	Madang	27 Apr 2004 (26 Apr 2010)	68	SriGas Energy Group Asia Ltd (Op)	100.00 %	Sri-Gas Energy Group Asia Ltd Pacific Place, 12th Floor, PO Box 167, Port Moresby, NCD Email: srigaspng@yahoo.com.au <u>Or</u> Manggala Wanabakti Building 2nd Flr, Wing A, Suites 201-202 JI. Gatot Subroto, Senayan, Jakarta Pusat, 10270 Indonesia				

	APPENDIX 4: THE INDEPENDENT STATE OF PAPUA NEW GUINEA PETROLEUM LICENCES AS AT 30 DECEMBER 2007											
•••••			•••••	• • • • • • • • • • • • •		•••••	•••••	• • • • • • • • • • • • • • • • • • • •				
LICENCE NO.	BASIN	ON/OFF SHORE	PROVINCE	DATE GRANTED (Expiry)	NO. OF BLOCKS	LICENSEES (Op=operator)	% INTEREST HELD	CONTACT ADDRESS				
(A = Applicat (O = Offered)	ion) (E (R = Refuse)	= Extensior (S = Surrer	n) nder)    (1 block = 81 sqkr	n approx')								
•••••												
								Ph: 62 21 570 0252 / 570 3790 62 21 573 2764	FX:			
249	Nth New Guinea	On	West Sepik	22 Jan 2004 (21 Jan 2010)	75	Invicta Oil and Gas (Op) Cheetah Oil and Gas Limited	90.00% 10.00%	See PPL 245				
250	Papuan	On	WHP/Chimbu/EHP/S HP	22 Jan 2004 (21 Jan 2010)	100	Invicta Oil and Gas (Op) Cheetah Oil and Gas Limited	90.00% 10.00%	See PPL 245				
252	Nth New Guinea	On	Eeast Sepik & Madang	8 Apr 2004 (7 Apr 2010)	92	Invicta Oil and Gas (Op) Cheetah Oil and Gas Limited	90.00% 10.00%	See PPL 245				
254	Papuan	Off	Central	17 Feb 2005 (16 Feb 2011)	201	Chinampa Exploration Ltd (Op)	100.00 %	Chinampa Exploration Pty Ltd Level 4, Defens Haus Cnr Champion Parade & Hunter St Port Moresby, PO Box 8415, Ph: (675) 3211748 Fax: (675) 3213116				
255	Papuan	Off	Central	17 Feb 2005 (16 Feb 2011)	185	Chinampa Exploration Ltd (Op)	100.00 %	See PPL 254				
256	Papuan	Off	Gulf & Central	17 Feb 2005 (16 Feb 2011)	139	Chinampa Exploration Ltd (Op)	100.00 %	See PPL 254				
257	Cape Vogel	On/Off	Oro	20 Oct 2004 (19 Oct 2010)	86	Eaglewood Energy Inc(Op)	100.00 %	Eaglewood Energy Inc Level 1, Suite 2, Pacific MMI Bldg Champion Parade Port Moresby, NCD Ph: 321 0530/0460 Fax: 321 1512				
258	Nth New Guinea	On	East & West Sepik	20 Oct 2004 (19 Oct 2010)	110	Eaglewood Energy Inc (Op)	100.00%	See PPL 257				
259	Papuan	On	Western	30 Jun 2005 (29 Jun 2011)	68	Eaglewood Energy Inc (Op)	100.00%	See PPL 257				
261	Papuan	On	Western &	24 Nov 2006	47	Rift Oil Ltd (Op)	100.00 %	See PPL 235				

#### Ε ΙΝΙΠΕΦΕΝΙΠΕΝΙΤ Ο ΤΑ ΤΕ ΜΕ D Α DI LA ΝΙΕΙΑ ΟΙ ΠΝΙΕ Α ΠΕΤΡΜΙ ΕΙ ΝΑ Ι ΙΜΕΝΙΜΕ Α Δ. Α.Τ. 20 ΠΕΜΕΥΝ ---------

#### APPENDIX 4: THE INDEPENDENT STATE OF PAPUA NEW GUINEA PETROLEUM LICENCES AS AT 30 DECEMBER 2007 ..... LICENCE BASIN ON/OFF PROVINCE DATE NO. OF LICENSEES % CONTACT ADDRESS NO. SHORE GRANTED BLOCKS INTEREST (Op=operator) (Expiry) HELD (A = Application) (E = Extension) (O = Offered) (R = Refuse) (S = Surrender) (1 block = 81 sqkm approx') Southern H/lands (23 Nov 2012) 260 Papuan On Western & 14 Mar 2005 77 Eaglewood Energy Inc (Op) 100.00% See PPL 257 Southern H/lands (13 Mar 2011) 265 Papuan On Western Province 30 Nov 2006 190 **Taylor Limited** 100.00% C/- New Guinea Energy Limited (29 Nov 2012) **PO Box 592** PORT MORESBY, NCD Ph: 321 1765 Fax: 321 1782 <u>Or</u> Suite 1404 Level 14 Goldfields House, 1 Alfred St, Sydney, NSW 2000 Ph: 612 9250 1888 Fax: 612 9250 1838 266 Papuan On Western Province 15 Aug 2005 98 Ladysmith Limited 100.00% See PPL 265 (14 Aug 2011) 267 Western Province 15 Aug 2005 84 **Roebuck Limited** 100.00% See PPL 265 Papuan On (14 Aug 2011) 268 Papuan On Western Province 15 Aug 2005 50 **Engelberg Limited** 100.00% See PPL 265 (14 Aug 2011) 269 Papuan On Western Province 15 Aug 2005 104 Kirkland Limited 100.00% See PPL 265 (14 Aug 2011) 30 Nov 2006 277 Southern Highlands 94 **Kingsbury Limited** 100.00% See PPL 265 Papuan On (29 Nov 2012) Province 30 Nov 2006 281 Nth New On Madang 41 Aequs Oil & Gas (PNG) Ltd 100.00% Aequs Oil & Gas Ltd PO Box 32 (29 Nov 2012) Guinea Port Moresby, NCD Ph: 320 0133 Fax: 321 0805 285 22 Dec 2006 116 **Bisset Limited (Papua Petroleum** 100.00% **Papua Petroleum Limited** Papuan On Western (21 Dec 2012) C/- Pacific Capital Limited Ltd) Level 12, Pacific Place **Champion Parade, Port Moresby**

#### APPENDIX 4: THE INDEPENDENT STATE OF PAPUA NEW GUINEA PETROLEUM LICENCES AS AT 30 DECEMBER 2007 ....... ......... ....... % LICENCE BASIN ON/OFF PROVINCE DATE NO. OF LICENSEES CONTACT ADDRESS NO. SHORE GRANTED BLOCKS (Op=operator) INTEREST (Expiry) HELD (A = Application) (E = Extension) (O = Offered) (R = Refuse) (S = Surrender) (1 block = 81 sqkm approx') ----.................. PO Box 2064 Port Moresby, NCD Ph: 321 7277 Fax: 320 1819 286 Papuan On Western 22 Dec 2006 144 Honner Limited (Papua 100.00% See PPL 285 (21 Dec 2012) Petroleum Ltd) 287 Papuan On Western 17 Aug 2007 89 **Potts Limited (Papua Petroleum** 100.00% See PPL 285 (16 Aug 2013) Ltd) 288 Papuan On Western 22 Dec 2006 100 **Rowell Limited (Papua** 100.00% See PPL 285 (21 Dec 2012) Petroleum Ltd) Nth New 16 May 2007 295 On East Sepik 121 Aequs Oil and Gas (PNG) Ltd 100.00% See PPL 281 Guinea (15 May 2013) **APPLICATION FOR PETROLEUM PROSPECTING LICENSES (APPLs)** 293 (A) On/Off Gulf/Central 62 Oil Search Limited (Op) 80.00% See PPL 188 Papuan Pending Nippon Oil Exploration Ltd 20.00% 294

294 (A)	Papuan	On	Western / West	Pending	74	Media Karya Sentosa Ltd	100.00%	Media Karya Sentosa (PNG) Ltd
			Sepik					91 Berrigans Road, Mudgeeraba,
								Queensland, Australia
								or
								SOGO LULU BUA - PNG Director
								PO Box 706, Alotau, Milne Bay
								PH: (675) 525 3023
								FX: (675) 525 2072
297 (A)	Cape Vogel	On/Off	Oro	Pending	86	Doo Chang Energy (PNG) Ltd	100.00%	Doo Chang Energy (PNG) Ltd
				0				PO Box 6755, Boroko, NCD
								Papua New Guinea,
								PH: (675) 323 5545
								FAX: (675) 323 5581
								Email: cmsspng@yahoo.com

	APPENDD	X4: THEIN	DEPENDENT 5	IATE OF PAP	UA NEW	GUINEA PETKOLEUM L.	ICENCES AS A	AT 30 DECEMBER 2007
LICENCE NO.	BASIN	ON/OFF SHORE	PROVINCE	DATE GRANTED (Expiry)	NO. OF BLOCKS	LICENSEES (Op=operator)	% INTEREST HELD	CONTACT ADDRESS
(O = Offered)	(R = Refuse)	(S = Surrender	:) (1 block = 81 sqk	m approx')				
300 (A)	Papuan	On/Off	Gulf	Pending	54	Oil Search Ltd (Op) Gedd (PNG) Ltd	90.00% 10.00%	See PPL 188
301 (A)	Papuan	On	Western	Pending	80	Foreland Oil Ltd (Rift)	100.00%	See PPL 235
302 (A)	Nth New Guinea	On	West Sepik	Pending	87	Min Oil Resources Ltd	100.00%	Min Oil Resources Limited PO Box 434, Waigani, NCD Papua New Guinea MOBILE: (675) 688 5664
303 (A)	Cape Vogel	Off	Oro Province	Pending	83	Victoria Petroleum Company (PNG) Limited	100.00%	Victoria Petroleum Company (PNG) Limited 1930 McDougall Street Kelowna British Columbia, Canada FX: (205) 712 1003 EMAIL: dkropinak69@shaw.ca
304 (A)	Nth New Guinea	On	East Sepik / Madang	Pending	82	Victoria Petroleum Company (PNG) Limited	100.00%	See APPL 303
305 (A)	Papuan	Off	Gulf	Pending	13	Suki Oil Limited	100.00%	P.O Box 1886 Boroko, N.C.D Phone: (675) 323 1683 Fax: (675) 325 8295
306 (A)	Nth New Guinea	On/Off	West Sepik	Pending	218	Min Oil Resources Ltd	100.00 %	See APPL 302
307 (A)	Nth New Guinea	On/Off	East Sepik	Pending	195	Min Oil Resources Ltd	100.00%	See APPL 302
308 (A)	Nth New Guinea	On 1	Morobe / Madang	Pending	243	Min Oil Resources Ltd	100.00%	See APPL 302

#### ADDENIDIV 4. THE INDEDENDENT STATE OF DADIA NEW CHINEA DETDOI FIM LICENCES AS AT 20 DECEMBED 2007

#### .....

LICENCE NO.	BASIN	ON/OFF SHORE	PROVINCE	DATE GRANTED (Expire)	NO. OF BLOCKS	LICENSEES (Op=operator)	% INTEREST HELD	CONTACT ADDRESS
(A = Application (O = Offered)	n) (R = Refus	(E = Extension) e) (S = Surrender)	(1 block = 81 sqkm	(Expiry) approx')			HELD	

#### .....

#### PETROLEUM DEVELOPMENT LICENCES (PDLs)

01	Papuan	On	Southern H/Lands Prov.	27 Sept 1990 (26 Sept 2015)	4	Oil Search (Tumbudu) Ltd Oil Search Ltd Esso Highlands Ltd (Op) Zan Star Ltd Lavana Ltd	14.00% 7.500% 47.50% 25.00% 6.000%	See PPL 233
02	Papuan	On	Southern H/Lands Prov.	10 Dec 1990 (9 Dec 2015)	12	Ampolex (PNG Petroleum) Inc. Merlin Pacific Oil Company Ltd Oil Search (PNG) Limited (Op) Pet. Resources Kutubu Ltd Merlin Petroleum Company AGL Gas Developments (PNG) Pty Ltd	11.611825% 2.9062500% 60.046458% 6.7500000% 6.7812500% 11.904217%	See PPL 188
03	Papuan	On	Gulf Province	24 Dec 1996 (23 Dec 2021)	1	Oil Search (Gobe) Limited (Op) Barracuda Limited Cue PNG Oil Company Pty Ltd Orogen Minerals (Gobe) Ltd Petroleum Resource Gobe Ltd Southern Highlands Petroleum Co. Ltd	15.859740% 15.921718% 5.5688920% 20.500000% 2.0000000% 40.149650%	See PPL 188
04	Papuan	On	Southern Highlands/ Gulf Provinces	24 Dec 1996 (23 Dec 2021)	4	Oil Search (PNG) Limited (Op) Ammpolex (Highlands) Limited Merlin Petroleum Company Petroleum Resources Gobe Ltd AGL Gas Developments (PNG) Pty Ltd	10.000000% 14.518075% 6.7812500% 2.0000000% 66.600675%	See PPL 188
05	Papuan	On	Southern H/Lands Prov.	17 Feb 2001 (16 Feb 2026)	1	Esso Highlands Limited (op) Oil Search (Moran) Limited Eda Oil Limited Petroleum Resources (Moran) Ltd	36.812500% 40.687500% 20.500000% 2.0000000%	See PPL 188

#### .....

LICENCE NO.	BASIN	ON/OFF SHORE	PROVINCE	DATE GRANTED	NO. OF BLOCKS
(A = Application	ı)	(E = Extension)		(Expiry)	

LICENSEES (Op=operator) %

INTEREST HELD CONTACT ADDRESS

(O = Offered) (R = Refuse) (S = Surrender) (1 block = 81 sqkm approx')

#### 

#### PIPELINE LICENCES (PLLs)

01	Papuan	On	Southern Highlands	27 Sept 1990 (26 Sept 2015)	Oil Search Limited Oil Search (Tumbudu) Pty Ltd	5.00% 95.00%	See PPL 188
02	Papuan	On/Off	Southern Highlands & Gulf	10 Dec 1990 (9 Dec 2015)`	Ampolex (PNG Petroleum) Inc. Merlin Pacific Oil Company Ltd Oil Search (PNG) Ltd (Op) Petroleum Resources Kutubu Ltd Merlin Petroleum Company AGL Gas Developments (PNG) Pty Ltd	11.611825% 2.906250% 2.906251% 2.906252% 2.906253% 2.906254%	See PLL 01
03	Papuan	On	Southern Highlands & Gulf	24 Dec 1996 (23 Dec 2021)	Oil Search (PNG) Ltd (Op) Ampolex (Highlands) Ltd Merlin Petroleum Company Petroleum Resources Gobe Ltd Barracuda Ltd Southern H/lands Petroleum Co. Cue PNG Oil Company Pty Ltd AGL Gas Developments (PNG) Pty Ltd	17.776123% 10.235243% 4.780781% 2.000000% 4.696907% 4.696908% 4.696909% 4.696910%	See PLL 01

#### PETROLEUM RETENTION LICENCES (PRLs)

01	Papuan	Off	Gulf (Pandora)	20 Feb 2003 (19 Feb 2008)	9	Taslisman Oil Ltd (Op) Ampolex (Pandora Reef) Command Pet. (Gulf) Claremont Pet. PNG Pacrim Energy Ltd Oil Search Ltd Secab Niugini P/L	48.1800% 16.3600% 12.7300% 6.3600% 5.0000% 5.0000%	See PPL 244
02	Papuan	On	Western (Juha)	12 Apr 2005 (11 Apr 2010)	10	Oil Search (PNG) Ltd Merlin Petroleum Company	25.5000% 12.5000%	See PPL 233

LICENCE NO. (A = Applicatio (O = Offered)	BASIN on) (E (R = Refuse)	ON/OFF SHORE E = Extension (S = Surren	PROVINCE ) der) (1 block = 81 sqk	DATE GRANTED (Expiry) m approx')	NO. OF BLOCKS	LICENSEES (Op=operator)	% INTEREST HELD	CONTACT ADDRESS
						Esso Highlands Ltd (Op) Ampolex (PNG) Ltd Oil Search Ltd	28.0100% 27.97980% 6.01020%	
03	Papuan	On	Western (P'nyang)	12 Apr 2005 (11 Apr 2010)	5	BHP Petroleum (PNG) Inc Oil Search (PNG) Ltd Merlin Petroleum Company Ltd Ampolex (PNG) Ltd Oil Search Ltd Esso Highlands Ltd (Op)	7.50000 % 25.0000% 12.5000 % 27.979800 % 6.01000% 21.0100%	See PPL 233
04	Papuan	On	Western (Stanley)	1 Sept 2000 (31 Aug 2005)	4	Austral Pacific Energy Ltd SPI (157) Limited (Op) Bligh PNG Limited	28.920% 43.130% 27.950%	See PPL 236
05	Papuan	On	Western (Ketu/Elavala)	15 Feb 2005 (14 Feb 2010)	9	Santos Niugini Exploration Ltd SPI (157) Limited Greenslopes Ltd Carnarvon Petroleum (NL) Trans Orient Petroleum (PNG) Ltd Bligh PNG Limited	35.250 % 20.000 % 15.000 % 15.000 % 7.5000 % 7.2500 %	Santos Niugini Ltd C/- Barracuda Ltd PO Box 1159 Port Moresby, NCD Ph: 321 2633 Fax: 21 2847
08	Papuan	On	Gulf (Kimu)	18 Dec 2002 (17 Dec 2007)	6	Oil Search Ltd (Op) Mosaic Oil Niugini Ltd Gedd (PNG) Ltd Cue Energy Resources Ltd	44.600 % 28.600 % 16.100 % 10.700 %	See PPL 188
09	Papuan	On	Gulf (Barikewa)	18 Dec 2002 (17 Dec 2007)	7	Barracuda Ltd Iona Pty Ltd Cue (PNG) Oil	42.553% 42.553% 14.894%	Barracuda Ltd PO Box 1159 Port Moresby, NCD Ph: 321 2633 Fax: 321 2847
10	Papuan	Off	Gulf (Uramu)	18 Dec 2002 (17 Dec 2007)	1	Oil Search Ltd (Op) Woodside Petroleum (PNG) Gedd Inc. (PNG) Ltd	49.550% 40.500% 10.000%	See PPL 188
11	Papuan	On	S.H.P (Angore)	21 Mar 2003 (20 Mar 2008)	7	Esso Highlands Ltd (Op) Oil Search Ltd	47.500% 52.500%	See PPL 233

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LICENCE NO. (A = Application (O = Offered)	BASIN n) (E = (R = Refuse)	ON/OFF SHORE = Extension) (S = Surrender)	PROVINCE (1 block = 81 sqkm	DATE GRANTED (Expiry) approx')	NO. OF BLOCKS	LICENSEES (Op=operator)	% INTEREST HELD	CONTACT ADDRESS
12	Papuan	On	S.H.P (Hides)	21 Mar 2003 (20 Mar 2008)	3	Esso Highlands Ltd (Op) Oil Search Ltd	47.500% 52.500%	See PPL 233
13	Papuan	On	Gulf (Kuru)	27 Jan 2005 (26 Jan 2010)	2	Invicta Oil and Gas (Op) Cheetah Oil and Gas Limited	90.00% 10.00%	See PPL 245

#### APPLICATION FOR PETROLEUM RETENTION LICENCES (APRLs)

None

#### PETROLEUM PROCESSING FACILITY LICENCE (PPFLs)

01	Papuan	On	NCD	14 Feb 2000	1	InterOil Ltd	100.00%	See PPL 236
	-		(Napa Napa Refinery)					

#### SUMMARY OF LICENCES

Number of PPLs	38
Number of Blocks	3226
Number of PDLs	5
Number of Blocks	22
Number of PRLs	11
Number of Blocks	63
Number of PPFL	1
Total Number of Blocks Under Licence	3312
Total Area Under Licence	268272 sq.km