

INVESTIGATION OF AN EFFICIENT PETROLEUM FISCAL REGIME FOR THAILAND

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การตรวจสอบระบบจัดเก็บภาษีปีโตรเลียมที่มีประสิทธิภาพสำหรับประเทศไทย



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The paper investigates the current fiscal regime, utilizing in Thailand (both Thailand-I and Thailand-III), under the condition of typical production profile and cost structure of petroleum production in Thailand. The analysis is based on various sizes of the actual operating oil and gas fields in Thailand from the past.

The efficiency of the fiscal regime is the objective of the sharing benefit between the host government and the oil company, which creates the win-win situation, thus, prevents the future renegotiation among the parties.

The analysis performs by the discounted cash flow model as a base case model to estimate the government take and company take. The results are compared with neighboring countries such as Malaysia and Myanmar. Monte Carlo simulation is also used to verify the result under the distribution of various inputs to get the distribution of the company take.

The result shows that Thailand-I tends to be regressive in most cases, concerning its regressive tool like fixed-rate royalty. Though, Thailand-III gives a good response to wider changing conditions but still has a regression in some cases such as long production fields or costly fields.

Moreover, the modification of fiscal regime is examined under the concession extension in this study. By adjusting the advantageous and detrimental elements in Thailand-III, the progressivity is observed with the proper gain to the government.

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List of abbreviations

BBL	Barrel
BBL/D	Barrel oil per Day
BCF	Billion Cubic Feet
BOE	Barrel of Oil Equivalent
BOE/D	Barrel of Oil Equivalent per Day
BTU/SCF	British Thermal Unit per Standard Cubic Feet
CAPEX	Capital Expenditure
CDF	Cumulative Density Function
CPI	Consumer Price Index
CT	Company Take
DMF	Department of Mineral Fuels
EIA	Energy Information administration of America
EMV	Expect Monetary Value
FSO	Floating Storage and Offloading unit
FPSO	Floating Production Storage and Offloading unit
G&A	General and administration costs
GT	Government Take
HG	Host Government
IOC	International Oil Company
IRR	Internal Rate of Return
K	Geological factor
MEPR	Maximum Efficient Production Rate
MIRR	Modified Internal Rate of Return
MMBBL	Million Barrel
MMBTU	Million British Thermal Unit
MMUSD	Million United State Dollar
MMSCF	Million Standard Cubic Feet
MMSCFD	Million Standard Cubic Feet per Day

MTJDA	Malaysia-Thailand Joint Development Area
MSCF/MCF	Thousand Standard Cubic Feet
MSCFD/MCFD	Thousand Standard Cubic Feet per Day
NCF	Net Cash Flow
NOC	National Oil Company
NPV	Net Present Value
OPEX	Operating Expenditure
p10	10 th percentile
p50	50 th percentile
p90	90 th percentile
PA	Petroleum Act
PDF	Probability Distribution Function
PI	Profitability Index
PITA	Petroleum Income Tax Act
PSC	Production Sharing Contract
ROR	Rate of Return
SCF	Standard Cubic Feet
SD	Standard Deviation
SI	Saving Index
USD	U.S. Dollar
WPI	Wholesale Price Index
WTI	West Texas Intermediate

CHAPTER I

INTRODUCTION

1.1 General

In Thailand, exploration and production for petroleum hydrocarbon has been executed for a long time and this business is considered as one of the most valuable among others. Therefore, the contractual terms before each step of operation must be developed and agreed on both government and contractors. Thai government assigned department of mineral fuels (DMF) of the ministry of energy as a main sector for regulating, permitting and promoting on exploration and production of petroleum business in Thailand.

There are 2 regimes that are being utilized in Thailand, called Thailand-I and Thailand-III which the anterior one is under the petroleum act B.E. 2514 (1971) and the latter one is under the petroleum act B.E. 2532 (1989). Both are concession system, which the government collects mainly on (1) royalty, (2) petroleum income tax, and (3) special remuneration benefit or SRB (Thailand-III only) as yearly income.

While the petroleum business is generating a massive profit, the mechanism, of how the share portion was set up, must be studied and informed to all concern to prevent confusion and argument on any party. An ideal mechanism should be designed to provide a fair and adequate return to host government, be simply to apply, but does not drop an attractiveness to contractors, and hence, resulting in a win-win situation.

Not only on an ascending phase, but the other way round which the world is now facing the downturn of the business, that fiscal regime should react and accommodate the portion of the stake; in order to maintain the stability of Thailand's energy strategy.

Therefore, investment conditions will be created and applied to each regime in Thailand, then compare the outcomes with neighbor countries in Southeast Asia. Variables that effect results such as (1) field size, (2) product prices, and (3) cost of

production will be studied. The calculated result from available information is subjected to further discussion and suggestion in the end.

1.2 Objectives and Scopes of Study

The research consists of 3 main objectives as follows

1. To study the status of existing petroleum fiscal system in Thailand relative to neighboring countries
2. To study mechanism and determine parameters affecting the efficiency of petroleum fiscal system
3. To propose and verify the efficient petroleum fiscal system using probabilistic approach

Scopes of the study will show gathered historical information of annual oil and gas production, operating cost, and capital investment, then apply these data into Thailand's petroleum fiscal regime to monitor the movement of government take and company take under the variation of defined field sizes. The data will be analyzed and compared to neighboring countries on the identical data basis. In addition, the mechanisms of legal contract in fiscal regime will be studied and advised to suit the present circumstance. This will be very gainful and advantageous to Thai government for future strategic planning of related disciplines such as researchers, planners and even investors.

1.3 Statement of Purposes/ Expected Result

The purpose of this study is to affirm the efficiency of the utilizing regimes in Thailand. Result should indicate a win-win situation between host government and IOC under varying circumstances; otherwise, the flaws of the system shall be pointed out. The outcome could possibly be used as a further improvement for Thailand fiscal system.

1.4 Outlines of methodology

1. Review historical investment of each asset
2. Construct fiscal models
 - 2.1. Thailand-I
 - 2.2. Thailand-III
 - 2.3. Malaysia
 - 2.4. Myanmar
3. Categorize the size of fields into large/medium/small
4. Input representative data of each asset into constructed models
5. Discuss and compare the outcome cases
 - 5.1. Progressivity monitoring
 - 5.2. Decommissioning case
6. Import distribution into input parameters and obtain outcome
 - 6.1. The new regime : modified Thailand-III
7. Discuss and measure the impact from each parameter
8. Draw conclusions from results

1.5 Outlines of thesis

The thesis describes preface content in chapter I, introduces the basic knowledge of petroleum industry in Thailand, and states the objectives of the study. Chapter II tracks out historical details and gives a brief perception of related published paper to scope the field of this thesis. Further, an overall of petroleum business system and categorizing definitions are illustrated in chapter III. From the descriptive regulation in Petroleum Act and preference of negotiation, a quantitative arithmetic is derived to equation in chapter IV. The evaluation, in each case of the result from both deterministic and probabilistic is discussed in chapter V. In succession, the conclusion and recommendation of this study, together with the improvement possibilities in further study are displayed in chapter VI.

CHAPTER II

LITERATURE REVIEW

Related documents are reviewed in this chapter. From the first economic principle in petroleum industry, parameters that play a role in profit sharing calculation, conflict between government and oil company and a following resolution that leads to various profit allocation concepts which can be found in these studies, and are also briefly explained hereafter.

2.1 Thailand Fiscal System & Regulations Review

Over 40 years of petroleum exploration and production in Thailand, there were many regulations developed to fulfill constrain and situation. The Petroleum Act and Petroleum income tax Act, B.E. 2514 (1971) [1, 2] was the first two documents [3] that announced to control and claim benefit to government. Then, both Acts had been revised along the time in B.E. 2516 (1973) [4], B.E. 2522 (1979) [5], B.E. 2532 (1989) [6], B.E. 2534 (1991) [7], and B.E. 2550 (2007) [8] respectively. For the offshore concessions approved from B.E. 2514 (1971) to B.E. 2532 (1989) and the onshore concessions before B.E. 2525 (1982) are also known as under Thailand-I regimes. There are some concessions that were approved during B.E. 2525 (1982) to B.E. 2528 (1985) fell under the Thailand-II regime as shown in Figure 1. Nonetheless, due to the stringency of Thailand-II, all of operators converted them into Thailand-III upon the Thailand-III had been announced in B.E. 2532 (1991). On the same basis, Thailand-III regimes also refer to any concessions approved from B.E. 2532 (1991) onward [9].

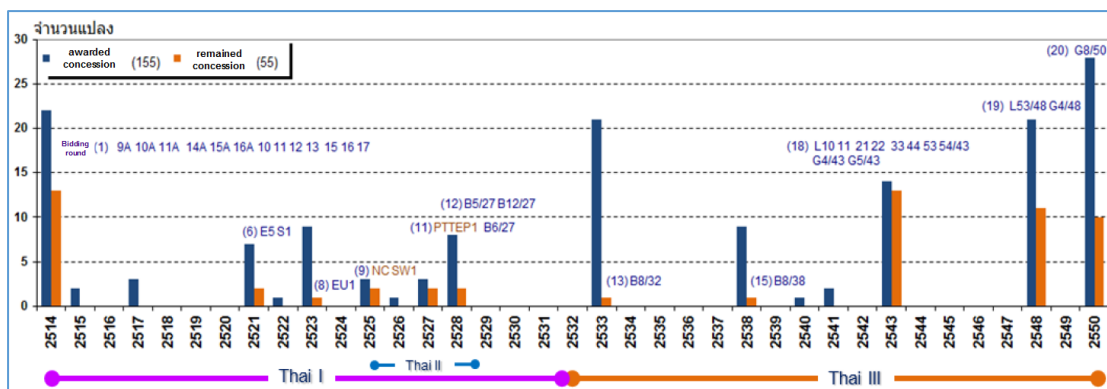


Figure 1 : Number of approved concessions as of November 2014[10]

In 2010, Sirasoontorn and Suksai [11] examined Thailand's concession fiscal regime about the method of allocation by using the efficiency, fairness and shared advantage of the contract as a main judgement. They also assessed the result against neighboring countries and it showed that the Thailand-I and Thailand-III regimes could motivate the contractors to invest as they have high chance of payback. Both regimes are stable; however, they are not flexible which means they may not be a suitable for some high risk area. In addition, Thailand receives the smallest government take portion from this business comparing neighboring countries.

The study of efficiency in Thailand fiscal regimes was done by Atsavakovith [12] in 2011 on the particular scope of undeveloped reserves. Royalty rate, tax rate, special remuneration benefit (SRB) and some other parameters were varied to monitor the return on both contractors and host government. The parameter such as percentages of government take, percentage of contractor take, percentage of cost to revenues, Net present value (NPV), internal rate of return (IRR) of the result indicated that the most influence concept is to adjust the royalty tool.

Hpyo [13] have developed a simulation model for Myanmar fiscal regime by statistically assuming and assigning distribution to each parameter. The result gives a good mechanic of fiscal system to Myanmar government, calculating based on internal rate of return (IRR). Both government and contractors in a contract can have a benefit in all cases over a marginal field or uncontrollable circumstance such as the price fluctuation of gas market.

Another alternative idea of flexible fiscal regime for Thailand is proposed by Srisatasuk [14]. Distribution model was constructed based on assumed parameters

such as various amount of cost and generating profit. New fiscal regime suggests an application of sliding scale on a profit-based via R-factor which has the advantage to, correspondently, prevent noncommercial outcomes in some models under Thailand-III system, and flexibly capable for numerous situations.

2.2 Global Fiscal System & Regulations Review

Dharmadji and Parlindungan [15] examine and then compare fiscal regimes from Australia, China, India, Indonesia, and Malaysia. They applied each of the mentioned fiscal into the same hypothetical field. Under the same production profile, price forecast, and occurred cost, and only common terms stated in each regime are considered. They concluded that the condition of each country determines how strict the fiscal regime is. A good historical exploration data and proved large reserve may drive government to draft a stringent regime. Otherwise, a permissive regime should be proposed in dissatisfied recorded results. Therefore, governments are essentially suggested to understand the reservoir condition on their countries, in order to offer a competitive fiscal regime which yield a fair share and also attractive to investors.

Putrohari [16] also compared the application of fiscal regime in selected South East Asian countries, such as Brunei, Indonesia, Malaysia, Thailand, and Vietnam. Under the identical model, the result indicates that the provided benefit to government is varied due to unique mechanism in each country. The model represents the characteristic of geology and reserve of the region by using the historical prospect. He additionally emphasized that, in order to rank a number of projects, the present value index (PVI) the finest indicator under the capital constrain.

Mohammad [17] suggested that the ideal fiscal regime should be simple to apply, with a sufficient rate of return (ROR) which proportionate with associated risk to contractors, and, still providing a comparable return to its host government. He reported that some countries' regime yet is burdensome and does not meet

objective of designing a fiscal regime. In addition, he also recommends that a fiscal regime should be designed based on contractor's rate of return.

Johnston [18] recommended designing a fiscal regime which could result in a stable environment and fairly share profits between government and contractors. In general, the parameters that play a key role on the government side are contract controlling, government percentage portion, effective royalty rate (ERR), Savings index, Lifting entitlement, Progressiveness, Fairness, and participation. However, the prospectivity, fiscal terms, stability, and taxes paid in-lieu are also major concerns from contractor's side.



CHAPTER III

PETROLEUM FISCAL REGIME

This chapter describes about the life cycle that repeating in petroleum industry and classifies the all type of fiscal regimes which mainly affect the structure of petroleum economic. Subsequently, a history of Thailand's fiscal regime and average reserves in each area are discussed.

3.1 Petroleum Life Cycle

In petroleum business, it could separate into 5 main phases in Figure 2 with detail as following

3.1.1 Licensing

First of everything, It is the utmost concern for IOC to understand the laws and regulations in each country. The type of fiscal regime applies, terms' length, share portion, extra options, additional exceptions, and many things else have to be pointed out in this stage of the negotiation. The IOC will then be able to accessing to the proposed area after the license is granted from HG and have the rest of activities.

3.1.2 Exploration

When the license is achieved, IOC then executes geological surveying methods such as seismic or exploration drilling. The seismic uses sound-waves, shot through the interested subterranean. Substances, generally water, salt, and assorted rocks return the sound-wave back to receivers differently. The result may show some sign of petroleum. Thereafter, if the seismic shows a promising outcome, IOC will execute the exploration drilling to ensure the data by drilling that area to a specific depth and bring up the cutting the earth core sample to their laboratory.

Once IOC have got a certain level of confidence of discovering petroleum, some additional seismic and appraisal drilling are next task. The purposes of this appraising stage are to clarify the reservoir quality, volume, extraction methodology. These data lead to the business consideration whether this project is commercially viable or not.

3.1.3 Development

After the project is declared commercial, then IOC will determine and fabricate the infrastructure to obtain the petroleum from the subsurface reservoir up to the selling point. Many facility engineering departments will have more involvement in this stage. Most of the investment is also spent in this developing phase, through those construction facilities such as production unit, processing unit, transporting unit, or even the specialization made to fit the reservoir criterion. All of the Engineering, Procurement, and Construction (EPC) generally take up to 8 years to achieve the complete installation onsite.

3.1.4 Production

After well completions and commissioning, petroleum is now ready to be produced. The production level may intermittently ramp up through time until the economical designated number. Some activities such as well intervention or workover may be performed during this period to recover declined production overtime. Cost occurred in earlier phase could be recovered inwardly this production span.

3.1.5 Abandonment

The abandonment and decommissioning occur when the optimum production point or economic limit is expected (typically around 10 to 50 years depends on the size of discovery, and IOC's commercial criteria) or reaching the expiring date of the license; within 2-3 years, IOC will be notified to prepare for abandonment activity. This is either to literally uninstall the facilities and return the

environment to initial state, or passes them to the one who has been granted, intended to continue the production and finally take the responsibility of abandonment later on.

It is good to mention that, at the point of abandonment, it might have a great amount of petroleum remained underground. IOC, however, may have many reasons to leave it behind. Normally, the technology and/or market price at the time has proven that it is not economic to extract it out. As public may not notice, a fiscal regime is secrecy blended in one of function to the IOC's consideration as well,



Figure 2 : Phases in petroleum business[19]

3.2 Petroleum Fiscal Regime Classification

Typically, only one fiscal regime is selected by government who owns the rights on mineral to represent as a country license. However, due to its complexity and dynamic of the petroleum business, a number of contractual models are established each year in 20-30 countries from the reasons such as situation and/or political changes. Thereby, there are more fiscal regimes than the number of countries [20]. Nevertheless, it could classify into 2 major systems as Figure 3 with their characteristic in Table 1.

3.2.1 Concessionary system

Concessionary, this oldest system of petroleum regime, is also known as royalty and tax system (R/T) and it was firstly used in mining operation in Greece. Under this system, the IOC is granted an area and, if discover, owns the title of hydrocarbon and the host government receives the royalty from gross revenue

regardless any expense. It may have a deduction from processing costs before royalty calculation in some countries. The IOC then partly takes OPEX/depreciation/amortization up to allowable amount. Remaining could be carried forward to following year. After the deduction to contractor, taxable income is taxed as agreed in contract.

3.2.2 Contractual system

Contractual system considered that the mineral resources belong to host government or the NOC, and the IOC, as being contracted, takes share as return. On the same aspect, most of the contractual system may also have royalty and tax payment like R/T system but the sharing of the profit sharing concept depends on the type of contract it applies. There are many extensions to this system but, generally, production sharing and service contract are the most favorable.

3.2.2.1 *Production sharing contract*

This type of contract returns the profit back to contractor as cost oil and profit oil. It means that the IOC receives some of the title in hydrocarbon upon production. The main attribute of this system is the ceiling cost, and excess oil. The IOC may recover cost as high as the specific ceiling in each year, and carry forward to next year for those remaining. Otherwise, if the annual cost is lower than ceiling in that year; the difference is called an excess oil and subject to share with NOC. As well as the profit, it is the term for the amount after the cost recovery process. This system was first introduced by Bolivia in 1950s and is now often used in Middle East and Central Asia [21].

3.2.2.2 *Service contract*

The concept of the contract is similar to the production sharing contract, except that the IOC take a return in cash, no hydrocarbon is transferred to the IOC. Alternatively, under a service contract, NOC may offer some risk to IOC to receive the fee as a function of project's accomplishment. This system is known as risk service

contract. While in pure service, IOC receives only a fixed amount. Kuwait, Venezuela, and Mexico are the countries that apply the service contract [22].

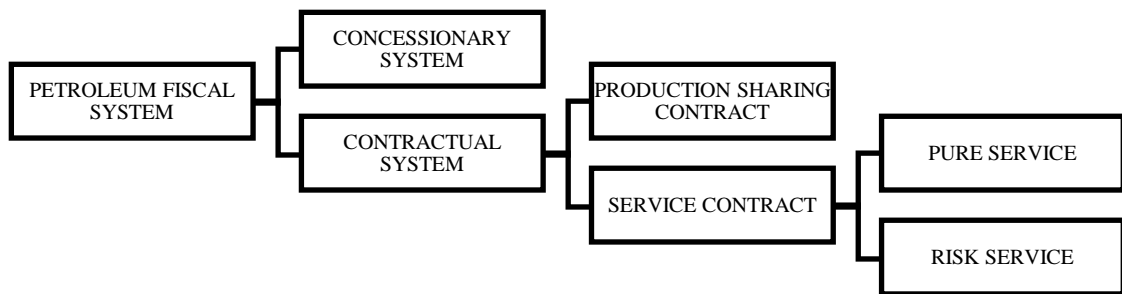


Figure 3 : Hierarchy petroleum fiscal system

Table 1 : Fiscal regimes and their characteristic [22]

	Concessionary	Contractual system	
		PSC	Service contract
Field ownership	IOC	NOC	NOC
Production ownership	IOC	IOC/NOC	NOC
Field operator	IOC	IOC	IOC/NOC
How the IOC is compensated	n/a	Production share	Fee
Risk	IOC	IOC/NOC	IOC/NOC

3.3 Thailand Fiscal Regime

From the first Petroleum Act (PA) and Petroleum income tax Act (PITA) in B.E. 2514 (1971) to the latest published in B.E 2550 (2007), there were many concessions awarded by DMF for exploration and production, and it is a company's responsibility to follow the profit sharing regulations which can be separated into 3 major periods of agreement overtime.

3.3.1 Thailand-I

Starting from 1971 to 1989, awarded concessions during this phase were under the regime of Thailand-I. Some of the operating fields are still remaining and aimed for further extension license. Straightforwardly, with a static rate of 12.5 % royalty and 50 % of tax had prosperously attracted a number of IOC as the flow show in Figure 4. This led to a successful leap of petroleum business in Thailand.

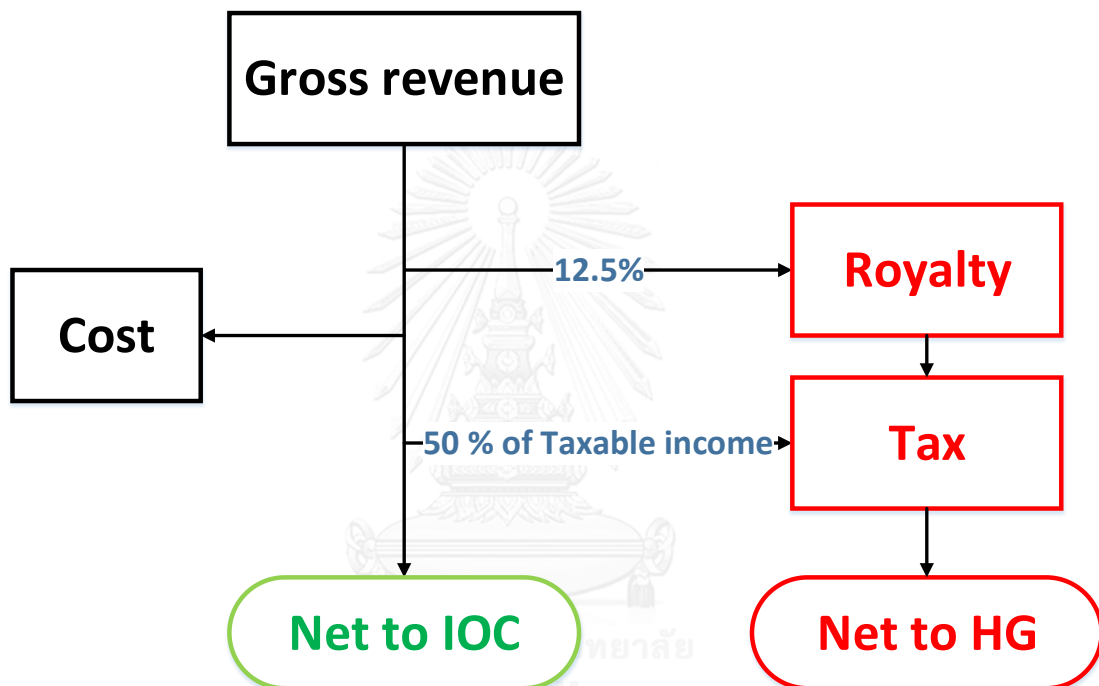


Figure 4 : Thailand-I regime, simplified flow of revenue

3.3.2 Thailand-II

Afterwards, in 1980 decade, the HG observed that there was a great thriving in petroleum operation. Consequently, an adjustment in regulation occurred and was announced as Thailand-II. With an additional of annual benefits that call upon the deductible expense has exceeded of 20 % of annual income in that fiscal year, and annual production bonus shown in Table 2 which calculate on 3 cases of crude oil production. These additions are considered too stringent and no IOC could develop a concession under this system.

Table 2 : Annual production bonus from daily crude oil production

Daily crude oil production (BBL)	Annual production bonus
10,000 – 20,000	27.5 %
20,000 – 30,000	37.5 %
30,000 +	43.5 %

3.3.3 Thailand-III

Once again in 1989, HG edited the system in a purpose to increase the project feasibility and support marginal field, together with the increment in government share on successful projects. To improve the flexibility of the system, royalty rate became a sliding scale between 5 – 15 % depending on monthly crude oil production as specify in Table 3. The annual benefits and annual production bonus were canceled. A 50% tax is maintained but windfall profit based levy tool called Special Remuneration Benefit at the sliding scale from 0 to 75 % was implemented instead as shown in Table 4 and overall flow is presented as Figure 5.

Table 3 : Sliding scale of royalty rate in Thailand-III

Monthly crude oil production (BBL)	Royalty rate
Up to 60,000	5.00 %
60,000 – 150,000	6.25 %
150,000 – 300,000	10.00 %
300,000 – 600,000	12.50 %
600,000 +	15.00 %

Table 4 : Special Remuneration Benefit in Thailand-III

Income per meter of well (THB)	Special Remuneration Benefit
Up to 4,000	0 %
4,000 to 14,400	1 % per each 240 THB increment
14,400 to 33,600	1 % per each 960 THB increment
33,600 +	1 % per each 3,840 THB increment

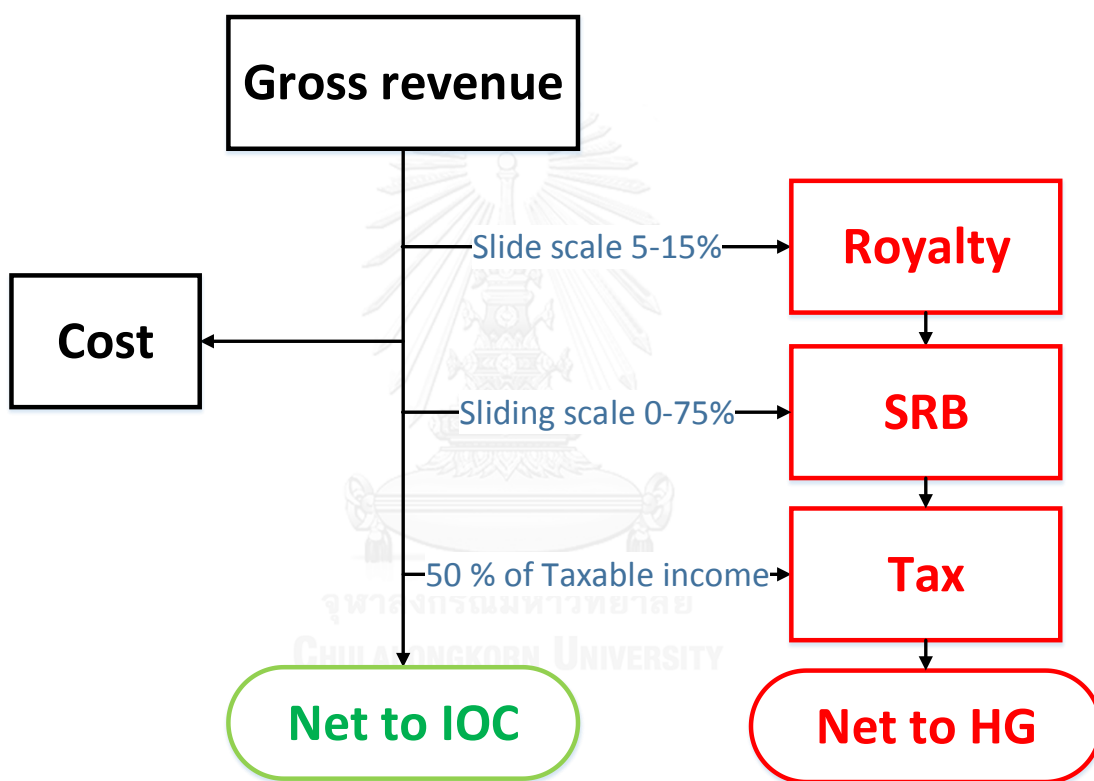


Figure 5 : Thailand-III regime, simplified flow of revenue

All information of applied elements in Thailand-I, Thailand-II, and Thailand-III can be summarized as Table 5 below.

Table 5 : Thailand fiscal regime comparison [9]

	Thailand-I	Thailand-II	Thailand-III
Royalty rates	12.5 % of income from sale or disposal of petroleum which may be treated as tax credit	12.5 % of income from sale or disposal of petroleum which may be treated as tax credit	Progressive rate at sliding scale 5-15 % deemed to be expenses which could be deducted in tax calculation
Petroleum income tax	50 % of net profit from petroleum business operation	50 % of net profit from petroleum business operation	50 % of net profit from petroleum business operation
Special benefits	n/a	Annual benefits, and annual production bonus	Special remunerator benefit (SRB), which may be taken as deduction
Exploration period	8 years, with 4 year extension	8 years, with 4 years extension	6 years, with 3 years extension
Production period	Not exceeding 30 years from expiry date of exploration, with extension not exceeding 10 years	Not exceeding 30 years from expiry date of exploration, with extension not exceeding 10 years	Not exceeding 20 years from expiry date of exploration, with extension not exceeding 10 years
Concession areas	Not exceeding 10,000 sq.km per exploration block, up to 5 exploration blocks	Not exceeding 10,000 sq.km per exploration block, up to 5 exploration blocks	Not exceeding 4,000 sq.km per exploration block, up to 5 exploration blocks

3.4 Neighboring countries' Fiscal Regime

Every country has a distinctive function in fiscal regime, depending on its unique geological and political issue. To make a comparison between fiscal regimes, the conditions of discovering petroleum prospect should also be considered to be similar under a particular surrounding and environment. In this study, author has selected Malaysia and Myanmar to represent a regime which is recognizable as one of the most successful and another one as a recently thriving regime that adjacent to Thailand.

3.4.1 Malaysia R/C PSC (1996)

In Malaysia, a concession system has been invented and established since 1966 [23]. Later on 1974, The Petroleum development Act and Petroleum Regulation were executed, Malaysia looked forward to convert the system into Production sharing contract and achieved in 1976 with some adjustment from Indonesian PSC. Then it had been revised with 1985 PSC and again in 1993 with additional content targeting deep water areas. And finally the R/C PSC was introduced in 1996 and implemented to the Malaysia system up to recent with minor revise in 2012. Alternatively, Risk service contract (RSC) was introduced to IOC in 2011 to encourage on marginal areas despite its original PSC.

Malaysia government founded Petronas (abbreviated from Petroliam Nasional Berhad [24]) as a national oil company in 1974 to responsible for developing and increasing value to the resource. Petronas generally join in any project in order to have a direct participation and ensure the performance of operating IOC on behalf of its government.

There are some additional terms apply in PSC system apart from the concession system. Since this study will mainly focus on R/C PSC, based on 1996 revision which illustrate as Figure 6, only related expression used in calculation will be discussed hereafter.

First, Royalty is calculated right after annual gross revenue at 10%, then the R/C index for contractor is computed on IOC's cumulative share of revenues and costs to date basis at all time. Both gas and oil has its own R/C index.

For oil, Revenue (R): Contractor's cumulative share of cost oil and profit oil less supplementary payment. Cost (C): Contractor's cumulative share of recoverable crude oil costs less non-recoverable expenditure & disputed costs (eg. Research contribution, capital expenditure)

For gas, Revenue (R): Contractor's cumulative share of cost gas and profit gas less supplementary payment. Cost (C): Contractor's cumulative share of recoverable natural gas costs less non-recoverable expenditure & disputed costs (eg. Research contribution, capital expenditure)

Total cost tranche (TCT): It serves as the ceiling for cost recovery in each year, calculate based on gross revenue with 10% royalty. However, the TCT sometimes will be left unrecovered and, again, the difference between actual recovery and TCT is subject to be shared with HG.

Threshold volume (THV): There are 2 sliding scale applied for all following share criteria after TCT. At early production, the scale will be very favorable to IOC and until the production reach the THV; then latter scale is applied which is, in turn, more favorable to HG. The THV for oil is 30 million barrels, and 0.75 trillion standard cubic feet for gas.

Total profit tranche (TPT): It is the portion remained after royalty, and TCT. The TPT is spilt between NOC and IOC regarding the value of R/C ratio as well. In additional, TPT is subjected to tax at fixed 38% rate, and also apply to both NOC and IOC portions.

Malaysia also has a supplementary payment to capture the excess profit from the base price which will be payable once the R/C is over 1.0, the rate is equal to 70% of the excess gained over the base price; The average price is the average number that used in the calculation of gross revenue at that year. The base price is the specified price from Malaysia government at the contract effective date, which escalate to the time of the payment.

And finally, all of the sharing profit is subjected to taxation of 38% on both share of IOC and NOC.

$$\text{Supplementary} = \frac{AP - BP}{AP} \times (CP_{prev} + UC_{prev}) \times 70\% \quad \text{Equation 1}$$

Where:

AP = Average oil/gas price

BP = Base oil/gas price

CP_{prev} = Previous year contractor profit oil/gas

UC_{prev} = Previous year contractor unused cost oil/gas

The TCT and TPT portions that are controlled by R/C index and THV can be summarize as Table 6 to Table 8 below

Table 6 : Tranche for each portion, based on R/C index

R/C Index	Total Cost Tranche (TCT)	Total Profit Tranche (TPT)
0.0 to 1.0	70%	20%
1.0 to 1.4	60%	30%
1.4 to 2.0	50%	40%
2.0 to 2.5	30%	60%
2.5 to 3.0	30%	60%
> 3.0	30%	60%

*note that 10% is deducted as royalty

Table 7 : Contractor's share of unused TCT, based on R/C index and THV

	Below THV	Above THV
0.0 to 1.0	-	-
1.0 to 1.4	80%	40%
1.4 to 2.0	70%	40%

2.0 to 2.5	60%	40%
2.5 to 3.0	50%	40%
> 3.0	40%	20%

Table 8 : Contractor’s share of TPT, based on R/C index and THV

	Below THV	Above THV
0.0 to 1.0	80%	40%
1.0 to 1.4	70%	30%
1.4 to 2.0	60%	30%
2.0 to 2.5	50%	30%
2.5 to 3.0	40%	30%
> 3.0	30%	10%

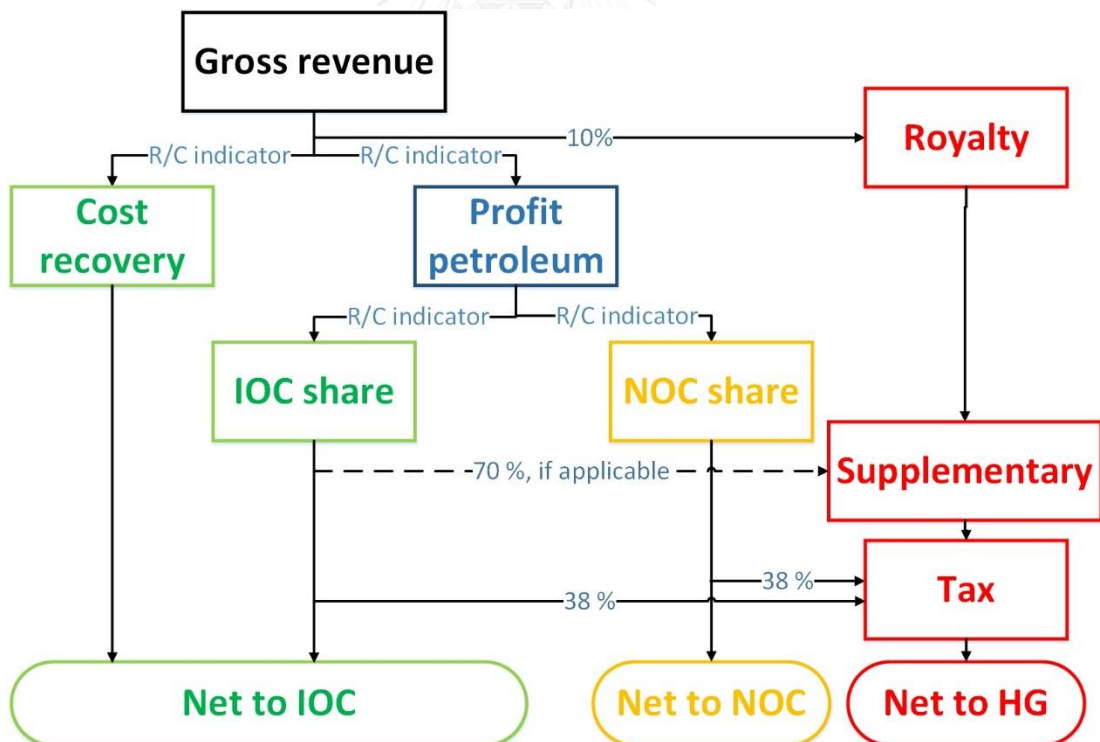


Figure 6 : Malaysia R/C PSC (1996) regime, simplified flow of revenue

3.4.2 Myanmar PSC (2013)

After gaining independence from UK in 1947, Myanmar took all control from foreign IOC and grant Myanmar oil corporation (MOC) to be a sole explore, develop, and produce petroleum during that time. Later on, MOC offered the first licensing round in total of 13 blocks to IOC in 1974 but the result was dissatisfied. Thereafter, MOC called a several licensing rounds but they were not so successful until a discovery of Yadana in 1983 and Yetagun in 1992, both are signed under PSC system. Between those times, MOC then renamed to Myanmar oil and gas enterprise (MOGE) in 1985 and became a national oil company since the day. Myanmar's PSC was revised the function along the time such in 1993, 2007, and 2013 to conform to the oil and gas market situation.

The production sharing system in Myanmar is very similar to the one in Malaysia, but with less the complexity in advanced terms and calculation as present in Figure 7. While Malaysia rely on a single parameter to control all petroleum fields and automated adjusting parameter like R/C, Myanmar uses a particular Table 9 to Table 12, dedicated for a field location, depth of reservoir, which also categorized either by oil or gas to justify how the IOC and NOC get the share portion straightforwardly based on production.

The special term in Myanmar calculation to be noted here is the Domestic supply obligation (DSO) which normally charge at 20% of oil and gas production and it can be deductible in tax calculation.

Likewise, the Myanmar system in this study aimed attention to only 2013 revision, only on onshore and shallow offshore area.

Table 9 : Onshore oil profit splits, based on production

Production (bpd)	Profit split (%) to HG	Profit split (%) to IOC
<10,000	60%	40%
<20,000	65%	35%
<50,000	70%	30%
<100,000	80%	20%
<150,000	85%	15%
>150,000	90%	10%

Table 10 : Onshore gas profit splits, based on production

Production (MMSCFD)	Profit split (%) to HG	Profit split (%) to IOC
<60	60%	40%
<120	65%	35%
<300	70%	30%
<600	80%	20%
<900	85%	15%
>900	90%	10%

Table 11 : Offshore oil profit splits, based on production (water depth <600 ft)

Production (bpd)	Profit split (%) to HG	Profit split (%) to IOC
<25,000	60%	40%
<50,000	65%	35%
<100,000	80%	20%
<150,000	85%	15%
>150,000	90%	10%

Table 12 : Offshore gas profit splits, based on production (water depth <600 ft)

Production (MMSCFD)	Profit split (%) to HG	Profit split (%) to IOC
<10,000	60%	35%
<20,000	75%	25%
<50,000	85%	15%
>150,000	90%	10%

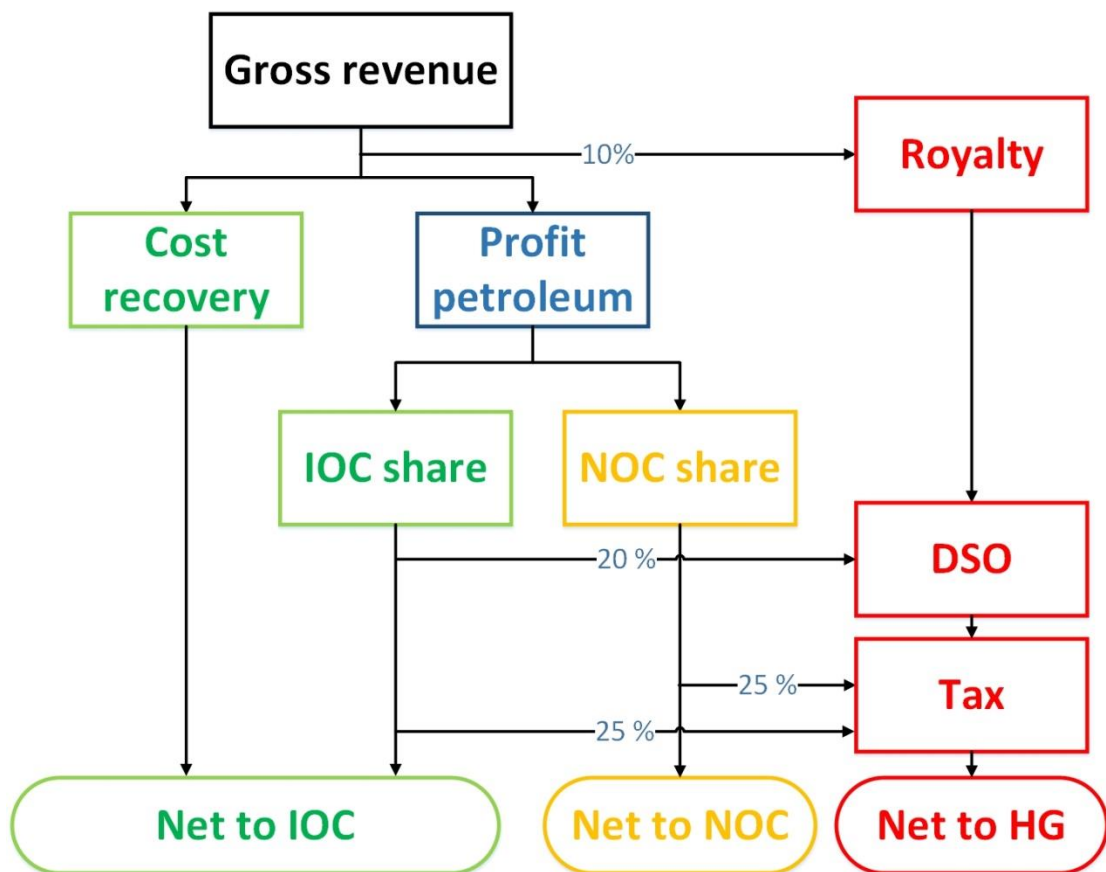


Figure 7 : Myanmar PSC (2013) regime, simplified flow of revenue

CHAPTER IV

METHODOLOGY

In Thailand, it is widely debatable about the utilizing system. Either concession or production sharing system will serve the requirement. It is true that one may be more attractive to IOC apart from another. On the other hand, one may have a proper control over technical data and knowledge conveyance. As the industry outsider might be unaware of. In fact, there are many unexpected parameters which way more important than a system. Balancing between these issues with many other constrains, a long experiment and truly understanding of these following criterions, are necessary.

4.1 Designing a Petroleum Fiscal Regime

In all business, the projects are commencing once each side of negotiation acquires a reasonable profit and acceptable risk as a return. Especially, in petroleum industry, the using legal term must be specifically designed to handle its particular complexity, diversification and, extremely, unpredictable while maintain mutual interests between HG and IOC. HG and IOC may have some different concerns over the petroleum regime which briefly summarize as Table 13 below.

Table 13 : Major concerns of HG and IOC [25]

HG preference	Receive fair profit spilt while promote a cost saving in operation
	Gain a certain share on each fiscal year
	Reach but not exceed Maximum efficient production rate (MEPR)
	Be able to control over the resource
	Maintain attractiveness to investors
IOC preference	Least front-end loaded taxes in promising petroleum play
	Negotiate with stable and transparent government
	Satisfy number of “Booking barrels”

4.2 Efficiency of a Petroleum Fiscal Regime

According to the concerns, the designed regime that yields an increment in government share portion as profitability goes up such as rising oil price, and conversely, the portion that decreases as profitability of the project goes down such as escalation of operating cost, a win-win situation to both HG and IOC, is technically called a “progressive” system. Moreover, the mechanic of the system should be flexible and remain applicable to all sizes, all types, and, more favorable or averse condition.

A ten barrel of oil in first year, for instance, generated a \$100 profit and it yields \$60 to HG and \$40 to IOC in Figure 8. That literally means a share of 60 to 40 ratios, respectively. Both HG and IOC then blissfully utilize those portions on their own proposes and objectives.

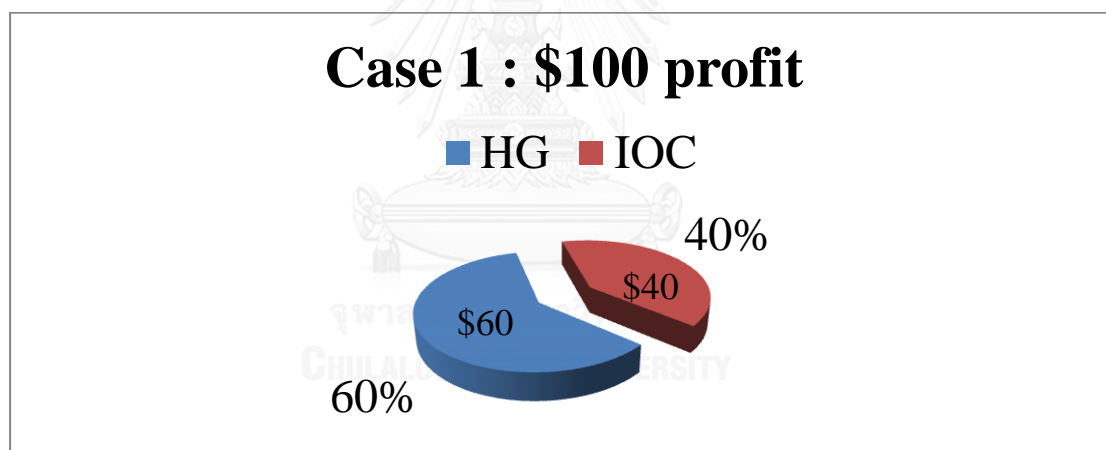


Figure 8 : Low profit spilt in first year

Following by Figure 9, another ten barrel of oil under the same condition and regime but with more favorable environment, now generated profit up to \$1000; a total of \$1,000 profit in second year splits into \$500 to both HG and IOC. It is certainly a bigger amount that HG and IOC gained, but as one may not notice, the lesser portion that HG obtained. According to disadvantage of HG in this situation defines this example regime as “regressive”.

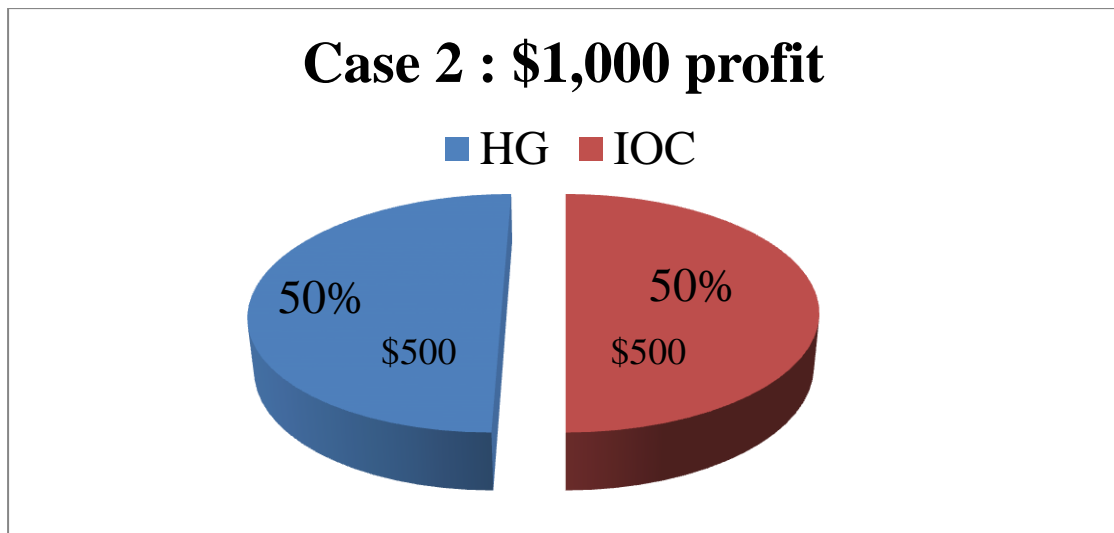


Figure 9 : High profit spilt in second year

It should be noted that, conversely, when the HG received higher portion of profit such as 70% pursuing the profit body (IOC took 30%), is considered this fiscal regime as “progressive”

The HG take portion may vary depending on the elements that are applied into each regime, and to be specific in this study, the flow of revenue, for example, of Thailand-I as Figure 10 is illustrated here again to supplement the explanation.

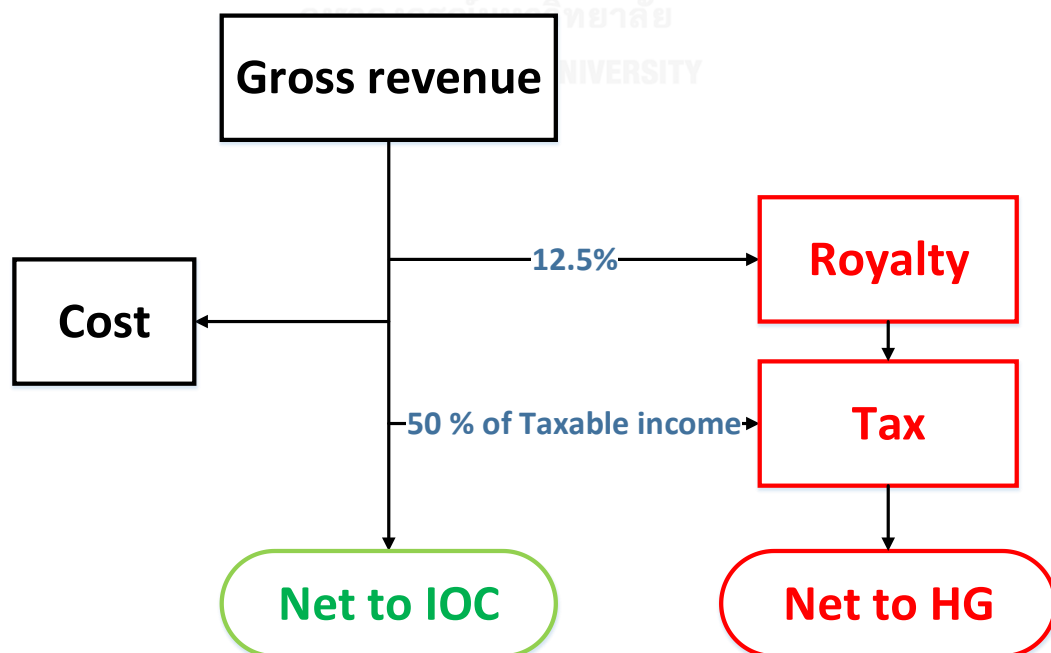


Figure 10 : Thailand-I regime, simplified flow of revenue

The gross revenue normally splits into 3 main portions, the cost, Net to IOC, and Net to HG. Notice that, the Net to HG portion is the summation of Royalty and tax in Thailand-I. Importantly, the percentage HG take which will be used in following chapter is calculated from the Net to HG divided by the total amount of that IOC and HG received. The concept of this percentage also applies to Thailand-III, Malaysia, and Myanmar as compile in a Table 14 below

Table 14 : Take percentage definition

Regime	HG take (%)
Thailand-I	$(\text{Royalty} + \text{Tax}) \div (\text{Net to IOC} + \text{Net to HG})$
Thailand-III	$(\text{Royalty} + \text{SRB} + \text{Tax}) \div (\text{Net to IOC} + \text{Net to HG})$
Malaysia	$(\text{Royalty} + \text{Supplementary} + \text{Tax} + \text{NOC share}) \div (\text{Net to IOC} + \text{Net to NOC} + \text{Net to HG})$
Myanmar	$(\text{Royalty} + \text{DSO} + \text{Tax} + \text{NOC share}) \div (\text{Net to IOC} + \text{Net to NOC} + \text{Net to HG})$

Pedro van Meurs [26] discuss about the progressivity of a fiscal regime does not only rely on the oil or gas price. But it is also a function of reservoir volume, and cost profile as well. The bigger volume drives a bigger profitability and the bigger project cost, vice versa, pushes the profitability down. However, in this study is focused on the profitability created through oil and gas price, solely.

According to Openoil [27], many elements may apply in combination within each regime, some are progressive, some are neutral, and some may cause a regressive to the overview of the regime. The different mixture of elements among countries reflect the different plays, risk, expense, and benefit in individual. In any case, these elements could practically be categorized into following Table 15 by the causing effect.

Table 15 : Terms that affect efficiency of a system [27]

Element	Effect
Signature bonus	Very regressive
Production bonus	Very regressive
Fixed royalty	Regressive
Corporate income tax	Neutral
Fixed profit share	Neutral
State participation	Neutral
Sliding scale royalty	Progressive
Sliding scale profit share	Progressive
Profit-based tax	Progressive
Other general taxes	Varies, but generally regressive
Service fee systems	Very progressive

4.2.1 Signature bonus

The signature bonus is an amount of money to be paid to HG when the contract is awarded, sometimes, it could be negotiated as per government's direction. The signature bonus is varied regarding how the government justify the area from available of geological data on hand. It can be relatively high if data shows a promising result, and it can be low if some deficiency is observed from the record. The signature bonus involves only in the licensing stage of petroleum life cycle, which is far from any production, hence, result a government only a single payment regardless any extend of profit in latter stage.

4.2.2 Production bonus

The production bonus is an amount of money to be paid to HG at specific point during the contract. It can be placed in various occasions such as when the project is declared commercial, at the commencing of production, reach the specific rate of production, or the cumulative production hit the agree level. The production bonus is similar to signature bonus which has no relation to profit

4.2.3 Fixed royalty

Royalty can be observed in most of the fiscal regimes and it usually falls between 10-15%. It is calculated at the time of production without any cost involve. It guarantees a return to HG in each year but it does not increase when profit body goes up. In additional, it is also considered as a front-end payment (reduce profit of a project) which influence the determination of IOC to have an early termination of a project even that prospect still favor the engineering feasible.

4.2.4 Corporate income tax

Corporate income tax is computed on a profit based (after cost deduction) just like other businesses beyond the petroleum section but it may be set at a different rate. It is also subjected to some deduction specified in contract. The corporate income tax is neutral has neutral effect to the efficient because it does not alter the government portion of the sharable profit.

4.2.5 Fixed profit share

Profit sharing is one of a famous element under production sharing system. The remaining production after cost recovery will be shared between HG and IOC. The fixed profit sharing turns out to be neutral because no matter how much profit is created through production or price in any year, it will result only a stable proportion to HG.

4.2.6 State participation

This element describes the situation when HG participates in the contract, generally, in the name of NOC. It could happen in exploration, development, or any stage of the contract depending on how much risk HG eager to bear. As appointed as one of the IOC role, it leads to the responsible to pay a proportion of cost and receive a profit as another IOC which also changes no portion of the final government share.

4.2.7 Sliding scale royalty

The stage of calculating and definition of a sliding scale royalty are the same with a fixed royalty. The only different is the applying rate will be a function of some criteria such as production rate, price, cost, attribute of the produced petroleum, or even economic tool like internal rate of return of the project at that time. The royalty will therefore be able to capture profit through these mentioned parameters and yield a higher portion of HG take. However, it is undeniably still a front-end payment, yet in relatively appropriate condition.

4.2.8 Sliding scale profit share

Alike normal profit sharing, a sliding scale is integrated into the allocate computation to augment the portion of HG take. On the same basis of royalty sliding scale, the rate is subjected to one or a combination of production level, cumulative production, R-factor, or cost limit which now generating more favor situations to the HG.

4.2.9 Profit-based tax

Many countries now have a concern when they couldn't capture the profit when the price suddenly shoot up and leave that advantage to IOC. Profit-based tax is invented to solve this issue. Either sliding scale, R-factor, or internal rate of return component is applied to the system to attain additional profit. This process normally calculate after the cost reduction, and result more HG take, as soon as this element is triggered.

4.2.10 Other general taxes

Tax or duty under this category can be specific following the local law in each country. Some examples which generally be observed comprises a value added tax (VAT), import/export duties, withholding, and, industrial tax.

4.2.11 Service fee systems

Under service contract regime, the service fee system is applied. IOC either takes only a fixed fee in return no matter how the annual production or oil price are leaping, or, negotiate some degree of risk-relate payment if HG also implement a risk service contract. Though, HG definitely receives a bigger return in direct proportion to the profit and brings a very progressive status to this element.

4.3 Parameter in Economic Evaluation

After the design concept of efficiency is determined, to measure a fiscal system to one another, in addition to the efficiency, other important arithmetic economic parameters using in regular project evaluation such as Net present value (NPV), Internal rate of return (IRR), or Profitability index (PI) also play a big role in designing a regime. Therefore, the regime should economically attractive to IOC while maintaining its progressiveness side by side.

4.3.1 Net Present Value (NPV)

NPV is the conventional parameter to verify the value of each project. It is the summation of project cash flow which based on the concept of time value of money for both income and outcome. The future money is estimated and discounted back to the present value at a specific rate. The project is sound when the value of NPV turns out positive.

$$NPV = \sum_{t=0}^n \frac{NCF_t}{(1+i_d)^t} \quad \text{Equation 2}$$

Where:

NCF = Net cash flow

t = Time

i_d = Discount rate

4.3.2 Internal Rate of Return (IRR)

IRR is one famous economic verifying parameter beside NPV. It is another term of discount rate which particular yield a zero value to NPV of that project. The higher IRR value, the more interesting in the project is. And the project is launched when IRR is greater than minimum acceptable rate of return of investors.

$$NPV = 0 = \sum_{t=0}^n \frac{NCF_t}{(1+IRR)^t} \quad \text{Equation 3}$$

Where:

NCF = Net cash flow

t = Time

IRR = Internal rate of return

4.3.3 Modified Internal Rate of Return (MIRR) [18]

MIRR is invented to eliminate an IRR disadvantages occur when yearly NCF changes its sign more than one time during a project life. (E.g. a positive cash flow change to negative and become positive again). This will have IRR outcome as many as the number of sign changing. MIRR also has advantage over IRR because it includes a reinvestment rate which could be feasible conceivable. It gives much more realistic than solely simple IRR. Note that MIRR will be used in this study instead of typical IRR.

$$MIRR = \sqrt[n]{\frac{FV_{positive}}{-PV_{negative}}} - 1 \quad \text{Equation 4}$$

Where:

FV = Summation in future value of positive flow at reinvestment rate

PV = Summation in present value of negative flow at financial rate

n = Number of year in project life

4.3.4 Profitability Index (PI)

PI is one of a tool that used to rank among projects. It returns a ratio of profit to investment of the project. The project is acceptable if PI is greater than 1. Also, the greater PI gives the greater the rank of the project. It illustrates a benefit per invested dollar.

$$PI = 1 + \frac{NPV}{PV_{cap}} \quad \text{Equation 5}$$

Where:

NPV = Net present value of the project

PV_{cap} = Present value of capital investment

4.4 Deterministic Approach

A deterministic model assumes certainty in all aspects. Randomness is not introduced into the calculation in this system and the same result can always be expected from the same input. This model will be used in the situation where relations between input and output is certainly defined. Example application of deterministic model are accounting, chemical reaction, or the programming/coding model. In petroleum business, discrete results such as most likely case, low case and high case of reservoir volume can be explained through particular equations. In this study, this approach is used to determine discrete cases of HG take portion.

4.5 Probabilistic (Stochastic) Approach

Possibilities and risks are likely involved in probabilistic determination. Most of the unknown data often address in range, confident level, and/or under number of uncertainties which the oil and gas business is mainly relying on this information, and frequently, is based on collected data onsite and plot into a chart. The model is used to estimate the probability of interested event on the historical data basis.

As the input data consist of uncertainty distributions, hence, the results of probabilistic approach apparently are reported in the range distribution format as well. It usually be reported in the form of probability density function (PDF), or cumulative density function (CDF) as shown in Figure 11.

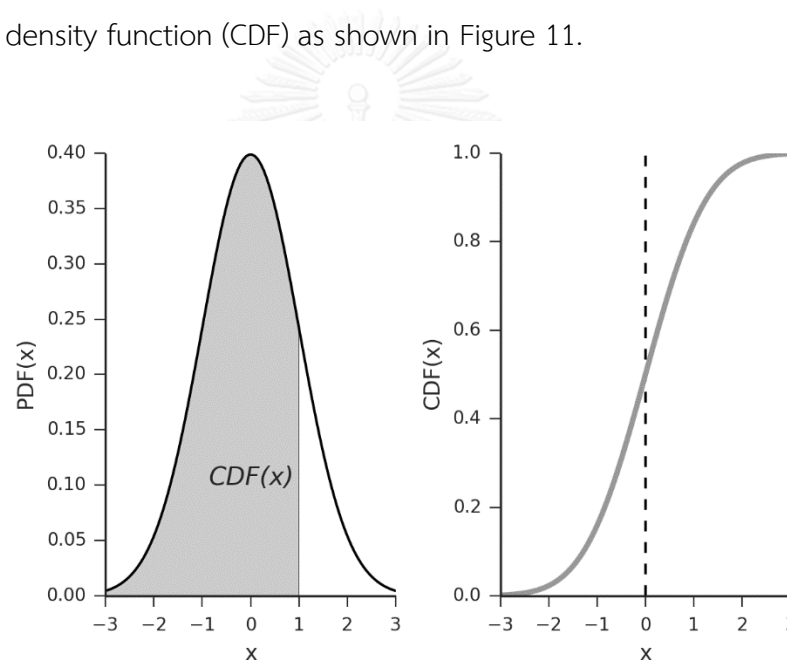


Figure 11 : Probability Density Function and Cumulative Distribution Function[28]

The grey area in PDF graph (left) represents a chance of finding value below “x”, where the dot line in CDF graph (right) shows the probability that outcome might has lower value than the selected value of x. There are some typical distributions using to fit the data such as normal distribution, gamma distribution, lognormal distribution, exponential distribution, and Weibull distribution. In a meanwhile, uniform data is used for equivalent possibility on each data or in the

limited statistic data, like min-max-median is frequently pictured in triangular distribution.

4.6 Monte Carlo Simulation

Monte Carlo Simulation (also known as Monte Carlo experiments) was invented since early 1930s, but its utilization has been developing along the power of computational tools such as computer [29]. It is now recognized as one the most efficient and valid mathematical method by randomly selected each individual input under its specified distribution into the calculation. Then, after a set of iterations, Monte Carlo presents the outcome, as well, in form of distribution.

The feature function of this study is “RiskPert” function shown in Figure 12. The “Pert” term stands for “Project Evaluation and Review Technique” and is a special form of scaled beta distribution [30]. The concept is similar to the triangular distribution; it generates a risk profile regarding the minimum, maximum, and most likely input except in a skewed (curved) form. The advantage of the curve over the triangular is, as in head or tail of the distribution, a less probability is expected in the range. The equations and parameters related to RiskPert are as following

$$Mean = \mu = \frac{a + (4 \times b) + c}{6} \quad \text{Equation 6}$$

$$\alpha_1 = \frac{(\mu - a) \times (2b - a - c)}{(b - \mu) \times (c - a)} \quad \text{Equation 7}$$

$$\alpha_2 = \frac{\alpha_1 \times (c - \mu)}{(\mu - a)} \quad \text{Equation 8}$$

Where:

- a = Minimum set value
- b = Most likely set value
- c = Maximum set value

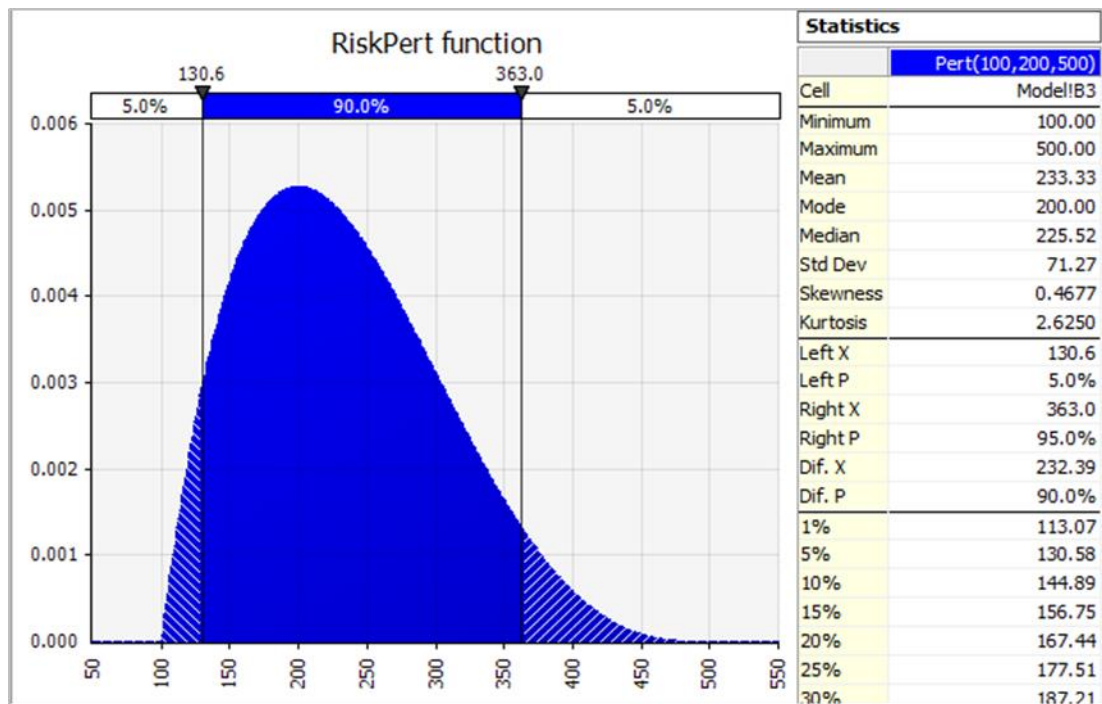


Figure 12 : Example of RiskPert PDF profile[30]

4.7 Thailand Average Reserve and Categorization

In petroleum industry, Thailand has awarded more than 100 concessions to IOC which cover over 140 exploration blocks on both onshore and offshore [31]. To define the average reserve, most of the IOC commonly report in 2P terms [32]. 2P consists of proved and probable reserve that referring to 90 % certainty of commercial extraction and 50 % certainty of commercial extraction, respectively [33]. They are accounted for commercial and technical certainty applying currently available technology in calculation. According to Thailand's statistic data collected by Wood Mackenzie [34], the 2P reserve (as of April 2016) can be categorized as following Table 16.

Table 16 : 2P Offshore oil reserve reported [34]

<u>Offshore oil</u>	2P reserve (MMBBL)
Field A	74.0
Field B	6.0
Field C	372.0
Field D	50.3
Field E	28.0
Field F	4.0
Field G	36.0
Field H	168.0
Field I	21.0
Field J	13.6
Field K	13.0
Field L	51.1
Field M	11.1

Note that the data of some fields can be a combined result from numerous plays and reservoirs together, which they are under the identical concessions, and belongs to the same companies. In additional, an oil field generally, incorporate with some gas production, or reversely, a gas field is likely to have a contribution of oil as well For this sorting process, a single criterion is determined at a time. The data is then plot into a histogram chart as present in Figure 13.

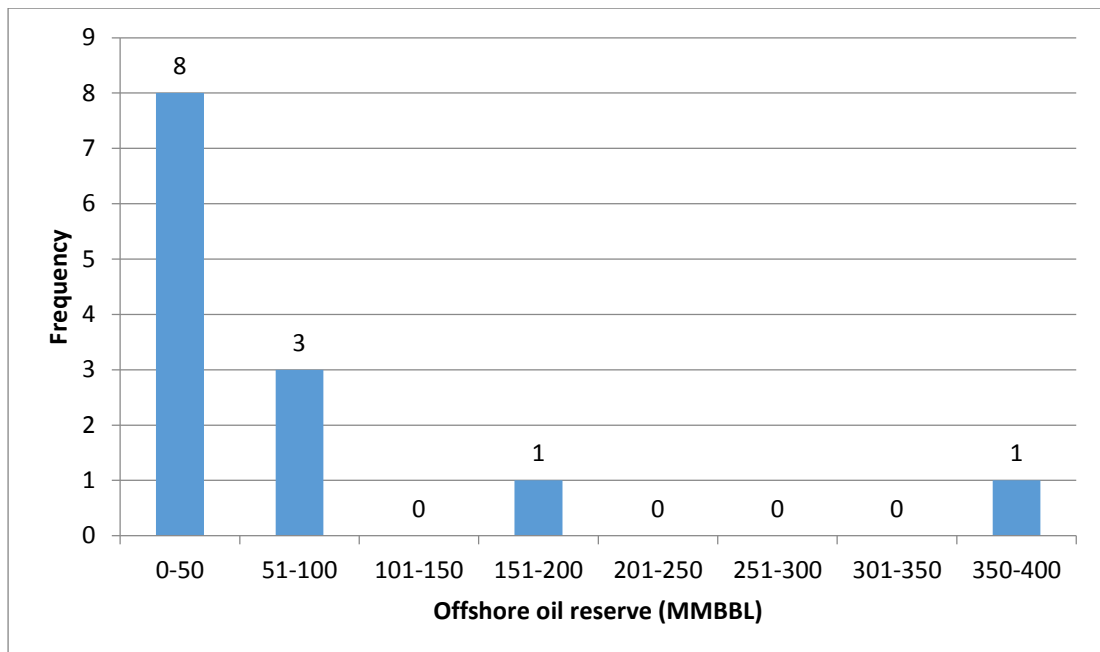


Figure 13 : Histogram data of 2P Offshore oil reserve

At this time, 10th, 50th, and 90th percentile can be derived from the histogram chart. Statistically, the 10th percentile (p10) can be interpreted such that 10% of the result value in observations are less than the value at the p10. In the same manner, the 90th percentile (p90) means most 90% of the result value in observation are less than the given value at p90 [35].

On the other side, it can be explained that at p10, there is a 90% of the results which turn out to be higher than the value at p10. This leads to the categorizing definition in this study where the small offshore oil (and/or gas) field is the field that has at least 90% chance to discover, up to the value at p50. The medium oil (and/or gas) field is the field that has at least 50% chance to discover, up to the value at p90. Finally, the large oil (and/or gas) field is the field that has at least 10% chance to discover. From the Table 16 and Figure 16, the result can be calculated as Table 17

Table 17 : Calculated statistic parameters of offshore oil field (MMBBL)

p10	p50	p90	median	mean	SD
7.0	28.0	149.2	28.0	65.2	98.0

Therefore, the author select eligible fields which field I (21.0 MMBBL), field A (74.0 MMBBL), and field C (372.0 MMBBL) to represent small, medium, and large offshore oil field respectively. The categorizing criteria also applied to oil onshore field, and gas offshore field as shown in Table 18 to Table 22 and Figure 14 to Figure 15, accordingly.

Table 18 : 2P Onshore oil reserve report[34]

<u>Onshore oil</u>	2P reserve (MMBBL)
Field N	2.1
Field O	37.0
Field P	10.5
Field Q	6.5
Field R	314.0

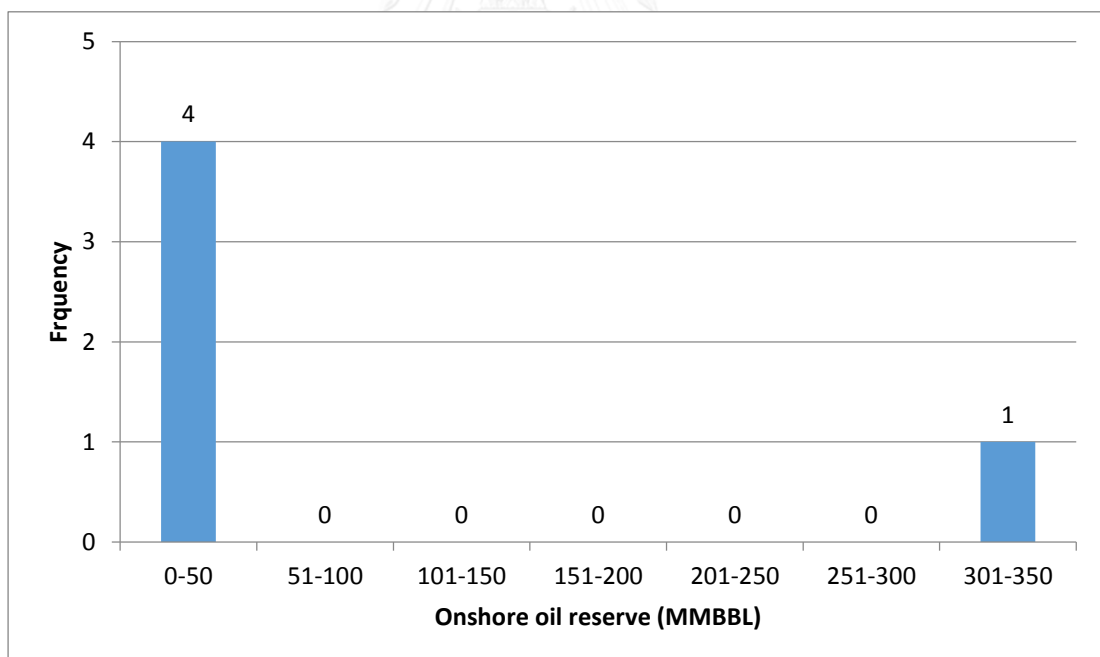


Figure 14 : Histogram data of 2P Onshore oil reserve

Table 19 : Calculated statistic parameters of onshore oil field (MMBBL)

p10	p50	p90	median	mean	SD
3.9	10.5	203.2	10.5	74.0	120.6

Table 20 : 2P Offshore gas reserve report[34]

Offshore gas	2P reserve (BCF)
Field S	2,013.0
Field T	3,196.0
Field U	1,414.0
Field V	8,136.0
Field W	3,911.0
Field X	5,504.0
Field Y	5,714.0
Field Z	848.0
Field AA	426.0

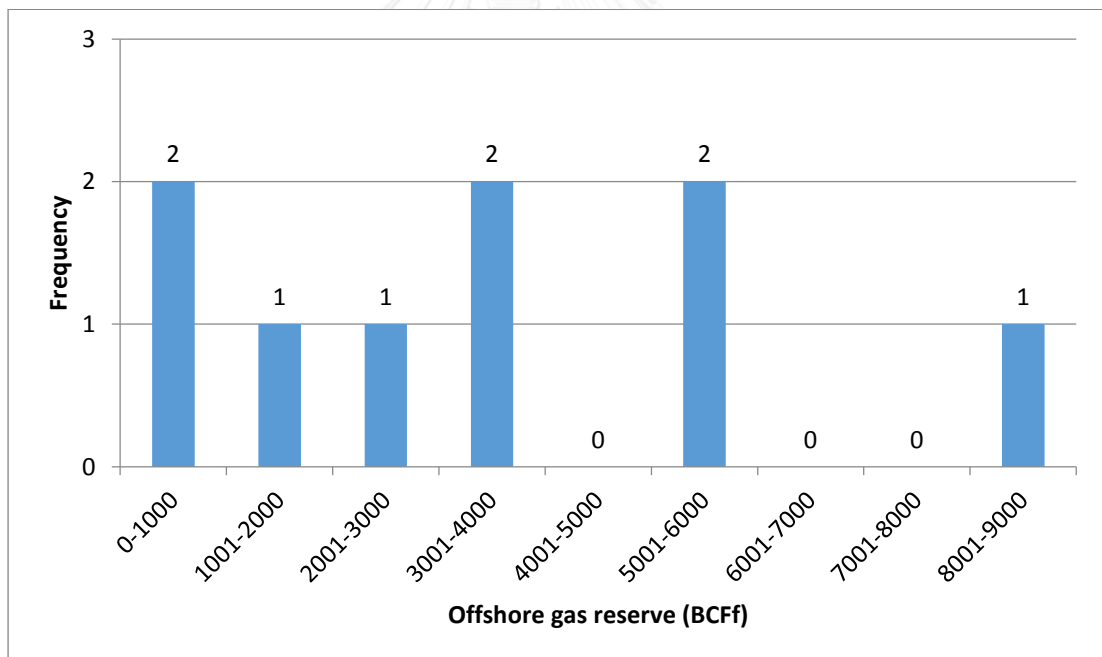


Figure 15 : Histogram data of 2P Offshore gas reserve

Table 21 : Calculated statistic parameters of offshore gas field (BCF)

p10	p50	p90	median	mean	SD
763.6	3,196.0	6,198.4	3,196.0	3,462.4	2,442.8

Table 22 : 2P Onshore gas reserve report[34]

<u>Onshore gas</u>	2P reserve (BCF)
Field AB	848.0
Field AC	426.0

Eventually, representative fields are selected and present in Table 23 which the reserve volume fall in between each range. Except for the onshore gas field which happens to establish only 2 sites in Thailand. The representative areas are portrayed as a following Figure 16 below.

Table 23 : Representative of each location

Location	Type	Small	Medium	Large
Offshore	Gas field (BCF)	3,196.0	3,911.0	8,136.0
	Oil field (MMBBL)	21.0	74.0	372.0
Onshore	Gas field (BCF)	426.0	848.0	n/a
	Oil field (MMBBL)	6.5	10.50	314.0

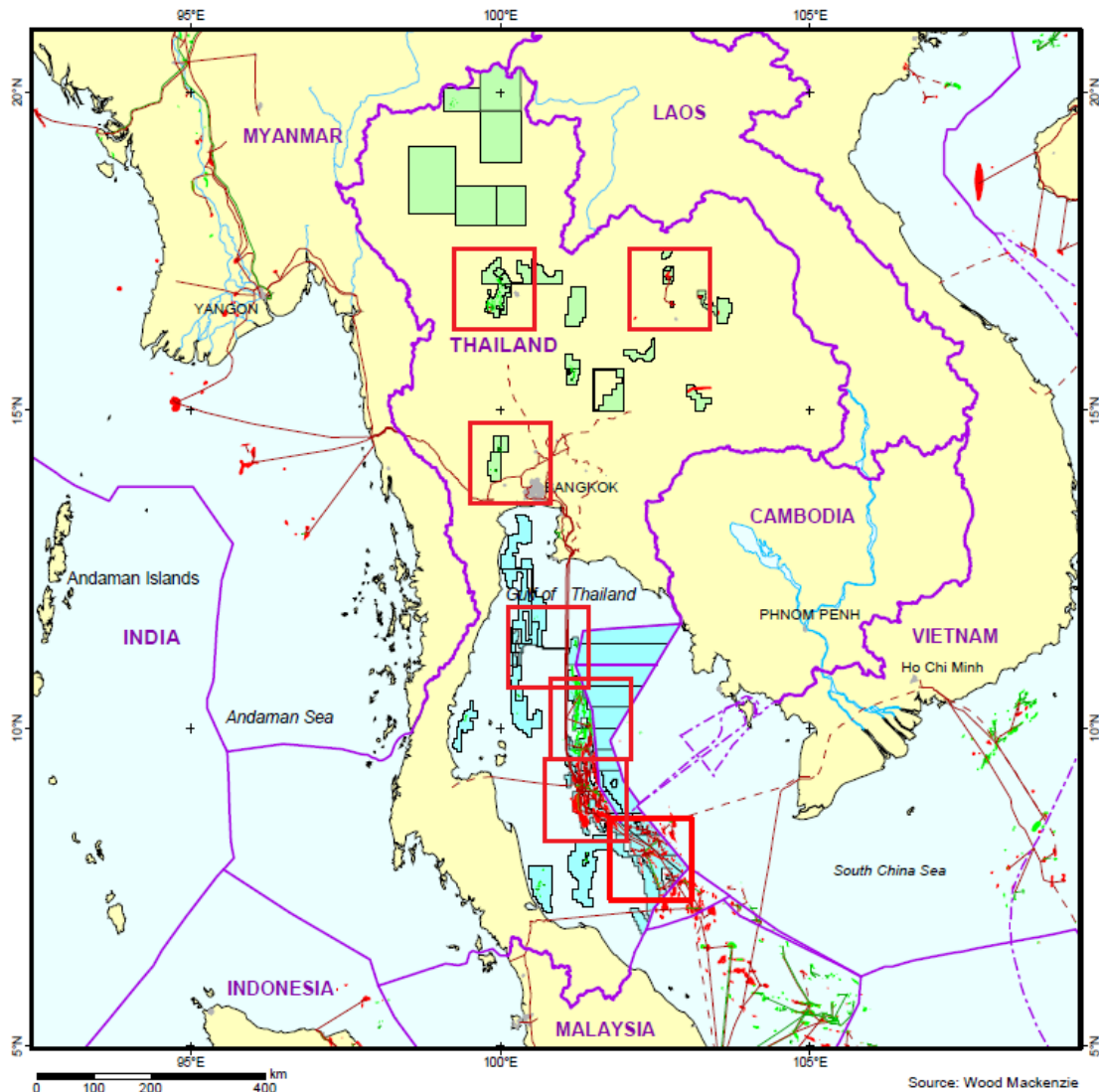


Figure 16 : Representative Fields in this study[34]

4.8. Decommissioning

In the present, Thailand has no dedicated regulation describe about decommissioning financial program (as of 25 Jun 2016). The only related document available is the ministerial regulations issued by energy minister [36], which administer on the scheduling , and estimating the cost of decommissioning activities with the integration of monetary insurance for IOC. Yet, no reflection of tax calculation is involved. The cost of decommissioning, in this study, is therefore assume to be deductible in the amount before cooperate tax.

The author calculates the main table as a single year decommissioning cost at the final year of each location. In addition, a case of 3 years option and 5 years option span are supplementary for better illustrate on the effect of decommissioning cost positioning. The portion for 3 years option is 20% in first year, 30% in second year, and 50% in third (final) year, and equally 20% straight line for 5 years option.

4.9 Economic Assumption

- General usage
 - HG take is calculated at nominal value on 1 Jan 2016
 - Production history, oil price, gas price, drilling depth and cost referred to 2016 Wood Mackenzie database
 - Investment cost is always fixed even when the profitability drops such as the case of falling oil price. (In reality, when the profitability drop, the IOC tends to react with the situation, minimizing the investment, for example, to maintain the field's fitness)
 - The oil and price in probabilistic calculation (Monte Carlo) referred to Energy Information Administration (EIA) 2015 [37]
 - The project discounted rate is calculated at 10%
 - MIRR reinvestment rate = 10% and finance rate = 5%
 - Tax is not Ring fencing in any representative areas
 - Decommissioning cost is calculated at the final year of each location (1 year option) for all locations and regimes, except the cases under decommissioning portion and timing section which apply 3 years and 5 years option
- Thailand-I
 - Decommissioning cost is treat as tax deduction
- Thailand-III
 - Geological Stability Factor for Onshore:
Northern, central Southern plains = 150,000 meters

- Geological Stability Factor for Onshore:
North east (Khorat Plateau) = 450,000 meters
- Geological Stability Factor for Offshore:
Gulf of Thailand = 600,000 meters
- 35% Uplift investment credit
- Conversion : 1 SCF = 980 BTU
- Conversion : 10,000 MMBTU = 1000 BOE
- Decommissioning cost is treat as tax deduction
- Malaysia R/C PSC (1996)
 - Oil Base year price for supplementary = \$25/BBL,
 - Gas Base year price for supplementary = \$1.4/MSCF



4.10 Calculation Flow

In the process of analysis, both deterministic and probabilistic approach is included, which follow the steps as shown in Figure 17 below. The analysis will start on the left to right which is observing progressivity and comparison, then study the portion and timing of decommissioning, and proposing a new system in the last.

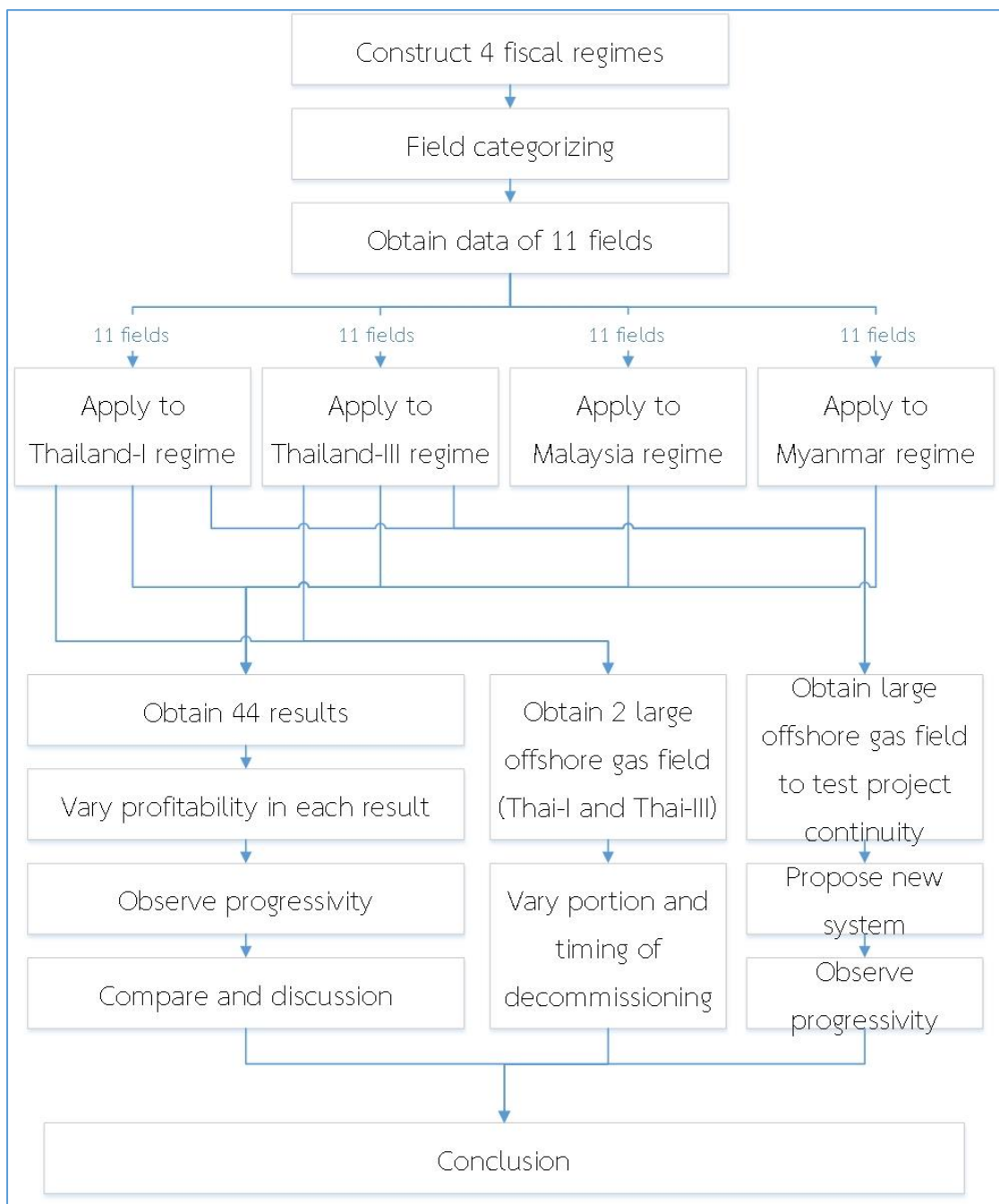


Figure 17 : Calculation flow

CHAPTER V

ANALYSIS AND RESULT

This chapter explains all the results using assumptions, data, and methodologies from previous chapter to develop charts and graphs, which follows the mentioned workflow and together with the discussion over the outcomes.

5.1 Progressivity Monitoring and Comparing with Neighbor Countries

In order to monitor the progressivity of each fiscal regime on field locations; the oil and gas prices are varied to track the change in HG take, with the investment remains unchanged. When oil and gas price raise, it means that the profitability of the project also goes up. Conversely, when oil and gas price fall, the profitability goes down.

For the case in Figure 18, the large offshore gas field is used as a demonstration how to interpret the data and graphs. The annual oil and gas production are calculated from historical price in Table H1 in Appendix H (the full result table refers to Table B1 in Appendix B) and then both prices yield the result as a bar chart of HG take and a percentage of MIRR.

B1: Large offshore gas field

Year	Production		Gross Rev \$M
	Liquids 000 b/d	Gas mmcf/d	
1990	-	-	-
1991	-	-	-
1992	-	-	-
1993	1.22	175.00	150.01
1994	4.00	250.00	210.09
1995	5.00	300.00	236.42
1996	6.50	337.00	405.08
1997	8.50	344.00	390.45
1998	10.00	435.00	390.78
1999	13.50	575.00	580.15
2000	15.00	548.00	1,040.80

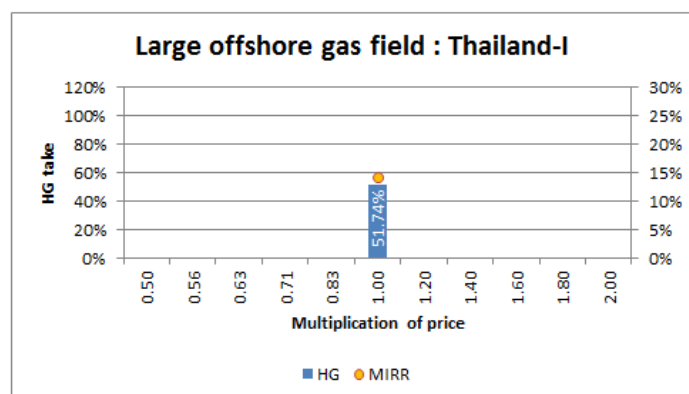


Figure 18 : 1.0 Multiplication of price and HG take & MIRR result

After that, with the same investment plan (cost is fixed), the oil and gas prices are now multiply by 1.2 and, therefore, both prices resulted in more gross revenue. Another data of HG take and percentage of MIRR are then plotted in to the graph as shown in Figure 19. The process continues to the 2.0 and down to 0.5 multiplication rate to observe the progressivity of the individual field.

B1: Large offshore gas field

Year	Production Liquids 000 b/d	Gas mmcf/d	Gross Rev \$M
1990	-	-	-
1991	-	-	-
1992	-	-	-
1993	1.22	175.00	180.01
1994	4.00	250.00	252.10
1995	5.00	300.00	283.71
1996	6.50	337.00	486.10
1997	8.50	344.00	468.54
1998	10.00	435.00	468.94
1999	13.50	575.00	696.18
2000	15.00	548.00	1,248.97

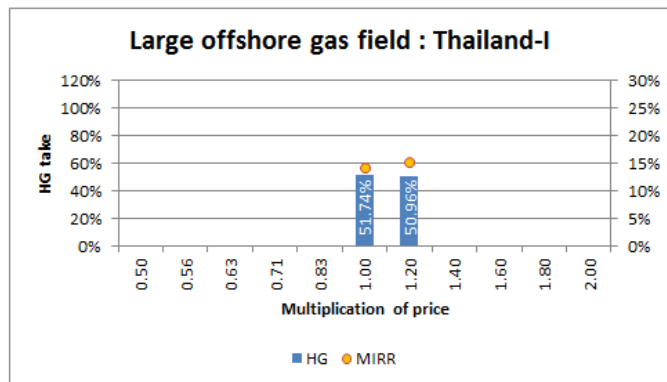


Figure 19 : 1.0 and 1.2 multiplication of price and HG take & MIRR result

5.1.1 Progressivity Monitoring

First, the overall HG takes for Thailand-I is 50% on the average, and the regressive effect is obviously dominate on many locations. The only element that heavily influence a regressive effect is the royalty, while tax is considered neutral because the HG take percentage is stable, regardless any change in tax rate. However, the upside of Thailand-I is the project MIRR, it always returns the highest among 3 others which means the more attractive to IOC. It is notable for the case of the small onshore gas field. The reason HG take goes down to 30-40% is because the special characteristic of Thailand-I regime shown as Figure 20, when the annual gross revenue to annual cost deduction ratio is 1.6:1; it drags the HG take to the smallest point as low as 33.33%; and when the revenues move beyond the particular ratio, a small progressive could be observed from Thailand-I.

For the Thailand-III, it is apparently the bigger portion of HG take when compared to Thailand-I. It is noticeable that the implementation of sliding scale royalty and SRB benefit in lessen the regressive effect in low profitability area and

gives a slightly progressivity in most cases at the profitability increases region where the HG take is generally at 60-75%.

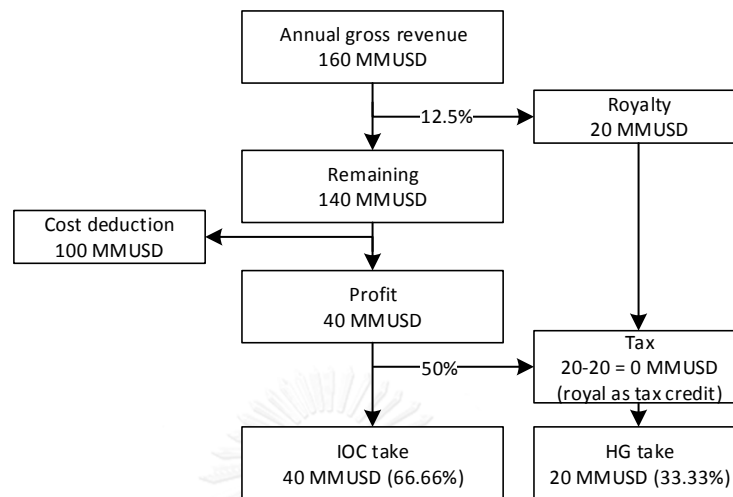


Figure 20 : Thailand-I lowest HG take scenario

Similar to Thailand-I regime, Thailand-III also has a distinct characteristic in the calculation of SRB. It is defined as a windfall profit capture tool based on the “annual” income per “accumulated” meter of well. For instance of the irregularity, an offshore field operated for 20 years without any sudden jump in oil or gas price, and have drilling activities along the time. It means that the field has accumulated some big number of meter of well drilled. And when the prices abruptly increase, the calculation will not trigger the SRB of Thailand-III.

For the field that SRB does not function over the production life and production is also low to keep the royalty at small amount, the HG take portion would fall under 50% due to the deduction of depreciation cost in early phase of production. This situation causes a lower in nominal value of HG take portion from later phase, comparing to the amount that IOC took it from early phase as in a field that has long production time like the medium onshore oil case.

In speaking of Malaysia regime, the HG take is mainly around 60-90% that is higher than Thailand-I and Thailand-III regime. The characteristic of Malaysia regime is close to Thailand-III where progressivity can be observed along the increasing price

and greater regressive degree in lower profitability on the appreciation of low royalty rate and, importantly, the R/C index that control the sliding scale of cost and profit tranche. The calculations of oil and gas are separated regarding the individual R/C index, which deliver more flexibility to Malaysia regime. However, Malaysia has a tough number of cost recovery limit which result as a project unfeasibility in a marginal area such as small offshore oil field case which HG take is over 100% because the remaining amount of unrecovered cost carries to the end of field life.

Obviously, the Myanmar regime favors the HG take around 60-80% but all of the cases return regressive results from the effect of royalty, and, in addition to that deficiency; some extent locations could not be developed in more severe than the case of Malaysia regime. Because Myanmar has more strict term of cost recovery at 50% fixed rate which increases the possibility that the project cost may not be fully recovered. The effect shows in the case of medium onshore oil field where the project could not commence until the 40% of oil price increase from base case.

5.1.2 Comparing with Neighboring Countries

The following Figure 25 to Figure 35 is going to show the contrast examination in a variation of 11 categorized locations between four studied regimes. For instance, in the sight of increasing progressivity (1.0 to 2.0 Multiplication of price); Malaysia's regime return the highest HG take under the fixed investment plan in the large offshore gas field, relative to other regime at the identical multiplication rate compared in Figure 25. As well as the regressive moment that can be observed in Thailand-I and Myanmar regime as the HG take percentage is persist to drop even in the increasing progressivity area, while the Thailand-III and Malaysia regimes indicate their progressive as they gradually regain the HG take amount.

Conversely, the higher HG take is also observed in all cases of any regimes when the profitability decrease (1.0 to 0.5 Multiplication of price). There are 2 major reasons that contribute to this effect. First one is the regressive element itself that implemented in a regime. Second one is the unrecoverable cost such as the amount from carrying forward which could not recover from early production year, then it is

carried to the end of field life, and/or the decommissioning cost at the last year (according to the assumption) which is also unable to be recovered because it has low or zero production at the year that decommissioning cost incur.

Generally, when the HG take is growing in these situations, it means the regime is regressive. However, in the reality, this regressive moment could hardly occur because the IOC will never let the situation happened. If any threat, such as the falling oil price, is forecasted; IOCs will decisively prepare the strategy in order to maintain the profitability in their favorable region – in advance. An effective way to maintain profitability for IOC is to have a cost reduction program, for example.

And from the mentioned reason, while the decommissioning cost is inevitable in actual operation, the progressivity monitoring in this study is tracked only from the part that has no effect from unrecoverable carry forward cost. Specifically, in Figure 21, the part that does not have such effect is on the increasing profitability side (1.0 to 2.0 multiplication rate) and, therefore, it describes the efficiency of the regime.

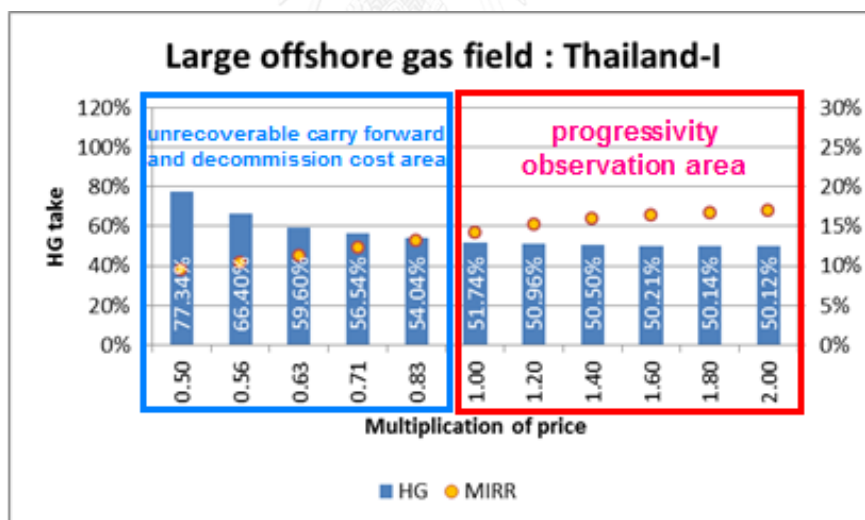


Figure 21 : Progressivity observation area in this study

In additional, it is good to indicate here about the red portion that stay on top of 100% of HG take as appears a case in low multiplication of price region of Malaysia in Figure 22, It means that the IOC paid the money into the project but could not recover any amount back and it is carried forward to the end of

production life. This sometimes occur when a regime applies a strict cost recovery/deduction regulation and/or too much front-end tax to assure a portion of HG take. Especially, when there were low oil or gas price (low profitability), and the amount of invested cost is close to the profit. It leads to the consequence that HG takes a particular amount of royalty and leave a small number for cost recovery or deduction, and therefore, no any profit share to IOC.

In practically, it is nature for IOC to closely monitor and secure its benefit by not letting the situation occur as previously mentioned. When the projection shows negative sign and it is persisting, IOC is likely to decrease the investment to match the generating profit.

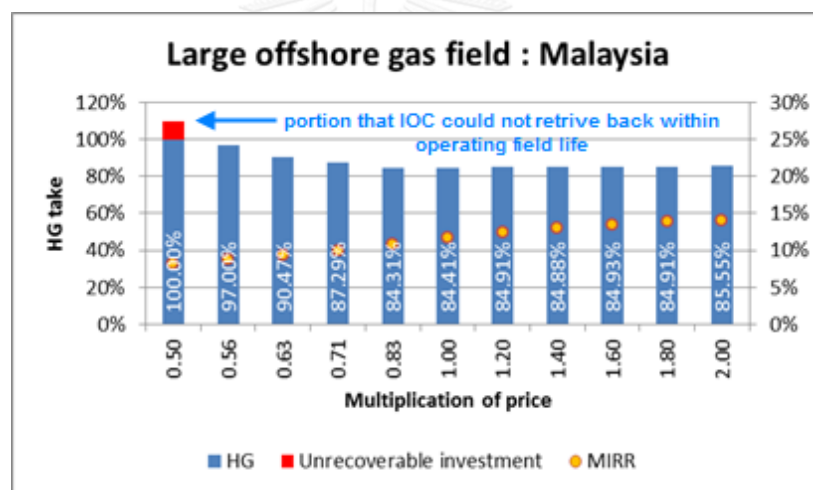


Figure 22 : The indication of IOC irretrievable portion

In Figure 23, the situation is getting worse in low multiplication of price region. As the oil and gas price drops in small offshore oil location to the point that they generate no any profit and result as no share percentage to both HG and IOC. It may have some small positive indication of MIRR, however, the project still could not be developed by the mean of negative NPV

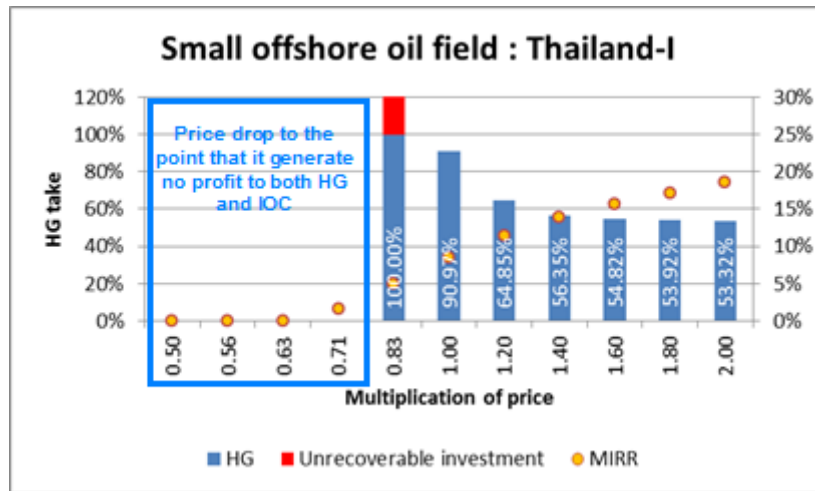


Figure 23 : Undeveloped project due to low petroleum prices

In comparison, one major advantage of Thailand-I and Thailand-III to emphasize here is the encouragement IOC to excel the attempt on marginal field (field that difficult to be developed). With their design to promote the kind of fields, the small offshore oil field project as Figure 28 is feasible under Thailand-I beginning at the 1.0 Multiplication of price, but not under the Myanmar regime even in the oil/gas price goes up to 1.2 Multiplication as indicated in Figure 24

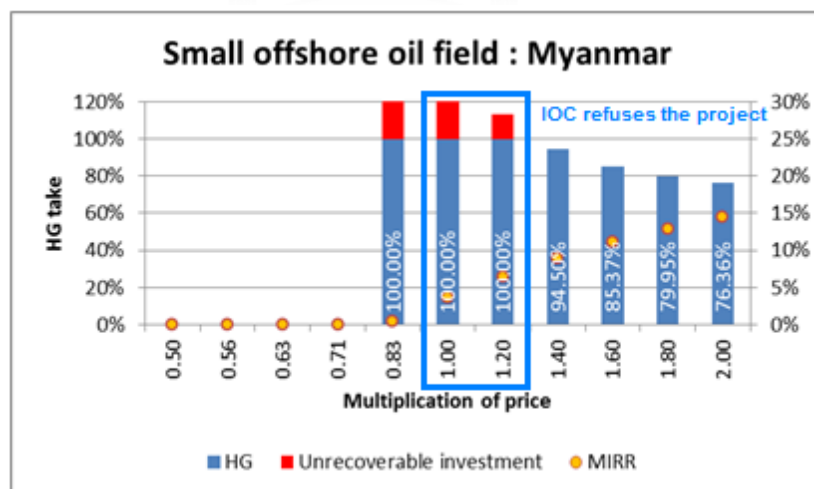


Figure 24 : Undeveloped project due to unattractive return to IOC

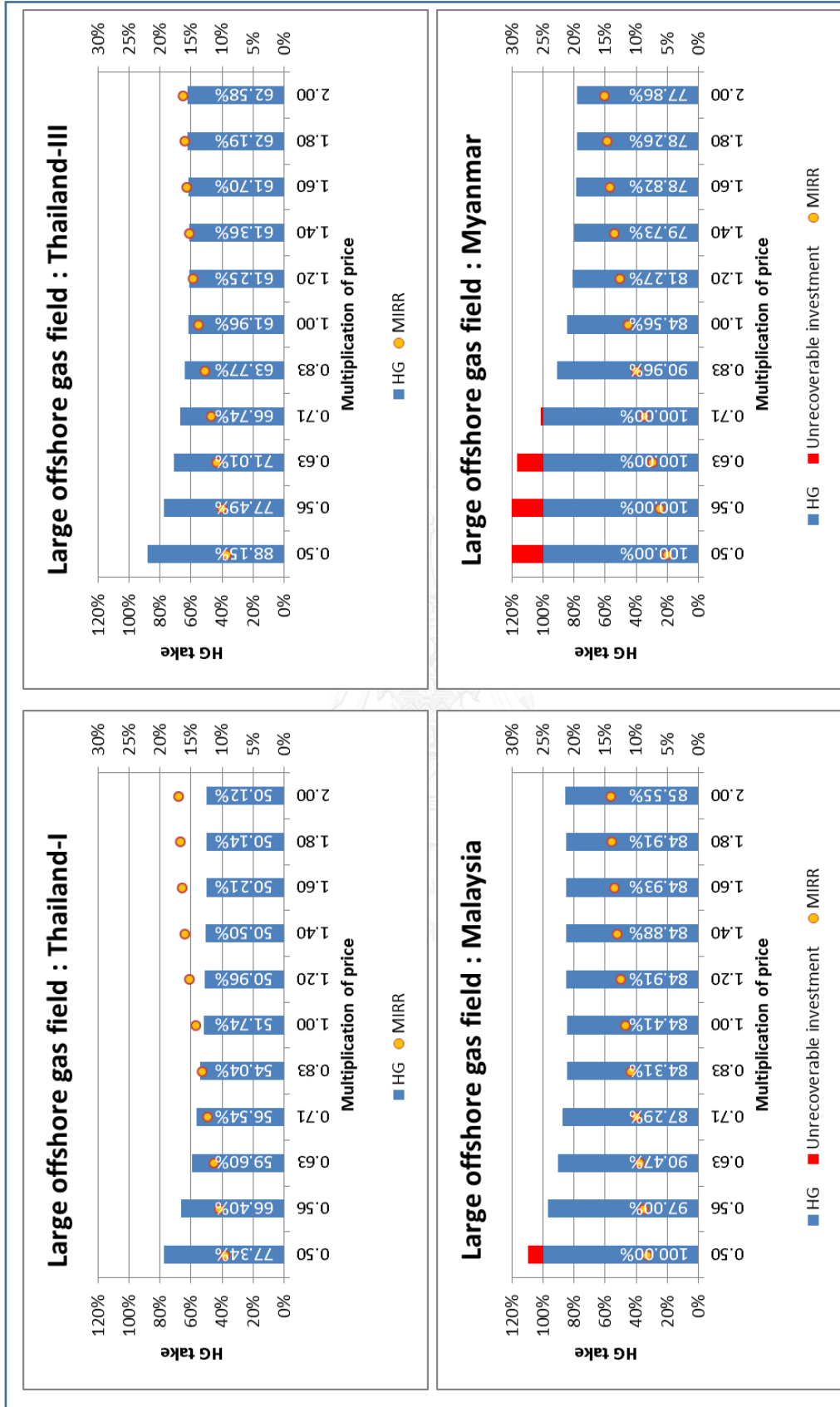


Figure 25 : HG take and project MIRR at different price multiplication – Large offshore gas field

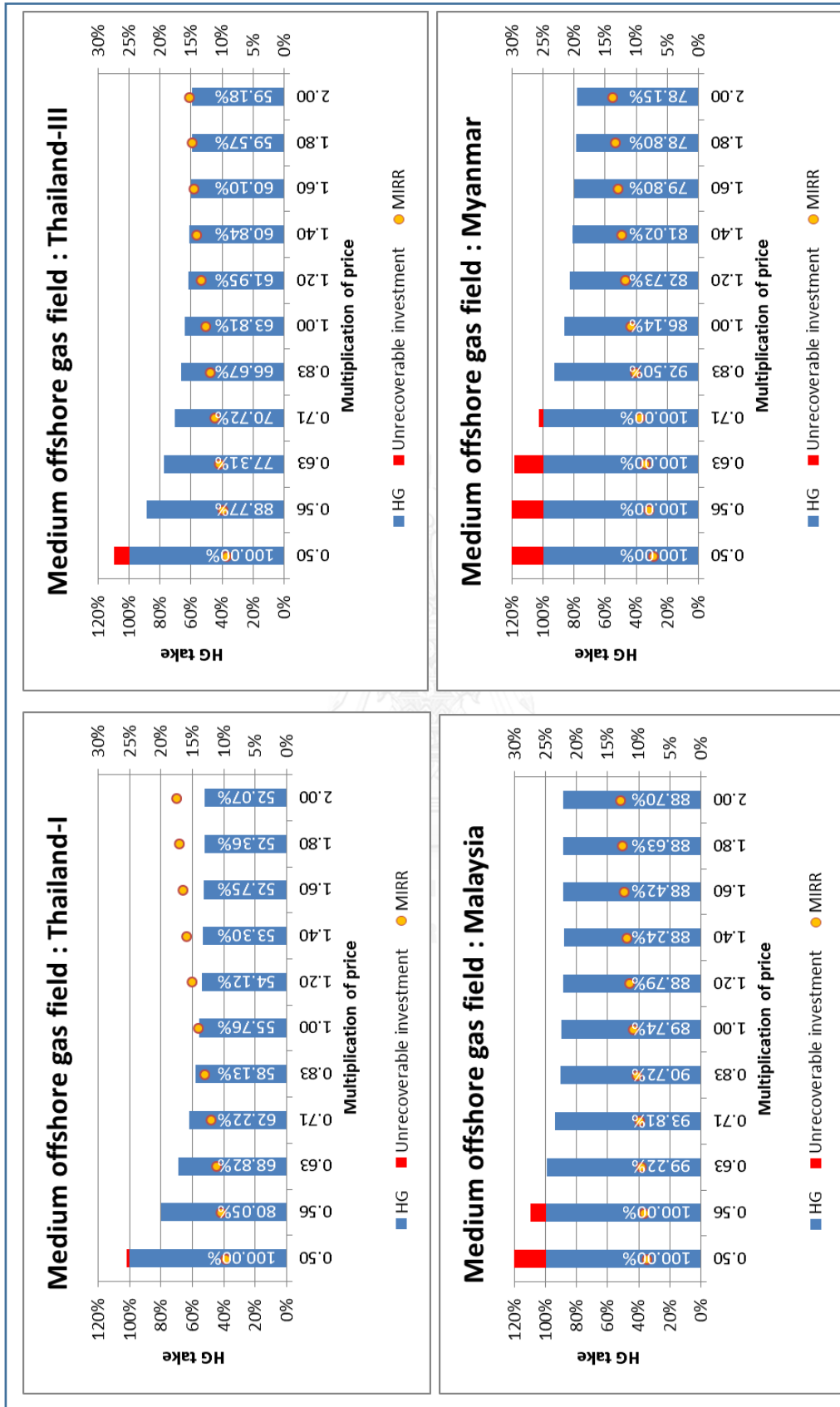


Figure 26 : HG take and project MIRR at different price multiplication – Medium offshore gas field

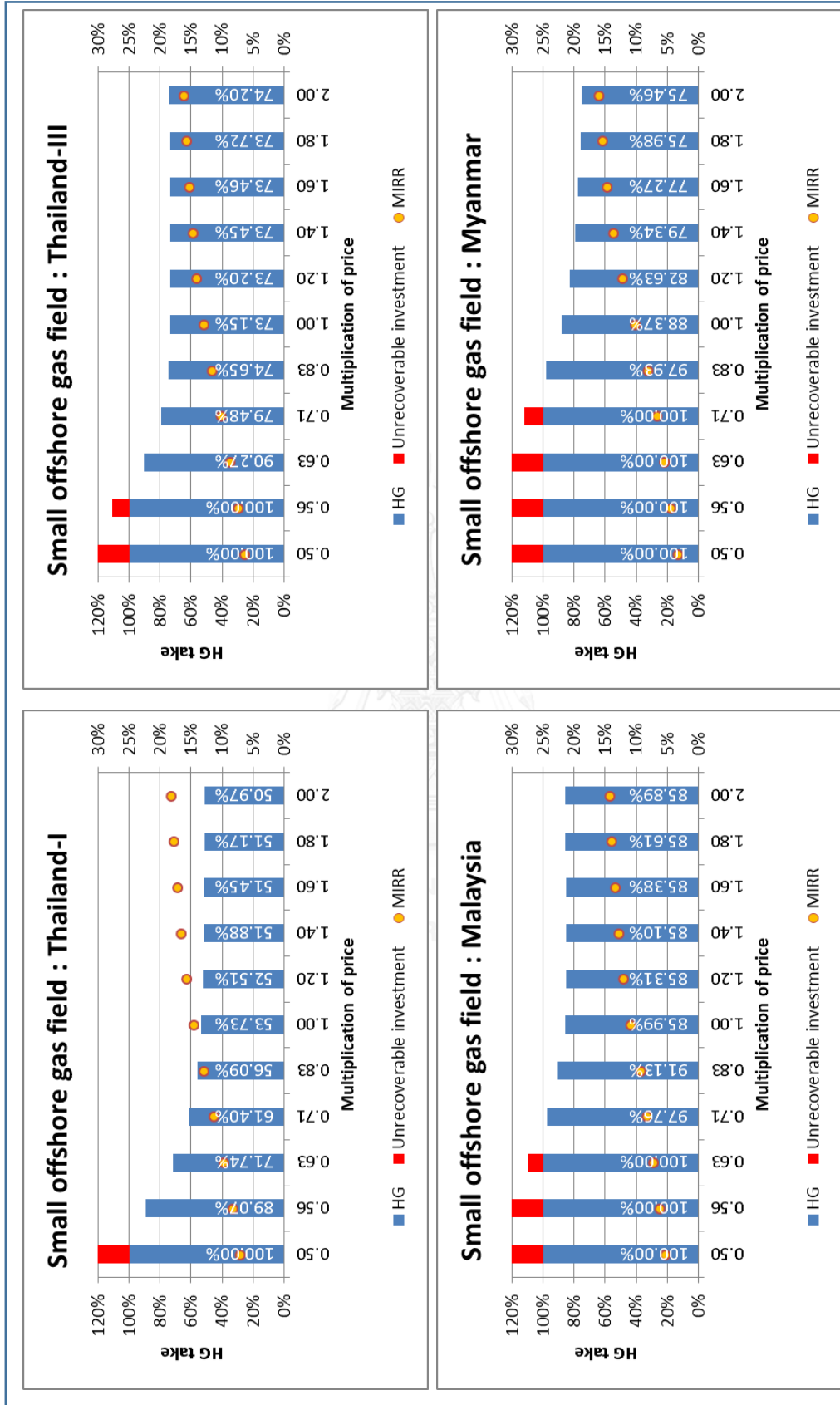


Figure 27 : HG take and project MIRR at different price multiplication – Small offshore gas field

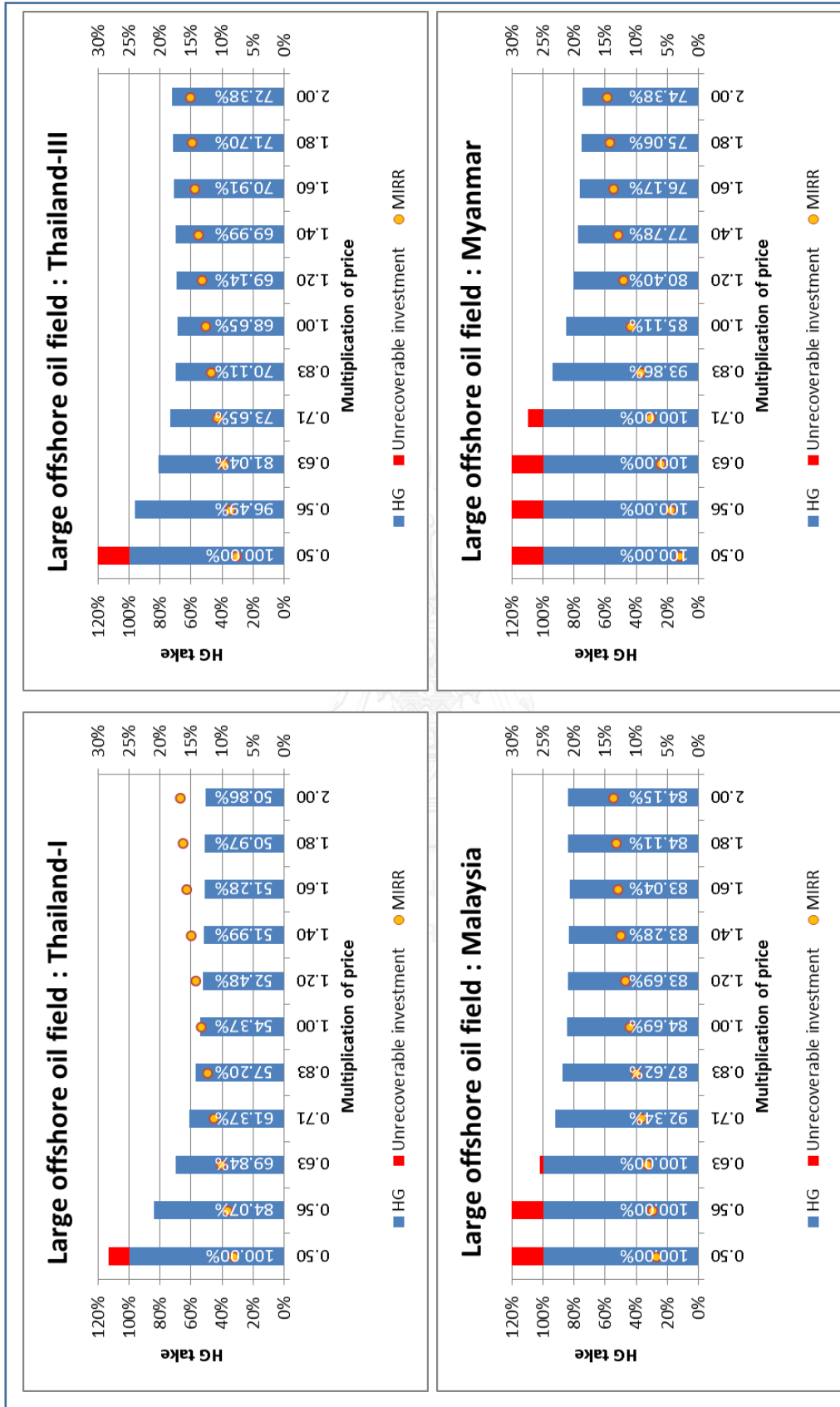


Figure 28 : HG take and project MIRR at different price multiplication – Large offshore oil field

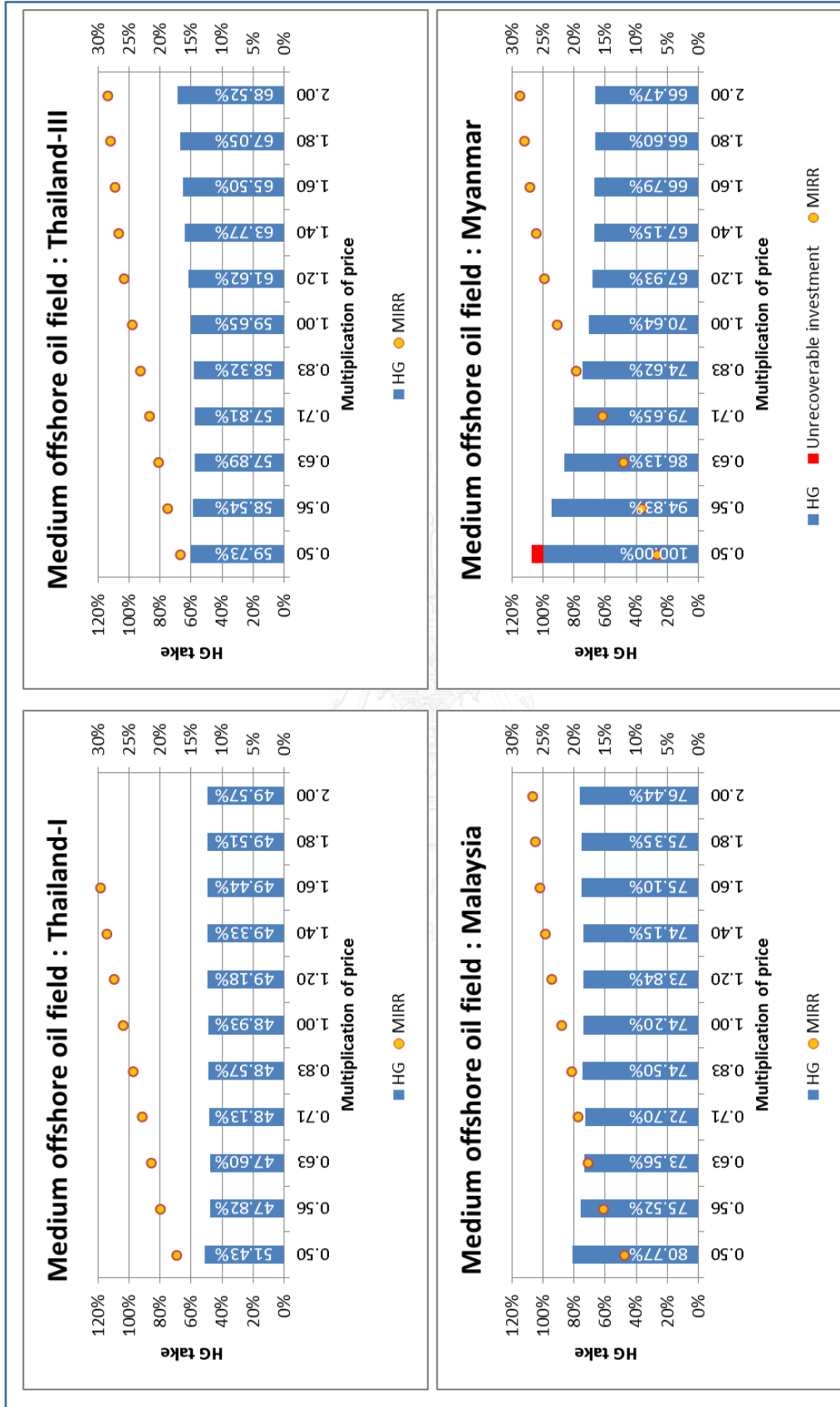


Figure 29 : HG take and project MIRR at different price multiplication – Medium offshore oil field

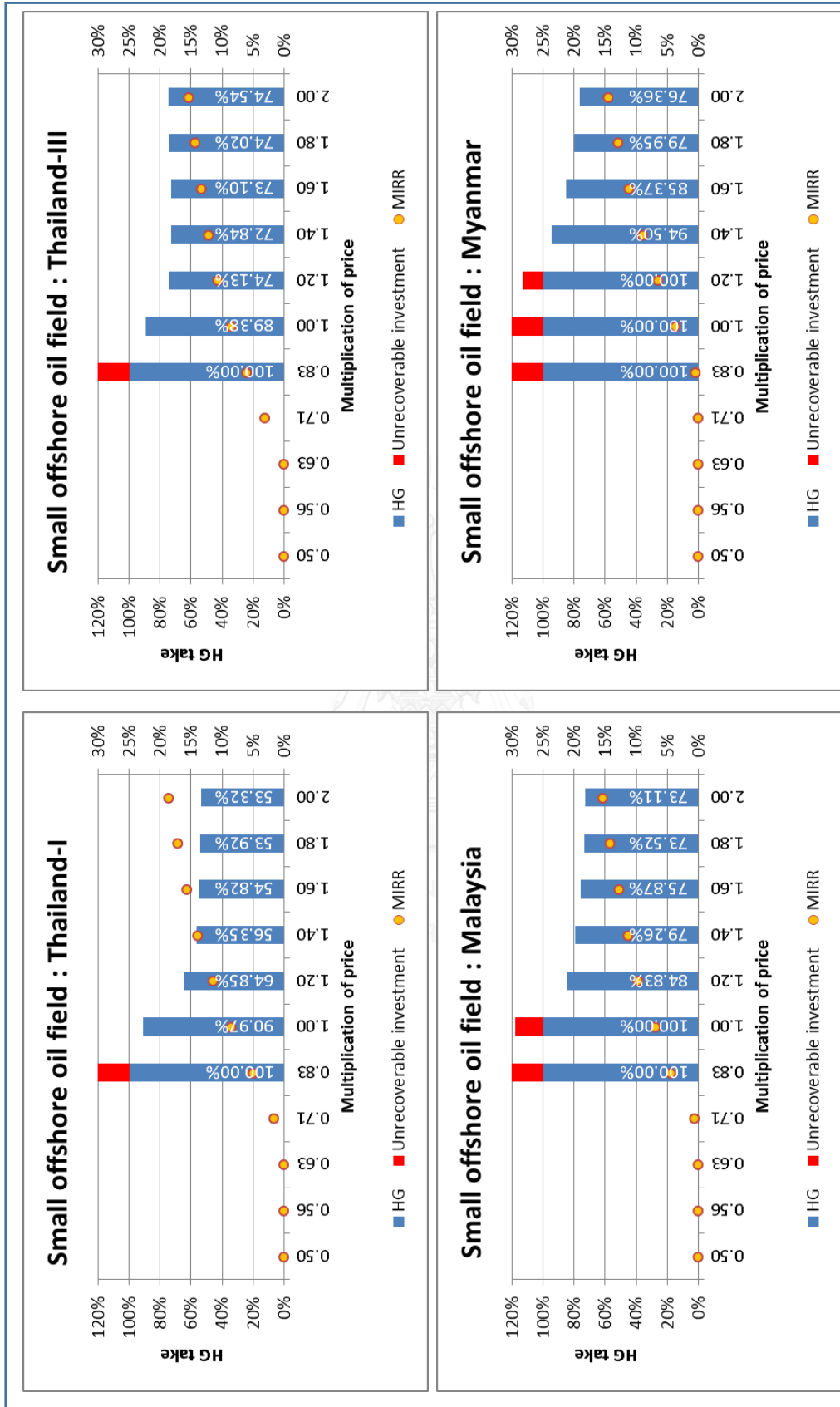


Figure 30 : HG take and project MIRR at different price multiplication – Small offshore oil field

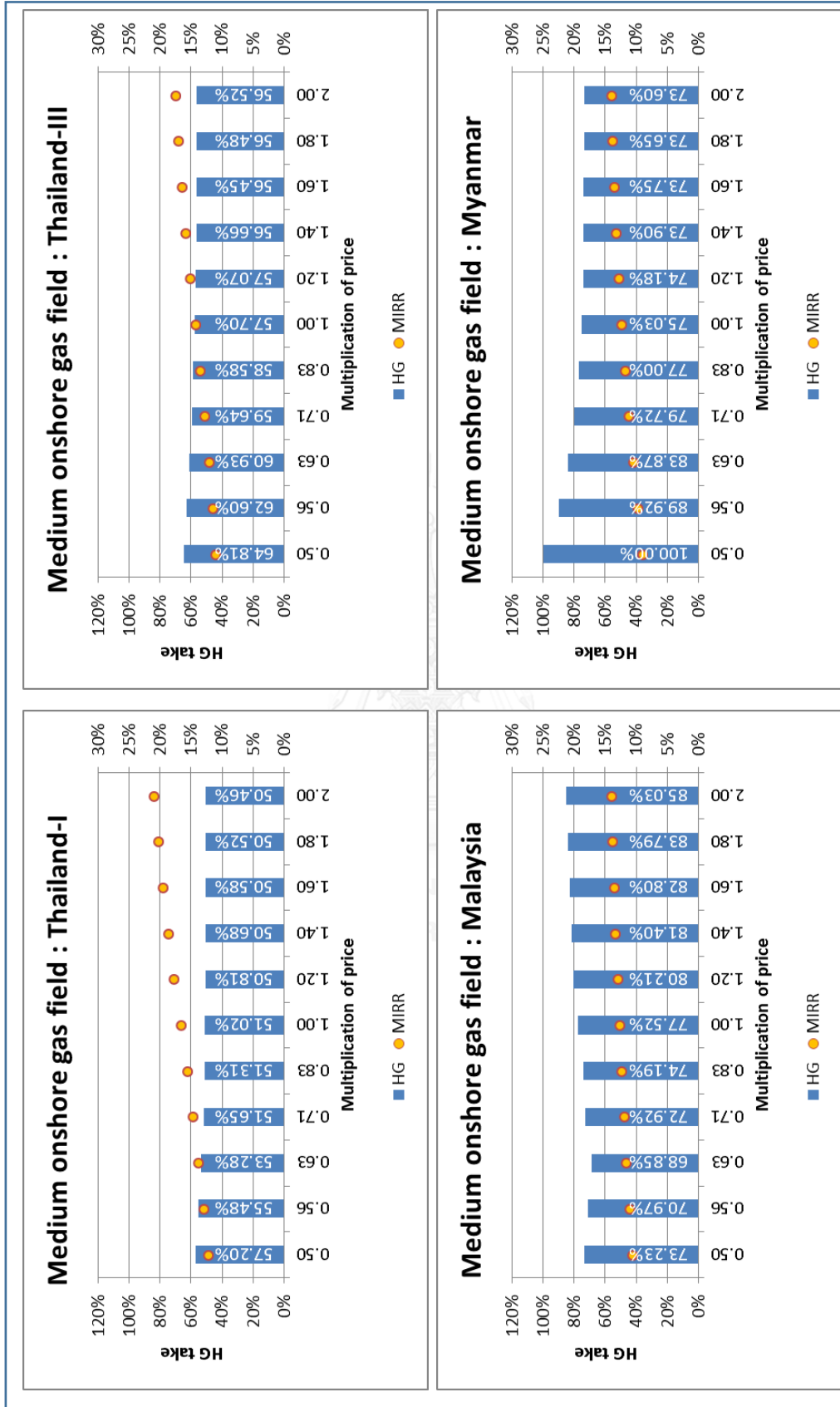


Figure 31 : HG take and project MIRR at different price multiplication – Medium onshore gas field

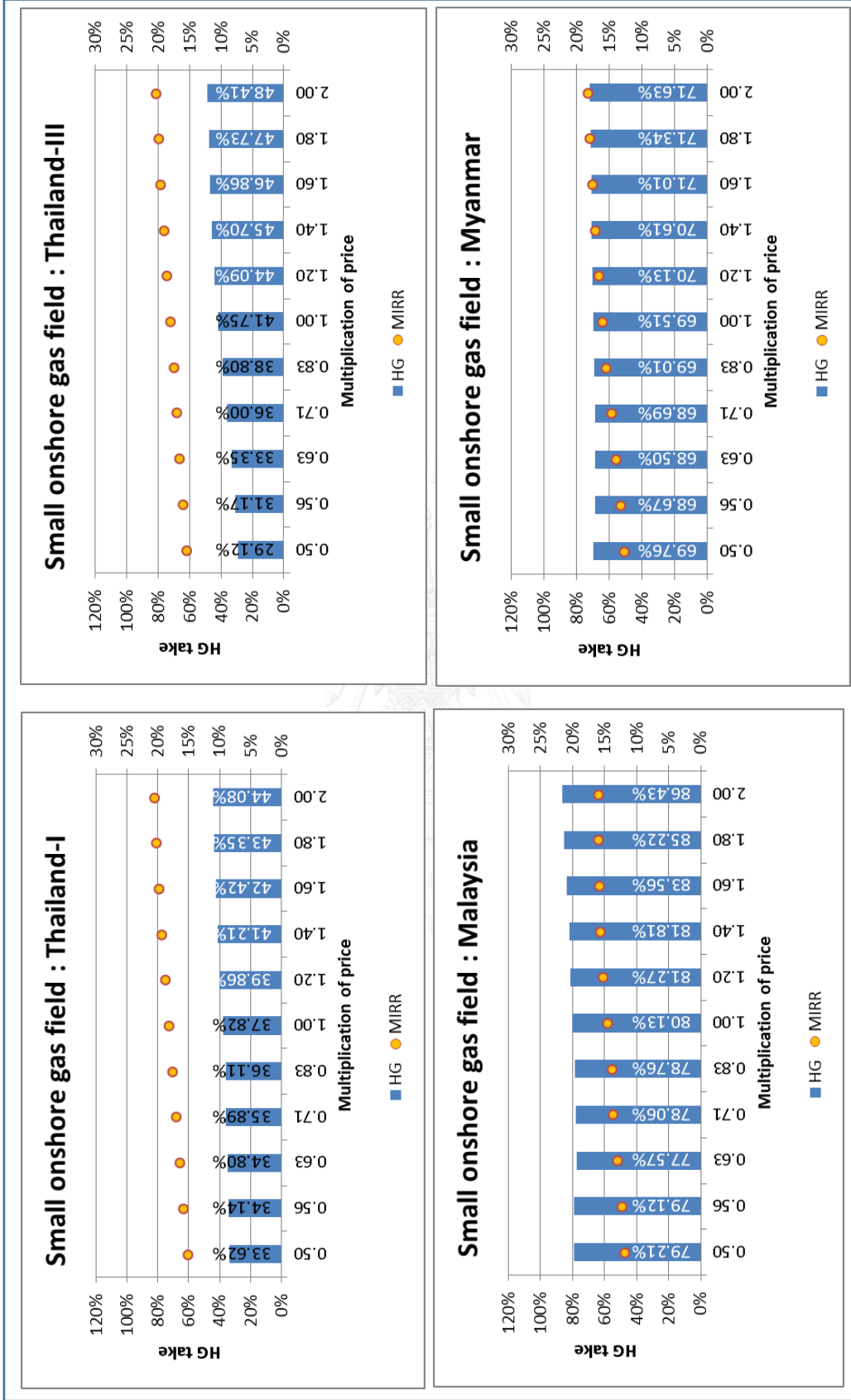


Figure 32 : HG take and project MIRR at different price multiplication – Small onshore gas field

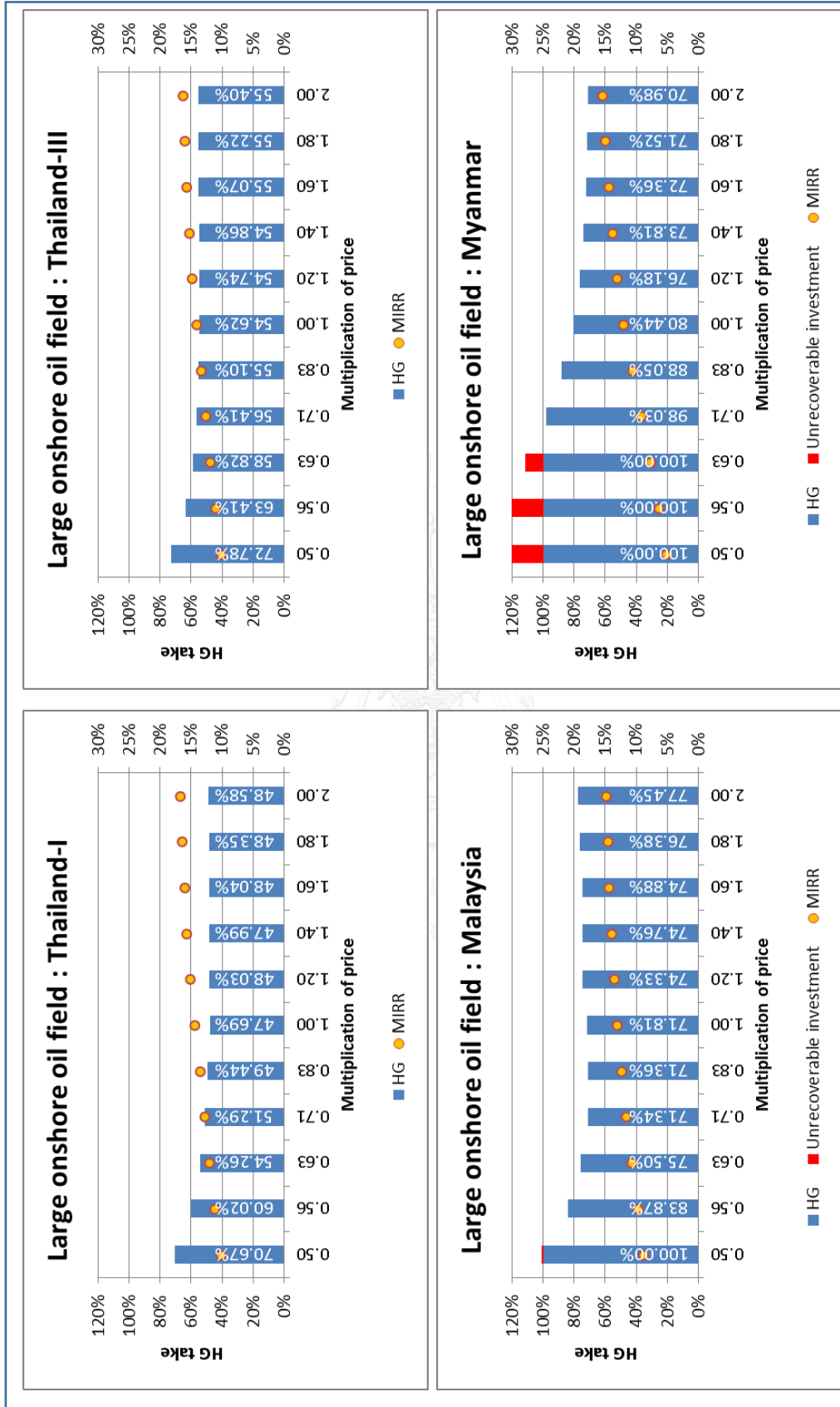


Figure 33 : HG take and project MIRR at different price multiplication – Large onshore oil field

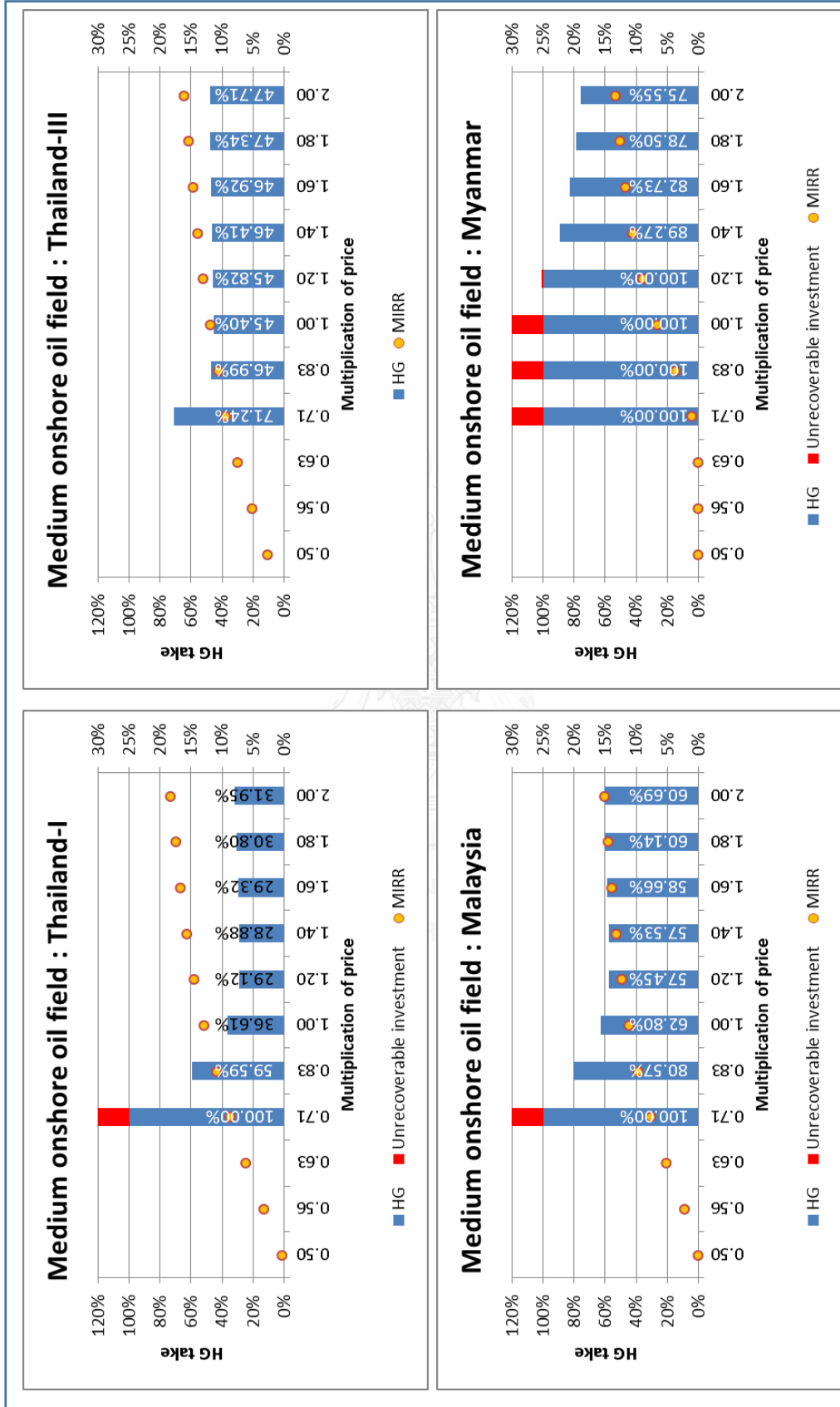


Figure 34 : HG take and project MIRR at different price multiplication – Medium onshore oil field

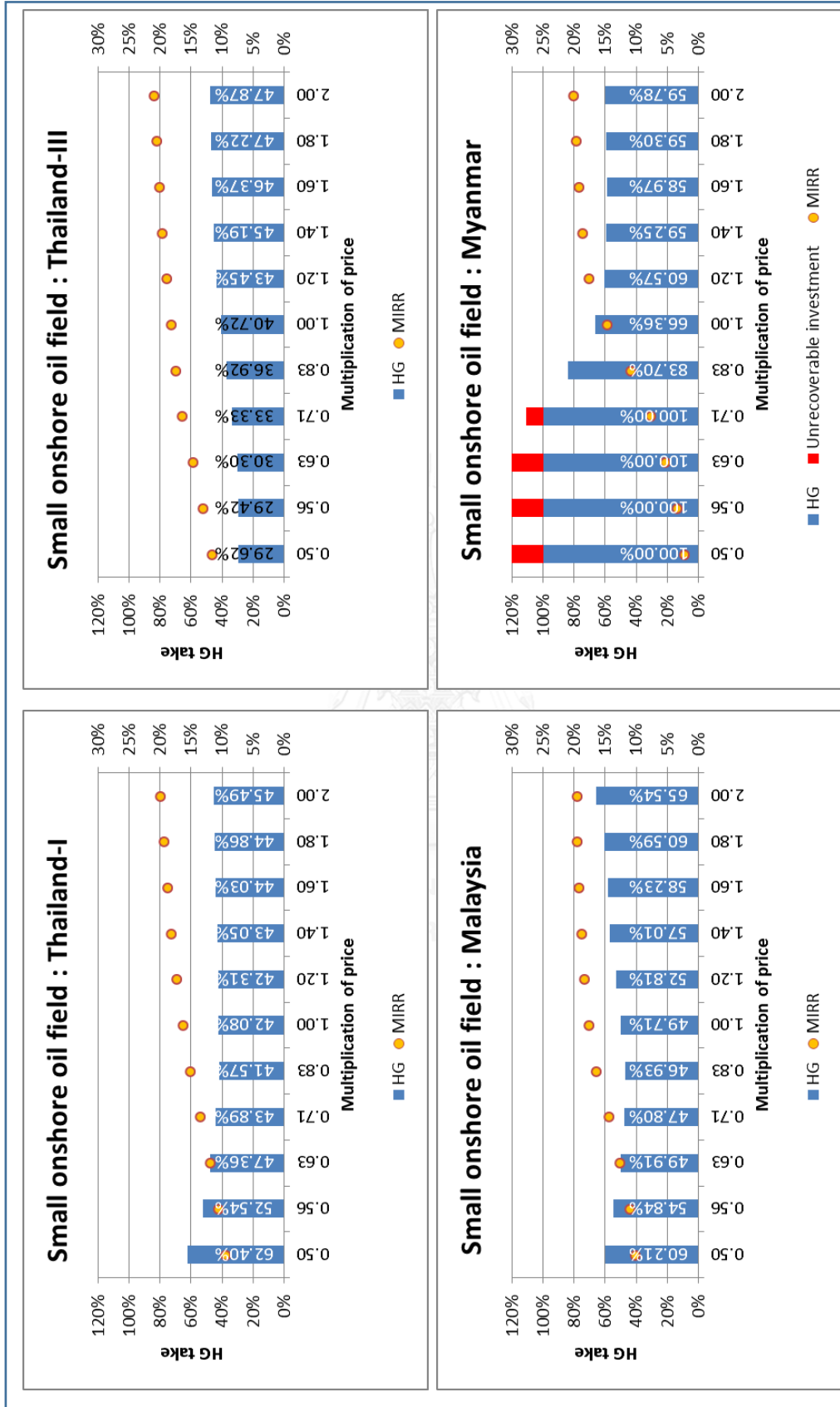


Figure 35 : HG take and project MIRR at different price multiplication – Small onshore oil field

Nevertheless, a good regime should also be attractive to IOC for investment. From the Figure 25 to Figure 35, it can be notably observed that all MIRR escalate in a proportion of the profitability (oil and gas price) on all cases. And according to Table 24, 3 economic parameters; Net present value (NPV), modified rate of return (MIRR), and profitability index (PI) report the best value in green and the worst in yellow for each regime. Different regimes do not yield a different ranking, the highest NPV is the large offshore gas field. The best MIRR is the medium offshore oil field, while the largest PI goes to small onshore gas field. In the opposite, the worst NPV, MIRR, and PI all indicate to small offshore oil field.

It should be noted that, again, the regime that has lower level of its cost recovery limit, the less chance of fields that have short production life to be developed. As we observed that Malaysia R/C PSC has sliding scale cost recovery, the small offshore oil field cannot be commenced (negative NPV and PI). And in Myanmar PSC which is stricter on cost recovery limit; it hinders the medium onshore oil field (the second worst) to establish in the same manner.

On the other hand, as previously mention along with the Figure 23 and Figure 24, The project could be able to develop under Thailand-I and Thailand-III system. For this instance, it is good opportunity to claim that no any single regime could apply and be appropriate to all locations. The type of regimes whether it is a concessionaire or production sharing system is necessary, but it is, indeed, not the main concern that instruct the investment in petroleum business from the IOC point of view.

Besides, it depends on the geological and reservoir factors underneath and it is the government's responsibility to picture the take percentage to match that condition. Otherwise, an improper regime is going to cause the reluctant condition as no IOC could develop any prospect and, therefore, generate zero income to government, as we; Thailand, already experienced the situation from Thailand-II system.

Table 24 : Economic parameter comparison at 1.0 price multiplication

	Revenue (MMUSD)	Cost (MMUSD)	Thailand-I			Thailand-III			Malaysia R/C PSC 1996			Myanmar PSC 2013			
			NPV (MMUSD)	MIRR (%)	PI (-)	NPV (MMUSD)	MIRR (%)	PI (-)	NPV (MMUSD)	MIRR (%)	PI (-)	NPV (MMUSD)	MIRR (%)	PI (-)	
Offshore gas	L	49312.74	18559.43	2258.12	14.24	1.23	1779.69	13.70	0.97	729.61	11.63	0.40	722.58	11.31	0.39
	M	22464.22	6846.93	715.42	14.01	0.85	585.29	12.60	0.69	165.88	10.76	0.20	224.20	10.84	0.27
	S	26392.87	13999.32	1920.32	14.50	0.83	1114.39	12.88	0.48	581.22	10.79	0.25	482.77	10.10	0.21
Offshore oil	L	29319.84	13333.27	1749.61	13.34	0.93	1201.96	12.52	0.64	587.08	10.99	0.31	570.82	10.80	0.30
	M	5739.25	1895.28	762.55	25.84	2.41	602.40	24.49	1.90	385.18	22.00	1.22	438.43	22.71	1.39
	S	1297.93	944.88	10.08	8.43	0.04	11.86	8.54	0.05	(20.29)	6.92	(0.08)	(81.18)	3.58	(0.32)
Onshore gas	M	4326.55	1162.38	387.64	16.59	1.80	334.74	14.25	1.55	177.88	12.56	0.83	197.60	12.26	0.92
	S	1475.55	232.78	245.59	18.19	5.09	230.06	17.98	4.77	78.48	14.55	1.63	120.41	15.98	2.50
	L	18848.33	6363.66	693.63	15.61	1.50	601.79	14.05	1.31	373.76	12.98	0.81	259.34	11.92	0.56
Onshore oil	M	683.90	388.59	22.58	12.84	0.55	19.45	11.82	0.48	13.25	11.03	0.32	(9.30)	6.50	(0.23)
	S	273.92	102.28	24.77	16.16	2.62	25.35	18.15	2.69	21.51	17.61	2.28	14.39	14.57	1.52

5.2 Decommissioning Portion and Timing

In the calculation from progressivity monitoring section, the estimate decommissioning cost is placed and treated as tax deduction as specified in the economic assumption section.at the last year of operation (1 year option) to all cases in this study. Each case returns a specific number of HG take, MIRR, and PI value. The Table 25 below presents the last 5 year calculation from the large offshore gas field in Appendix B1 which the estimated decommissioning cost is highlighted in red

Table 25 : Decommissioning cost in large offshore gas field (1 year option)

Year	Production Liquids 000 b/d	Gas mmcf/d	Gross Rev \$M	Field Opex \$M	Field Capex \$M	Royalty \$M	Tax \$M	IOC Take \$M	HG Take \$M
..
2028	3.75	355.00	854.09	152.19	320.87	106.76	86.68	187.59	193.44
2029	2.90	255.00	630.00	135.83	327.28	78.75	7.68	80.46	86.43
2030	2.00	175.00	436.07	112.16	333.83	54.51	-	(64.43)	54.51
2031	1.45	122.50	318.64	87.48	95.56	39.83	-	95.77	39.83
2032	0.80	75.00	197.68	89.23	-	24.71	-	83.74	24.71
2033	0.50	45.00	122.97	91.02	-	15.37	-	16.58	15.37
2034	-	-	-	-	1,463.52	-	-	(1,463.52)	-

For this decommissioning portion and timing section, similar to the 1 year option. All production and cost are fixed and apply the 3 year and 5 year option (Table 26 and Table 27) to all locations under Thailand-I and Thailand-III regime to observe the variation of 3 economic parameters as mentioned (Full calculation from Appendix F1.2 and Appendix F2.2) Note that the 1st and 2nd cost in 5Y option are merged into the normal CAPEX)

Table 26 : Decommissioning cost in large offshore gas field (3 year option)

Year	Production Liquids 000 b/d	Gas mmcf/d	Gross Rev \$M	Field Opex \$M	Field Capex \$M	Royalty \$M	Tax \$M	IOC Take \$M	HG Take \$M
..
2028	3.50	355.00	854.09	152.19	320.87	106.76	86.68	187.59	193.44
2029	2.80	255.00	630.00	135.83	327.28	78.75	7.68	80.46	86.43
2030	2.00	175.00	436.07	112.16	333.83	54.51	-	(64.43)	54.51
2031	1.45	122.50	318.64	87.48	95.56	39.83	-	95.77	39.83
2032	0.80	75.00	197.68	89.23	292.70	24.71	-	(208.96)	24.71
2033	0.50	45.00	122.97	91.02	439.06	15.37	-	(422.48)	15.37
2034	-	-	-	-	731.76	-	-	(731.76)	-

Table 27 : Decommissioning cost in large offshore gas field (5 year option)

Year	Production Liquids 000 b/d	Gas mmcf/d	Gross Rev \$M	Field Opex \$M	Field Capex \$M	Royalty \$M	Tax \$M	IOC Take \$M	HG Take \$M
..
2028	3.50	355.00	854.09	152.19	320.87	106.76	86.68	187.59	193.44
2029	2.80	255.00	630.00	135.83	327.28	78.75	7.68	80.46	86.43
2030	2.00	175.00	436.07	112.16	626.53	54.51	-	(357.13)	54.51
2031	1.45	122.50	318.64	87.48	388.26	39.83	-	(196.93)	39.83
2032	0.80	75.00	197.68	89.23	292.70	24.71	-	(208.96)	24.71
2033	0.50	45.00	122.97	91.02	292.70	15.37	-	(276.12)	15.37
2034	-	-	-	-	292.70	-	-	(292.70)	-

Referring to Table 28, the option of 5 year distributes decommissioning cost dividing in equally portion (20% each) would yield a higher HG take than the 3 year option (20% 1st year, 30% 2nd year, and 50% 3rd year) and 1 year option (100% last year). Incorporate with higher MIRR which is preferred by IOC.

The key point of this section is the portion and timing of decommissioning cost. Both factors should be deliberately planned. Otherwise, the cost that is placed when field generate low revenue will represent itself in the form of unrecoverable carry forward cost, and could eventually result the unattractive economic parameters to IOC, or even turn an efficient regime into a regressive one.

Table 28 : Economic parameter comparison 3Y/5Y option on Thailand-I and Thailand-III

	5Y Thailand-I				3Y Thailand-I				1Y Thailand-I			
	HG (%)	NPV (MMUSD)	MIRR (%)	PI (-)	HG (%)	NPV (MMUSD)	MIRR (%)	PI (-)	HG (%)	NPV (MMUSD)	MIRR (%)	PI (-)
Offshore gas	51.79	2,253.24	14.28	1.23	51.76	2,256.53	14.27	1.23	51.74	2,258.12	14.24	1.23

	5Y Thailand-III				3Y Thailand-III				1Y Thailand-III			
	HG (%)	NPV (MMUSD)	MIRR (%)	PI (-)	HG (%)	NPV (MMUSD)	MIRR (%)	PI (-)	HG (%)	NPV (MMUSD)	MIRR (%)	PI (-)
Offshore gas	62.03	1,774.81	13.75	0.97	61.98	1,778.10	13.74	0.97	61.96	1,779.69	13.70	0.97

5.3 The Efficient System Proposal and Project Continuity

To meet the final objective of this study, an efficient system is proposed based on Thailand-III system which already has progressivity element tied. Together with some additional below assumptions,

- Remove the royalty element

The reason of this cancellation of the royalty tool came from the observation of previous section, where royalty is front-end load and is main concern that generate the regressive to a regime whether it is in a form of fix or sliding scale.

Practically, royalty is not only widely used in many countries to ensure the HG take whenever the IOC begin to generate any revenue. But it also guarantees a return to HG in a developing marginal area. Oppositely, IOC determine the royalty as at tool that decelerate when the future return is not promising. Hence, this study remove the royalty out to observe the impact on both HG and IOC by the theoretically mean.

- 1 year tangible asset depreciation without limit of carry forwarding

The original 5 year tangible asset depreciation leads to a situation where the low revenue near the end of production life could not fully recover the carry forward cost. Therefore, it is changed to 1 year in this section

- Adjust sliding scale of SRB as Table 29

Table 29 : Special Remuneration Benefit in modified Thailand-III

Income per meter of well (THB)	Special Remuneration Benefit
Up to 2,400	30 %
2,400 to 4,800	1 % per each 120 THB increment
4,800 to 8,400	1 % per each 240 THB increment
8,400-13,200 +	1 % per each 480 THB increment

The special remuneration benefit (SRB) is now adjusted not to be only a windfall profit capture tool, but to function as a general sliding scale profit-based tax element, and to have a quicker response in range. According to this study, the average income per meter of well is fall between 3,000-7,500 THB. Therefore the SRB in modified Thailand-III is designed to be a very active profit-based tool

There is a minor downside of this regime such that the HG would experience a delay of receiving share in first few years of the project, if this proposed regime is applied to a brand-new developing concession. However, in the case that the proposed regime is utilized as a continuation of operated field; HG will draw out more nominal portion than any existing regimes in a long run.

The large offshore gas field is used to represent the situation where It is now operating under the Thailand-I regime and the concession is going to expire in 2020. After that, the modified Thailand-III will be introduced to continue the project to the end of production life. The project follows the deterministic calculation under Thailand-I regime from 1990 up to 2020, and will be replaced by probabilistic calculation from 2020 to 2034.

The distribution of annual oil price can be referred from Energy Information Administration (EIA) [37].The capex such as field development, and drilling cost are relatively set to be influenced by the increase or decrease of the oil price on that year

As the result in Figure 36 can be noticed that there is slight increase of HG take portion in the escalation of profitability and decrease when the profitability decline. It can be implied that this system is progressive. The raising HG portion in 0.5, 0.56, and 0.63 Multiplication of price came from the unclaimed tax carry forward at the end of field life.

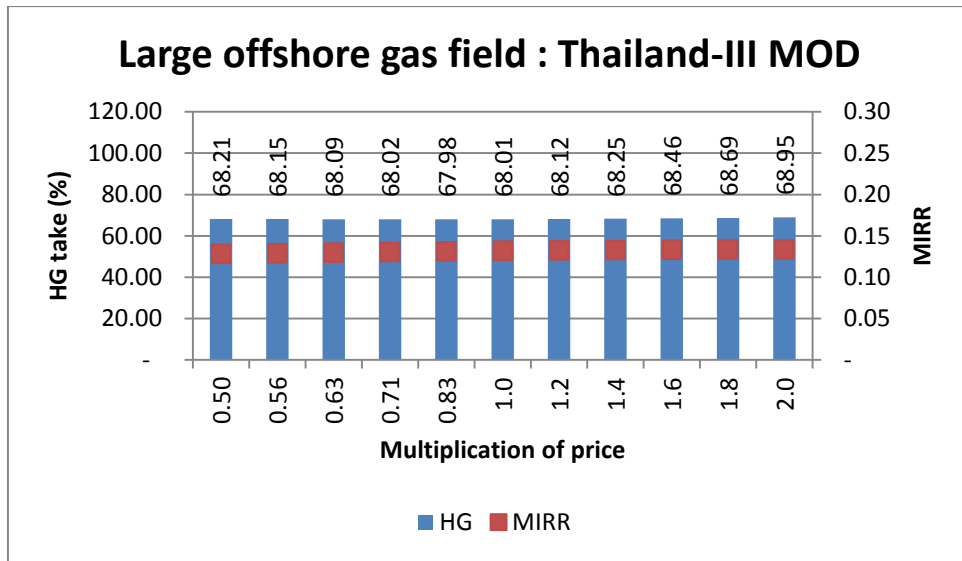


Figure 36 : HG take and project MIRR at different price multiplication – Large offshore gas field under modified Thailand-III regime

The result also indicates the higher portion of HG take even if the regime has just implement only at the last 15 year; from originally at 60% HG take in Thailand-I to 68% in modified Thailand-III.

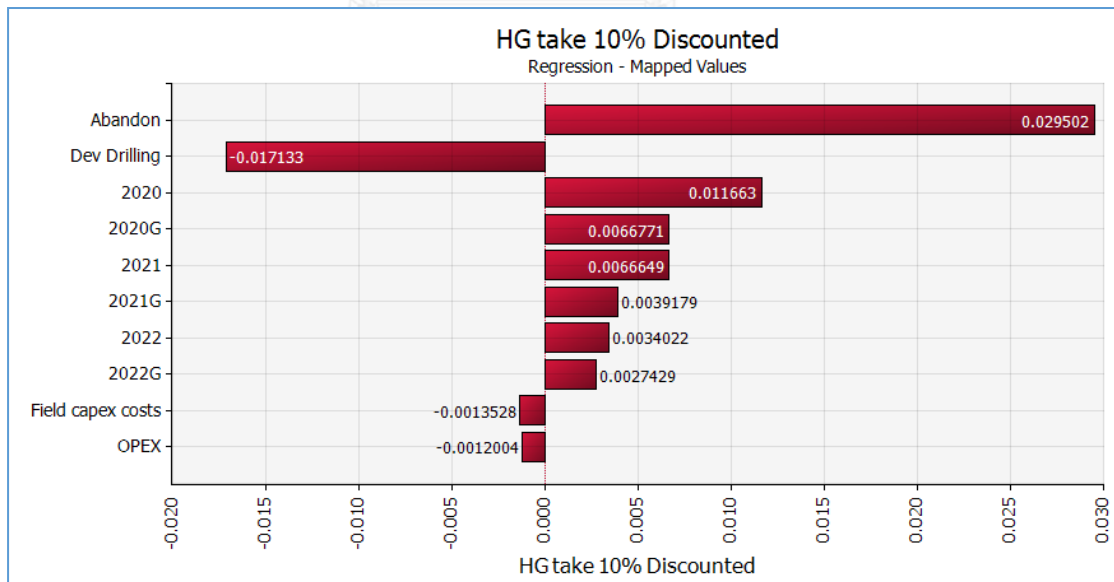


Figure 37 : Tornado chart of HG take

The tornado chart in Figure 37 shows the change of HG take when each parameter increases or decreases by 1 SD. For example, when the oil price in 2020 has increase 1 standard deviation, the HG take percentage would go up 0.011663% or when the development drilling cost has decrease 1 standard deviation, the HG take percentage would gain up 0.017133%. Both of the examples fit into the concept of progressiveness.

The only exception is the increasing HG take when Abandonment cost raises. The reason is from the assumption that the cost is treated as tax deduction and placed at the last year of operation. It means that the cost could not be fully claimed at that year and there were no more production year to be carried forward. From this instance, it deducts the IOC share amount and hence, increases the HG take portion.



CHAPTER VI

CONCLUSION AND RECOMMENDATION

6.1 Conclusion

From the study and analysis in each section from last chapter, the following conclusions can be drawn to accomplish all main objectives as specified.

6.1.1 To study the status of existing petroleum fiscal system in Thailand relative to neighboring countries

- Thailand-I is regressive with the HG take around 50%
- Thailand-III is slightly progressive with the 60-75% of HG take

The utilizing fiscal regimes in Thailand are Thailand-I and Thailand-III, which return a secure number to government. Author has experimented 11 cases to both Thailand-I and Thailand-III, individually and the results show that Government take Thailand-I is clustered in between 50% and has a regressive situation in majority. In a meanwhile, Thailand-III returns higher take to government in the range of 60-75% with slightly progressivity in most projects.

- Malaysia R/C 1996 PSC is slightly progressive with HG take up to 60-90%.

In the speaking of comparison to Malaysia's fiscal regime, the 1996 production sharing system based on Revenue over cost index (R/C) yields wide responses between 60-90% in combination of government and national oil company. The efficient is also favorable as it also has progressivity in most cases.

- Myanmar 2012 PSC is regressive with the 60-80% take

Myanmar PSC 2013 regime yields a great number of HG take of 60-80% in majority, but, the system is explicit regressive. The regressive structure

of the fiscal regime, whenever it happens, could affect both IOC and HG. Not only to the HG which obtains smaller portion of the share, but also be a hindrance for IOC to invest more in a promising field, or in the worst situation, a withdrawal of IOC which means, no any single share to HG.

- In comparison, Thailand stands in a good position to attract IOC among neighboring countries

Thailand-I and Thailand-III regime yield a slightly smaller share percentage than Malaysia R/C 1996 PSC or Myanmar 2012 PSC do. Though, HG take portion and tempting MIRR are things to be balanced. Beside the geological and reservoir favorability consideration, one constrain which should be ensured is the feasibility of the project, other than just focusing on the take percentage to the government.

6.1.2 To study mechanism and determine parameters affecting the efficiency of petroleum fiscal system

- For Thailand-I, the element that cause regressive effect is the royalty,
- In Thailand-III, Sliding scale royalty and SRB turn the regime efficiency to progressive domain

Royalty is the only element that yields regressive effect to Thailand-I while the tax is considered as neutral element. By the way, there is an application of royalty in Thailand-III as well, but with the introduction of sliding scale which decrease the degree of regressive and with the utilizing of SB which is an effective progressive tool. It makes Thailand-III become progressive in the interesting degree.

- The minor function that could affect the efficiency are the unrecoverable carry forward cost and the decommissioning program

As the unrecoverable carry forward cost influence the regressive moment in low profitability as it is proved to hinder the part that should

return to IOC in a slim degree. Another factor that has connection to the efficiency is the selection of an option on decommissioning program. In this case, the study indicated that the 5 year option with the 20% distribution span in each year is the most suitable under the assumption that the decommissioning cost is treated as tax deduction.

- For Malaysia and Myanmar, the royalty, unrecoverable carry forward, and decommissioning cost also yield the same regressive result to the efficiency but Malaysia has tax element based on revenue and cost which result the regime with a slightly progressive as Thailand-III. While leaving Myanmar with only depends on production as regressive

6.1.3 To propose and verify the efficient petroleum fiscal system using probabilistic approach

- The modified Thailand-III is proved to be a progressive system with the HG take is improve from Thailand-I and Thailand-III as estimate around 65-75%

The modified Thailand-III is designed with the intention to continue the existing concession with simple operating calculation. According to the modification of Thailand-III study, the result marks the regime as progressive by the cancellation of royalty and changing SRB from the role of windfall tracking tool to normal profit-based tax tool. Originally, the SRB is considered a self-adjustment tool as a function of revenue and cost. And in this modification, SRB still serve the function but it adjust with faster within sliding scale. The amount return to HG is estimated around 65-75% which is considerably higher than Thailand-I and Thailand-III.

In additional, the probabilistic approach also result that the modified Thailand-III regime react progressively to the higher oil/gas price or in the cost reduction situation (increase profitability)

The tradeoff of the proposed regime is that the HG will not have a tool to ensure the income, and the application from the first production field would result a government in a delay of early year's share

6.2 Limitation of Study

- The investment cost in all projects is fixed in any gaining or lowering multiplication of price which may not reflect the practical operation where IOC supposed to lower the cost when the price is decline, or boost the investment when price is upturn. In this study, some representative fields are operated by a company, however, most of them came from different companies which has particular risk preference and investment philosophy that lead to the complexity if alteration in cost investment is involved.

6.3 Recommendation for Further Study

- To investigate the volume and cost progressivity then recommend a tool to integrate with the modified Thailand-III
- Modified Thailand-III is considered progressive but it has not yet captured the economic parameters' movement, as well as, the timing of the HG receiving share portion from modified Thailand-III. In order to govern the best HG benefit, the parameters tracking should be studied
- Despite the proposal of modified Thailand-III regime which has the minimizing the change in element as a main criteria. The extent of using some advantage in Malaysia fiscal elements is also recommended
- To ensure the HG take and MIRR from any deviation in decommissioning program as per further director from government regulation

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APPENDIX

จุฬาลงกรณ์มหาวิทยาลัย
CHULALONGKORN UNIVERSITY

APPENDIX A : Profile of selected fields

A1: Large offshore gas field (Source: Wood Mackenzie)

Year	Production		Field	E&A	Field	Dev.	Transpt	Other	Aband	Sunk	Sunk
	Liquids	Gas	Opex	Costs	Capex	Drilling	Capex	Capex		Oil	Gas
	000 b/d	mmcf	\$M	\$M	\$M	\$M	\$M	\$M	\$M	\$M	\$M
1990	-	-	-	-	10.00	-	-	7.00	-	-	210.00
1991	-	-	-	-	88.00	-	-	10.00	-	-	-
1992	-	-	-	-	107.00	10.00	13.00	10.00	-	-	-
1993	1.22	175.00	40.00	-	65.00	34.00	32.00	10.00	-	-	28.00
1994	4.00	250.00	40.00	-	116.00	14.00	-	10.00	-	-	20.00
1995	5.00	300.00	50.00	-	112.00	66.00	-	10.00	-	-	25.00
1996	6.50	337.00	55.00	-	109.00	10.00	-	-	-	-	35.00
1997	8.50	344.00	60.00	-	130.00	28.00	-	-	-	-	15.00
1998	10.00	435.00	80.00	-	83.00	28.00	-	-	-	-	37.00
1999	13.50	575.00	100.00	-	30.00	10.00	-	-	-	-	-
2000	15.00	548.00	100.00	-	61.00	10.00	-	-	-	-	-
2001	16.21	573.35	109.61	-	35.00	45.00	10.00	45.00	-	-	-
2002	16.10	551.52	110.00	-	80.00	39.00	47.00	-	-	-	7.00
2003	16.60	499.00	105.50	-	120.00	40.00	-	-	-	-	-
2004	17.71	587.52	120.00	-	110.00	-	-	-	-	-	8.00
2005	17.84	592.09	140.00	-	60.00	10.00	-	-	-	-	8.00
2006	17.65	599.20	140.00	-	95.00	30.00	-	-	-	-	-
2007	18.01	607.25	140.00	-	128.00	27.00	-	-	-	-	42.00
2008	18.55	589.30	130.00	-	495.00	160.00	-	-	-	-	29.20
2009	18.20	516.32	130.00	-	375.00	95.00	40.00	-	-	-	28.50
2010	19.70	586.40	150.00	-	350.00	102.00	40.00	-	-	-	18.00
2011	20.56	591.01	160.00	-	450.00	340.00	-	-	-	-	13.00
2012	28.36	773.42	210.00	-	225.00	205.00	-	-	-	-	22.30
2013	32.49	889.06	245.00	-	90.00	206.00	-	-	-	-	75.90
2014	28.95	870.57	245.00	-	450.00	221.00	-	-	-	-	20.00
2015	28.95	904.69	240.00	-	45.00	323.00	-	-	-	-	28.00
2016	23.45	910.00	232.00	-	180.00	178.50	-	-	-	-	-
2017	20.75	900.00	236.64	-	91.80	120.87	51.00	-	-	-	-
2018	17.90	870.00	241.37	-	218.48	153.98	-	-	-	-	-
2019	15.80	870.00	249.38	-	-	157.06	53.06	-	-	-	-
2020	13.85	870.00	243.55	-	227.31	160.20	-	-	-	-	-
2021	12.10	750.00	237.38	-	-	163.40	-	-	-	-	-
2022	9.95	654.50	230.86	-	118.25	93.47	-	-	-	-	-
2023	8.80	621.00	223.99	-	120.61	88.45	-	-	-	-	-
2024	7.45	612.00	216.76	-	123.02	173.41	-	-	-	-	-
2025	6.55	577.00	215.12	-	125.48	176.87	-	-	-	-	-
2026	5.50	505.00	195.04	-	127.99	180.41	-	-	-	-	-
2027	4.40	430.00	174.07	-	130.55	184.02	-	-	-	-	-
2028	3.75	355.00	152.19	-	133.17	187.70	-	-	-	-	-
2029	2.90	255.00	135.83	-	135.83	191.45	-	-	-	-	-
2030	2.00	175.00	112.16	-	138.55	195.28	-	-	-	-	-
2031	1.45	122.50	87.48	-	-	95.56	-	-	-	-	-
2032	0.80	75.00	89.23	-	-	-	-	-	-	-	-
2033	0.50	45.00	91.02	-	-	-	-	-	-	-	-
2034	-	-	-	-	-	-	-	-	1,463.52	-	-

A2: Medium offshore gas field (Source: Wood Mackenzie)

Year	Production		Field	E&A	Field	Dev.	Transpt	Other	Aband	Sunk	Sunk
	Liquids	Gas	Opex	Costs	Capex	Drilling	Capex	Capex		Oil	Gas
	000 b/d	mmcf/d	\$M	\$M	\$M	\$M	\$M	\$M	\$M	\$M	\$M
1980	-	-	-	-	60.00	35.00	3.00	-	-	-	-
1981	1.20	73.00	7.16	-	65.00	44.00	7.00	-	-	-	-
1982	5.60	128.00	7.52	-	88.00	57.00	8.00	-	-	-	-
1983	6.00	145.00	10.98	-	84.00	28.00	1.80	-	-	-	-
1984	6.90	184.00	12.20	-	40.00	24.00	1.20	-	-	-	-
1985	7.10	185.00	12.64	-	43.00	28.00	5.00	-	-	-	-
1986	6.70	161.00	12.56	-	20.00	18.00	-	-	-	-	-
1987	6.40	207.00	14.00	-	25.00	11.00	5.00	-	-	-	-
1988	6.30	216.00	14.67	-	40.00	15.00	5.00	-	-	-	-
1989	7.30	230.00	15.47	-	40.00	10.00	-	-	-	-	-
1990	8.10	224.00	15.96	-	15.00	20.00	6.00	-	-	-	-
1991	9.60	277.00	18.00	-	3.00	16.00	2.00	-	-	-	-
1992	8.50	247.00	21.00	-	16.00	23.00	8.00	-	-	-	-
1993	9.30	283.00	22.00	-	17.50	35.00	6.00	-	-	-	-
1994	9.00	262.00	23.00	-	13.00	37.00	2.50	-	-	-	-
1995	9.20	275.00	24.00	-	-	9.00	2.00	-	-	-	-
1996	8.10	259.00	27.00	-	12.00	13.00	-	-	-	-	-
1997	9.60	285.00	30.00	-	6.00	28.00	-	-	-	-	-
1998	9.50	292.00	33.00	-	-	15.40	-	-	-	-	1.70
1999	9.60	298.00	33.00	-	-	22.50	-	-	-	-	3.49
2000	8.60	270.00	32.80	-	-	39.20	-	-	-	-	0.02
2001	8.93	257.00	30.00	-	3.00	27.00	-	-	-	-	3.73
2002	9.03	251.00	30.00	-	22.00	31.00	2.00	-	-	-	4.00
2003	12.07	268.15	33.00	-	30.00	37.00	2.00	-	-	-	-
2004	11.76	261.65	33.00	-	30.00	30.00	10.00	-	-	-	-
2005	11.60	265.26	33.00	-	40.00	50.00	10.00	-	-	-	-
2006	11.11	243.12	37.00	-	40.00	60.00	20.00	-	-	-	-
2007	11.29	266.40	40.00	-	50.00	80.00	20.00	-	-	-	-
2008	10.62	252.85	44.00	-	75.00	107.50	4.00	-	-	-	-
2009	12.50	235.13	42.00	-	50.00	80.00	5.00	-	-	-	-
2010	11.20	245.02	44.00	-	50.00	80.00	5.00	-	-	-	-
2011	10.54	230.36	46.00	-	50.00	70.00	5.00	-	-	-	-
2012	9.03	247.49	49.00	-	25.00	36.40	5.00	-	-	-	-
2013	5.87	190.32	45.00	-	100.00	145.60	5.00	-	-	-	-
2014	6.75	216.99	43.00	-	50.00	92.40	7.50	-	-	-	-
2015	5.80	206.75	49.00	-	25.00	44.80	7.50	-	-	-	-
2016	5.50	225.00	50.85	-	38.14	68.34	5.09	-	-	-	-
2017	6.10	250.00	52.90	-	25.93	46.47	5.19	-	-	-	-
2018	8.00	250.00	60.31	-	39.68	71.10	5.29	-	-	-	-
2019	9.80	265.00	61.52	-	40.47	72.53	5.40	-	-	-	-
2020	10.70	255.00	62.75	-	41.28	73.98	5.50	-	-	-	-
2021	10.00	250.00	61.76	-	56.14	100.61	5.61	-	-	-	-
2022	9.60	225.00	58.41	-	45.81	76.96	4.58	-	-	-	-
2023	8.20	196.00	54.91	-	35.05	58.88	4.67	-	-	-	-
2024	6.00	168.00	51.24	-	35.75	60.06	4.77	-	-	-	-
2025	6.00	135.00	47.40	-	24.31	40.84	4.86	-	-	-	-
2026	5.90	113.00	43.39	-	24.79	41.65	4.96	-	-	-	-
2027	5.85	95.00	39.20	-	25.29	42.49	5.06	-	-	-	-
2028	4.35	73.50	34.82	-	25.80	28.89	5.16	-	-	-	-
2029	2.65	57.50	34.21	-	26.31	29.47	5.26	-	-	-	-
2030	2.25	40.00	33.55	-	26.84	30.06	5.37	-	-	-	-
2031	1.10	27.00	28.74	-	27.37	30.66	5.47	-	-	-	-
2032	0.50	13.50	15.36	-	-	-	-	-	-	-	-
2033	-	-	-	-	-	-	-	-	597.30	-	-

A3: Small offshore gas field (Source: Wood Mackenzie)

Year	Production		Field	E&A	Field	Dev.	Transpt	Other	Aband	Sunk	Sunk
	Liquids	Gas	Opex	Costs	Capex	Drilling	Capex	Capex		Oil	Gas
	000 b/d	mmcf/d	\$M	\$M	\$M	\$M	\$M	\$M	\$M	\$M	\$M
1997	-	-	-	-	176.20	-	-	-	-	-	115.00
1998	-	-	-	-	137.60	66.00	-	-	-	-	-
1999	6.00	52.00	16.00	-	7.00	25.00	-	-	-	-	-
2000	9.30	171.00	20.00	-	36.60	2.00	-	-	-	-	-
2001	8.10	180.00	24.00	-	126.50	28.00	-	-	-	-	10.00
2002	14.10	335.00	31.00	-	44.00	66.00	-	-	-	-	9.00
2003	13.79	355.22	54.02	-	39.00	18.00	-	-	-	-	-
2004	13.91	368.53	54.02	-	85.00	80.00	-	-	-	-	-
2005	15.51	378.61	63.00	-	125.00	120.00	-	-	-	-	15.00
2006	18.66	388.02	71.00	-	160.00	120.00	-	-	-	-	5.00
2007	18.23	398.72	79.00	-	160.00	150.00	-	-	-	-	14.00
2008	17.26	391.45	105.00	-	85.00	153.00	-	-	-	-	50.00
2009	15.47	364.23	115.00	-	75.00	132.00	-	-	-	-	27.50
2010	15.68	362.24	125.00	-	90.00	150.00	5.00	-	-	-	5.00
2011	14.68	396.19	150.00	-	350.00	185.50	5.00	-	-	-	2.00
2012	11.61	391.53	165.00	-	300.00	269.50	-	-	-	-	4.45
2013	15.93	376.21	165.00	-	150.00	231.00	-	-	-	-	9.50
2014	17.54	375.23	165.00	-	250.00	266.00	-	-	-	-	9.10
2015	13.54	340.73	160.00	-	100.00	280.00	-	-	-	-	1.70
2016	15.50	345.00	162.72	-	218.66	149.50	-	-	-	-	-
2017	12.25	330.00	165.97	-	259.34	130.70	5.19	-	-	-	-
2018	9.00	280.00	158.71	-	306.85	133.32	-	-	-	-	-
2019	18.50	310.00	203.69	-	248.23	218.87	-	-	-	-	-
2020	27.80	335.00	228.37	-	253.19	223.25	-	-	-	-	-
2021	32.00	330.00	255.39	-	258.26	227.71	-	-	-	-	-
2022	29.45	310.00	266.23	-	211.88	188.29	-	-	-	-	-
2023	25.75	290.00	271.55	-	186.91	167.52	-	-	-	-	-
2024	22.75	280.00	276.98	-	169.80	147.99	-	-	-	-	-
2025	18.75	260.00	258.21	-	173.20	150.95	-	-	-	-	-
2026	15.70	225.00	238.58	-	145.67	127.94	-	-	-	-	-
2027	12.65	195.00	224.39	-	148.58	130.50	-	-	-	-	-
2028	6.65	145.00	186.31	-	-	-	-	-	-	-	-
2029	-	-	-	-	-	-	-	-	1175.34	-	-

A4: Large offshore oil field (Source: Wood Mackenzie)

Year	Production		Field	E&A	Field	Dev.	Transpt	Other	Aband	Sunk	Sunk
	Liquids	Gas	Opex	Costs	Capex	Drilling	Capex	Capex		Oil	Gas
	000 b/d	mmcfd	\$M	\$M	\$M	\$M	\$M	\$M	\$M	\$M	\$M
1994	-	-	-	-	-	-	-	-	-	38.60	-
1995	-	-	-	-	35.00	15.00	-	-	-	25.70	-
1996	-	-	-	-	87.00	17.00	-	-	-	35.10	-
1997	5.20	40.00	42.20	-	112.00	32.00	-	-	-	46.80	-
1998	6.50	70.00	45.00	-	170.00	37.00	-	-	-	25.00	-
1999	11.60	120.00	48.00	-	103.00	130.00	-	-	-	7.60	-
2000	17.80	180.00	72.50	-	62.00	30.00	-	-	-	15.20	-
2001	37.22	198.30	80.00	-	72.00	85.00	-	-	-	22.00	-
2002	41.78	244.00	82.50	-	173.00	70.00	-	-	-	12.00	-
2003	56.04	264.00	89.00	-	231.00	55.00	-	-	-	12.00	-
2004	45.52	248.09	95.00	-	140.00	100.00	-	-	-	4.00	-
2005	57.49	219.43	95.00	-	120.00	140.00	-	-	-	10.00	-
2006	60.75	197.76	110.00	-	140.00	160.00	-	-	-	12.00	-
2007	52.20	195.11	125.00	-	110.00	140.00	-	-	-	3.50	-
2008	54.13	166.67	140.00	-	100.00	200.00	-	-	-	6.00	-
2009	52.32	176.49	175.00	-	90.00	190.00	-	-	-	-	-
2010	41.12	171.66	175.00	-	100.00	170.00	-	-	-	-	-
2011	33.67	154.33	170.00	-	50.00	87.50	-	-	-	4.20	-
2012	34.46	123.90	175.00	-	175.00	178.50	-	-	-	4.40	-
2013	28.03	109.14	159.00	-	100.00	224.00	-	-	-	-	-
2014	28.21	93.09	220.00	-	100.00	224.00	-	-	-	-	-
2015	28.31	101.06	220.00	-	125.00	210.00	-	-	-	-	-
2016	27.75	100.25	214.20	-	89.25	128.52	-	-	-	-	-
2017	28.85	74.75	208.08	-	91.56	149.82	-	-	-	-	-
2018	27.25	74.75	212.24	-	93.39	152.81	-	-	-	-	-
2019	25.35	74.75	216.49	-	203.50	155.87	-	-	-	-	-
2020	23.70	125.25	220.82	-	262.77	158.99	-	-	-	-	-
2021	22.00	159.00	225.23	-	99.10	162.17	-	-	-	-	-
2022	20.20	186.00	229.74	-	75.81	124.06	-	-	-	-	-
2023	18.90	186.00	234.33	-	77.33	126.54	-	-	-	-	-
2024	16.50	185.00	239.02	-	65.73	107.56	-	-	-	-	-
2025	14.60	180.00	237.70	-	67.04	109.71	-	-	-	-	-
2026	10.50	150.00	205.16	-	54.71	89.52	-	-	-	-	-
2027	7.50	140.00	196.58	-	55.80	91.31	-	-	-	-	-
2028	5.00	125.00	174.64	-	28.46	46.57	-	-	-	-	-
2029	2.50	107.00	145.14	-	14.51	23.75	-	-	-	-	-
2030	1.25	70.00	134.59	-	-	-	-	-	-	-	-
2031	-	-	-	-	-	-	-	-	1025.54	-	-

A5: Medium offshore oil field (Source: Wood Mackenzie)

Year	Production		Field	E&A	Field	Dev.	Transpt	Other	Aband	Sunk	Sunk
	Liquids	Gas	Opex	Costs	Capex	Drilling	Capex	Capex		Oil	Gas
	000 b/d	mmcf/d	\$M	\$M	\$M	\$M	\$M	\$M	\$M	\$M	\$M
2001	-	-	-	-	-	-	-	-	-	-	-
2002	-	-	-	-	-	-	-	-	-	-	-
2003	-	-	-	-	-	-	-	-	-	67.00	-
2004	-	-	-	-	20.00	-	-	-	-	6.70	-
2005	5.70	-	24.36	-	16.00	9.84	5.00	-	-	3.50	-
2006	8.70	-	45.40	-	35.00	5.74	2.50	-	-	11.50	-
2007	19.30	-	92.70	-	21.00	48.00	2.50	-	-	-	-
2008	19.70	-	103.70	-	67.00	144.40	5.00	-	-	30.40	-
2009	20.20	-	108.79	-	-	24.70	-	-	-	5.00	-
2010	17.70	-	97.10	-	-	44.46	-	-	-	-	-
2011	17.30	-	97.10	-	-	23.76	-	-	-	-	-
2012	14.10	-	83.35	-	-	7.10	-	-	-	-	-
2013	13.10	-	76.48	-	-	28.70	-	-	-	-	-
2014	13.80	-	76.48	-	-	90.00	-	-	-	5.74	-
2015	13.00	-	70.64	-	-	13.50	-	-	-	-	-
2016	11.50	-	59.82	-	-	22.95	-	-	-	-	-
2017	10.00	-	52.69	-	2.08	23.41	-	-	-	-	-
2018	7.50	-	39.95	-	-	23.88	-	-	-	-	-
2019	5.50	-	31.55	-	-	24.35	-	-	-	-	-
2020	3.00	-	25.55	-	-	-	-	-	-	-	-
2021	1.00	-	21.55	-	-	-	-	-	-	-	-
2022	-	-	-	-	-	-	-	-	89.60	-	-

A6: Small offshore oil field (Source: Wood Mackenzie)

Year	Production		Field	E&A	Field	Dev.	Transpt	Other	Aband	Sunk	Sunk
	Liquids	Gas	Opex	Costs	Capex	Drilling	Capex	Capex		Oil	Gas
	000 b/d	mmcf/d	\$M	\$M	\$M	\$M	\$M	\$M	\$M	\$M	\$M
2009	-	-	-	-	-	-	-	-	-	6.00	-
2010	-	-	-	-	-	-	-	-	-	18.00	-
2011	-	-	-	-	-	-	-	-	-	-	-
2012	-	-	-	-	25.00	-	5.00	-	-	12.00	-
2013	-	-	-	-	60.00	-	15.00	-	-	12.00	-
2014	1.34	-	10.98	-	80.00	63.00	8.40	-	-	-	-
2015	14.00	-	111.90	-	75.00	43.00	-	-	-	-	-
2016	12.20	-	91.90	-	-	9.00	-	-	-	-	-
2017	9.50	-	83.54	-	-	-	-	-	-	-	-
2018	7.50	-	74.80	-	-	-	-	-	-	-	-
2019	6.50	-	70.99	-	-	-	-	-	-	-	-
2020	4.50	-	50.77	-	-	-	-	-	-	-	-
2021	2.00	-	19.30	-	-	-	-	-	-	-	-
2022	-	-	-	-	-	-	-	-	47.30	-	-

A7: Medium onshore gas field (Source: Wood Mackenzie)

Year	Production		Field	E&A	Field	Dev.	Transpt	Other	Aband	Sunk	Sunk
	Liquids	Gas	Opex	Costs	Capex	Drilling	Capex	Capex		Oil	Gas
	000 b/d	mmcf/d	\$M	\$M	\$M	\$M	\$M	\$M	\$M	\$M	\$M
2002	-	-	-	-	-	-	-	-	-	-	6.00
2003	-	-	-	-	-	-	-	-	-	-	9.00
2004	-	-	-	-	-	-	-	-	-	-	18.00
2005	-	-	-	-	40.00	-	-	-	-	-	-
2006	-	6.07	1.40	-	70.00	20.00	30.00	-	-	-	-
2007	0.47	85.51	13.20	-	-	38.00	-	-	-	-	-
2008	0.45	83.07	13.20	-	-	25.00	-	-	-	-	-
2009	0.43	85.04	12.00	-	-	-	-	-	-	-	-
2010	0.43	87.20	13.51	-	-	-	-	-	-	-	0.50
2011	0.38	83.14	14.97	-	-	-	-	-	-	-	3.00
2012	0.43	93.22	14.27	-	-	-	-	-	-	-	-
2013	0.38	87.59	15.06	-	-	-	-	-	-	-	-
2014	0.42	105.12	19.80	-	-	-	-	-	-	-	-
2015	0.52	115.00	19.13	-	-	20.00	-	-	-	-	-
2016	0.54	97.88	19.64	-	-	17.34	15.30	-	-	-	-
2017	0.54	98.89	20.03	-	41.62	-	10.40	-	-	-	-
2018	0.54	99.81	20.43	-	-	18.04	-	-	-	-	-
2019	0.54	100.62	20.84	-	-	18.40	-	-	-	-	-
2020	0.50	101.36	21.25	-	-	18.77	-	-	-	-	-
2021	0.45	102.03	21.68	-	-	-	-	-	-	-	-
2022	0.40	108.00	22.74	-	-	19.53	17.23	-	-	-	-
2023	0.40	108.00	23.20	-	-	39.84	11.72	-	-	-	-
2024	0.35	108.00	23.66	-	-	20.32	-	-	-	-	-
2025	0.32	100.00	23.47	-	-	20.72	-	-	-	-	-
2026	0.25	89.00	23.93	-	-	21.14	-	-	-	-	-
2027	0.20	77.00	24.41	-	-	21.56	-	-	-	-	-
2028	0.20	65.00	24.19	-	-	21.99	-	-	-	-	-
2029	0.15	55.00	25.40	-	-	-	-	-	-	-	-
2030	0.15	43.00	25.91	-	-	-	-	-	-	-	-
2031	0.15	30.00	26.43	-	-	-	-	-	-	-	-
2032	-	-	-	-	-	-	-	-	84.01	-	-

A9: Large onshore oil field (Source: Wood Mackenzie)

Year	Production		Field	E&A	Field	Dev.	Transpt	Other	Aband	Sunk	Sunk
	Liquids	Gas	Opex	Costs	Capex	Drilling	Capex	Capex		Oil	Gas
	000 b/d	mmcf/d	\$M	\$M	\$M	\$M	\$M	\$M	\$M	\$M	\$M
1981	-	-	-	-	10.00	13.50	-	1.00	-	11.00	-
1982	-	-	-	-	25.50	29.50	-	1.00	-	-	-
1983	6.10	3.50	21.90	-	23.00	27.00	-	1.00	-	114.00	-
1984	13.70	11.40	26.50	-	30.00	30.00	-	2.00	-	38.00	-
1985	20.70	17.60	31.20	-	20.00	40.00	-	-	-	33.00	-
1986	20.00	21.30	32.50	-	4.00	16.00	-	1.00	-	11.00	-
1987	16.65	22.10	32.50	-	1.00	10.00	-	1.00	-	-	-
1988	18.00	21.60	31.10	-	-	17.00	-	1.00	-	11.00	-
1989	20.40	22.30	30.90	-	13.50	20.00	-	1.00	-	-	-
1990	23.39	24.40	30.00	-	-	20.00	-	1.00	-	-	-
1991	24.95	28.70	32.00	-	-	20.00	-	2.00	-	16.00	-
1992	26.51	33.00	34.00	-	-	10.00	-	2.00	-	11.00	-
1993	24.50	36.50	37.00	-	-	9.00	-	-	-	-	-
1994	24.97	38.60	40.00	-	10.00	14.00	-	-	-	-	-
1995	20.48	35.50	43.00	-	16.00	8.00	-	-	-	-	-
1996	21.96	39.00	43.00	-	7.00	9.00	-	-	-	-	-
1997	20.83	39.00	43.00	-	8.00	13.00	-	-	-	-	-
1998	23.77	39.00	43.00	-	11.00	22.00	-	-	-	2.00	-
1999	26.38	39.00	42.00	-	9.00	15.00	-	-	-	6.00	-
2000	26.90	39.00	45.00	-	6.00	25.00	-	-	-	4.00	-
2001	24.30	42.80	44.00	-	7.00	25.00	-	-	-	15.00	-
2002	23.20	42.10	35.00	-	20.00	23.00	-	-	-	6.00	-
2003	22.08	40.56	35.00	-	20.49	19.51	-	-	-	-	-
2004	21.80	37.29	40.00	-	17.00	17.99	-	-	-	-	-
2005	20.60	39.20	40.00	-	7.00	25.00	-	-	-	24.00	-
2006	21.69	40.58	45.00	-	20.00	36.60	-	-	-	4.00	-
2007	23.33	34.17	50.00	-	27.00	56.00	-	-	-	17.50	-
2008	23.10	29.47	61.00	-	69.00	66.00	-	-	-	19.00	-
2009	22.90	25.97	61.00	-	50.00	60.00	-	-	-	7.78	-
2010	23.60	12.87	61.40	-	50.00	65.60	-	-	-	8.20	-
2011	24.80	14.06	65.00	-	60.00	82.50	-	-	-	5.40	-
2012	31.30	19.80	87.90	-	88.00	155.40	-	-	-	11.75	-
2013	36.06	24.29	91.50	-	73.00	119.35	-	-	-	60.35	-
2014	31.00	26.14	88.40	-	101.00	161.45	-	-	-	10.30	-
2015	31.83	28.31	80.20	-	91.00	144.95	-	-	-	10.20	-
2016	29.70	26.90	80.48	-	82.62	132.70	-	-	-	-	-
2017	28.10	25.55	80.94	-	75.95	121.62	-	-	-	-	-
2018	26.34	24.28	81.50	-	70.04	111.80	-	-	-	-	-
2019	23.92	23.07	76.09	-	63.86	102.94	-	-	-	-	-
2020	21.39	21.91	75.96	-	58.52	94.07	-	-	-	-	-
2021	18.22	20.82	75.45	-	54.06	86.66	-	-	-	-	-
2022	14.87	19.77	74.66	-	49.39	78.91	-	-	-	-	-
2023	12.16	18.78	74.40	-	45.69	72.76	-	-	-	-	-
2024	9.50	17.84	62.03	-	40.63	66.33	-	-	-	-	-
2025	7.68	16.95	61.92	-	37.79	61.19	-	-	-	-	-
2026	5.96	16.11	61.92	-	-	-	-	-	-	-	-
2027	-	-	-	-	-	-	-	-	470.52	-	-

A10: Medium onshore oil field (Source: Wood Mackenzie)

Year	Production Liquids 000 b/d	Gas mmcf/d	Field Opex \$M	E&A Costs \$M	Field Capex \$M	Dev. Drilling \$M	Transpt Capex \$M	Other Capex \$M	Aband \$M	Sunk Oil \$M	Sunk Gas \$M
1990	0.00	-	-	-	0.50	1.00	-	1.00	-	25.00	-
1991	0.10	-	0.84	-	1.50	3.00	-	1.00	-	-	-
1992	0.19	-	1.04	-	0.50	-	-	-	-	-	-
1993	0.16	-	1.04	-	-	-	-	-	-	3.00	-
1994	0.22	-	1.19	-	-	-	-	-	-	-	-
1995	0.20	-	1.17	-	-	1.00	-	-	-	3.00	-
1996	0.44	-	1.48	-	-	6.00	-	-	-	-	-
1997	0.35	-	1.40	-	-	2.00	-	-	-	-	-
1998	0.52	-	1.85	-	-	3.00	-	-	-	-	-
1999	0.57	-	1.89	-	-	-	-	-	-	-	-
2000	0.63	-	1.95	-	-	0.80	-	-	-	-	-
2001	0.90	-	2.29	-	-	3.20	-	-	-	-	-
2002	0.80	-	2.10	-	-	1.60	-	-	-	-	-
2003	0.74	-	2.05	-	-	1.60	-	-	-	-	-
2004	0.86	-	2.15	-	-	2.50	-	-	-	-	-
2005	1.10	-	2.35	-	3.00	5.00	-	2.50	-	11.07	-
2006	1.03	-	2.90	-	4.00	7.00	-	2.50	-	3.00	-
2007	1.40	-	7.50	-	-	12.00	-	-	-	8.63	-
2008	1.71	-	8.00	-	-	15.00	-	-	-	10.00	-
2009	1.68	-	7.95	-	-	9.00	-	-	-	6.00	-
2010	1.49	-	9.00	-	-	14.00	-	-	-	5.00	-
2011	1.26	-	11.00	-	-	11.00	-	-	-	8.50	-
2012	1.67	-	11.90	-	-	17.00	-	-	-	-	-
2013	1.77	-	12.65	-	-	15.50	-	-	-	-	-
2014	1.60	-	12.00	-	-	13.95	-	-	-	-	-
2015	1.50	-	11.55	-	-	11.00	-	-	-	-	-
2016	1.32	-	10.75	-	-	6.11	-	-	-	-	-
2017	1.08	-	9.41	-	-	-	-	-	-	-	-
2018	0.92	-	8.54	-	-	5.30	-	-	-	-	-
2019	0.77	-	7.62	-	-	-	-	-	-	-	-
2020	0.64	-	7.23	-	-	1.10	-	-	-	-	-
2021	0.54	-	6.24	-	-	-	-	-	-	-	-
2022	0.20	-	2.87	-	-	1.15	-	-	8.02	-	-
2023	0.16	-	2.34	-	-	-	-	-	-	-	-
2024	0.13	-	1.73	-	-	1.20	-	-	-	-	-
2025	0.10	-	1.46	-	-	-	-	-	-	-	-
2026	0.08	-	1.87	-	-	-	-	-	-	-	-
2027	0.00	-	-	-	-	-	-	-	13.95	-	-

A11: Small onshore oil field (Source: Wood Mackenzie)

Year	Production Liquids 000 b/d	Gas mmcf/d	Field Opex \$M	E&A Costs \$M	Field Capex \$M	Dev. Drilling \$M	Transpt Capex \$M	Other Capex \$M	Aband \$M	Sunk Oil \$M	Sunk Gas \$M
1989	-	-	-	-	-	-	-	-	-	14.50	-
1990	-	-	-	-	2.00	-	-	-	-	-	-
1991	0.40	-	0.95	-	1.00	-	-	-	-	-	-
1992	1.26	-	2.00	-	-	-	-	-	-	1.50	-
1993	1.26	-	2.00	-	-	-	-	-	-	-	-
1994	1.00	-	2.00	-	-	2.40	-	-	-	-	-
1995	1.16	-	2.00	-	-	-	-	-	-	-	-
1996	1.00	-	2.10	-	-	1.20	-	-	-	3.00	-
1997	0.78	-	2.00	-	-	-	-	-	-	-	-
1998	0.69	-	2.00	-	-	-	-	-	-	1.00	-
1999	0.60	-	1.10	-	-	0.50	-	-	-	0.70	-
2000	0.55	-	1.10	-	-	1.50	-	-	-	-	-
2001	0.60	-	1.10	-	0.40	-	-	-	-	-	-
2002	0.75	-	1.10	-	-	-	-	-	-	1.45	-
2003	0.64	-	0.90	-	0.20	-	-	-	-	-	-
2004	0.54	-	0.80	-	-	-	-	-	-	-	-
2005	0.48	-	0.60	-	0.20	0.10	-	-	-	-	-
2006	0.58	-	0.75	-	-	3.00	-	-	-	-	-
2007	0.54	-	1.00	-	-	3.50	-	-	-	-	-
2008	0.72	-	1.50	-	1.80	-	-	-	-	-	-
2009	0.51	-	2.00	-	-	4.00	-	-	-	2.00	-
2010	0.42	-	2.50	-	-	0.50	-	-	-	-	-
2011	0.50	-	2.80	-	0.50	-	-	-	-	-	-
2012	0.40	-	2.80	-	-	6.00	-	-	-	-	-
2013	0.31	-	2.80	-	-	4.50	-	-	-	-	-
2014	0.25	-	3.80	-	-	-	-	-	-	-	-
2015	0.29	-	2.50	-	-	-	-	-	-	-	-
2016	0.36	-	2.54	-	-	1.53	-	-	-	-	-
2017	0.31	-	2.59	-	-	1.56	-	-	-	-	-
2018	-	-	-	-	-	-	-	-	2.65	-	-

APPENDIX B : Deterministic calculation table of Thailand-I

B1: Large offshore gas field

Year	Production		Gross	Field	Field	Royalty	Tax	IOC	HG
	Liquids	Gas	Rev	Opex	Capex			Take	Take
	000 b/d	mmcf/d	\$M	\$M	\$M	\$M	\$M	\$M	\$M
1990	-	-	-	-	17.00	-	-	(17.00)	-
1991	-	-	-	-	98.00	-	-	(98.00)	-
1992	-	-	-	-	140.00	-	-	(140.00)	-
1993	1.22	175.00	150.01	40.00	141.00	18.75	-	(49.74)	18.75
1994	4.00	250.00	210.09	40.00	140.00	26.26	-	3.83	26.26
1995	5.00	300.00	236.42	50.00	188.00	29.55	-	(31.13)	29.55
1996	6.50	337.00	405.08	55.00	119.00	50.64	-	180.45	50.64
1997	8.50	344.00	390.45	60.00	158.00	48.81	-	123.65	48.81
1998	10.00	435.00	390.78	80.00	111.00	48.85	7.61	143.32	56.46
1999	13.50	575.00	580.15	100.00	40.00	72.52	103.22	264.41	175.73
2000	15.00	548.00	1,040.80	100.00	71.00	130.10	282.87	456.83	412.97
2001	16.21	573.35	986.15	109.61	135.00	123.27	243.72	374.55	366.99
2002	16.10	551.52	829.76	110.00	166.00	103.72	184.70	265.34	288.42
2003	16.60	499.00	1,184.41	105.50	160.00	148.05	329.09	441.77	477.15
2004	17.71	587.52	1,530.57	120.00	110.00	191.32	458.07	651.17	649.39
2005	17.84	592.09	2,295.70	140.00	70.00	286.96	730.52	1,068.22	1,017.48
2006	17.65	599.20	1,897.67	140.00	125.00	237.21	575.51	819.96	812.72
2007	18.01	607.25	2,020.21	140.00	155.00	252.53	603.58	869.11	856.11
2008	18.55	589.30	2,576.07	130.00	655.00	322.01	723.95	745.12	1,045.95
2009	18.20	516.32	1,154.14	130.00	510.00	144.27	188.63	181.24	332.90
2010	19.70	586.40	1,508.62	150.00	492.00	188.58	279.12	398.93	467.69
2011	20.56	591.01	1,574.24	160.00	790.00	196.78	155.14	272.31	351.92
2012	28.36	773.42	1,754.04	210.00	430.00	219.25	242.85	651.93	462.10
2013	32.49	889.06	2,371.99	245.00	296.00	296.50	472.08	1,062.40	768.58
2014	28.95	870.57	2,362.06	245.00	671.00	295.26	482.09	668.71	777.35
2015	28.95	904.69	1,459.83	240.00	368.00	182.48	128.94	540.40	311.42
2016	23.45	910.00	1,525.99	232.00	358.50	190.75	264.13	480.62	454.87
2017	20.75	900.00	1,709.12	236.64	263.67	213.64	365.70	629.47	579.34
2018	17.90	870.00	1,698.73	241.37	372.46	212.34	332.97	539.59	545.31
2019	15.80	870.00	1,730.62	249.38	210.12	216.33	380.07	674.73	596.39
2020	13.85	870.00	1,811.95	243.55	387.51	226.49	395.75	558.65	622.24
2021	12.10	750.00	1,601.74	237.38	163.40	200.22	336.71	664.03	536.93
2022	9.95	654.50	1,440.79	230.86	211.72	180.10	313.81	504.30	493.91
2023	8.80	621.00	1,394.26	223.99	209.06	174.28	312.50	474.43	486.79
2024	7.45	612.00	1,383.24	216.76	296.43	172.91	266.59	430.55	439.50
2025	6.55	577.00	1,326.79	215.12	302.35	165.85	254.70	388.77	420.55
2026	5.50	505.00	1,202.03	195.04	308.40	150.25	203.39	344.94	353.65
2027	4.40	430.00	1,018.80	174.07	314.57	127.35	141.41	261.40	268.76
2028	3.75	355.00	854.09	152.19	320.87	106.76	86.68	187.59	193.44
2029	2.90	255.00	630.00	135.83	327.28	78.75	7.68	80.46	86.43
2030	2.00	175.00	436.07	112.16	333.83	54.51	-	(64.43)	54.51
2031	1.45	122.50	318.64	87.48	95.56	39.83	-	95.77	39.83
2032	0.80	75.00	197.68	89.23	-	24.71	-	83.74	24.71
2033	0.50	45.00	122.97	91.02	-	15.37	-	16.58	15.37
2034	-	-	-	-	1,463.52	-	-	(1,463.52)	-

B2: Medium offshore gas field

Year	Production		Gross	Field	Field	Royalty	Tax	IOC	HG
	Liquids	Gas	Rev	Opex	Capex			Take	Take
	000 b/d	mmcf/d	\$M	\$M	\$M	\$M	\$M	\$M	\$M
1980	-	-	-	-	98.00	-	-	(98.00)	-
1981	1.20	73.00	68.56	7.16	116.00	8.57	-	(63.17)	8.57
1982	4.50	128.00	170.04	7.52	153.00	21.25	16.54	(28.28)	37.80
1983	4.00	145.00	181.40	10.98	113.80	22.68	23.27	10.68	45.94
1984	5.50	184.00	237.63	12.20	65.20	29.70	41.18	89.34	70.88
1985	6.50	185.00	235.85	12.64	76.00	29.48	33.41	84.31	62.89
1986	6.50	161.00	149.88	12.56	38.00	18.73	11.17	69.41	29.91
1987	6.40	207.00	170.98	14.00	41.00	21.37	28.58	66.03	49.95
1988	6.30	216.00	169.96	14.67	60.00	21.25	30.27	43.78	51.52
1989	7.00	230.00	191.88	15.47	50.00	23.98	40.60	61.82	64.58
1990	7.25	224.00	204.56	15.96	41.00	25.57	43.39	78.64	68.96
1991	8.00	277.00	221.66	18.00	21.00	27.71	52.10	102.85	79.81
1992	7.50	247.00	215.86	21.00	47.00	26.98	45.76	75.12	72.74
1993	9.00	283.00	289.86	22.00	58.50	36.23	69.56	103.57	105.79
1994	8.50	262.00	234.04	23.00	52.50	29.26	49.41	79.88	78.66
1995	9.00	275.00	234.06	24.00	11.00	29.26	63.52	106.28	92.78
1996	8.10	259.00	327.02	27.00	25.00	40.88	94.41	139.73	135.29
1997	9.00	285.00	325.75	30.00	34.00	40.72	87.44	133.60	128.16
1998	8.75	292.00	267.74	33.00	15.40	33.47	71.62	114.26	105.08
1999	9.00	298.00	309.32	33.00	22.50	38.66	84.87	130.29	123.53
2000	8.50	270.00	519.62	32.80	39.20	64.95	157.77	224.89	222.73
2001	8.90	257.00	457.48	32.59	30.00	57.19	139.12	198.58	196.31
2002	8.00	251.00	384.04	35.24	55.00	48.00	106.46	139.33	154.47
2003	12.07	268.15	672.17	33.00	69.00	84.02	211.33	274.81	295.35
2004	11.76	261.65	740.13	33.00	70.00	92.52	235.93	308.68	328.44
2005	11.60	265.26	1,102.90	33.00	100.00	137.86	357.86	474.18	495.72
2006	11.11	243.12	865.22	37.00	120.00	108.15	256.24	343.83	364.39
2007	11.29	266.40	975.71	40.00	150.00	121.96	282.12	381.63	404.09
2008	10.62	252.85	1,202.08	44.00	186.50	150.26	347.23	474.09	497.49
2009	12.50	235.13	620.41	42.00	135.00	77.55	140.48	225.38	218.03
2010	11.20	245.02	716.42	44.00	135.00	89.55	174.68	273.19	264.24
2011	10.54	230.36	701.27	46.00	125.00	87.66	172.90	269.71	260.56
2012	9.03	247.49	559.73	49.00	66.40	69.97	137.88	236.49	207.85
2013	5.87	190.32	468.97	45.00	275.60	58.62	51.23	38.53	109.85
2014	6.75	216.99	573.40	43.00	175.10	71.68	103.36	180.27	175.04
2015	5.47	196.41	305.73	49.00	180.50	38.22	5.87	32.14	44.09
2016	5.80	222.27	359.78	48.00	67.50	44.97	55.79	143.52	100.77
2017	8.50	250.00	564.36	53.55	109.65	70.54	119.02	211.60	189.56
2018	11.75	250.00	684.63	59.82	70.23	85.58	179.83	289.17	265.41
2019	10.25	265.00	707.60	63.67	116.42	88.45	174.86	264.20	263.31
2020	9.00	255.00	693.88	64.95	118.74	86.73	172.33	251.12	259.07
2021	7.20	230.00	618.79	60.72	159.65	77.35	130.59	190.48	207.94
2022	7.10	205.00	581.65	57.43	125.23	72.71	128.75	197.54	201.45
2023	6.50	186.00	546.10	53.99	96.94	68.26	123.93	202.98	192.20
2024	6.25	168.00	516.22	50.38	98.89	64.53	114.66	187.76	179.19
2025	6.00	135.00	455.24	46.61	68.84	56.90	104.24	178.65	161.14
2026	5.90	113.00	422.79	42.66	70.22	52.85	97.41	159.65	150.26
2027	5.85	95.00	389.95	39.79	71.62	48.74	88.47	141.33	137.22
2028	4.35	73.50	300.50	34.24	58.84	37.56	64.88	104.98	102.44
2029	2.65	57.50	213.10	34.93	60.02	26.64	32.68	58.83	59.32
2030	2.25	40.00	164.77	35.63	61.23	20.60	13.75	33.56	34.35
2031	1.70	28.00	124.16	29.61	54.91	15.52	4.54	19.58	20.06
2032	0.50	13.50	49.36	16.47	-	6.17	-	26.72	6.17
2033	-	-	-	-	601.56	-	-	(601.56)	-

B3: Small offshore gas field

Year	Production		Gross	Field	Field	Royalty	Tax	IOC	HG
	Liquids	Gas	Rev	Opex	Capex			Take	Take
	000 b/d	mmcf/d	\$M	\$M	\$M	\$M	\$M	\$M	\$M
1997	-	-	-	-	176.20	-	-	(176.20)	-
1998	-	-	-	-	203.60	-	-	(203.60)	-
1999	2.00	80.00	80.10	16.00	32.00	10.01	-	22.09	10.01
2000	4.50	171.00	319.33	20.00	38.60	39.92	41.40	179.42	81.32
2001	6.50	180.00	322.93	24.00	154.50	40.37	33.01	71.06	73.37
2002	12.00	370.00	568.09	31.00	110.00	71.01	99.64	256.44	170.65
2003	13.28	345.28	839.87	54.02	57.00	104.98	211.62	412.25	316.60
2004	14.38	354.13	978.52	54.02	165.00	122.31	260.55	376.63	382.86
2005	16.63	378.61	1,575.69	63.00	245.00	196.96	445.08	625.65	642.04
2006	18.89	388.02	1,408.83	71.00	280.00	176.10	378.79	502.94	554.89
2007	17.66	398.72	1,480.47	79.00	310.00	185.06	371.61	534.80	556.67
2008	18.15	391.45	1,923.14	105.00	238.00	240.39	500.61	839.14	741.01
2009	19.39	364.23	961.66	115.00	207.00	120.21	162.98	356.47	283.19
2010	18.73	362.24	1,122.13	125.00	245.00	140.27	222.98	388.88	363.25
2011	16.32	407.19	1,159.38	150.00	540.50	144.92	189.70	134.26	334.63
2012	15.15	391.53	915.22	165.00	569.50	114.40	36.64	29.68	151.04
2013	15.93	376.21	1,081.72	165.00	381.00	135.21	107.25	293.25	242.47
2014	17.54	375.23	1,191.21	165.00	516.00	148.90	114.09	247.22	262.99
2015	14.14	305.34	576.10	160.00	454.50	72.01	-	(110.42)	72.01
2016	14.80	326.20	642.77	152.50	247.50	80.35	-	162.42	80.35
2017	13.50	345.00	824.13	155.55	283.97	103.02	87.44	194.15	190.46
2018	11.00	310.00	757.65	149.30	346.87	94.71	57.94	108.84	152.64
2019	9.80	275.00	712.46	164.49	430.85	89.06	23.02	5.05	112.07
2020	15.70	295.00	943.55	193.46	468.48	117.94	47.54	116.12	165.49
2021	20.00	305.00	1,107.08	223.52	396.81	138.39	98.17	250.19	236.56
2022	21.45	290.00	1,145.39	227.99	404.74	143.17	102.84	266.64	246.02
2023	16.75	255.00	977.44	192.35	348.51	122.18	70.92	243.48	193.10
2024	13.25	225.00	838.26	196.19	355.49	104.78	25.94	155.86	130.73
2025	11.25	180.00	707.84	164.27	362.59	88.48	-	92.50	88.48
2026	8.20	140.00	552.31	155.36	269.03	69.04	-	58.88	69.04
2027	6.15	105.00	420.56	158.47	217.22	52.57	-	(7.70)	52.57
2028	3.65	65.00	259.03	129.93	-	32.38	-	96.72	32.38
2029	-	-	-	-	1,118.44	-	-	(1,118.44)	-

B4: Large offshore oil field

Year	Production		Gross	Field	Field	Royalty	Tax	IOC	HG
	Liquids	Gas	Rev	Opex	Capex			Take	Take
	000 b/d	mmcf/d	\$M	\$M	\$M	\$M	\$M	\$M	\$M
1994	-	-	-	-	-	-	-	-	-
1995	-	-	-	-	50.00	-	-	(50.00)	-
1996	-	-	-	-	104.00	-	-	(104.00)	-
1997	2.50	15.00	32.40	42.20	144.00	4.05	-	(157.85)	4.05
1998	3.00	20.00	30.97	45.00	207.00	3.87	-	(224.90)	3.87
1999	8.60	70.00	118.42	48.00	233.00	14.80	-	(177.38)	14.80
2000	25.10	130.00	482.21	72.50	92.00	60.28	-	257.43	60.28
2001	36.97	143.30	557.67	80.00	157.00	69.71	-	250.96	69.71
2002	41.26	217.00	659.19	82.50	243.00	82.40	89.86	161.44	172.26
2003	54.64	227.18	1,072.83	89.00	286.00	134.10	253.26	310.46	387.36
2004	44.24	199.38	1,096.82	95.00	240.00	137.10	239.24	385.48	376.35
2005	56.71	218.96	1,882.60	95.00	260.00	235.32	506.36	785.91	741.69
2006	59.48	198.21	1,921.72	110.00	300.00	240.22	496.18	775.32	736.40
2007	50.62	191.87	1,824.15	125.00	250.00	228.02	476.52	744.61	704.53
2008	52.56	162.69	2,436.47	140.00	300.00	304.56	682.22	1,009.69	986.78
2009	52.41	176.08	1,433.78	175.00	280.00	179.22	300.05	499.51	479.28
2010	41.12	171.29	1,465.99	175.00	270.00	183.25	322.93	514.81	506.18
2011	33.67	153.49	1,392.03	170.00	137.50	174.00	342.73	567.79	516.74
2012	34.46	123.90	1,309.40	175.00	353.50	163.68	261.32	355.91	424.99
2013	28.03	109.14	1,150.71	159.00	324.00	143.84	191.13	332.74	334.97
2014	28.21	93.09	1,107.32	220.00	310.00	138.41	149.46	289.44	287.87
2015	26.20	98.10	572.43	220.00	285.50	71.55	-	(4.63)	71.55
2016	29.40	99.98	650.77	181.00	126.90	81.35	55.84	205.68	137.19
2017	28.35	74.95	829.75	183.81	117.50	103.72	138.23	286.49	241.94
2018	26.90	74.90	802.98	191.36	149.82	100.37	120.98	240.45	221.35
2019	25.10	74.85	779.35	208.45	271.67	97.42	68.57	133.25	165.99
2020	23.60	75.25	762.51	212.62	277.10	95.31	59.07	118.41	154.39
2021	21.80	74.00	733.16	216.87	247.31	91.65	49.93	127.40	141.58
2022	20.00	76.00	706.80	221.21	216.23	88.35	43.02	137.99	131.37
2023	18.75	76.00	692.79	225.64	220.54	86.60	31.38	128.63	117.98
2024	16.50	75.00	643.19	230.15	224.96	80.40	11.13	96.55	91.53
2025	14.60	75.00	602.54	222.80	152.97	75.32	25.90	125.55	101.22
2026	10.50	75.00	491.44	202.88	156.04	61.43	-	71.09	61.43
2027	7.50	75.00	403.10	188.28	119.36	50.39	-	45.07	50.39
2028	5.00	63.00	300.95	185.71	40.58	37.62	-	37.04	37.62
2029	2.50	58.00	208.86	150.61	-	26.11	-	32.15	26.11
2030	1.50	53.00	164.54	116.39	-	20.57	-	27.58	20.57
2031	-	-	-	-	929.81	-	-	(929.81)	-

B5: Medium offshore oil field

Year	Production		Gross	Field	Field	Royalty	Tax	IOC	HG
	Liquids	Gas	Rev	Opex	Capex			Take	Take
	000 b/d	mmcf/d	\$M	\$M	\$M	\$M	\$M	\$M	\$M
2001	-	-	-	-	-	-	-	-	-
2002	-	-	-	-	-	-	-	-	-
2003	-	-	-	-	-	-	-	-	-
2004	-	-	-	-	20.00	-	-	(20.00)	-
2005	5.70	-	117.57	24.36	30.84	14.70	17.62	30.05	32.31
2006	8.70	-	209.87	45.40	43.24	26.23	36.03	58.96	62.27
2007	19.30	-	509.39	92.70	71.50	63.67	108.03	173.48	171.70
2008	19.70	-	716.46	103.70	216.40	89.56	114.18	192.63	203.73
2009	20.20	-	454.77	108.79	24.70	56.85	78.49	185.94	135.34
2010	17.70	-	513.16	97.10	44.46	64.14	104.12	203.33	168.26
2011	17.30	-	600.38	97.10	23.76	75.05	149.83	254.65	224.88
2012	14.10	-	484.70	83.35	7.10	60.59	123.58	210.08	184.16
2013	13.10	-	468.35	76.48	28.70	58.54	119.82	184.80	178.37
2014	13.80	-	469.55	76.48	90.00	58.69	89.44	154.93	148.14
2015	12.30	-	219.99	70.64	18.00	27.50	35.04	68.81	62.54
2016	11.50	-	209.88	58.64	10.00	26.23	43.24	71.76	69.47
2017	10.00	-	256.01	57.78	12.24	32.00	60.64	93.35	92.65
2018	8.00	-	204.58	46.45	10.40	25.57	47.11	75.04	72.69
2019	6.00	-	156.59	44.72	10.61	19.57	30.74	50.94	50.31
2020	3.50	-	93.21	39.12	-	11.65	14.78	27.66	26.43
2021	2.00	-	54.82	28.31	-	6.85	5.68	13.98	12.53
2022	-	-	-	-	82.21	-	-	(82.21)	-

B6: Small offshore oil field

Year	Production		Gross	Field	Field	Royalty	Tax	IOC	HG
	Liquids	Gas	Rev	Opex	Capex			Take	Take
	000 b/d	mmcf/d	\$M	\$M	\$M	\$M	\$M	\$M	\$M
2009	-	-	-	-	-	-	-	-	-
2010	-	-	-	-	-	-	-	-	-
2011	-	-	-	-	-	-	-	-	-
2012	-	-	-	-	30.00	-	-	(30.00)	-
2013	-	-	-	-	75.00	-	-	(75.00)	-
2014	1.34	-	45.59	10.98	151.40	5.70	-	(122.49)	5.70
2015	14.00	-	250.39	111.90	118.00	31.30	-	(10.81)	31.30
2016	12.20	-	222.65	91.90	9.00	27.83	-	93.92	27.83
2017	9.50	-	243.21	83.54	-	30.40	18.80	110.47	49.21
2018	7.50	-	191.79	74.80	-	23.97	3.89	89.12	27.86
2019	6.50	-	169.63	70.99	-	21.20	17.94	59.50	39.14
2020	4.50	-	119.84	50.77	-	14.98	17.30	36.78	32.28
2021	2.00	-	54.82	19.30	-	6.85	8.75	19.92	15.60
2022	-	-	-	-	47.30	-	-	(47.30)	-

B7: Medium onshore gas field

Year	Production		Gross	Field	Field	Royalty	Tax	IOC	HG
	Liquids	Gas	Rev	Opex	Capex			Take	Take
	000 b/d	mmcf/d	\$M	\$M	\$M	\$M	\$M	\$M	\$M
2002	-	-	-	-	-	-	-	-	-
2003	-	-	-	-	-	-	-	-	-
2004	-	-	-	-	-	-	-	-	-
2005	-	-	-	-	40.00	-	-	(40.00)	-
2006	-	6.07	14.91	1.40	120.00	1.86	-	(108.35)	1.86
2007	0.47	85.51	229.95	13.20	38.00	28.74	27.88	122.13	56.62
2008	0.45	83.07	284.40	13.20	25.00	35.55	72.15	138.49	107.70
2009	0.43	85.04	132.29	12.00	-	16.54	26.96	76.79	43.50
2010	0.43	87.20	151.87	13.51	-	18.98	33.32	86.06	52.31
2011	0.38	83.14	134.27	14.97	-	16.78	39.37	63.15	56.15
2012	0.43	93.22	108.69	14.27	-	13.59	31.85	48.98	45.44
2013	0.38	87.59	132.84	15.06	-	16.60	40.76	60.41	57.37
2014	0.42	105.12	180.81	19.80	-	22.60	56.38	82.03	78.99
2015	0.52	115.00	131.03	19.13	20.00	16.38	28.86	46.66	45.23
2016	0.54	120.00	146.95	19.58	32.55	18.37	35.64	40.81	54.01
2017	0.54	120.00	180.26	19.97	51.86	22.53	50.53	35.37	73.06
2018	0.54	120.00	198.21	20.37	17.99	24.78	48.78	86.29	73.56
2019	0.54	120.00	213.38	20.78	18.35	26.67	53.92	93.66	80.60
2020	0.50	120.00	227.06	21.19	18.71	28.38	58.70	100.08	87.08
2021	0.45	110.00	213.89	21.61	-	26.74	63.67	101.88	90.40
2022	0.40	108.00	211.96	22.68	36.65	26.49	56.92	69.21	83.42
2023	0.40	108.00	218.63	23.13	51.40	27.33	48.70	68.07	76.03
2024	0.35	108.00	221.43	23.59	20.26	27.68	58.26	91.65	85.94
2025	0.32	100.00	209.22	23.40	20.66	26.15	53.57	85.43	79.73
2026	0.25	89.00	192.20	23.86	21.08	24.02	46.56	76.67	70.58
2027	0.20	77.00	165.97	24.34	21.50	20.75	37.99	61.39	58.74
2028	0.20	65.00	141.34	24.12	21.93	17.67	30.02	47.60	47.69
2029	0.15	55.00	119.91	25.33	-	14.99	31.45	48.14	46.44
2030	0.15	43.00	94.75	25.83	-	11.84	21.97	35.11	33.82
2031	0.15	30.00	70.34	26.35	-	8.79	12.55	22.65	21.34
2032	-	-	-	-	83.77	-	-	(83.77)	-

B9: Large onshore oil field

Year	Production		Gross	Field	Field	Royalty	Tax	IOC	HG
	Liquids	Gas	Rev	Opex	Capex			Take	Take
	000 b/d	mmcf/d	\$M	\$M	\$M	\$M	\$M	\$M	\$M
1981	-	-	-	-	24.50	-	-	(24.50)	-
1982	-	-	-	-	56.00	-	-	(56.00)	-
1983	6.10	3.50	70.91	21.90	51.00	8.86	-	(10.86)	8.86
1984	13.70	11.40	157.98	26.50	62.00	19.75	-	49.74	19.75
1985	20.70	17.60	227.45	31.20	60.00	28.43	-	107.82	28.43
1986	20.00	21.30	125.46	32.50	21.00	15.68	0.74	55.54	16.42
1987	16.65	22.10	130.03	32.50	12.00	16.25	9.80	59.48	26.06
1988	18.00	21.60	118.25	31.10	18.00	14.78	5.70	48.66	20.48
1989	20.40	22.30	159.47	30.90	34.50	19.93	27.09	47.05	47.03
1990	23.39	24.40	224.14	30.00	21.00	28.02	54.22	90.90	82.24
1991	24.95	28.70	212.70	32.00	22.00	26.59	41.94	90.17	68.53
1992	26.51	33.00	220.26	34.00	12.00	27.53	50.42	96.31	77.95
1993	24.50	36.50	194.39	37.00	9.00	24.30	47.33	76.75	71.63
1994	24.97	38.60	183.21	40.00	24.00	22.90	39.90	56.40	62.80
1995	20.48	35.50	159.89	43.00	24.00	19.99	30.98	41.92	50.96
1996	21.96	39.00	216.09	43.00	16.00	27.01	51.37	78.71	78.39
1997	20.83	39.00	192.15	43.00	21.00	24.02	40.08	64.06	64.10
1998	23.77	39.00	154.72	43.00	33.00	19.34	19.84	39.54	39.18
1999	26.38	39.00	218.29	42.00	24.00	27.29	45.56	79.45	72.85
2000	26.90	39.00	358.60	45.00	31.00	44.83	93.87	143.91	138.69
2001	24.68	42.80	295.49	44.00	32.00	36.94	65.44	117.11	102.37
2002	23.69	42.10	277.31	35.00	43.00	34.66	66.71	97.94	101.38
2003	22.23	37.34	326.49	35.00	40.00	40.81	88.52	122.16	129.33
2004	20.10	38.73	386.85	40.00	34.99	48.36	108.57	154.93	156.92
2005	19.94	40.97	544.68	40.00	32.00	68.08	153.50	251.09	221.58
2006	21.96	35.65	617.31	45.00	56.60	77.16	180.71	257.84	257.88
2007	23.34	29.47	690.99	50.00	83.00	86.37	189.89	281.72	276.26
2008	23.10	25.97	923.91	61.00	135.00	115.49	261.06	351.37	376.54
2009	22.95	13.00	535.42	61.00	110.00	66.93	119.32	178.17	186.25
2010	23.53	14.67	705.63	61.40	115.60	88.20	175.70	264.73	263.90
2011	24.80	19.76	889.44	65.00	142.50	111.18	232.01	338.76	343.19
2012	31.30	24.30	1,100.44	87.90	243.40	137.55	256.98	374.60	394.54
2013	36.06	26.15	1,324.81	91.50	192.35	165.60	332.33	543.03	497.93
2014	31.00	28.34	1,099.68	88.40	262.45	137.46	246.89	364.48	384.35
2015	32.18	25.67	602.71	80.30	240.55	75.34	65.74	140.79	141.08
2016	30.28	24.38	580.46	77.28	184.28	72.56	77.60	168.75	150.16
2017	27.28	23.17	730.53	77.91	160.88	91.32	143.43	257.00	234.74
2018	24.66	22.01	664.42	78.53	138.35	83.05	127.30	237.19	210.36
2019	22.92	20.91	632.88	74.82	142.73	79.11	121.60	214.62	200.71
2020	19.89	19.86	565.05	74.80	131.24	70.63	104.39	183.99	175.02
2021	17.02	18.87	501.12	74.30	122.17	62.64	85.97	156.04	148.61
2022	13.67	17.93	419.90	73.20	112.67	52.49	60.88	120.66	113.37
2023	10.86	17.03	349.55	72.83	101.61	43.69	39.13	92.29	82.82
2024	8.78	16.18	295.92	60.93	94.32	36.99	29.20	74.48	66.19
2025	7.13	15.37	251.89	60.83	86.70	31.49	16.89	55.98	48.38
2026	5.66	14.60	211.46	60.83	-	26.43	18.56	105.64	44.99
2027	-	-	-	-	438.91	-	-	(438.91)	-

B10: Medium onshore oil field

Year	Production		Gross	Field	Field	Royalty	Tax	IOC	HG
	Liquids	Gas	Rev	Opex	Capex			Take	Take
	000 b/d	mmcf/d	\$M	\$M	\$M	\$M	\$M	\$M	\$M
1990	-	-	-	-	2.50	-	-	-	(2.50)
1991	0.10	-	0.79	0.84	5.50	0.10	-	-	(5.65)
1992	0.19	-	1.43	1.04	0.50	0.18	-	-	(0.29)
1993	0.16	-	1.08	1.04	-	0.13	-	-	(0.10)
1994	0.22	-	1.38	1.19	-	0.17	-	-	0.02
1995	0.20	-	1.34	1.17	1.00	0.17	-	-	(1.00)
1996	0.44	-	3.54	1.48	6.00	0.44	-	-	(4.38)
1997	0.35	-	2.64	1.40	2.00	0.33	-	-	(1.09)
1998	0.52	-	2.74	1.85	3.00	0.34	-	-	(2.46)
1999	0.57	-	4.02	1.89	-	0.50	-	-	1.63
2000	0.63	-	6.96	1.95	0.80	0.87	-	-	3.34
2001	0.90	-	8.51	2.29	3.20	1.06	-	-	1.95
2002	0.80	-	7.62	2.10	1.60	0.95	-	-	2.97
2003	0.74	-	8.39	2.05	1.60	1.05	-	-	3.69
2004	0.86	-	12.99	2.15	2.50	1.62	-	-	6.72
2005	1.10	-	22.69	2.35	10.50	2.84	-	-	7.00
2006	1.03	-	24.85	2.90	13.50	3.11	-	-	5.34
2007	1.40	-	36.95	7.50	12.00	4.62	-	-	12.83
2008	1.71	-	62.19	8.00	15.00	7.77	-	-	31.42
2009	1.68	-	37.82	7.95	9.00	4.73	-	-	16.14
2010	1.49	-	43.20	9.00	14.00	5.40	-	-	14.80
2011	1.26	-	43.73	11.00	11.00	5.47	-	-	16.26
2012	1.67	-	57.41	11.90	17.00	7.18	-	-	21.33
2013	1.77	-	63.28	12.65	15.50	7.91	-	-	27.22
2014	1.60	-	54.44	12.00	13.95	6.81	-	-	21.69
2015	1.50	-	26.83	11.55	11.00	3.35	-	-	0.92
2016	1.32	-	24.09	10.73	6.10	3.01	-	-	4.25
2017	1.08	-	27.65	9.39	-	3.46	-	-	14.80
2018	0.92	-	23.53	8.52	5.29	2.94	-	-	6.78
2019	0.77	-	20.10	7.61	-	2.51	-	-	9.97
2020	0.64	-	17.04	7.21	1.10	2.13	-	-	6.60
2021	0.54	-	14.80	6.23	-	1.85	-	-	6.72
2022	0.20	-	5.66	2.86	1.15	0.71	-	-	0.94
2023	0.16	-	4.67	2.34	-	0.58	-	-	1.75
2024	0.13	-	3.91	1.73	1.19	0.49	-	-	0.50
2025	0.10	-	3.10	1.46	-	0.39	-	-	1.26
2026	0.08	-	2.56	1.86	-	0.32	-	-	0.38
2027	-	-	-	-	21.93	-	-	-	(21.93)

B11: Small onshore oil field

Year	Production		Gross	Field	Field	Royalty	Tax	IOC	HG
	Liquids	Gas	Rev	Opex	Capex			Take	Take
	000 b/d	mmcf/d	\$M	\$M	\$M	\$M	\$M	\$M	\$M
1989	-	-	-	-	-	-	-	-	-
1990	-	-	-	-	2.00	-	-	-	(2.00)
1991	0.40	-	3.15	0.95	1.00	0.39	-	-	0.80
1992	1.26	-	9.46	2.00	-	1.18	-	0.76	5.52
1993	1.26	-	8.48	2.00	-	1.06	-	1.07	4.35
1994	1.00	-	6.27	2.00	2.40	0.78	-	-	1.09
1995	1.16	-	7.79	2.00	-	0.97	-	0.70	4.11
1996	1.00	-	8.04	2.10	1.20	1.01	-	-	3.74
1997	0.78	-	5.87	2.00	-	0.73	-	0.48	2.66
1998	0.69	-	3.63	2.00	-	0.45	-	-	1.18
1999	0.60	-	4.23	1.10	0.50	0.53	-	-	2.10
2000	0.55	-	6.07	1.10	1.50	0.76	-	0.27	2.45
2001	0.60	-	5.67	1.10	0.40	0.71	-	1.50	1.96
2002	0.75	-	7.14	1.10	-	0.89	-	1.39	3.77
2003	0.64	-	7.25	0.90	0.20	0.91	-	2.17	3.08
2004	0.54	-	8.16	0.80	-	1.02	-	2.57	3.77
2005	0.48	-	9.90	0.60	0.30	1.24	-	3.27	4.49
2006	0.57	-	13.75	0.75	3.00	1.72	-	3.35	4.94
2007	0.49	-	12.93	1.00	3.50	1.62	-	2.67	4.15
2008	0.72	-	26.19	1.50	1.80	3.27	-	8.80	10.81
2009	0.49	-	11.03	2.00	4.00	1.38	-	0.11	3.54
2010	0.42	-	12.18	2.50	0.50	1.52	-	2.78	4.87
2011	0.50	-	17.35	2.80	0.50	2.17	-	4.78	7.11
2012	0.40	-	13.75	2.80	6.00	1.72	-	0.70	2.53
2013	0.31	-	11.08	2.80	4.50	1.39	-	0.51	1.89
2014	0.25	-	8.51	3.80	-	1.06	-	1.13	2.51
2015	0.25	-	4.47	3.00	-	0.56	-	0.02	0.89
2016	0.29	-	5.29	3.00	0.75	0.66	-	0.03	0.85
2017	0.33	-	8.45	3.06	0.77	1.06	-	1.23	2.33
2018	0.35	-	8.95	3.12	1.56	1.12	1.00	1.06	1.09
2019	0.31	-	8.09	3.18	-	1.01	2.00	1.41	0.49
2020	0.23	-	6.12	3.25	-	0.77	3.00	0.64	(1.53)
2021	0.17	-	4.66	2.21	-	0.58	4.00	0.60	(2.74)
2022	-	-	-	-	3.38	-	5.00	-	(8.38)

APPENDIX C : Deterministic calculation table of Thailand-III

C1: Large offshore gas field

Year	Production		Gross	Field	Field	Royalty	SRB	Tax	IOC	HG
	Liquids	Gas	Rev	Opex	Capex				Take	Take
	000 b/d	mmcf/d	\$M	\$M	\$M	\$M	\$M	\$M	\$M	\$M
1990	-	-	-	-	17.00	-	-	-	(17.00)	-
1991	-	-	-	-	98.00	-	-	-	(98.00)	-
1992	-	-	-	-	140.00	-	-	-	(140.00)	-
1993	1.22	175.00	150.01	40.00	141.00	17.95	-	-	(48.94)	17.95
1994	6.00	250.00	210.09	40.00	140.00	27.44	-	-	2.65	27.44
1995	7.00	300.00	236.42	50.00	188.00	31.63	-	-	(33.21)	31.63
1996	8.00	337.00	405.08	55.00	119.00	54.92	-	-	176.16	54.92
1997	10.50	344.00	390.45	60.00	158.00	53.24	-	-	119.22	53.24
1998	11.50	435.00	390.78	80.00	111.00	54.31	-	19.67	125.80	73.98
1999	15.00	575.00	580.15	100.00	40.00	82.18	-	134.65	223.33	216.82
2000	16.00	548.00	1,040.80	100.00	71.00	147.14	-	339.40	383.26	486.54
2001	16.21	573.35	986.15	109.61	135.00	139.75	-	297.11	304.67	436.87
2002	16.10	551.52	829.76	110.00	166.00	117.35	-	229.74	206.66	347.10
2003	16.60	499.00	1,184.41	105.50	160.00	166.66	-	393.82	358.44	560.48
2004	17.71	587.52	1,530.57	120.00	110.00	217.33	-	540.73	542.51	758.06
2005	17.84	592.09	2,295.70	140.00	70.00	326.11	123.17	792.84	843.58	1,242.12
2006	17.65	599.20	1,897.67	140.00	125.00	269.70	-	677.87	685.11	947.57
2007	18.01	607.25	2,020.21	140.00	155.00	287.34	-	712.44	725.44	999.78
2008	18.55	589.30	2,576.07	130.00	655.00	365.97	-	862.97	562.13	1,228.94
2009	18.20	516.32	1,154.14	130.00	510.00	162.86	-	251.47	99.81	414.33
2010	19.70	586.40	1,508.62	150.00	492.00	214.39	-	360.50	291.73	574.89
2011	20.56	591.01	1,574.24	160.00	790.00	223.88	-	239.98	160.38	463.86
2012	28.36	773.42	1,754.04	210.00	430.00	252.76	-	335.72	525.55	588.49
2013	32.49	889.06	2,371.99	245.00	296.00	343.62	-	596.77	890.59	940.39
2014	28.89	870.57	2,362.06	245.00	671.00	341.73	-	606.48	497.85	948.21
2015	28.08	904.69	1,459.83	240.00	368.00	211.41	-	205.71	434.70	417.13
2016	26.65	910.00	1,525.99	232.00	358.50	220.97	-	344.39	370.13	565.36
2017	18.00	900.00	1,709.12	236.64	263.67	246.97	-	455.85	505.99	702.82
2018	14.15	870.00	1,698.73	241.37	372.46	244.95	-	422.83	417.12	667.78
2019	10.95	870.00	1,730.62	249.38	210.12	249.35	-	471.72	550.05	721.07
2020	9.85	870.00	1,811.95	243.55	387.51	261.00	-	491.74	428.15	752.74
2021	8.30	750.00	1,601.74	237.38	163.40	229.18	-	422.34	549.44	651.52
2022	7.95	654.50	1,440.79	230.86	211.72	204.76	-	391.53	401.92	596.29
2023	7.00	621.00	1,394.26	223.99	209.06	197.50	-	388.04	375.68	585.54
2024	6.25	612.00	1,383.24	216.76	296.43	195.70	-	341.65	332.70	537.35
2025	5.70	577.00	1,326.79	215.12	302.35	187.01	-	327.05	295.26	514.05
2026	4.90	505.00	1,202.03	195.04	308.40	167.86	-	269.72	261.01	437.58
2027	3.90	430.00	1,018.80	174.07	314.57	140.39	-	198.57	191.21	338.96
2028	3.50	355.00	854.09	152.19	320.87	115.55	-	135.66	129.82	251.21
2029	2.80	255.00	630.00	135.83	327.28	81.67	-	45.59	39.63	127.26
2030	2.00	175.00	436.07	112.16	333.83	52.50	-	-	(62.42)	52.50
2031	1.45	122.50	318.64	87.48	95.56	34.35	-	-	101.24	34.35
2032	0.80	75.00	197.68	89.23	-	18.12	-	-	90.33	18.12
2033	0.50	45.00	122.97	91.02	-	9.17	-	-	22.78	9.17
2034	-	-	-	-	1,463.52	-	-	-	(1,463.52)	-

C2: Medium offshore gas field

Year	Production		Gross	Field	Field	Royalty	SRB	Tax	IOC	HG
	Liquids	Gas	Rev	Opex	Capex				Take	Take
	000 b/d	mmcfd	\$M	\$M	\$M	\$M	\$M	\$M	\$M	\$M
1980	-	-	-	-	98.00	-	-	-	(98.00)	-
1981	1.20	73.00	68.56	7.16	116.00	6.29	-	-	(60.89)	6.29
1982	4.50	128.00	170.04	7.52	153.00	19.40	-	11.76	(21.65)	31.16
1983	4.00	145.00	181.40	10.98	113.80	21.25	-	27.09	8.28	48.34
1984	5.50	184.00	237.63	12.20	65.20	29.56	-	47.88	82.79	77.44
1985	6.50	185.00	235.85	12.64	76.00	29.52	-	39.91	77.78	69.43
1986	6.50	161.00	149.88	12.56	38.00	18.31	-	19.18	61.83	37.49
1987	6.40	207.00	170.98	14.00	41.00	21.78	-	37.49	56.72	59.26
1988	6.30	216.00	169.96	14.67	60.00	21.77	-	39.05	34.46	60.83
1989	7.00	230.00	191.88	15.47	50.00	24.86	-	50.58	50.97	75.44
1990	7.25	224.00	204.56	15.96	41.00	26.43	-	54.17	67.00	80.60
1991	8.00	277.00	221.66	18.00	21.00	29.46	-	65.08	88.12	94.54
1992	7.50	247.00	215.86	21.00	47.00	28.27	-	58.60	60.98	86.87
1993	9.00	283.00	289.86	22.00	58.50	38.70	-	86.44	84.22	125.14
1994	8.50	262.00	234.04	23.00	52.50	30.95	-	63.19	64.41	94.14
1995	9.00	275.00	234.06	24.00	11.00	31.15	-	77.20	90.70	108.36
1996	8.10	259.00	327.02	27.00	25.00	43.14	-	113.72	118.16	156.86
1997	9.00	285.00	325.75	30.00	34.00	43.52	-	106.39	111.83	149.92
1998	8.75	292.00	267.74	33.00	15.40	35.84	-	87.16	96.33	123.01
1999	9.00	298.00	309.32	33.00	22.50	41.51	-	102.78	109.53	144.29
2000	8.50	270.00	519.62	32.80	39.20	68.95	-	188.25	190.42	257.20
2001	8.90	257.00	457.48	32.59	30.00	60.43	-	166.09	168.37	226.52
2002	8.00	251.00	384.04	35.24	55.00	50.47	-	129.24	114.10	179.70
2003	12.07	268.15	672.17	33.00	69.00	89.83	-	250.44	229.90	340.27
2004	11.76	261.65	740.13	33.00	70.00	98.61	-	279.14	259.38	377.75
2005	11.60	265.26	1,102.90	33.00	100.00	147.09	-	422.18	400.63	569.27
2006	11.11	243.12	865.22	37.00	120.00	114.22	-	307.28	286.72	421.50
2007	11.29	266.40	975.71	40.00	150.00	130.10	-	339.04	316.58	469.13
2008	10.62	252.85	1,202.08	44.00	186.50	159.17	-	417.91	394.51	577.07
2009	12.50	235.13	620.41	42.00	135.00	81.90	-	177.08	184.43	258.98
2010	11.20	245.02	716.42	44.00	135.00	94.68	-	216.90	225.85	311.58
2011	10.54	230.36	701.27	46.00	125.00	91.88	-	214.62	223.77	306.50
2012	9.03	247.49	559.73	49.00	66.40	73.64	-	171.03	199.67	244.67
2013	5.87	190.32	468.97	45.00	275.60	58.79	-	80.45	9.13	139.24
2014	6.75	216.99	573.40	43.00	175.10	73.63	-	138.22	143.45	211.85
2015	5.47	196.41	305.73	49.00	180.50	38.45	-	24.86	12.92	63.32
2016	5.80	222.27	359.78	48.00	67.50	46.20	-	77.67	120.42	123.86
2017	8.50	250.00	564.36	53.55	109.65	74.23	-	152.45	174.48	226.68
2018	11.75	250.00	684.63	59.82	70.23	90.79	-	220.01	243.78	310.80
2019	10.25	265.00	707.60	63.67	116.42	94.08	-	216.27	217.16	310.35
2020	9.00	255.00	693.88	64.95	118.74	91.59	-	213.27	205.33	304.86
2021	7.20	230.00	618.79	60.72	159.65	80.23	-	167.83	150.37	248.06
2022	7.10	205.00	581.65	57.43	125.23	74.18	-	164.36	160.45	238.54
2023	6.50	186.00	546.10	53.99	96.94	68.42	-	157.99	168.77	226.41
2024	6.25	168.00	516.22	50.38	98.89	63.46	-	147.46	156.03	210.92
2025	6.00	135.00	455.24	46.61	68.84	53.45	-	134.41	151.92	187.87
2026	5.90	113.00	422.79	42.66	70.22	47.53	-	126.49	135.89	174.02
2027	5.85	95.00	389.95	39.79	71.62	41.75	-	116.34	120.45	158.09
2028	4.35	73.50	300.50	34.24	58.84	29.47	-	87.70	90.25	117.17
2029	2.65	57.50	213.10	34.93	60.02	18.86	-	49.88	49.40	68.75
2030	2.25	40.00	164.77	35.63	61.23	12.68	-	28.01	27.22	40.69
2031	1.70	28.00	124.16	29.61	54.91	8.41	-	15.86	15.38	24.26
2032	0.50	13.50	49.36	16.47	-	2.65	-	-	30.24	2.65
2033	-	-	-	-	601.56	-	-	-	(601.56)	-

C3: Small offshore gas field

Year	Production		Gross	Field	Field	Royalty	SRB	Tax	IOC	HG
	Liquids	Gas	Rev	Opex	Capex				Take	Take
	000 b/d	mmcf/d	\$M	\$M	\$M	\$M	\$M	\$M	\$M	\$M
1997	-	-	-	-	176.20	-	-	-	(176.20)	-
1998	-	-	-	-	203.60	-	-	-	(203.60)	-
1999	2.00	80.00	80.10	16.00	32.00	7.69	-	-	24.41	7.69
2000	4.50	171.00	319.33	20.00	38.60	38.95	-	58.00	163.79	96.95
2001	6.50	180.00	322.93	24.00	154.50	40.24	-	53.25	50.94	93.49
2002	12.00	370.00	568.09	31.00	110.00	78.07	12.19	125.52	211.31	215.78
2003	13.28	345.28	839.87	54.02	57.00	114.98	184.16	167.03	262.68	466.17
2004	14.38	354.13	978.52	54.02	165.00	134.41	175.03	228.15	221.92	537.58
2005	16.63	378.61	1,575.69	63.00	245.00	218.01	430.37	317.85	301.46	966.23
2006	18.89	388.02	1,408.83	71.00	280.00	195.66	241.41	336.36	284.41	773.43
2007	17.66	398.72	1,480.47	79.00	310.00	205.73	194.86	356.37	334.50	756.96
2008	18.15	391.45	1,923.14	105.00	238.00	267.05	354.53	430.21	528.34	1,051.80
2009	19.39	364.23	961.66	115.00	207.00	133.09	5.07	214.11	287.39	352.27
2010	18.73	362.24	1,122.13	125.00	245.00	155.13	5.97	282.70	308.33	443.80
2011	16.32	407.19	1,159.38	150.00	540.50	161.13	-	254.06	53.69	415.19
2012	15.15	391.53	915.22	165.00	569.50	126.72	-	87.68	(33.69)	214.40
2013	15.93	376.21	1,081.72	165.00	381.00	149.49	-	167.72	218.50	317.21
2014	17.54	375.23	1,191.21	165.00	516.00	164.86	-	180.56	164.79	345.42
2015	14.14	305.34	576.10	160.00	454.50	78.19	-	-	(116.59)	78.19
2016	14.80	326.20	642.77	152.50	247.50	87.79	-	-	154.98	87.79
2017	13.50	345.00	824.13	155.55	283.97	112.85	-	55.70	216.06	168.55
2018	11.00	310.00	757.65	149.30	346.87	102.44	-	101.42	57.62	203.86
2019	9.80	275.00	712.46	164.49	430.85	95.00	-	64.57	(42.45)	159.57
2020	15.70	295.00	943.55	193.46	468.48	128.01	-	101.48	52.12	229.49
2021	20.00	305.00	1,107.08	223.52	396.81	151.50	-	160.81	174.44	312.31
2022	21.45	290.00	1,145.39	227.99	404.74	156.50	-	167.77	188.39	324.27
2023	16.75	255.00	977.44	192.35	348.51	131.25	-	127.47	177.86	258.72
2024	13.25	225.00	838.26	196.19	355.49	110.37	-	75.54	100.67	185.91
2025	11.25	180.00	707.84	164.27	362.59	90.20	-	41.12	49.66	131.32
2026	8.20	140.00	552.31	155.36	269.03	66.55	-	7.91	53.46	74.46
2027	6.15	105.00	420.56	158.47	217.22	46.54	-	-	(1.66)	46.54
2028	3.65	65.00	259.03	129.93	-	24.38	-	-	104.72	24.38
2029	-	-	-	-	1,118.44	-	-	-	(1,118.44)	-

C4: Large offshore oil field

Year	Production		Gross	Field	Field	Royalty	SRB	Tax	IOC	HG
	Liquids	Gas	Rev	Opex	Capex				Take	Take
	000 b/d	mmcf/d	\$M	\$M	\$M	\$M	\$M	\$M	\$M	\$M
1994	-	-	-	-	-	-	-	-	-	-
1995	-	-	-	-	50.00	-	-	-	(50.00)	-
1996	-	-	-	-	104.00	-	-	-	(104.00)	-
1997	2.50	15.00	32.40	42.20	144.00	1.89	-	-	(155.69)	1.89
1998	3.00	20.00	30.97	45.00	207.00	2.08	-	-	(223.11)	2.08
1999	8.60	70.00	118.42	48.00	233.00	12.29	-	-	(174.87)	12.29
2000	25.10	130.00	482.21	72.50	92.00	62.62	-	-	255.09	62.62
2001	36.97	143.30	557.67	80.00	157.00	74.99	-	-	245.68	74.99
2002	41.26	217.00	659.19	82.50	243.00	90.86	-	49.89	192.94	140.75
2003	54.64	227.18	1,072.83	89.00	286.00	149.97	18.37	303.19	226.29	471.53
2004	44.24	199.38	1,096.82	95.00	240.00	151.16	103.81	248.86	257.99	503.83
2005	56.71	218.96	1,882.60	95.00	260.00	263.30	391.93	414.07	458.30	1,069.30
2006	59.48	198.21	1,921.72	110.00	300.00	268.59	261.06	471.57	510.50	1,001.22
2007	50.62	191.87	1,824.15	125.00	250.00	252.74	155.53	500.40	540.48	908.67
2008	52.56	162.69	2,436.47	140.00	300.00	336.49	265.60	685.73	708.64	1,287.82
2009	52.41	176.08	1,433.78	175.00	280.00	198.46	-	380.04	400.27	578.51
2010	41.12	171.29	1,465.99	175.00	270.00	200.02	-	406.17	414.80	606.19
2011	33.67	153.49	1,392.03	170.00	137.50	186.64	-	423.42	474.47	610.05
2012	34.46	123.90	1,309.40	175.00	353.50	173.93	-	338.02	268.95	511.96
2013	28.03	109.14	1,150.71	159.00	324.00	149.07	-	260.43	258.20	409.51
2014	28.21	93.09	1,107.32	220.00	310.00	142.12	-	216.81	218.39	358.93
2015	26.20	98.10	572.43	220.00	285.50	73.14	-	-	(6.22)	73.14
2016	29.40	99.98	650.77	181.00	126.90	84.24	-	89.79	168.84	174.04
2017	28.35	74.95	829.75	183.81	117.50	105.18	-	189.35	233.90	294.54
2018	26.90	74.90	802.98	191.36	149.82	101.11	-	170.79	189.90	271.90
2019	25.10	74.85	779.35	208.45	271.67	97.24	-	117.37	84.63	214.61
2020	23.60	75.25	762.51	212.62	277.10	94.39	-	107.19	71.21	201.58
2021	21.80	74.00	733.16	216.87	247.31	89.64	-	96.76	82.58	186.40
2022	20.00	76.00	706.80	221.21	216.23	85.56	-	88.58	95.21	174.15
2023	18.75	76.00	692.79	225.64	220.54	83.08	-	76.44	87.09	159.52
2024	16.50	75.00	643.19	230.15	224.96	75.55	-	53.76	58.78	129.31
2025	14.60	75.00	602.54	222.80	152.97	69.43	-	66.50	90.84	135.93
2026	10.50	75.00	491.44	202.88	156.04	53.66	-	31.63	47.23	85.29
2027	7.50	75.00	403.10	188.28	119.36	41.61	-	15.58	38.26	57.19
2028	5.00	63.00	300.95	185.71	40.58	28.91	-	2.77	42.97	31.68
2029	2.50	58.00	208.86	150.61	-	18.45	-	0.70	39.10	19.15
2030	1.50	53.00	164.54	116.39	-	13.48	-	-	34.66	13.48
2031	-	-	-	-	929.81	-	-	-	(929.81)	-

C5: Medium offshore oil field

Year	Production		Gross	Field	Field	Royalty	SRB	Tax	IOC	HG
	Liquids	Gas	Rev	Opex	Capex				Take	Take
	000 b/d	mmcf/d	\$M	\$M	\$M	\$M	\$M	\$M	\$M	\$M
2001	-	-	-	-	-	-	-	-	-	-
2002	-	-	-	-	-	-	-	-	-	-
2003	-	-	-	-	-	-	-	-	-	-
2004	-	-	-	-	20.00	-	-	-	(20.00)	-
2005	5.70	-	117.57	24.36	30.84	7.37	-	28.63	26.37	36.00
2006	8.70	-	209.87	45.40	43.24	15.86	-	54.34	51.03	70.20
2007	19.30	-	509.39	92.70	71.50	51.47	49.93	121.00	122.78	222.40
2008	19.70	-	716.46	103.70	216.40	72.74	77.67	128.53	117.42	278.94
2009	20.20	-	454.77	108.79	24.70	46.55	19.23	102.45	153.05	168.23
2010	17.70	-	513.16	97.10	44.46	50.74	25.67	130.06	165.13	206.47
2011	17.30	-	600.38	97.10	23.76	59.00	42.05	174.35	204.12	275.40
2012	14.10	-	484.70	83.35	7.10	44.69	13.98	154.83	180.75	213.50
2013	13.10	-	468.35	76.48	28.70	42.01	6.42	154.15	160.59	202.58
2014	13.80	-	469.55	76.48	90.00	42.96	2.60	125.36	132.15	170.92
2015	12.30	-	219.99	70.64	18.00	19.23	-	52.93	59.19	72.15
2016	11.50	-	209.88	58.64	10.00	17.79	-	60.58	62.87	78.37
2017	10.00	-	256.01	57.78	12.24	20.16	-	82.56	83.27	102.73
2018	8.00	-	204.58	46.45	10.40	15.02	-	65.17	67.53	80.20
2019	6.00	-	156.59	44.72	10.61	10.11	-	45.26	45.89	55.37
2020	3.50	-	93.21	39.12	-	5.16	-	23.85	25.08	29.01
2021	2.00	-	54.82	28.31	-	2.74	-	11.16	12.61	13.90
2022	-	-	-	-	82.21	-	-	-	(82.21)	-

C6: Small offshore oil field

Year	Production		Gross	Field	Field	Royalty	SRB	Tax	IOC	HG
	Liquids	Gas	Rev	Opex	Capex				Take	Take
	000 b/d	mmcf/d	\$M	\$M	\$M	\$M	\$M	\$M	\$M	\$M
2009	-	-	-	-	-	-	-	-	-	-
2010	-	-	-	-	-	-	-	-	-	-
2011	-	-	-	-	-	-	-	-	-	-
2012	-	-	-	-	30.00	-	-	-	(30.00)	-
2013	-	-	-	-	75.00	-	-	-	(75.00)	-
2014	1.34	-	45.59	10.98	51.40	2.28	-	-	(119.07)	2.28
2015	14.00	-	250.39	111.90	118.00	23.03	-	-	(2.54)	23.03
2016	12.20	-	222.65	91.90	9.00	19.39	-	-	102.36	19.39
2017	9.50	-	243.21	83.54	-	18.88	-	33.81	106.98	52.69
2018	7.50	-	191.79	74.80	-	13.74	-	20.99	82.25	34.74
2019	6.50	-	169.63	70.99	-	11.42	5.04	30.91	51.27	47.37
2020	4.50	-	119.84	50.77	-	6.82	-	28.87	33.37	35.70
2021	2.00	-	54.82	19.30	-	2.74	-	14.23	18.55	16.97
2022	-	-	-	-	47.30	-	-	-	(47.30)	-

C7: Medium onshore gas field

Year	Production		Gross	Field	Field	Royalty	SRB	Tax	IOC	HG
	Liquids	Gas	Rev	Opex	Capex				Take	Take
	000 b/d	mmcf/d	\$M	\$M	\$M	\$M	\$M	\$M	\$M	\$M
2002	-	-	-	-	-	-	-	-	-	-
2003	-	-	-	-	-	-	-	-	-	-
2004	-	-	-	-	-	-	-	-	-	-
2005	-	-	-	-	40.00	-	-	-	(40.00)	-
2006	-	6.07	14.91	1.40	120.00	0.75	-	-	(107.23)	0.75
2007	0.47	85.51	229.95	13.20	38.00	21.83	-	45.33	111.59	67.16
2008	0.45	83.07	284.40	13.20	25.00	26.74	-	94.33	125.12	121.08
2009	0.43	85.04	132.29	12.00	-	12.53	-	37.24	70.53	49.76
2010	0.43	87.20	151.87	13.51	-	14.49	-	45.06	78.81	59.55
2011	0.38	83.14	134.27	14.97	-	12.61	-	49.84	56.84	62.45
2012	0.43	93.22	108.69	14.27	-	10.57	-	40.15	43.69	50.73
2013	0.38	87.59	132.84	15.06	-	12.68	-	51.03	54.07	63.71
2014	0.42	105.12	180.81	19.80	-	18.14	-	69.91	72.95	88.06
2015	0.52	115.00	131.03	19.13	20.00	13.52	-	38.47	39.90	52.00
2016	0.54	120.00	146.95	19.58	32.55	15.45	-	46.28	33.09	61.73
2017	0.54	120.00	180.26	19.97	51.86	18.96	-	63.58	25.89	82.54
2018	0.54	120.00	198.21	20.37	17.99	20.84	-	63.14	75.87	83.98
2019	0.54	120.00	213.38	20.78	18.35	22.44	-	69.38	82.44	91.82
2020	0.50	120.00	227.06	21.19	18.71	23.86	-	75.15	88.15	99.01
2021	0.45	110.00	213.89	21.61	-	21.70	-	79.55	91.03	101.25
2022	0.40	108.00	211.96	22.68	36.65	21.40	-	72.72	58.52	94.11
2023	0.40	108.00	218.63	23.13	51.40	22.07	-	64.99	57.04	87.06
2024	0.35	108.00	221.43	23.59	20.26	22.34	-	74.77	80.48	97.11
2025	0.32	100.00	209.22	23.40	20.66	20.70	-	69.37	75.08	90.08
2026	0.25	89.00	192.20	23.86	21.08	18.39	-	61.39	67.48	79.78
2027	0.20	77.00	165.97	24.34	21.50	15.11	-	51.18	53.83	66.29
2028	0.20	65.00	141.34	24.12	21.93	12.00	-	41.69	41.60	53.69
2029	0.15	55.00	119.91	25.33	-	9.38	-	41.75	43.45	51.12
2030	0.15	43.00	94.75	25.83	-	6.84	-	30.39	31.68	37.24
2031	0.15	30.00	70.34	26.35	-	4.26	-	19.21	20.52	23.47
2032	-	-	-	-	83.77	-	-	-	(83.77)	-

C8: Small onshore gas field

Year	Production		Gross	Field	Field	Royalty	SRB	Tax	IOC	HG
	Liquids	Gas	Rev	Opex	Capex				Take	Take
	000 b/d	mmcf/d	\$M	\$M	\$M	\$M	\$M	\$M	\$M	\$M
1989	-	-	-	-	16.00	-	-	-	(16.00)	-
1990	-	51.00	29.23	2.30	-	2.22	-	-	24.70	2.22
1991	-	57.00	36.82	2.40	-	2.90	-	1.47	30.06	4.36
1992	-	56.00	45.38	2.40	-	3.55	-	7.40	32.03	10.95
1993	-	63.00	43.46	2.50	-	3.60	-	6.37	30.99	9.97
1994	-	64.00	40.41	2.70	-	3.38	-	4.86	29.48	8.23
1995	-	65.00	65.72	2.90	1.00	5.53	-	18.80	37.48	24.33
1996	-	84.00	76.04	4.00	20.00	7.10	-	13.87	31.06	20.98
1997	-	90.00	68.33	5.00	-	6.53	-	18.81	37.99	25.34
1998	-	93.00	76.72	5.00	35.00	7.40	-	8.26	21.05	15.67
1999	-	71.00	111.95	5.00	-	9.81	-	38.18	58.96	47.99
2000	-	60.00	87.16	5.00	-	7.04	-	36.56	38.56	43.60
2001	-	59.00	72.36	5.00	-	5.79	-	29.98	31.58	35.77
2002	-	49.71	99.25	5.00	-	7.49	-	42.58	44.18	50.07
2003	-	35.00	75.24	5.00	-	4.90	-	32.67	32.67	37.57
2004	-	33.54	109.20	5.00	-	6.95	-	48.62	48.62	55.58
2005	-	30.83	75.73	5.40	1.80	4.58	-	32.05	31.90	36.63
2006	-	25.51	64.90	5.40	-	3.69	-	27.89	27.92	31.58
2007	-	23.22	74.92	5.40	-	4.22	-	32.63	32.67	36.85
2008	-	19.49	28.10	6.90	-	1.55	-	9.58	10.07	11.13
2009	-	18.19	29.08	9.60	-	1.59	-	8.69	9.20	10.28
2010	-	15.53	22.62	5.00	-	1.20	-	8.20	8.22	9.40
2011	-	14.33	14.44	5.00	-	0.76	-	4.33	4.35	5.09
2012	-	13.40	18.24	5.00	-	0.95	-	6.14	6.16	7.08
2013	-	12.49	19.79	5.00	-	1.01	-	6.88	6.89	7.89
2014	-	12.15	12.86	5.00	-	0.65	-	3.60	3.60	4.26
2015	-	10.94	12.50	5.09	-	0.62	-	3.39	3.39	4.02
2016	-	9.84	13.65	5.19	-	0.68	-	3.89	3.89	4.57
2017	-	8.86	13.61	5.29	-	0.68	-	3.82	3.82	4.50
2018	-	7.97	13.24	5.40	-	0.66	-	3.59	3.59	4.25
2019	-	7.17	12.77	5.50	-	0.64	-	3.32	3.32	3.95
2020	-	6.46	11.84	5.61	-	0.59	-	2.82	2.82	3.41
2021	-	-	-	-	-	-	-	-	-	-
2022	-	-	-	-	16.00	-	-	-	(16.00)	-

C9: Large onshore oil field

Year	Production		Gross	Field	Field	Royalty	Tax	IOC	HG
	Liquids	Gas	Rev	Opex	Capex			Take	Take
	000 b/d	mmcfd	\$M	\$M	\$M	\$M	\$M	\$M	\$M
1981	-	-	-	-	24.50	-	-	(24.50)	-
1982	-	-	-	-	56.00	-	-	(56.00)	-
1983	6.10	3.50	70.91	21.90	51.00	4.85	-	(6.84)	4.85
1984	13.70	11.40	157.98	26.50	62.00	15.09	-	54.39	15.09
1985	20.70	17.60	227.45	31.20	60.00	24.91	-	111.34	24.91
1986	20.00	21.30	125.46	32.50	21.00	13.73	6.52	51.71	20.25
1987	16.65	22.10	130.03	32.50	12.00	13.40	19.36	52.78	32.76
1988	18.00	21.60	118.25	31.10	18.00	12.51	14.23	42.41	26.74
1989	20.40	22.30	159.47	30.90	34.50	17.60	38.23	38.25	55.83
1990	23.39	24.40	224.14	30.00	21.00	25.82	69.33	77.99	95.15
1991	24.95	28.70	212.70	32.00	22.00	25.07	55.99	77.63	81.06
1992	26.51	33.00	220.26	34.00	12.00	26.47	64.72	83.08	91.18
1993	24.50	36.50	194.39	37.00	9.00	23.10	60.08	65.20	83.18
1994	24.97	38.60	183.21	40.00	24.00	21.92	51.84	45.44	73.76
1995	20.48	35.50	159.89	43.00	24.00	18.21	41.86	32.82	60.07
1996	21.96	39.00	216.09	43.00	16.00	25.18	65.79	66.11	90.98
1997	20.83	39.00	192.15	43.00	21.00	22.13	53.03	52.99	75.16
1998	23.77	39.00	154.72	43.00	33.00	18.34	30.01	30.37	48.35
1999	26.38	39.00	218.29	42.00	24.00	26.41	59.64	66.24	86.05
2000	26.90	39.00	358.60	45.00	31.00	43.55	116.92	122.14	160.47
2001	24.68	42.80	295.49	44.00	32.00	35.48	84.64	99.38	120.11
2002	23.69	42.10	277.31	35.00	43.00	33.00	84.88	81.44	117.88
2003	22.23	37.34	326.49	35.00	40.00	38.04	110.31	103.14	148.35
2004	20.10	38.73	386.85	40.00	34.99	44.16	134.84	132.85	179.01
2005	19.94	40.97	544.68	40.00	32.00	62.35	190.41	219.92	252.76
2006	21.96	35.65	617.31	45.00	56.60	71.51	222.12	222.08	293.63
2007	23.34	29.47	690.99	50.00	83.00	80.30	236.12	241.58	316.41
2008	23.10	25.97	923.91	61.00	135.00	106.40	323.34	298.17	429.74
2009	22.95	13.00	535.42	61.00	110.00	59.88	156.31	148.23	216.19
2010	23.53	14.67	705.63	61.40	115.60	79.81	223.99	224.83	303.81
2011	24.80	19.76	889.44	65.00	142.50	103.11	291.63	287.20	394.74
2012	31.30	24.30	1,100.44	87.90	243.40	135.26	326.90	306.97	462.17
2013	36.06	26.15	1,324.81	91.50	192.35	167.33	414.26	459.37	581.59
2014	31.00	28.34	1,099.68	88.40	262.45	135.50	316.60	296.73	452.10
2015	32.18	25.67	602.71	80.30	240.55	74.58	103.78	103.49	178.37
2016	30.28	24.38	580.46	77.28	184.28	70.89	114.71	133.30	185.60
2017	27.28	23.17	730.53	77.91	160.88	87.13	191.18	213.43	278.31
2018	24.66	22.01	664.42	78.53	138.35	77.22	171.74	198.58	248.97
2019	22.92	20.91	632.88	74.82	142.73	72.00	164.71	178.62	236.71
2020	19.89	19.86	565.05	74.80	131.24	61.47	144.29	153.26	205.76
2021	17.02	18.87	501.12	74.30	122.17	51.42	122.90	130.33	174.32
2022	13.67	17.93	419.90	73.20	112.67	40.93	92.90	100.20	133.83
2023	10.86	17.03	349.55	72.83	101.61	32.00	66.82	76.28	98.82
2024	8.78	16.18	295.92	60.93	94.32	25.19	53.59	61.89	78.78
2025	7.13	15.37	251.89	60.83	86.70	19.73	38.51	46.12	58.24
2026	5.66	14.60	211.46	60.83	-	15.67	37.16	97.80	52.83
2027	-	-	-	-	438.91	-	-	(438.91)	-

C10: Medium onshore oil field

Year	Production Liquids 000 b/d	Gas mmcf	Gross Rev \$M	Field Opex \$M	Field Capex \$M	Royalty \$M	SRB \$M	Tax \$M	IOC Take \$M	HG Take \$M
1990	-	-	-	-	2.50	-	-	-	(2.50)	-
1991	0.10	-	0.79	0.84	5.50	0.04	-	-	(5.59)	0.04
1992	0.19	-	1.43	1.04	0.50	0.07	-	-	(0.19)	0.07
1993	0.16	-	1.08	1.04	-	0.05	-	-	(0.02)	0.05
1994	0.22	-	1.38	1.19	-	0.07	-	-	0.12	0.07
1995	0.20	-	1.34	1.17	1.00	0.07	-	-	(0.89)	0.07
1996	0.44	-	3.54	1.48	6.00	0.18	-	-	(4.12)	0.18
1997	0.35	-	2.64	1.40	2.00	0.13	-	-	(0.90)	0.13
1998	0.52	-	2.74	1.85	3.00	0.14	-	-	(2.25)	0.14
1999	0.57	-	4.02	1.89	-	0.20	-	-	1.93	0.20
2000	0.63	-	6.96	1.95	0.80	0.35	-	-	3.86	0.35
2001	0.90	-	8.51	2.29	3.20	0.43	-	-	2.59	0.43
2002	0.80	-	7.62	2.10	1.60	0.38	-	-	3.54	0.38
2003	0.74	-	8.39	2.05	1.60	0.42	-	-	4.32	0.42
2004	0.86	-	12.99	2.15	2.50	0.65	-	-	7.69	0.65
2005	1.10	-	22.69	2.35	10.50	1.13	-	-	8.70	1.13
2006	1.03	-	24.85	2.90	13.50	1.24	-	-	7.20	1.24
2007	1.40	-	36.95	7.50	12.00	1.85	-	-	15.60	1.85
2008	1.71	-	62.19	8.00	15.00	3.11	-	9.57	26.51	12.68
2009	1.68	-	37.82	7.95	9.00	1.89	-	5.17	13.81	7.06
2010	1.49	-	43.20	9.00	14.00	2.16	-	5.92	12.12	8.08
2011	1.26	-	43.73	11.00	11.00	2.19	-	5.50	14.04	7.69
2012	1.67	-	57.41	11.90	17.00	2.87	-	12.71	12.92	15.58
2013	1.77	-	63.28	12.65	15.50	3.16	-	15.90	16.07	19.06
2014	1.60	-	54.44	12.00	13.95	2.72	-	12.73	13.04	15.45
2015	1.50	-	26.83	11.55	11.00	1.34	-	1.25	1.69	2.59
2016	1.32	-	24.09	10.73	6.10	1.20	-	2.70	3.36	3.90
2017	1.08	-	27.65	9.39	-	1.38	-	7.97	8.90	9.36
2018	0.92	-	23.53	8.52	5.29	1.18	-	4.17	4.37	5.35
2019	0.77	-	20.10	7.61	-	1.00	-	5.52	5.96	6.52
2020	0.64	-	17.04	7.21	1.10	0.85	-	3.87	4.01	4.72
2021	0.54	-	14.80	6.23	-	0.74	-	3.85	3.98	4.59
2022	0.20	-	5.66	2.86	1.15	0.28	-	0.66	0.70	0.95
2023	0.16	-	4.67	2.34	-	0.23	-	1.03	1.07	1.26
2024	0.13	-	3.91	1.73	1.19	0.20	-	0.42	0.37	0.62
2025	0.10	-	3.10	1.46	-	0.16	-	0.72	0.77	0.88
2026	0.08	-	2.56	1.86	-	0.13	-	0.25	0.32	0.38
2027	-	-	-	-	21.93	-	-	-	(21.93)	-

C11: Small onshore oil field

Year	Production Liquids 000 b/d	Gas mmcf	Gross Rev \$M	Field Opex \$M	Field Capex \$M	Royalty \$M	SRB \$M	Tax \$M	IOC Take \$M	HG Take \$M
1989	-	-	-	-	-	-	-	-	-	-
1990	-	-	-	-	2.00	-	-	-	(2.00)	-
1991	0.40	-	3.15	0.95	1.00	0.16	-	-	1.04	0.16
1992	1.26	-	9.46	2.00	-	0.47	-	1.63	5.36	2.10
1993	1.26	-	8.48	2.00	-	0.42	-	1.91	4.14	2.34
1994	1.00	-	6.27	2.00	2.40	0.31	-	-	1.56	0.31
1995	1.16	-	7.79	2.00	-	0.39	-	1.32	4.07	1.71
1996	1.00	-	8.04	2.10	1.20	0.40	-	0.15	4.19	0.55
1997	0.78	-	5.87	2.00	-	0.29	-	1.07	2.51	1.37
1998	0.69	-	3.63	2.00	-	0.18	-	-	1.45	0.18
1999	0.60	-	4.23	1.10	0.50	0.21	-	-	2.42	0.21
2000	0.55	-	6.07	1.10	1.50	0.30	-	0.68	2.49	0.98
2001	0.60	-	5.67	1.10	0.40	0.28	-	2.07	1.82	2.35
2002	0.75	-	7.14	1.10	-	0.36	-	2.10	3.59	2.46
2003	0.64	-	7.25	0.90	0.20	0.36	-	2.89	2.90	3.26
2004	0.54	-	8.16	0.80	-	0.41	-	3.38	3.56	3.79
2005	0.48	-	9.90	0.60	0.30	0.50	-	4.26	4.24	4.76
2006	0.57	-	13.75	0.75	3.00	0.69	-	4.72	4.59	5.41
2007	0.49	-	12.93	1.00	3.50	0.65	-	3.96	3.82	4.61
2008	0.72	-	26.19	1.50	1.80	1.31	-	11.42	10.15	12.73
2009	0.49	-	11.03	2.00	4.00	0.55	-	1.21	3.27	1.77
2010	0.42	-	12.18	2.50	0.50	0.61	-	4.00	4.57	4.61
2011	0.50	-	17.35	2.80	0.50	0.87	-	6.51	6.67	7.38
2012	0.40	-	13.75	2.80	6.00	0.69	-	2.08	2.19	2.76
2013	0.31	-	11.08	2.80	4.50	0.55	-	1.62	1.61	2.17
2014	0.25	-	8.51	3.80	-	0.43	-	1.98	2.30	2.41
2015	0.25	-	4.47	3.00	-	0.22	-	0.47	0.78	0.69
2016	0.29	-	5.29	3.00	0.75	0.26	-	0.56	0.71	0.83
2017	0.33	-	8.45	3.06	0.77	0.42	-	2.08	2.12	2.50
2018	0.35	-	8.95	3.12	1.56	0.45	-	1.96	1.86	2.41
2019	0.31	-	8.09	3.18	-	0.40	-	2.22	2.28	2.63
2020	0.23	-	6.12	3.25	-	0.31	-	1.25	1.32	1.56
2021	0.17	-	4.66	2.21	-	0.23	-	1.07	1.15	1.30
2022	-	-	-	-	3.38	-	-	-	(3.38)	-

APPENDIX D : Deterministic calculation table of Malaysia PSC (1996)

D1.1: Large offshore gas field

Year	Production		Gross	Field	Field	Royalty	Cost	Profit
	Liquids	Gas	Rev	Opex	Capex		oil	Oil
	000 b/d	mmcf/d	\$M	\$M	\$M	\$M	\$M	\$M
1990	-	-	-	-	-	17.00	-	-
1991	-	-	-	-	-	98.00	-	-
1992	-	-	-	-	-	140.00	-	-
1993	1.22	175.00	150.01	40.00	141.00	17.95	105.01	30.00
1994	6.00	250.00	210.09	40.00	140.00	27.44	147.06	42.02
1995	7.00	300.00	236.42	50.00	188.00	31.63	165.50	47.28
1996	8.00	337.00	405.08	55.00	119.00	54.92	283.56	81.02
1997	10.50	344.00	390.45	60.00	158.00	53.24	273.32	78.09
1998	11.50	435.00	390.78	80.00	111.00	54.31	273.55	78.16
1999	15.00	575.00	580.15	100.00	40.00	82.18	406.10	116.03
2000	16.00	548.00	1,040.80	100.00	71.00	147.14	642.98	293.74
2001	16.21	573.35	986.15	109.61	135.00	139.75	300.46	587.07
2002	16.10	551.52	829.76	110.00	166.00	117.35	320.23	426.55
2003	16.60	499.00	1,184.41	105.50	160.00	166.66	299.86	766.11
2004	17.71	587.52	1,530.57	120.00	110.00	217.33	277.85	1,099.66
2005	17.84	592.09	2,295.70	140.00	70.00	326.11	258.16	1,807.97
2006	17.65	599.20	1,897.67	140.00	125.00	269.70	305.51	1,402.40
2007	18.01	607.25	2,020.21	140.00	155.00	287.34	378.09	1,440.10
2008	18.55	589.30	2,576.07	130.00	655.00	365.97	854.43	1,464.04
2009	18.20	516.32	1,154.14	130.00	510.00	162.86	556.87	481.86
2010	19.70	586.40	1,508.62	150.00	492.00	214.39	755.92	601.83
2011	20.56	591.01	1,574.24	160.00	790.00	223.88	802.36	614.45
2012	28.36	773.42	1,754.04	210.00	430.00	252.76	720.33	858.30
2013	32.49	889.06	2,371.99	245.00	296.00	343.62	949.67	1,185.11
2014	28.89	870.57	2,362.06	245.00	671.00	341.73	1,015.06	1,110.80
2015	28.08	904.69	1,459.83	240.00	368.00	211.41	697.63	616.22
2016	26.65	910.00	1,525.99	232.00	358.50	220.97	651.96	721.43
2017	18.00	900.00	1,709.12	236.64	263.67	246.97	558.35	979.86
2018	14.15	870.00	1,698.73	241.37	372.46	244.95	668.86	859.99
2019	10.95	870.00	1,730.62	249.38	210.12	249.35	513.48	1,044.08
2020	9.85	870.00	1,811.95	243.55	387.51	261.00	677.24	953.51
2021	8.30	750.00	1,601.74	237.38	163.40	229.18	454.38	987.19
2022	7.95	654.50	1,440.79	230.86	211.72	204.76	483.10	813.62
2023	7.00	621.00	1,394.26	223.99	209.06	197.50	471.31	783.52
2024	6.25	612.00	1,383.24	216.76	296.43	195.70	537.07	707.85
2025	5.70	577.00	1,326.79	215.12	302.35	187.01	533.25	660.86
2026	4.90	505.00	1,202.03	195.04	308.40	167.86	507.20	574.62
2027	3.90	430.00	1,018.80	174.07	314.57	140.39	489.25	427.68
2028	3.50	355.00	854.09	152.19	320.87	115.55	462.96	305.72
2029	2.80	255.00	630.00	135.83	327.28	81.67	378.00	189.00
2030	2.00	175.00	436.07	112.16	333.83	52.50	261.64	130.82
2031	1.45	122.50	318.64	87.48	95.56	34.35	191.18	95.59
2032	0.80	75.00	197.68	89.23	-	18.12	118.61	59.30
2033	0.50	45.00	122.97	91.02	-	9.17	73.78	36.89
2034	-	-	-	-	1,463.52	-	-	-

D1.2: Large offshore gas field (Continue)

Year	HG share Profit oil \$M	Supplementary Payment \$M	Research \$M	Export Duty \$M	Tax \$M	IOC Take \$M	HG Take \$M
1990	-	-	-	-	-	(17.00)	-
1991	-	-	-	-	-	(98.00)	-
1992	-	-	-	-	-	(140.00)	-
1993	6.00	-	0.65	0.13	-	(52.77)	21.78
1994	8.40	-	0.90	0.60	-	(0.83)	30.92
1995	9.46	-	1.02	0.75	-	(36.45)	34.87
1996	16.20	-	1.74	1.03	-	171.60	59.48
1997	15.62	-	1.68	1.27	45.43	69.41	103.04
1998	15.63	-	1.68	0.97	27.10	115.32	84.46
1999	47.04	-	2.38	1.69	89.27	241.75	198.40
2000	196.34	-	3.70	2.83	185.88	376.97	492.84
2001	370.77	81.74	2.58	3.22	49.76	134.86	606.68
2002	280.82	47.06	2.33	2.34	37.30	100.94	452.82
2003	495.20	116.39	2.85	3.74	64.09	118.19	800.72
2004	705.71	165.61	3.36	6.62	84.57	181.64	1,118.93
2005	1,153.65	312.24	4.56	10.30	113.02	262.35	1,823.35
2006	917.35	194.61	3.95	10.77	106.99	209.23	1,423.44
2007	944.87	193.35	4.37	11.98	121.31	247.32	1,477.90
2008	981.47	191.42	6.69	13.34	233.23	107.32	1,683.75
2009	335.28	30.99	3.52	5.72	68.31	(45.09)	559.23
2010	412.07	31.12	4.73	10.54	140.49	116.81	749.80
2011	423.03	24.93	4.97	11.40	72.99	(70.51)	694.75
2012	577.35	9.22	5.01	21.08	96.73	229.24	884.80
2013	793.84	28.60	6.70	28.23	184.70	551.70	1,279.28
2014	747.17	51.30	6.89	19.76	179.06	205.68	1,240.38
2015	418.55	10.49	4.48	8.29	4.09	259.95	591.87
2016	483.50	17.61	4.45	8.29	43.50	225.55	709.95
2017	643.80	48.70	4.47	8.97	48.91	283.05	925.76
2018	570.57	53.82	4.79	5.38	68.49	211.97	872.93
2019	681.22	76.86	4.38	5.07	44.22	286.31	984.81
2020	629.09	76.16	5.01	3.15	90.68	195.61	985.28
2021	642.64	78.31	3.99	3.76	45.64	266.44	934.52
2022	533.64	59.92	3.82	3.41	62.24	191.11	807.10
2023	513.98	57.62	3.70	2.94	59.75	183.79	777.43
2024	468.09	50.05	3.88	2.26	65.98	141.46	728.59
2025	438.09	44.65	3.78	2.12	59.26	128.75	680.57
2026	382.40	38.29	3.50	1.88	50.20	102.11	596.48
2027	287.17	25.99	3.15	1.16	37.08	73.73	456.44
2028	209.05	15.61	2.80	1.07	25.84	41.24	339.78
2029	132.30	7.88	2.17	0.89	-	(39.35)	206.24
2030	91.57	4.62	1.50	0.65	-	(151.89)	141.96
2031	66.91	3.35	1.10	0.49	-	31.89	103.71
2032	41.51	2.03	0.68	0.28	-	44.18	64.27
2033	25.82	1.20	0.42	0.18	-	(7.98)	39.93
2034	-	-	-	-	-	(1,463.52)	-

D2.1: Medium offshore gas field

Year	Production Liquids 000 b/d	Gas mmcf/d	Gross Rev \$M	Field Opex \$M	Field Capex \$M	Royalty \$M	Cost oil \$M	Profit Oil \$M
1980	-	-	-	-	98.00	-	-	-
1981	1.20	73.00	68.56	7.16	116.00	6.86	47.99	13.71
1982	4.50	128.00	170.04	7.52	153.00	17.00	119.03	34.01
1983	4.00	145.00	181.40	10.98	113.80	18.14	126.98	36.28
1984	5.50	184.00	237.63	12.20	65.20	23.76	166.34	47.53
1985	6.50	185.00	235.85	12.64	76.00	23.58	148.14	64.12
1986	6.50	161.00	149.88	12.56	38.00	14.99	93.51	41.38
1987	6.40	207.00	170.98	14.00	41.00	17.10	91.71	62.18
1988	6.30	216.00	169.96	14.67	60.00	17.00	82.77	70.20
1989	7.00	230.00	191.88	15.47	50.00	19.19	84.10	88.59
1990	7.25	224.00	204.56	15.96	41.00	20.46	85.56	98.54
1991	8.00	277.00	221.66	18.00	21.00	22.17	75.41	124.08
1992	7.50	247.00	215.86	21.00	47.00	21.59	85.29	108.98
1993	9.00	283.00	289.86	22.00	58.50	28.99	96.05	164.82
1994	8.50	262.00	234.04	23.00	52.50	23.40	89.94	120.69
1995	9.00	275.00	234.06	24.00	11.00	23.41	50.18	160.47
1996	8.10	259.00	327.02	27.00	25.00	32.70	66.20	228.12
1997	9.00	285.00	325.75	30.00	34.00	32.58	79.65	213.53
1998	8.75	292.00	267.74	33.00	15.40	26.77	66.01	174.96
1999	9.00	298.00	309.32	33.00	22.50	30.93	75.24	203.15
2000	8.50	270.00	519.62	32.80	39.20	51.96	86.84	380.82
2001	8.90	257.00	457.48	32.59	30.00	45.75	80.64	331.10
2002	8.00	251.00	384.04	35.24	55.00	38.40	108.04	237.60
2003	12.07	268.15	672.17	33.00	69.00	67.22	117.67	487.28
2004	11.76	261.65	740.13	33.00	70.00	74.01	118.29	547.83
2005	11.60	265.26	1,102.90	33.00	100.00	110.29	148.41	844.19
2006	11.11	243.12	865.22	37.00	120.00	86.52	171.25	607.44
2007	11.29	266.40	975.71	40.00	150.00	97.57	205.39	672.76
2008	10.62	252.85	1,202.08	44.00	186.50	120.21	245.08	836.79
2009	12.50	235.13	620.41	42.00	135.00	62.04	191.25	367.12
2010	11.20	245.02	716.42	44.00	135.00	71.64	193.37	451.41
2011	10.54	230.36	701.27	46.00	125.00	70.13	184.51	446.63
2012	9.03	247.49	559.73	49.00	66.40	55.97	129.31	374.45
2013	5.87	190.32	468.97	45.00	275.60	46.90	271.91	150.16
2014	6.75	216.99	573.40	43.00	175.10	57.34	286.45	229.61
2015	5.47	196.41	305.73	49.00	180.50	30.57	183.44	91.72
2016	5.80	222.27	359.78	48.00	67.50	35.98	186.66	137.15
2017	8.50	250.00	564.36	53.55	109.65	56.44	177.08	330.84
2018	11.75	250.00	684.63	59.82	70.23	68.46	144.79	471.37
2019	10.25	265.00	707.60	63.67	116.42	70.76	195.14	441.70
2020	9.00	255.00	693.88	64.95	118.74	69.39	197.94	426.55
2021	7.20	230.00	618.79	60.72	159.65	61.88	232.98	323.93
2022	7.10	205.00	581.65	57.43	125.23	58.16	194.08	329.40
2023	6.50	186.00	546.10	53.99	96.94	54.61	161.31	330.19
2024	6.25	168.00	516.22	50.38	98.89	51.62	158.74	305.85
2025	6.00	135.00	455.24	46.61	68.84	45.52	123.32	286.39
2026	5.90	113.00	422.79	42.66	70.22	42.28	119.70	260.81
2027	5.85	95.00	389.95	39.79	71.62	39.00	117.38	233.58
2028	4.35	73.50	300.50	34.24	58.84	30.05	97.65	172.80
2029	2.65	57.50	213.10	34.93	60.02	21.31	98.33	93.46
2030	2.25	40.00	164.77	35.63	61.23	16.48	89.09	59.20
2031	1.70	28.00	124.16	29.61	54.91	12.42	70.61	41.14
2032	0.50	13.50	49.36	16.47	-	4.94	24.76	19.67
2033	-	-	-	-	601.56	-	-	-

D2.2: Medium offshore gas field (Continue)

Year	HG share Profit oil \$M	Supplementary Payment \$M	Research \$M	Export Duty \$M	Tax \$M	IOC Take \$M	HG Take \$M
1980	-	-	-	-	-	(98.00)	-
1981	2.74	-	0.29	0.25	-	(64.75)	10.15
1982	6.80	-	0.73	0.88	18.88	(34.78)	44.30
1983	7.26	-	0.78	0.71	27.08	2.65	53.97
1984	9.51	-	1.02	0.94	45.95	79.04	81.18
1985	17.91	-	0.97	1.06	38.42	65.26	81.95
1986	11.70	-	0.62	0.57	15.83	55.61	43.70
1987	28.51	-	0.63	0.72	15.55	53.47	62.51
1988	34.51	-	0.59	0.77	8.97	33.46	61.83
1989	48.30	-	0.62	1.05	10.91	46.34	80.06
1990	55.59	-	0.64	1.36	9.38	60.18	87.42
1991	77.54	-	0.61	1.32	12.02	69.00	113.66
1992	80.87	-	0.57	1.18	7.77	35.87	111.98
1993	131.47	-	0.65	1.27	11.21	35.77	173.58
1994	97.72	-	0.56	0.67	5.90	30.28	128.26
1995	139.41	-	0.36	0.54	0.02	35.33	163.73
1996	198.69	-	0.48	0.59	7.12	35.44	239.58
1997	184.21	-	0.54	0.61	7.07	36.74	225.01
1998	150.86	-	0.45	0.41	3.54	37.30	182.04
1999	175.31	-	0.52	0.57	6.72	39.77	214.05
2000	334.05	18.13	0.67	0.84	8.88	33.08	414.54
2001	289.92	14.92	0.61	0.76	7.86	35.08	359.81
2002	203.03	10.65	0.71	0.69	14.05	26.26	267.54
2003	426.78	24.02	0.89	1.23	21.41	28.62	541.55
2004	481.21	25.58	0.92	1.60	24.06	29.73	607.39
2005	744.93	44.02	1.24	2.15	32.30	34.97	934.93
2006	529.57	27.72	1.25	2.41	32.26	28.48	679.73
2007	584.94	31.41	1.47	2.68	37.03	30.62	755.10
2008	728.61	40.26	1.77	3.48	43.39	33.87	937.71
2009	311.28	10.58	1.24	2.53	22.65	33.09	410.33
2010	386.94	13.00	1.29	2.92	22.69	38.94	498.48
2011	383.52	9.72	1.24	3.29	20.30	42.07	488.20
2012	324.08	2.95	0.90	2.79	6.88	50.76	393.57
2013	107.95	6.12	1.57	1.89	18.66	(34.72)	183.09
2014	178.00	9.56	1.69	2.07	37.04	69.60	285.70
2015	64.20	1.71	1.05	0.88	-	(22.19)	98.42
2016	104.76	2.60	1.10	0.95	16.98	81.91	162.37
2017	280.05	6.17	1.14	1.96	9.86	45.56	355.60
2018	409.76	7.90	1.03	2.70	6.45	58.28	496.30
2019	378.02	9.75	1.29	2.41	15.04	50.23	477.27
2020	364.10	10.63	1.30	2.16	15.11	47.50	462.69
2021	268.24	9.68	1.44	1.78	19.74	35.66	362.76
2022	277.06	8.35	1.23	1.81	12.30	40.08	358.91
2023	281.04	7.70	1.05	1.71	10.15	38.92	356.26
2024	259.40	6.80	1.03	1.69	10.95	35.46	331.49
2025	245.42	5.36	0.82	1.68	6.41	34.57	305.21
2026	222.76	4.65	0.79	1.70	5.77	31.97	277.94
2027	198.48	3.57	0.76	1.74	6.16	28.84	249.71
2028	145.76	2.49	0.62	1.34	1.99	25.18	182.24
2029	74.28	1.78	0.59	0.84	-	19.35	98.80
2030	44.37	1.06	0.52	0.74	-	4.75	63.16
2031	29.97	0.76	0.41	0.57	-	(4.49)	44.13
2032	15.22	0.37	0.15	0.17	-	12.05	20.85
2033	-	-	-	-	-	(601.56)	-

D3.1: Small offshore gas field

Year	Production		Gross	Field	Field	Royalty	Cost	Profit
	Liquids	Gas	Rev	Opex	Capex		oil	Oil
	000 b/d	mmcf/d	\$M	\$M	\$M	\$M	\$M	\$M
1997	-	-	-	-	176.20	-	-	-
1998	-	-	-	-	203.60	-	-	-
1999	2.00	80.00	80.10	16.00	32.00	8.01	56.07	16.02
2000	4.50	171.00	319.33	20.00	38.60	31.93	223.53	63.87
2001	6.50	180.00	322.93	24.00	154.50	32.29	226.05	64.59
2002	12.00	370.00	568.09	31.00	110.00	56.81	376.38	134.89
2003	13.28	345.28	839.87	54.02	57.00	83.99	218.77	537.12
2004	14.38	354.13	978.52	54.02	165.00	97.85	327.25	553.42
2005	16.63	378.61	1,575.69	63.00	245.00	157.57	394.58	1,023.54
2006	18.89	388.02	1,408.83	71.00	280.00	140.88	406.06	861.88
2007	17.66	398.72	1,480.47	79.00	310.00	148.05	453.44	878.98
2008	18.15	391.45	1,923.14	105.00	238.00	192.31	442.99	1,287.84
2009	19.39	364.23	961.66	115.00	207.00	96.17	397.45	468.05
2010	18.73	362.24	1,122.13	125.00	245.00	112.21	422.37	587.55
2011	16.32	407.19	1,159.38	150.00	540.50	115.94	579.69	463.75
2012	15.15	391.53	915.22	165.00	569.50	91.52	549.13	274.57
2013	15.93	376.21	1,081.72	165.00	381.00	108.17	639.86	333.69
2014	17.54	375.23	1,191.21	165.00	516.00	119.12	670.02	402.06
2015	14.14	305.34	576.10	160.00	454.50	57.61	345.66	172.83
2016	14.80	326.20	642.77	152.50	247.50	64.28	385.66	192.83
2017	13.50	345.00	824.13	155.55	283.97	82.41	494.48	247.24
2018	11.00	310.00	757.65	149.30	346.87	75.77	454.59	227.30
2019	9.80	275.00	712.46	164.49	430.85	71.25	427.48	213.74
2020	15.70	295.00	943.55	193.46	468.48	94.36	566.13	283.07
2021	20.00	305.00	1,107.08	223.52	396.81	110.71	664.25	332.12
2022	21.45	290.00	1,145.39	227.99	404.74	114.54	687.23	343.62
2023	16.75	255.00	977.44	192.35	348.51	97.74	586.46	293.23
2024	13.25	225.00	838.26	196.19	355.49	83.83	502.96	251.48
2025	11.25	180.00	707.84	164.27	362.59	70.78	424.70	212.35
2026	8.20	140.00	552.31	155.36	269.03	55.23	331.39	165.69
2027	6.15	105.00	420.56	158.47	217.22	42.06	252.34	126.17
2028	3.65	65.00	259.03	129.93	-	25.90	155.42	77.71
2029	-	-	-	-	1,118.44	-	-	-

D3.2: Small offshore gas field (Continue)

Year	HG share Profit oil \$M	Supplementary Payment \$M	Research \$M	Export Duty \$M	Tax \$M	IOC Take \$M	HG Take \$M
1997	-	-	-	-	-	(176.20)	-
1998	-	-	-	-	-	(203.60)	-
1999	3.20	-	0.34	0.23	-	20.32	11.78
2000	12.77	-	1.37	0.80	-	213.86	46.88
2001	12.92	-	1.39	0.98	51.65	45.20	99.23
2002	44.00	-	2.34	1.83	103.60	218.52	208.57
2003	128.11	191.88	3.14	2.41	99.18	220.16	508.70
2004	192.13	165.01	3.44	3.48	107.51	190.07	569.43
2005	350.39	313.34	5.34	11.99	161.89	267.18	1,000.51
2006	416.26	147.02	4.26	16.06	133.58	199.78	858.06
2007	586.61	107.73	3.73	8.32	89.55	147.49	943.98
2008	849.63	157.02	4.41	15.18	94.96	266.62	1,313.52
2009	319.29	24.91	2.73	7.69	41.13	147.73	491.93
2010	397.42	32.82	3.06	10.12	57.62	138.89	613.25
2011	324.63	22.91	3.59	6.80	60.31	(65.29)	534.17
2012	192.20	4.67	3.16	4.69	-	(115.51)	296.23
2013	232.66	12.10	3.70	5.49	48.07	125.52	410.20
2014	276.97	16.53	3.98	7.16	43.58	42.87	467.33
2015	120.98	2.66	1.99	2.28	-	(223.92)	185.51
2016	134.98	3.81	2.22	2.43	-	35.05	207.72
2017	173.07	8.51	2.84	3.11	-	114.66	269.95
2018	159.11	9.79	2.61	2.53	-	11.67	249.81
2019	149.62	10.12	2.46	2.30	-	(118.62)	235.74
2020	198.15	12.29	3.26	3.76	-	(30.20)	311.81
2021	232.49	12.83	3.82	4.93	-	121.97	364.78
2022	240.53	11.82	3.95	5.46	-	136.36	376.30
2023	205.26	10.55	3.37	4.40	-	115.25	321.33
2024	176.04	9.11	2.89	3.59	-	11.13	275.46
2025	148.65	7.15	2.44	3.14	-	(51.19)	232.16
2026	115.99	5.76	1.91	2.36	-	(53.32)	181.24
2027	88.32	3.94	1.45	1.83	-	(92.72)	137.60
2028	54.40	2.20	0.89	1.12	-	44.59	84.51
2029	-	-	-	-	-	(1,118.44)	-

D4.1: Large offshore oil field

Year	Production		Gross	Field	Field	Royalty	Cost	Profit
	Liquids	Gas	Rev	Opex	Capex		oil	Oil
	000 b/d	mmcf/d	\$M	\$M	\$M	\$M	\$M	\$M
1994	-	-	-	-	-	-	-	-
1995	-	-	-	-	50.00	-	-	-
1996	-	-	-	-	104.00	-	-	-
1997	2.50	15.00	32.40	42.20	144.00	3.24	22.68	6.48
1998	3.00	20.00	30.97	45.00	207.00	3.10	21.68	6.19
1999	8.60	70.00	118.42	48.00	233.00	11.84	82.89	23.68
2000	25.10	130.00	482.21	72.50	92.00	48.22	337.55	96.44
2001	36.97	143.30	557.67	80.00	157.00	55.77	390.37	111.53
2002	41.26	217.00	659.19	82.50	243.00	65.92	434.04	159.23
2003	54.64	227.18	1,072.83	89.00	286.00	107.28	563.73	401.81
2004	44.24	199.38	1,096.82	95.00	240.00	109.68	581.10	406.04
2005	56.71	218.96	1,882.60	95.00	260.00	188.26	770.04	924.30
2006	59.48	198.21	1,921.72	110.00	300.00	192.17	476.71	1,252.84
2007	50.62	191.87	1,824.15	125.00	250.00	182.41	427.42	1,214.31
2008	52.56	162.69	2,436.47	140.00	300.00	243.65	493.07	1,699.75
2009	52.41	176.08	1,433.78	175.00	280.00	143.38	503.35	787.05
2010	41.12	171.29	1,465.99	175.00	270.00	146.60	486.32	833.08
2011	33.67	153.49	1,392.03	170.00	137.50	139.20	346.88	905.94
2012	34.46	123.90	1,309.40	175.00	353.50	130.94	522.31	656.15
2013	28.03	109.14	1,150.71	159.00	324.00	115.07	481.95	553.69
2014	28.21	93.09	1,107.32	220.00	310.00	110.73	521.58	475.01
2015	26.20	98.10	572.43	220.00	285.50	57.24	333.07	182.11
2016	29.40	99.98	650.77	181.00	126.90	65.08	390.46	195.23
2017	28.35	74.95	829.75	183.81	117.50	82.97	414.80	331.97
2018	26.90	74.90	802.98	191.36	149.82	80.30	366.34	356.34
2019	25.10	74.85	779.35	208.45	271.67	77.94	467.61	233.81
2020	23.60	75.25	762.51	212.62	277.10	76.25	457.51	228.75
2021	21.80	74.00	733.16	216.87	247.31	73.32	439.90	219.95
2022	20.00	76.00	706.80	221.21	216.23	70.68	424.08	212.04
2023	18.75	76.00	692.79	225.64	220.54	69.28	415.68	207.84
2024	16.50	75.00	643.19	230.15	224.96	64.32	385.92	192.96
2025	14.60	75.00	602.54	222.80	152.97	60.25	361.52	180.76
2026	10.50	75.00	491.44	202.88	156.04	49.14	294.86	147.43
2027	7.50	75.00	403.10	188.28	119.36	40.31	241.86	120.93
2028	5.00	63.00	300.95	185.71	40.58	30.09	180.57	90.28
2029	2.50	58.00	208.86	150.61	-	20.89	125.32	62.66
2030	1.50	53.00	164.54	116.39	-	16.45	98.72	49.36
2031	-	-	-	-	929.81	-	-	-

D4.2: Large offshore oil field (Continue)

Year	HG share Profit oil \$M	Supplementary Payment \$M	Research \$M	Export Duty \$M	Tax \$M	IOC Take \$M	HG Take \$M
1994	-	-	-	-	-	-	-
1995	-	-	-	-	-	(50.00)	-
1996	-	-	-	-	-	(104.00)	-
1997	1.30	-	0.14	0.30	-	(158.77)	4.98
1998	1.24	-	0.13	0.25	-	(225.75)	4.72
1999	4.74	-	0.51	0.97	-	(180.64)	18.06
2000	19.29	-	2.07	4.44	-	243.69	74.02
2001	22.31	-	2.40	5.59	-	234.60	86.06
2002	66.69	21.73	2.63	3.60	76.25	96.87	236.82
2003	143.51	104.06	4.11	4.95	143.54	190.37	507.46
2004	179.05	87.70	4.04	5.35	134.83	241.18	520.64
2005	494.13	190.63	6.00	9.36	220.98	418.25	1,109.35
2006	717.13	106.80	5.06	32.86	153.75	303.94	1,207.78
2007	688.57	109.65	4.77	31.28	141.32	291.14	1,158.01
2008	990.40	126.39	6.01	47.88	200.96	381.18	1,615.29
2009	481.50	25.85	4.04	23.10	91.58	209.32	769.46
2010	525.62	24.41	3.97	24.13	91.42	204.85	816.14
2011	587.56	14.48	3.33	27.34	75.20	237.42	847.11
2012	434.22	1.97	3.72	20.70	77.35	112.00	668.90
2013	368.22	4.68	3.34	16.76	52.10	107.54	560.17
2014	319.70	5.47	3.38	13.76	38.27	86.00	491.31
2015	127.48	1.14	1.94	4.22	-	(125.09)	192.02
2016	136.66	1.17	2.25	4.83	-	132.89	209.98
2017	224.08	1.85	2.61	9.85	45.71	161.36	367.08
2018	237.89	2.37	2.42	10.81	24.06	103.94	357.86
2019	163.66	2.75	2.69	5.90	14.39	31.91	267.33
2020	160.13	3.14	2.63	5.66	7.59	17.40	255.39
2021	153.96	3.11	2.53	5.38	3.24	27.44	241.54
2022	148.43	3.10	2.44	5.09	5.23	34.39	234.97
2023	145.49	3.14	2.39	4.92	0.83	20.56	226.06
2024	135.07	3.04	2.22	4.47	-	(21.03)	209.12
2025	126.53	2.98	2.08	4.08	-	30.85	195.92
2026	103.20	3.08	1.70	3.03	-	(27.63)	160.15
2027	84.65	2.82	1.39	2.23	-	(35.94)	131.40
2028	63.20	2.13	1.04	1.54	-	(23.34)	98.00
2029	43.86	1.79	0.72	0.79	-	(9.80)	68.05
2030	34.55	1.40	0.57	0.49	-	(5.32)	53.47
2031	-	-	-	-	-	(929.81)	-

D5.1: Medium offshore oil field

Year	Production Liquids 000 b/d	Gas mmcf/d	Gross Rev \$M	Field Opex \$M	Field Capex \$M	Royalty \$M	Cost oil \$M	Profit Oil \$M
2001	-	-	-	-	-	-	-	-
2002	-	-	-	-	-	-	-	-
2003	-	-	-	-	-	-	-	-
2004	-	-	-	-	20.00	-	-	-
2005	5.70	-	117.57	24.36	30.84	11.76	82.30	23.51
2006	8.70	-	209.87	45.40	43.24	20.99	146.91	41.97
2007	19.30	-	509.39	92.70	71.50	50.94	201.19	257.26
2008	19.70	-	716.46	103.70	216.40	71.65	358.23	286.58
2009	20.20	-	454.77	108.79	24.70	45.48	146.93	262.36
2010	17.70	-	513.16	97.10	44.46	51.32	148.73	313.11
2011	17.30	-	600.38	97.10	23.76	60.04	127.87	412.47
2012	14.10	-	484.70	83.35	7.10	48.47	96.16	340.06
2013	13.10	-	468.35	76.48	28.70	46.83	110.49	311.03
2014	13.80	-	469.55	76.48	90.00	46.95	177.81	244.78
2015	12.30	-	219.99	70.64	18.00	22.00	98.62	99.36
2016	11.50	-	209.88	58.64	10.00	20.99	73.30	115.59
2017	10.00	-	256.01	57.78	12.24	25.60	74.07	156.34
2018	8.00	-	204.58	46.45	10.40	20.46	60.09	124.03
2019	6.00	-	156.59	44.72	10.61	15.66	57.76	83.17
2020	3.50	-	93.21	39.12	-	9.32	40.54	43.35
2021	2.00	-	54.82	28.31	-	5.48	27.41	21.93
2022	-	-	-	-	82.21	-	-	-

D5.2: Medium offshore oil field (Continue)

Year	HG share Profit oil \$M	Supplementary Payment \$M	Research \$M	Export Duty \$M	Tax \$M	IOC Take \$M	HG Take \$M
2001	-	-	-	-	-	-	-
2002	-	-	-	-	-	-	-
2003	-	-	-	-	-	-	-
2004	-	-	-	-	-	(20.00)	-
2005	4.70	-	0.51	1.88	-	43.52	18.85
2006	8.39	-	0.90	3.36	37.60	49.98	71.25
2007	66.73	-	1.96	19.05	83.61	122.89	222.29
2008	114.63	-	2.65	17.20	86.74	103.50	292.87
2009	96.90	-	1.56	16.55	50.57	110.22	211.05
2010	162.80	-	1.50	15.03	46.71	94.24	277.35
2011	271.50	-	1.34	14.10	41.47	91.07	388.45
2012	223.43	-	1.06	11.66	31.67	77.95	316.30
2013	205.35	-	1.08	10.57	29.63	69.71	293.46
2014	165.65	-	1.28	7.91	25.24	56.03	247.04
2015	68.42	-	0.65	3.09	3.69	33.50	97.85
2016	77.75	-	0.56	3.78	6.53	31.63	109.61
2017	104.04	-	0.63	5.23	13.17	37.31	148.68
2018	82.60	-	0.51	4.14	12.42	27.60	120.13
2019	56.16	-	0.42	2.70	7.67	18.64	82.61
2020	29.74	-	0.27	1.36	2.58	10.82	43.27
2021	15.35	-	0.17	0.66	-	4.85	21.66
2022	-	-	-	-	-	(82.21)	-

D6.1: Small offshore oil field

Year	Production		Gross	Field	Field	Royalty	Cost	Profit
	Liquids	Gas	Rev	Opex	Capex		oil	Oil
	000 b/d	mmcf/d	\$M	\$M	\$M	\$M	\$M	\$M
2009	-	-	-	-	-	-	-	-
2010	-	-	-	-	-	-	-	-
2011	-	-	-	-	-	-	-	-
2012	-	-	-	-	30.00	-	-	-
2013	-	-	-	-	75.00	-	-	-
2014	1.34	-	45.59	10.98	151.40	4.56	31.92	9.12
2015	14.00	-	250.39	111.90	118.00	25.04	175.27	50.08
2016	12.20	-	222.65	91.90	9.00	22.27	155.86	44.53
2017	9.50	-	243.21	83.54	-	24.32	170.25	48.64
2018	7.50	-	191.79	74.80	-	19.18	134.25	38.36
2019	6.50	-	169.63	70.99	-	16.96	118.74	33.93
2020	4.50	-	119.84	50.77	-	11.98	71.90	35.95
2021	2.00	-	54.82	19.30	-	5.48	32.89	16.45
2022	-	-	-	-	47.30	-	-	-

D6.2: Small offshore oil field (Continue)

Year	HG share	Supplementary	Research	Export	Tax	IOC	HG
	Profit oil	Payment		Duty		Take	Take
	\$M	\$M	\$M	\$M	\$M	\$M	\$M
2009	-	-	-	-	-	-	-
2010	-	-	-	-	-	-	-
2011	-	-	-	-	-	-	-
2012	-	-	-	-	-	(30.00)	-
2013	-	-	-	-	-	(75.00)	-
2014	1.82	-	0.20	0.73	-	(124.09)	7.31
2015	10.02	-	1.08	4.01	-	(19.65)	40.14
2016	8.91	-	0.96	3.56	-	86.06	35.69
2017	9.73	-	1.05	3.89	33.14	87.55	72.12
2018	7.67	-	0.82	3.07	20.68	65.57	51.42
2019	6.79	-	0.73	2.71	15.37	56.09	42.56
2020	10.79	-	0.49	2.52	5.29	38.00	31.06
2021	4.93	-	0.22	1.15	-	23.73	11.79
2022	-	-	-	-	-	(47.30)	-

D7.1: Medium onshore gas field

Year	Production		Gross Rev \$M	Field Opex \$M	Field Capex \$M	Royalty \$M	Cost oil \$M	Profit Oil \$M
	Liquids 000 b/d	Gas mmcf/d						
2002	-	-	-	-	-	-	-	-
2003	-	-	-	-	-	-	-	-
2004	-	-	-	-	-	-	-	-
2005	-	-	-	-	40.00	-	-	-
2006	-	6.07	14.91	1.40	120.00	1.49	10.44	2.98
2007	0.47	85.51	229.95	13.20	38.00	22.99	160.96	45.99
2008	0.45	83.07	284.40	13.20	25.00	28.44	118.74	137.22
2009	0.43	85.04	132.29	12.00	-	13.23	15.08	103.98
2010	0.43	87.20	151.87	13.51	-	15.19	17.17	119.52
2011	0.38	83.14	134.27	14.97	-	13.43	20.97	99.87
2012	0.43	93.22	108.69	14.27	-	10.87	17.64	80.18
2013	0.38	87.59	132.84	15.06	-	13.28	18.22	101.33
2014	0.42	105.12	180.81	19.80	-	18.08	23.59	139.14
2015	0.52	115.00	131.03	19.13	20.00	13.10	43.15	74.77
2016	0.54	120.00	146.95	19.58	32.55	14.69	55.75	76.50
2017	0.54	120.00	180.26	19.97	51.86	18.03	75.16	87.08
2018	0.54	120.00	198.21	20.37	17.99	19.82	44.55	133.84
2019	0.54	120.00	213.38	20.78	18.35	21.34	43.46	148.58
2020	0.50	120.00	227.06	21.19	18.71	22.71	44.23	160.13
2021	0.45	110.00	213.89	21.61	-	21.39	25.57	166.93
2022	0.40	108.00	211.96	22.68	36.65	21.20	62.86	127.90
2023	0.40	108.00	218.63	23.13	51.40	21.86	65.59	131.18
2024	0.35	108.00	221.43	23.59	20.26	22.14	59.92	139.37
2025	0.32	100.00	209.22	23.40	20.66	20.92	48.03	140.26
2026	0.25	89.00	192.20	23.86	21.08	19.22	48.06	124.91
2027	0.20	77.00	165.97	24.34	21.50	16.60	48.13	101.24
2028	0.20	65.00	141.34	24.12	21.93	14.13	42.40	84.81
2029	0.15	55.00	119.91	25.33	-	11.99	33.03	74.88
2030	0.15	43.00	94.75	25.83	-	9.48	27.43	57.84
2031	0.15	30.00	70.34	26.35	-	7.03	26.93	36.38
2032	-	-	-	-	83.77	-	-	-

D7.2: Medium onshore gas field (Continue)

Year	HG share Profit oil \$M	Supplementary Payment \$M	Research \$M	Export Duty \$M	Tax \$M	IOC Take \$M	HG Take \$M
2002	-	-	-	-	-	-	-
2003	-	-	-	-	-	-	-
2004	-	-	-	-	-	-	-
2005	-	-	-	-	-	(40.00)	-
2006	1.79	-	0.06	-	-	(109.83)	3.34
2007	9.20	-	0.99	0.20	52.49	92.88	85.87
2008	91.72	-	0.82	0.26	43.35	81.60	164.60
2009	24.76	25.47	0.47	0.58	14.76	41.02	79.27
2010	41.93	26.26	0.47	0.64	13.82	40.06	98.31
2011	35.33	18.67	0.43	0.65	11.76	39.04	80.26
2012	28.40	5.88	0.35	0.70	11.78	36.44	57.98
2013	37.02	15.46	0.41	0.54	12.94	38.12	79.66
2014	50.36	25.66	0.56	0.57	18.29	47.48	113.53
2015	28.42	3.98	0.45	0.28	12.15	33.52	58.38
2016	29.62	4.99	0.51	0.30	20.18	24.53	70.29
2017	34.44	9.58	0.64	0.41	29.59	15.74	92.69
2018	48.08	18.48	0.65	0.48	24.84	47.49	112.36
2019	54.38	21.95	0.69	0.51	25.87	49.53	124.73
2020	58.32	25.23	0.73	0.48	27.37	52.33	134.83
2021	79.60	20.99	0.56	0.50	21.82	47.40	144.88
2022	63.88	14.78	0.63	0.34	21.53	30.27	122.36
2023	65.59	14.90	0.66	0.35	16.79	23.96	120.14
2024	69.04	15.48	0.65	0.32	22.38	47.58	130.01
2025	68.66	15.20	0.60	0.30	18.54	40.94	124.22
2026	61.50	13.47	0.56	0.24	16.42	35.85	111.41
2027	68.16	6.27	0.41	0.20	9.06	19.43	100.69
2028	58.55	4.40	0.34	0.20	5.11	12.55	82.74
2029	49.20	3.97	0.29	0.16	7.71	21.26	73.32
2030	37.95	2.58	0.24	0.16	4.07	14.44	54.48
2031	24.08	1.49	0.20	0.17	-	11.02	32.97
2032	-	-	-	-	-	(83.77)	-

D8.2: Small onshore gas field (Continue)

Year	HG share Profit oil \$M	Supplementary Payment \$M	Research \$M	Export Duty \$M	Tax \$M	IOC Take \$M	HG Take \$M
1989	-	-	-	-	-	(10.00)	-
1990	-	-	-	-	-	(16.00)	-
1991	3.51	-	0.11	-	-	20.38	6.54
1992	19.95	-	0.07	-	-	10.72	23.70
1993	24.42	-	0.08	-	-	13.93	29.04
1994	23.71	-	0.08	-	-	12.83	28.13
1995	21.82	-	0.07	-	-	11.78	25.93
1996	37.09	-	0.11	-	-	18.05	43.77
1997	31.94	-	0.18	-	-	12.32	39.72
1998	37.28	-	0.12	-	-	19.09	44.24
1999	32.22	-	0.18	-	-	(3.36)	40.08
2000	51.74	12.79	0.25	-	-	30.98	75.97
2001	49.30	10.72	0.15	-	-	13.28	68.88
2002	40.41	7.58	0.12	-	-	12.01	55.35
2003	56.55	13.84	0.16	-	-	13.77	80.48
2004	42.15	10.40	0.13	-	-	10.05	60.20
2005	62.52	17.42	0.18	-	-	13.16	91.04
2006	41.12	10.23	0.14	-	3.13	6.34	62.19
2007	35.70	8.91	0.11	-	2.69	5.59	53.91
2008	41.71	11.14	0.13	-	2.99	6.06	63.46
2009	12.72	1.97	0.06	-	1.18	2.46	18.74
2010	12.21	1.93	0.07	-	0.69	1.67	17.81
2011	10.04	1.43	0.05	-	1.44	2.39	15.23
2012	6.06	0.34	0.03	-	0.57	0.98	8.46
2013	7.66	0.86	0.04	-	1.07	1.78	11.46
2014	8.75	1.19	0.05	-	1.05	1.76	13.02
2015	5.40	0.21	0.03	-	0.34	0.59	7.27
2016	5.25	0.26	0.03	-	0.24	0.39	7.02
2017	5.73	0.49	0.03	-	0.32	0.52	7.94
2018	5.72	0.56	0.03	-	0.25	0.40	7.92
2019	5.56	0.59	0.03	-	0.13	0.21	7.63
2020	5.36	0.60	0.03	-	0.00	0.00	7.27
2021	4.97	0.54	0.03	-	-	(0.50)	6.73
2022	-	-	-	-	-	-	-

D9.1: Large onshore oil field

Year	Production		Gross	Field	Field	Royalty	Cost	Profit
	Liquids	Gas	Rev	Opex	Capex		oil	Oil
	000 b/d	mmcf/d	\$M	\$M	\$M	\$M	\$M	\$M
1981	-	-	-	-	24.50	-	-	-
1982	-	-	-	-	56.00	-	-	-
1983	6.10	3.50	70.91	21.90	51.00	7.09	49.63	14.18
1984	13.70	11.40	157.98	26.50	62.00	15.80	110.59	31.60
1985	20.70	17.60	227.45	31.20	60.00	22.75	159.22	45.49
1986	20.00	21.30	125.46	32.50	21.00	12.55	87.82	25.09
1987	16.65	22.10	130.03	32.50	12.00	13.00	89.68	27.35
1988	18.00	21.60	118.25	31.10	18.00	11.82	79.62	26.81
1989	20.40	22.30	159.47	30.90	34.50	15.95	108.44	35.08
1990	23.39	24.40	224.14	30.00	21.00	22.41	150.80	50.92
1991	24.95	28.70	212.70	32.00	22.00	21.27	122.67	68.75
1992	26.51	33.00	220.26	34.00	12.00	22.03	69.29	128.95
1993	24.50	36.50	194.39	37.00	9.00	19.44	57.76	117.19
1994	24.97	38.60	183.21	40.00	24.00	18.32	76.08	88.81
1995	20.48	35.50	159.89	43.00	24.00	15.99	77.16	66.74
1996	21.96	39.00	216.09	43.00	16.00	21.61	69.96	124.52
1997	20.83	39.00	192.15	43.00	21.00	19.22	74.53	98.41
1998	23.77	39.00	154.72	43.00	33.00	15.47	88.37	50.87
1999	26.38	39.00	218.29	42.00	24.00	21.83	85.91	110.55
2000	26.90	39.00	358.60	45.00	31.00	35.86	92.84	229.91
2001	24.68	42.80	295.49	44.00	32.00	29.55	103.25	162.69
2002	23.69	42.10	277.31	35.00	43.00	27.73	95.82	153.76
2003	22.23	37.34	326.49	35.00	40.00	32.65	85.95	207.89
2004	20.10	38.73	386.85	40.00	34.99	38.68	85.22	262.94
2005	19.94	40.97	544.68	40.00	32.00	54.47	106.32	383.89
2006	21.96	35.65	617.31	45.00	56.60	61.73	116.33	439.25
2007	23.34	29.47	690.99	50.00	83.00	69.10	161.34	460.55
2008	23.10	25.97	923.91	61.00	135.00	92.39	225.52	606.00
2009	22.95	13.00	535.42	61.00	110.00	53.54	182.03	299.85
2010	23.53	14.67	705.63	61.40	115.60	70.56	194.50	440.57
2011	24.80	19.76	889.44	65.00	142.50	88.94	223.29	577.21
2012	31.30	24.30	1,100.44	87.90	243.40	110.04	345.55	644.85
2013	36.06	26.15	1,324.81	91.50	192.35	132.48	357.98	834.35
2014	31.00	28.34	1,099.68	88.40	262.45	109.97	370.45	619.26
2015	32.18	25.67	602.71	80.30	240.55	60.27	301.36	241.08
2016	30.28	24.38	580.46	77.28	184.28	58.05	290.23	232.19
2017	27.28	23.17	730.53	77.91	160.88	73.05	259.31	398.17
2018	24.66	22.01	664.42	78.53	138.35	66.44	228.15	369.84
2019	22.92	20.91	632.88	74.82	142.73	63.29	228.04	341.55
2020	19.89	19.86	565.05	74.80	131.24	56.51	216.05	292.50
2021	17.02	18.87	501.12	74.30	122.17	50.11	205.28	245.72
2022	13.67	17.93	419.90	73.20	112.67	41.99	192.88	185.03
2023	10.86	17.03	349.55	72.83	101.61	34.95	174.77	139.82
2024	8.78	16.18	295.92	60.93	94.32	29.59	165.54	100.79
2025	7.13	15.37	251.89	60.83	86.70	25.19	148.07	78.63
2026	5.66	14.60	211.46	60.83	-	21.15	73.10	117.21
2027	-	-	-	-	438.91	-	-	-

D9.2: Large onshore oil field (Continue)

Year	HG share Profit oil \$M	Supplementary Payment \$M	Research \$M	Export Duty \$M	Tax \$M	IOC Take \$M	HG Take \$M
1981	-	-	-	-	-	(24.50)	-
1982	-	-	-	-	-	(56.00)	-
1983	2.84	-	0.30	1.08	-	(13.31)	11.31
1984	6.32	-	0.68	2.35	-	44.34	25.15
1985	9.10	-	0.98	3.38	-	100.05	36.20
1986	5.02	-	0.54	1.77	-	52.09	19.87
1987	5.87	-	0.56	1.86	17.55	46.69	38.85
1988	11.80	-	0.47	1.07	5.61	38.36	30.79
1989	19.09	-	0.62	1.17	18.51	38.75	55.33
1990	27.35	-	0.87	1.67	37.55	83.27	89.87
1991	44.93	-	0.73	1.78	19.48	70.50	88.19
1992	80.09	-	0.59	4.01	11.45	56.09	118.17
1993	70.92	-	0.52	3.46	12.57	41.49	106.90
1994	54.75	-	0.55	2.51	12.86	30.21	88.99
1995	41.87	-	0.51	1.83	11.48	21.21	71.67
1996	74.31	-	0.60	3.48	17.59	39.49	117.60
1997	59.13	-	0.57	2.66	14.23	32.35	95.80
1998	31.46	-	0.54	1.13	8.22	21.90	56.81
1999	67.55	-	0.64	3.11	16.28	42.87	109.42
2000	136.49	13.00	0.93	6.59	28.31	61.42	221.18
2001	94.69	11.75	0.86	4.15	20.19	58.29	161.19
2002	90.88	8.37	0.79	4.11	22.93	44.50	154.81
2003	119.33	17.06	0.87	5.43	27.93	48.22	203.27
2004	151.87	19.93	0.98	7.16	33.14	60.08	251.78
2005	229.68	31.13	1.30	9.92	41.62	104.55	368.13
2006	271.49	17.72	1.42	13.34	55.15	94.86	420.85
2007	294.72	14.28	1.64	13.81	58.51	105.93	452.06
2008	390.78	16.09	2.20	18.59	86.90	120.96	606.95
2009	199.45	1.95	1.41	9.48	41.49	57.10	307.32
2010	289.75	2.08	1.73	14.52	59.44	90.56	438.07
2011	378.45	2.22	2.11	19.19	78.33	112.69	569.25
2012	427.99	0.77	2.81	21.10	93.09	113.34	655.80
2013	549.33	2.24	3.21	27.65	108.52	217.52	823.44
2014	410.15	3.33	2.90	19.83	90.26	112.38	636.44
2015	165.50	0.60	1.88	6.91	23.13	23.57	258.29
2016	159.19	0.76	1.82	6.63	32.04	60.42	258.48
2017	264.27	1.52	1.97	12.62	44.20	94.11	397.64
2018	244.42	1.85	1.77	11.73	34.31	87.02	360.53
2019	226.08	2.05	1.72	10.71	31.25	80.23	335.10
2020	193.86	2.21	1.57	9.02	23.55	72.30	286.71
2021	163.33	2.12	1.44	7.41	16.91	63.33	241.32
2022	123.82	1.95	1.27	5.32	10.14	49.55	184.48
2023	93.96	1.88	1.10	3.80	2.33	37.08	138.03
2024	65.88	1.75	1.00	2.73	4.52	35.20	105.47
2025	51.37	1.63	0.88	1.99	-	23.31	81.05
2026	73.34	1.60	0.58	3.66	-	50.29	100.34
2027	-	-	-	-	-	(438.91)	-

D10.1: Medium onshore oil field

Year	Production		Gross	Field	Field	Royalty	Cost	Profit
	Liquids	Gas	Rev	Opex	Capex		oil	Oil
	000 b/d	mmcf/d	\$M	\$M	\$M	\$M	\$M	\$M
1990	-	-	-	-	2.50	-	-	-
1991	0.10	-	0.79	0.84	5.50	0.08	0.55	0.16
1992	0.19	-	1.43	1.04	0.50	0.14	1.00	0.29
1993	0.16	-	1.08	1.04	-	0.11	0.75	0.22
1994	0.22	-	1.38	1.19	-	0.14	0.97	0.28
1995	0.20	-	1.34	1.17	1.00	0.13	0.94	0.27
1996	0.44	-	3.54	1.48	6.00	0.35	2.48	0.71
1997	0.35	-	2.64	1.40	2.00	0.26	1.84	0.53
1998	0.52	-	2.74	1.85	3.00	0.27	1.92	0.55
1999	0.57	-	4.02	1.89	-	0.40	2.82	0.80
2000	0.63	-	6.96	1.95	0.80	0.70	4.87	1.39
2001	0.90	-	8.51	2.29	3.20	0.85	5.96	1.70
2002	0.80	-	7.62	2.10	1.60	0.76	5.33	1.52
2003	0.74	-	8.39	2.05	1.60	0.84	5.87	1.68
2004	0.86	-	12.99	2.15	2.50	1.30	9.09	2.60
2005	1.10	-	22.69	2.35	10.50	2.27	15.88	4.54
2006	1.03	-	24.85	2.90	13.50	2.48	17.39	4.97
2007	1.40	-	36.95	7.50	12.00	3.70	25.87	7.39
2008	1.71	-	62.19	8.00	15.00	6.22	43.53	12.44
2009	1.68	-	37.82	7.95	9.00	3.78	26.48	7.56
2010	1.49	-	43.20	9.00	14.00	4.32	30.24	8.64
2011	1.26	-	43.73	11.00	11.00	4.37	30.61	8.75
2012	1.67	-	57.41	11.90	17.00	5.74	34.44	17.22
2013	1.77	-	63.28	12.65	15.50	6.33	37.97	18.98
2014	1.60	-	54.44	12.00	13.95	5.44	32.66	16.33
2015	1.50	-	26.83	11.55	11.00	2.68	16.10	8.05
2016	1.32	-	24.09	10.73	6.10	2.41	14.45	7.23
2017	1.08	-	27.65	9.39	-	2.76	16.59	8.29
2018	0.92	-	23.53	8.52	5.29	2.35	14.12	7.06
2019	0.77	-	20.10	7.61	-	2.01	12.06	6.03
2020	0.64	-	17.04	7.21	1.10	1.70	10.23	5.11
2021	0.54	-	14.80	6.23	-	1.48	8.88	4.44
2022	0.20	-	5.66	2.86	1.15	0.57	3.39	1.70
2023	0.16	-	4.67	2.34	-	0.47	2.80	1.40
2024	0.13	-	3.91	1.73	1.19	0.39	2.35	1.17
2025	0.10	-	3.10	1.46	-	0.31	1.86	0.93
2026	0.08	-	2.56	1.86	-	0.26	1.54	0.77
2027	-	-	-	-	21.93	-	-	-

D10.2: Medium onshore oil field (Continue)

Year	HG share Profit oil \$M	Supplementary Payment \$M	Research \$M	Export Duty \$M	Tax \$M	IOC Take \$M	HG Take \$M
1990	-	-	-	-	-	(2.50)	-
1991	0.03	-	0.00	0.01	-	(5.68)	0.13
1992	0.06	-	0.01	0.02	-	(0.34)	0.23
1993	0.04	-	0.00	0.02	-	(0.14)	0.17
1994	0.06	-	0.01	0.02	-	(0.03)	0.22
1995	0.05	-	0.01	0.02	-	(1.04)	0.22
1996	0.14	-	0.02	0.06	-	(4.51)	0.57
1997	0.11	-	0.01	0.04	-	(1.19)	0.42
1998	0.11	-	0.01	0.04	-	(2.55)	0.44
1999	0.16	-	0.02	0.06	-	1.49	0.64
2000	0.28	-	0.03	0.11	-	3.09	1.12
2001	0.34	-	0.04	0.14	-	1.65	1.36
2002	0.30	-	0.03	0.12	-	2.70	1.22
2003	0.34	-	0.04	0.13	-	3.39	1.34
2004	0.52	-	0.06	0.21	-	6.26	2.08
2005	0.91	-	0.10	0.36	-	6.20	3.64
2006	0.99	-	0.11	0.40	-	4.46	3.98
2007	1.48	-	0.16	0.59	-	11.53	5.92
2008	2.49	-	0.27	1.00	-	29.22	9.97
2009	1.51	-	0.16	0.61	2.78	12.03	8.84
2010	1.73	-	0.19	0.69	2.96	10.31	9.89
2011	1.75	-	0.19	0.70	1.90	12.81	8.91
2012	5.17	-	0.23	1.21	5.97	10.19	18.32
2013	5.70	-	0.26	1.33	7.71	13.81	21.32
2014	4.90	-	0.22	1.14	5.72	11.07	17.42
2015	2.41	-	0.11	0.56	-	(1.49)	5.77
2016	2.17	-	0.10	0.51	-	2.08	5.18
2017	2.49	-	0.11	0.58	3.34	8.97	9.29
2018	2.12	-	0.10	0.49	1.05	3.61	6.11
2019	1.81	-	0.08	0.42	2.02	6.14	6.35
2020	1.53	-	0.07	0.36	1.10	3.97	4.77
2021	1.33	-	0.06	0.31	1.25	4.14	4.44
2022	0.51	-	0.02	0.12	-	0.43	1.22
2023	0.42	-	0.02	0.10	-	1.32	1.00
2024	0.35	-	0.02	0.08	-	0.15	0.84
2025	0.28	-	0.01	0.07	-	0.98	0.67
2026	0.23	-	0.01	0.05	-	0.15	0.55
2027	-	-	-	-	-	(21.93)	-

D11.1: Small onshore oil field

Year	Production		Gross	Field	Field	Royalty	Cost	Profit
	Liquids	Gas	Rev	Opex	Capex		oil	Oil
	000 b/d	mmcf/d	\$M	\$M	\$M	\$M	\$M	\$M
1989	-	-	-	-	-	-	-	-
1990	-	-	-	-	2.00	-	-	-
1991	0.40	-	3.15	0.95	1.00	0.31	2.20	0.63
1992	1.26	-	9.46	2.00	-	0.95	6.62	1.89
1993	1.26	-	8.48	2.00	-	0.85	5.93	1.70
1994	1.00	-	6.27	2.00	2.40	0.63	4.39	1.25
1995	1.16	-	7.79	2.00	-	0.78	5.45	1.56
1996	1.00	-	8.04	2.10	1.20	0.80	5.63	1.61
1997	0.78	-	5.87	2.00	-	0.59	4.11	1.17
1998	0.69	-	3.63	2.00	-	0.36	2.18	1.09
1999	0.60	-	4.23	1.10	0.50	0.42	2.54	1.27
2000	0.55	-	6.07	1.10	1.50	0.61	3.64	1.82
2001	0.60	-	5.67	1.10	0.40	0.57	3.40	1.70
2002	0.75	-	7.14	1.10	-	0.71	4.29	2.14
2003	0.64	-	7.25	0.90	0.20	0.73	3.34	3.19
2004	0.54	-	8.16	0.80	-	0.82	0.90	6.44
2005	0.48	-	9.90	0.60	0.30	0.99	0.99	7.92
2006	0.57	-	13.75	0.75	3.00	1.38	3.86	8.52
2007	0.49	-	12.93	1.00	3.50	1.29	4.59	7.05
2008	0.72	-	26.19	1.50	1.80	2.62	3.44	20.13
2009	0.49	-	11.03	2.00	4.00	1.10	5.52	4.41
2010	0.42	-	12.18	2.50	0.50	1.22	5.66	5.30
2011	0.50	-	17.35	2.80	0.50	1.74	3.39	12.22
2012	0.40	-	13.75	2.80	6.00	1.38	6.88	5.50
2013	0.31	-	11.08	2.80	4.50	1.11	5.54	4.43
2014	0.25	-	8.51	3.80	-	0.85	4.25	3.40
2015	0.25	-	4.47	3.00	-	0.45	2.24	1.79
2016	0.29	-	5.29	3.00	0.75	0.53	2.65	2.12
2017	0.33	-	8.45	3.06	0.77	0.84	4.22	3.38
2018	0.35	-	8.95	3.12	1.56	0.90	4.48	3.58
2019	0.31	-	8.09	3.18	-	0.81	4.05	3.24
2020	0.23	-	6.12	3.25	-	0.61	3.06	2.45
2021	0.17	-	4.66	2.21	-	0.47	2.33	1.86
2022	-	-	-	-	3.38	-	-	-

D11.2: Small onshore oil field (Continue)

Year	HG share Profit oil \$M	Supplementary Payment \$M	Research \$M	Export Duty \$M	Tax \$M	IOC Take \$M	HG Take \$M
1989	-	-	-	-	-	-	-
1990	-	-	-	-	-	(2.00)	-
1991	0.13	-	0.01	0.05	-	0.69	0.50
1992	0.38	-	0.04	0.15	-	5.94	1.52
1993	0.34	-	0.04	0.14	-	5.12	1.36
1994	0.25	-	0.03	0.10	-	0.87	1.01
1995	0.31	-	0.03	0.12	-	4.54	1.25
1996	0.32	-	0.03	0.13	0.08	3.38	1.37
1997	0.23	-	0.03	0.09	0.93	2.00	1.87
1998	0.33	-	0.01	0.08	-	0.85	0.78
1999	0.38	-	0.02	0.09	0.26	1.47	1.17
2000	0.55	-	0.02	0.13	0.77	1.40	2.08
2001	0.51	-	0.02	0.12	1.15	1.81	2.36
2002	0.64	-	0.03	0.15	1.04	3.46	2.58
2003	0.86	-	0.03	0.23	1.59	2.72	3.43
2004	1.53	-	0.03	0.49	1.62	2.87	4.49
2005	1.88	-	0.04	0.60	2.07	3.42	5.58
2006	3.11	-	0.05	0.54	2.03	2.90	7.10
2007	2.63	-	0.05	0.44	1.71	2.31	6.12
2008	7.09	-	0.08	1.30	4.85	6.94	15.95
2009	1.77	-	0.04	0.26	0.08	1.78	3.25
2010	2.08	-	0.04	0.32	1.92	3.59	5.59
2011	4.36	-	0.06	0.79	2.64	4.47	9.58
2012	2.20	-	0.05	0.33	0.65	0.34	4.61
2013	1.77	-	0.04	0.27	0.34	0.26	3.52
2014	1.36	-	0.03	0.20	0.56	1.70	3.01
2015	0.72	-	0.02	0.11	-	0.18	1.29
2016	0.85	-	0.02	0.13	-	0.02	1.52
2017	1.35	-	0.03	0.20	0.65	1.54	3.08
2018	1.43	-	0.03	0.21	0.58	1.12	3.15
2019	1.29	-	0.03	0.19	0.81	1.77	3.14
2020	0.98	-	0.02	0.15	0.27	0.85	2.03
2021	0.75	-	0.02	0.11	0.10	1.01	1.44
2022	-	-	-	-	-	(3.38)	-

APPENDIX E : Deterministic calculation table of Myanmar PSC (2013)

E1.1: Large offshore gas field

Year	Production		Gross	Field	Field	Royalty	Cost	Profit
	Liquids	Gas	Rev	Opex	Capex		oil	Oil
	000 b/d	mmcf/d	\$M	\$M	\$M	\$M	\$M	\$M
1990	-	-	-	-	-	17.00	-	-
1991	-	-	-	-	-	98.00	-	-
1992	-	-	-	-	-	140.00	-	-
1993	1.22	175.00	150.01	40.00	141.00	15.00	75.00	59.18
1994	6.00	250.00	210.09	40.00	140.00	21.01	105.04	80.27
1995	7.00	300.00	236.42	50.00	188.00	23.64	118.21	89.87
1996	8.00	337.00	405.08	55.00	119.00	40.51	202.54	155.60
1997	10.50	344.00	390.45	60.00	158.00	39.05	195.23	148.27
1998	11.50	435.00	390.78	80.00	111.00	39.08	195.39	150.26
1999	15.00	575.00	580.15	100.00	40.00	58.01	290.07	221.48
2000	16.00	548.00	1,040.80	100.00	71.00	104.08	520.40	398.65
2001	16.21	573.35	986.15	109.61	135.00	98.61	493.07	379.13
2002	16.10	551.52	829.76	110.00	166.00	82.98	414.88	316.57
2003	16.60	499.00	1,184.41	105.50	160.00	118.44	404.86	642.30
2004	17.71	587.52	1,530.57	120.00	110.00	153.06	239.84	1,110.92
2005	17.84	592.09	2,295.70	140.00	70.00	229.57	231.18	1,798.15
2006	17.65	599.20	1,897.67	140.00	125.00	189.77	265.58	1,399.75
2007	18.01	607.25	2,020.21	140.00	155.00	202.02	373.71	1,396.95
2008	18.55	589.30	2,576.07	130.00	655.00	257.61	715.91	1,535.10
2009	18.20	516.32	1,154.14	130.00	510.00	115.41	418.35	579.40
2010	19.70	586.40	1,508.62	150.00	492.00	150.86	525.53	775.12
2011	20.56	591.01	1,574.24	160.00	790.00	157.42	502.88	842.58
2012	28.36	773.42	1,754.04	210.00	430.00	175.40	506.29	974.86
2013	32.49	889.06	2,371.99	245.00	296.00	237.20	725.18	1,293.45
2014	28.89	870.57	2,362.06	245.00	671.00	236.21	791.49	1,236.06
2015	28.08	904.69	1,459.83	240.00	368.00	145.98	561.37	702.25
2016	26.65	910.00	1,525.99	232.00	358.50	152.60	593.76	731.00
2017	18.00	900.00	1,709.12	236.64	263.67	170.91	687.95	804.17
2018	14.15	870.00	1,698.73	241.37	372.46	169.87	719.86	772.81
2019	10.95	870.00	1,730.62	249.38	210.12	173.06	763.60	765.38
2020	9.85	870.00	1,811.95	243.55	387.51	181.20	733.96	870.56
2021	8.30	750.00	1,601.74	237.38	163.40	160.17	394.20	1,024.62
2022	7.95	654.50	1,440.79	230.86	211.72	144.08	426.39	847.84
2023	7.00	621.00	1,394.26	223.99	209.06	139.43	414.31	820.10
2024	6.25	612.00	1,383.24	216.76	296.43	138.32	469.57	756.53
2025	5.70	577.00	1,326.79	215.12	302.35	132.68	471.58	704.84
2026	4.90	505.00	1,202.03	195.04	308.40	120.20	452.84	613.29
2027	3.90	430.00	1,018.80	174.07	314.57	101.88	433.08	470.95
2028	3.50	355.00	854.09	152.19	320.87	85.41	388.62	368.12
2029	2.80	255.00	630.00	135.83	327.28	63.00	286.97	270.17
2030	2.00	175.00	436.07	112.16	333.83	43.61	200.40	184.80
2031	1.45	122.50	318.64	87.48	95.56	31.86	147.06	134.28
2032	0.80	75.00	197.68	89.23	-	19.77	97.33	77.48
2033	0.50	45.00	122.97	91.02	-	12.30	61.48	47.19
2034	-	-	-	-	1,463.52	-	-	-

E1.2: Large offshore gas field (Continue)

Year	HG share Profit oil \$M	Domestic Supply Obligation \$M	Research \$M	Tax \$M	IOC Take \$M	HG Take \$M
1990	-	-	-	-	(17.00)	-
1991	-	-	-	-	(98.00)	-
1992	-	-	-	-	(140.00)	-
1993	38.35	0.02	0.10	-	(84.46)	53.47
1994	51.61	0.09	0.14	-	(42.77)	72.85
1995	57.71	0.11	0.16	-	(83.20)	81.63
1996	101.67	0.15	0.27	70.36	18.12	212.96
1997	96.79	0.19	0.26	80.03	(43.86)	216.31
1998	100.86	0.15	0.25	75.23	(15.78)	215.56
1999	151.45	0.25	0.35	115.90	114.18	325.96
2000	272.11	0.42	0.63	183.38	309.17	560.63
2001	260.02	0.37	0.60	146.20	235.73	505.80
2002	215.81	0.37	0.50	97.62	156.48	397.28
2003	436.41	0.60	1.03	104.29	258.14	660.77
2004	758.16	1.48	1.76	97.39	288.72	1,011.85
2005	1,231.29	2.11	2.83	152.48	467.41	1,618.29
2006	948.83	2.47	2.25	127.39	361.96	1,270.71
2007	949.28	2.44	2.24	145.37	423.86	1,301.35
2008	1,025.96	3.81	2.55	208.63	292.52	1,498.55
2009	375.00	2.25	1.02	15.00	5.45	508.69
2010	502.13	3.20	1.36	37.70	171.36	695.26
2011	539.72	3.99	1.51	-	(78.40)	702.64
2012	630.49	5.23	1.72	-	301.20	812.84
2013	857.42	6.29	2.18	10.48	717.42	1,113.57
2014	827.12	5.38	2.04	74.01	301.29	1,144.77
2015	480.85	2.52	1.11	-	221.36	630.46
2016	502.64	2.50	1.14	2.05	274.56	660.93
2017	557.40	2.44	1.23	67.38	409.44	799.37
2018	542.06	1.90	1.15	81.98	287.93	796.96
2019	543.92	1.50	1.11	92.03	459.49	811.63
2020	624.33	1.40	1.23	91.20	281.53	899.36
2021	728.69	1.19	1.48	29.76	279.67	921.29
2022	587.90	1.15	1.30	52.32	211.47	786.74
2023	564.51	1.04	1.28	47.98	206.98	754.24
2024	519.34	0.97	1.19	48.64	161.60	708.45
2025	480.92	0.90	1.12	37.73	155.96	653.36
2026	414.47	0.80	0.99	30.06	132.05	566.53
2027	313.85	0.65	0.79	18.15	94.84	435.32
2028	240.12	0.59	0.64	4.21	50.05	330.97
2029	172.73	0.46	0.49	-	(69.79)	236.68
2030	118.15	0.32	0.33	-	(172.32)	162.40
2031	85.85	0.23	0.24	-	17.41	118.19
2032	49.82	0.09	0.14	-	38.63	69.82
2033	30.37	0.05	0.08	-	(10.85)	42.80
2034	-	-	-	-	(1,463.52)	-

E2.1: Medium offshore gas field

Year	Production Liquids 000 b/d	Gas mmcf/d	Gross Rev \$M	Field Opex \$M	Field Capex \$M	Royalty \$M	Cost oil \$M	Profit Oil \$M
1980	-	-	-	-	98.00	-	-	-
1981	1.20	73.00	68.56	7.16	116.00	6.86	28.03	32.09
1982	4.50	128.00	170.04	7.52	153.00	17.00	59.90	87.62
1983	4.00	145.00	181.40	10.98	113.80	18.14	71.22	87.61
1984	5.50	184.00	237.63	12.20	65.20	23.76	92.35	115.61
1985	6.50	185.00	235.85	12.64	76.00	23.58	88.30	117.33
1986	6.50	161.00	149.88	12.56	38.00	14.99	60.01	71.29
1987	6.40	207.00	170.98	14.00	41.00	17.10	66.76	82.65
1988	6.30	216.00	169.96	14.67	60.00	17.00	69.79	79.50
1989	7.00	230.00	191.88	15.47	50.00	19.19	73.96	93.73
1990	7.25	224.00	204.56	15.96	41.00	20.46	48.38	129.25
1991	8.00	277.00	221.66	18.00	21.00	22.17	37.13	156.08
1992	7.50	247.00	215.86	21.00	47.00	21.59	57.85	130.80
1993	9.00	283.00	289.86	22.00	58.50	28.99	65.64	189.18
1994	8.50	262.00	234.04	23.00	52.50	23.40	63.28	142.03
1995	9.00	275.00	234.06	24.00	11.00	23.41	37.54	167.08
1996	8.10	259.00	327.02	27.00	25.00	32.70	49.07	238.74
1997	9.00	285.00	325.75	30.00	34.00	32.58	58.93	227.46
1998	8.75	292.00	267.74	33.00	15.40	26.77	52.36	184.01
1999	9.00	298.00	309.32	33.00	22.50	30.93	61.77	210.27
2000	8.50	270.00	519.62	32.80	39.20	51.96	64.93	393.34
2001	8.90	257.00	457.48	32.59	30.00	45.75	66.07	337.25
2002	8.00	251.00	384.04	35.24	55.00	38.40	86.94	251.07
2003	12.07	268.15	672.17	33.00	69.00	67.22	85.77	505.50
2004	11.76	261.65	740.13	33.00	70.00	74.01	87.64	560.71
2005	11.60	265.26	1,102.90	33.00	100.00	110.29	106.90	861.78
2006	11.11	243.12	865.22	37.00	120.00	86.52	128.55	623.34
2007	11.29	266.40	975.71	40.00	150.00	97.57	152.33	696.01
2008	10.62	252.85	1,202.08	44.00	186.50	120.21	182.62	860.63
2009	12.50	235.13	620.41	42.00	135.00	62.04	151.16	379.07
2010	11.20	245.02	716.42	44.00	135.00	71.64	154.05	458.26
2011	10.54	230.36	701.27	46.00	125.00	70.13	153.42	441.14
2012	9.03	247.49	559.73	49.00	66.40	55.97	120.49	352.23
2013	5.87	190.32	468.97	45.00	275.60	46.90	149.69	251.40
2014	6.75	216.99	573.40	43.00	175.10	57.34	189.09	304.01
2015	5.47	196.41	305.73	49.00	180.50	30.57	119.63	145.75
2016	5.80	222.27	359.78	48.00	67.50	35.98	141.09	172.13
2017	8.50	250.00	564.36	53.55	109.65	56.44	194.02	292.14
2018	11.75	250.00	684.63	59.82	70.23	68.46	205.32	380.81
2019	10.25	265.00	707.60	63.67	116.42	70.76	165.44	444.64
2020	9.00	255.00	693.88	64.95	118.74	69.39	166.64	433.89
2021	7.20	230.00	618.79	60.72	159.65	61.88	186.64	350.53
2022	7.10	205.00	581.65	57.43	125.23	58.16	160.84	342.57
2023	6.50	186.00	546.10	53.99	96.94	54.61	137.45	335.08
2024	6.25	168.00	516.22	50.38	98.89	51.62	134.75	311.03
2025	6.00	135.00	455.24	46.61	68.84	45.52	111.62	279.47
2026	5.90	113.00	422.79	42.66	70.22	42.28	108.59	253.02
2027	5.85	95.00	389.95	39.79	71.62	39.00	107.32	224.30
2028	4.35	73.50	300.50	34.24	58.84	30.05	90.42	165.19
2029	2.65	57.50	213.10	34.93	60.02	21.31	75.21	107.26
2030	2.25	40.00	164.77	35.63	61.23	16.48	59.20	80.92
2031	1.70	28.00	124.16	29.61	54.91	12.42	45.41	59.96
2032	0.50	13.50	49.36	16.47	-	4.94	21.46	21.03
2033	-	-	-	-	601.56	-	-	-

E2.2: Medium offshore gas field (Continue)

Year	HG share Profit oil \$M	Domestic Supply Obligation \$M	Research \$M	Tax \$M	IOC Take \$M	HG Take \$M
1980	-	-	-	-	(98.00)	-
1981	20.31	0.09	0.06	-	(81.91)	27.31
1982	54.87	0.33	0.16	-	(62.85)	72.37
1983	55.31	0.26	0.16	-	(17.25)	73.87
1984	72.94	0.35	0.21	-	62.96	97.27
1985	73.79	0.40	0.22	-	49.22	97.98
1986	45.06	0.21	0.13	-	38.94	60.38
1987	52.11	0.26	0.15	-	46.36	69.62
1988	50.37	0.21	0.15	-	27.57	67.72
1989	59.12	0.29	0.17	4.11	43.52	82.89
1990	81.68	0.37	0.24	6.78	38.08	109.53
1991	99.19	0.36	0.28	8.23	52.43	130.23
1992	83.04	0.32	0.24	10.43	32.24	115.62
1993	120.77	0.35	0.34	16.57	42.34	167.02
1994	90.45	0.30	0.26	10.21	33.92	124.62
1995	106.49	0.34	0.30	11.84	56.68	142.38
1996	152.84	0.37	0.43	22.04	66.64	208.39
1997	145.45	0.38	0.41	20.63	62.30	199.45
1998	118.13	0.24	0.33	16.95	56.92	162.42
1999	134.65	0.32	0.38	20.32	67.22	186.60
2000	252.21	0.55	0.71	38.31	103.87	343.74
2001	216.33	0.46	0.60	34.79	96.96	297.93
2002	160.70	0.40	0.45	27.98	65.87	227.93
2003	323.44	0.82	0.91	52.69	125.09	445.08
2004	357.75	1.07	1.01	58.08	145.19	491.94
2005	550.94	1.47	1.55	87.18	218.45	751.44
2006	395.02	1.62	1.14	61.93	161.97	546.24
2007	441.10	1.81	1.27	67.34	176.62	609.10
2008	544.67	2.36	1.58	82.13	220.63	750.95
2009	236.09	1.65	0.71	26.75	116.16	327.25
2010	285.88	1.92	0.86	35.16	141.96	395.46
2011	273.31	2.15	0.84	35.73	148.11	382.16
2012	217.89	1.77	0.67	23.54	144.49	299.84
2013	156.02	1.18	0.48	-	(56.20)	204.58
2014	189.28	1.33	0.57	7.78	99.00	256.30
2015	91.61	0.50	0.27	-	(46.72)	122.95
2016	108.36	0.56	0.32	-	99.06	145.22
2017	182.22	1.23	0.55	14.38	146.35	254.81
2018	236.82	1.71	0.72	43.65	203.22	351.36
2019	279.52	1.52	0.83	34.11	140.77	386.74
2020	273.56	1.35	0.80	30.44	134.64	375.55
2021	220.92	1.11	0.65	22.56	91.30	307.12
2022	215.63	1.13	0.63	19.49	103.94	295.05
2023	211.15	1.06	0.62	18.13	109.60	285.58
2024	195.56	1.06	0.58	16.76	101.37	265.58
2025	175.16	1.04	0.52	15.56	101.98	237.81
2026	157.86	1.06	0.48	15.00	93.23	216.67
2027	139.05	1.08	0.43	13.36	85.63	192.91
2028	102.29	0.81	0.31	7.66	66.30	141.12
2029	66.75	0.47	0.20	-	29.41	88.74
2030	50.21	0.38	0.15	-	0.69	67.23
2031	37.19	0.29	0.11	-	(10.36)	50.00
2032	13.22	0.07	0.04	-	14.63	18.27
2033	-	-	-	-	(601.56)	-

E3.1: Small offshore gas field

Year	Production		Gross	Field	Field	Royalty	Cost	Profit
	Liquids	Gas	Rev	Opex	Capex		oil	Oil
	000 b/d	mmcf/d	\$M	\$M	\$M	\$M	\$M	\$M
1997	-	-	-	-	-	176.20	-	-
1998	-	-	-	-	-	203.60	-	-
1999	2.00	80.00	80.10	16.00	32.00	8.01	40.05	30.63
2000	4.50	171.00	319.33	20.00	38.60	31.93	159.67	122.76
2001	6.50	180.00	322.93	24.00	154.50	32.29	161.47	123.03
2002	12.00	370.00	568.09	31.00	110.00	56.81	284.04	215.80
2003	13.28	345.28	839.87	54.02	57.00	83.99	256.94	483.89
2004	14.38	354.13	978.52	54.02	165.00	97.85	164.92	694.02
2005	16.63	378.61	1,575.69	63.00	245.00	157.57	253.59	1,130.23
2006	18.89	388.02	1,408.83	71.00	280.00	140.88	271.82	950.56
2007	17.66	398.72	1,480.47	79.00	310.00	148.05	317.71	968.10
2008	18.15	391.45	1,923.14	105.00	238.00	192.31	383.72	1,281.10
2009	19.39	364.23	961.66	115.00	207.00	96.17	314.77	507.07
2010	18.73	362.24	1,122.13	125.00	245.00	112.21	341.39	614.23
2011	16.32	407.19	1,159.38	150.00	540.50	115.94	369.78	617.03
2012	15.15	391.53	915.22	165.00	569.50	91.52	291.10	480.51
2013	15.93	376.21	1,081.72	165.00	381.00	108.17	342.97	573.62
2014	17.54	375.23	1,191.21	165.00	516.00	119.12	379.87	632.54
2015	14.14	305.34	576.10	160.00	454.50	57.61	231.84	261.36
2016	14.80	326.20	642.77	152.50	247.50	64.28	250.42	301.06
2017	13.50	345.00	824.13	155.55	283.97	82.41	304.49	402.66
2018	11.00	310.00	757.65	149.30	346.87	75.77	293.61	360.15
2019	9.80	275.00	712.46	164.49	430.85	71.25	287.40	328.24
2020	15.70	295.00	943.55	193.46	468.48	94.36	348.45	458.94
2021	20.00	305.00	1,107.08	223.52	396.81	110.71	390.11	551.44
2022	21.45	290.00	1,145.39	227.99	404.74	114.54	390.13	580.05
2023	16.75	255.00	977.44	192.35	348.51	97.74	340.51	490.30
2024	13.25	225.00	838.26	196.19	355.49	83.83	313.04	401.50
2025	11.25	180.00	707.84	164.27	362.59	70.78	260.38	341.76
2026	8.20	140.00	552.31	155.36	269.03	55.23	218.73	252.10
2027	6.15	105.00	420.56	158.47	217.22	42.06	185.24	172.94
2028	3.65	65.00	259.03	129.93	-	25.90	129.52	91.16
2029	-	-	-	-	1,118.44	-	-	-

E3.2: Small offshore gas field (Continue)

Year	HG share Profit oil \$M	Domestic Supply Obligation \$M	Research \$M	Tax \$M	IOC Take \$M	HG Take \$M
1997	-	-	-	-	(176.20)	-
1998	-	-	-	-	(203.60)	-
1999	19.70	0.03	0.05	-	4.31	27.80
2000	79.05	0.12	0.22	-	149.41	111.32
2001	79.05	0.15	0.22	-	32.73	111.71
2002	141.99	0.27	0.37	44.95	182.69	244.40
2003	315.84	0.64	0.84	84.59	242.96	485.90
2004	451.16	1.29	1.21	58.77	149.20	610.30
2005	740.73	1.97	1.95	110.20	255.28	1,012.41
2006	614.96	2.69	1.68	89.19	208.42	849.41
2007	628.26	2.67	1.70	79.74	231.05	860.42
2008	830.22	3.54	2.25	110.21	441.61	1,138.53
2009	318.45	2.38	0.94	21.06	200.66	439.00
2010	384.68	2.99	1.15	42.12	208.98	543.15
2011	388.32	3.04	1.14	16.46	(56.02)	524.90
2012	299.89	2.58	0.90	-	(214.17)	394.89
2013	358.57	2.95	1.08	-	64.95	470.77
2014	396.18	3.16	1.18	-	(9.43)	519.64
2015	163.51	1.06	0.49	-	(261.07)	222.66
2016	189.29	1.22	0.56	-	(12.57)	255.34
2017	253.67	1.69	0.74	-	46.10	338.51
2018	226.23	1.36	0.67	-	(42.54)	304.02
2019	206.08	1.16	0.61	-	(161.98)	279.10
2020	285.87	1.99	0.87	-	(101.47)	383.08
2021	342.41	2.62	1.05	-	29.97	456.78
2022	358.81	2.92	1.11	-	35.29	477.37
2023	303.95	2.36	0.93	-	31.59	404.99
2024	249.69	1.81	0.76	-	(49.50)	336.08
2025	212.23	1.59	0.65	-	(104.27)	285.25
2026	157.05	1.09	0.48	-	(85.93)	213.85
2027	108.11	0.69	0.32	-	(106.30)	151.18
2028	57.39	0.30	0.17	-	45.34	83.76
2029	-	-	-	-	(1,118.44)	-

E4.1: Large offshore oil field

Year	Production		Gross	Field	Field	Royalty	Cost	Profit
	Liquids	Gas	Rev	Opex	Capex		oil	Oil
	000 b/d	mmcf/d	\$M	\$M	\$M	\$M	\$M	\$M
1994	-	-	-	-	-	-	-	-
1995	-	-	-	-	50.00	-	-	-
1996	-	-	-	-	104.00	-	-	-
1997	2.50	15.00	32.40	42.20	144.00	3.24	16.20	11.08
1998	3.00	20.00	30.97	45.00	207.00	3.10	15.49	10.81
1999	8.60	70.00	118.42	48.00	233.00	11.84	59.21	41.30
2000	25.10	130.00	482.21	72.50	92.00	48.22	168.58	237.69
2001	36.97	143.30	557.67	80.00	157.00	55.77	154.22	312.73
2002	41.26	217.00	659.19	82.50	243.00	65.92	182.26	371.71
2003	54.64	227.18	1,072.83	89.00	286.00	107.28	278.16	625.46
2004	44.24	199.38	1,096.82	95.00	240.00	109.68	272.19	648.13
2005	56.71	218.96	1,882.60	95.00	260.00	188.26	373.69	1,203.68
2006	59.48	198.21	1,921.72	110.00	300.00	192.17	264.97	1,321.10
2007	50.62	191.87	1,824.15	125.00	250.00	182.41	277.25	1,230.88
2008	52.56	162.69	2,436.47	140.00	300.00	243.65	322.67	1,679.00
2009	52.41	176.08	1,433.78	175.00	280.00	143.38	270.95	901.46
2010	41.12	171.29	1,465.99	175.00	270.00	146.60	279.23	920.95
2011	33.67	153.49	1,392.03	170.00	137.50	139.20	254.47	881.51
2012	34.46	123.90	1,309.40	175.00	353.50	130.94	220.73	839.28
2013	28.03	109.14	1,150.71	159.00	324.00	115.07	212.76	722.66
2014	28.21	93.09	1,107.32	220.00	310.00	110.73	264.43	636.17
2015	26.20	98.10	572.43	220.00	285.50	57.24	232.01	236.31
2016	29.40	99.98	650.77	181.00	126.90	65.08	206.34	325.70
2017	28.35	74.95	829.75	183.81	117.50	82.97	212.76	461.43
2018	26.90	74.90	802.98	191.36	149.82	80.30	221.48	432.41
2019	25.10	74.85	779.35	208.45	271.67	77.94	237.36	398.56
2020	23.60	75.25	762.51	212.62	277.10	76.25	242.26	381.15
2021	21.80	74.00	733.16	216.87	247.31	73.32	244.56	355.53
2022	20.00	76.00	706.80	221.21	216.23	70.68	247.62	331.94
2023	18.75	76.00	692.79	225.64	220.54	69.28	251.02	317.77
2024	16.50	75.00	643.19	230.15	224.96	64.32	250.97	278.23
2025	14.60	75.00	602.54	222.80	152.97	60.25	242.27	254.71
2026	10.50	75.00	491.44	202.88	156.04	49.14	216.41	192.26
2027	7.50	75.00	403.10	188.28	119.36	40.31	193.39	144.61
2028	5.00	63.00	300.95	185.71	40.58	30.09	150.47	103.32
2029	2.50	58.00	208.86	150.61	-	20.89	104.43	74.75
2030	1.50	53.00	164.54	116.39	-	16.45	82.27	60.37
2031	-	-	-	-	929.81	-	-	-

E4.2: Large offshore oil field (Continue)

Year	HG share Profit oil \$M	Domestic Supply Obligation \$M	Research \$M	Tax \$M	IOC Take \$M	HG Take \$M
1994	-	-	-	-	-	-
1995	-	-	-	-	(50.00)	-
1996	-	-	-	-	(104.00)	-
1997	6.92	0.05	0.02	-	(164.02)	10.23
1998	6.79	0.04	0.02	-	(230.97)	9.95
1999	25.94	0.15	0.08	-	(200.58)	38.00
2000	146.74	1.24	0.45	-	121.05	196.66
2001	195.52	1.76	0.59	-	67.04	253.63
2002	233.57	2.02	0.69	-	31.49	302.20
2003	402.05	3.20	1.12	-	184.18	513.64
2004	407.82	3.61	1.20	-	239.52	522.31
2005	778.63	6.21	2.13	-	552.37	975.23
2006	861.80	7.40	2.30	3.76	444.29	1,067.43
2007	777.74	7.29	2.27	75.96	403.48	1,045.66
2008	1,067.96	10.40	3.06	113.73	557.67	1,438.80
2009	572.39	5.87	1.65	4.24	251.26	727.52
2010	573.95	6.17	1.73	15.12	277.42	743.57
2011	543.57	6.13	1.69	26.49	367.44	717.08
2012	516.90	6.10	1.61	-	125.36	655.55
2013	440.15	5.23	1.41	-	105.84	561.87
2014	387.93	4.55	1.24	-	72.86	504.46
2015	144.31	1.55	0.46	-	(136.64)	203.56
2016	199.80	2.20	0.63	-	75.17	267.70
2017	281.42	3.31	0.90	-	159.83	368.60
2018	263.11	3.06	0.85	-	114.48	347.32
2019	241.69	2.79	0.78	-	(23.97)	323.20
2020	231.37	2.62	0.75	-	(38.20)	310.99
2021	216.03	2.41	0.70	-	(23.47)	292.45
2022	201.99	2.20	0.65	-	(6.16)	275.52
2023	193.58	2.08	0.62	-	(18.94)	265.55
2024	169.87	1.76	0.54	-	(48.40)	236.48
2025	155.82	1.56	0.49	-	8.64	218.12
2026	118.46	1.04	0.37	-	(36.50)	169.02
2027	89.87	0.66	0.27	-	(35.66)	131.11
2028	64.60	0.41	0.19	-	(20.64)	95.30
2029	47.27	0.21	0.14	-	(10.25)	68.50
2030	38.42	0.13	0.11	-	(6.97)	55.12
2031	-	-	-	-	(929.81)	-

E5.1: Medium offshore oil field

Year	Production Liquids 000 b/d	Gas mmcf/d	Gross Rev \$M	Field Opex \$M	Field Capex \$M	Royalty \$M	Cost oil \$M	Profit Oil \$M
2001	-	-	-	-	-	-	-	-
2002	-	-	-	-	-	-	-	-
2003	-	-	-	-	-	-	-	-
2004	-	-	-	-	20.00	-	-	-
2005	5.70	-	117.57	24.36	30.84	11.76	24.36	69.70
2006	8.70	-	209.87	45.40	43.24	20.99	45.40	122.50
2007	19.30	-	509.39	92.70	71.50	50.94	92.70	314.81
2008	19.70	-	716.46	103.70	216.40	71.65	103.70	469.47
2009	20.20	-	454.77	108.79	24.70	45.48	108.79	255.02
2010	17.70	-	513.16	97.10	44.46	51.32	97.10	313.43
2011	17.30	-	600.38	97.10	23.76	60.04	97.10	383.21
2012	14.10	-	484.70	83.35	7.10	48.47	83.35	304.41
2013	13.10	-	468.35	76.48	28.70	46.83	76.48	298.20
2014	13.80	-	469.55	76.48	90.00	46.95	76.48	299.16
2015	12.30	-	219.99	70.64	18.00	22.00	70.64	105.35
2016	11.50	-	209.88	58.64	10.00	20.99	58.64	109.26
2017	10.00	-	256.01	57.78	12.24	25.60	57.78	147.03
2018	8.00	-	204.58	46.45	10.40	20.46	46.45	117.21
2019	6.00	-	156.59	44.72	10.61	15.66	44.72	80.55
2020	3.50	-	93.21	39.12	-	9.32	39.12	35.45
2021	2.00	-	54.82	28.31	-	5.48	27.41	16.45
2022	-	-	-	-	82.21	-	-	-

E5.2: Medium offshore oil field (Continue)

Year	HG share Profit oil \$M	Domestic Supply Obligation \$M	Research \$M	Tax \$M	IOC Take \$M	HG Take \$M
2001	-	-	-	-	-	-
2002	-	-	-	-	-	-
2003	-	-	-	-	-	-
2004	-	-	-	-	(20.00)	-
2005	41.82	0.56	0.14	-	8.10	54.27
2006	73.50	0.98	0.24	-	25.52	95.71
2007	188.89	2.52	0.63	-	102.21	242.97
2008	281.68	3.76	0.94	-	38.34	358.02
2009	153.01	2.04	0.51	-	120.24	201.04
2010	188.06	2.51	0.63	-	129.09	242.51
2011	229.92	3.07	0.77	-	185.73	293.79
2012	182.64	2.44	0.61	-	160.09	234.16
2013	178.92	2.39	0.60	-	134.43	228.74
2014	179.50	2.39	0.60	-	73.63	229.44
2015	63.21	0.84	0.21	-	45.08	86.26
2016	65.56	0.87	0.22	-	53.60	87.64
2017	88.22	1.18	0.29	-	70.70	115.29
2018	70.33	0.94	0.23	-	55.77	91.96
2019	48.33	0.64	0.16	-	36.46	64.79
2020	21.27	0.28	0.07	-	23.14	30.94
2021	9.87	0.13	0.03	-	11.00	15.51
2022	-	-	-	-	(82.21)	-

E6.1: Small offshore oil field

Year	Production		Gross Rev \$M	Field Opex \$M	Field Capex \$M	Royalty \$M	Cost oil \$M	Profit Oil \$M
	Liquids 000 b/d	Gas mmcf/d						
2009	-	-	-	-	-	-	-	-
2010	-	-	-	-	-	-	-	-
2011	-	-	-	-	-	-	-	-
2012	-	-	-	-	30.00	-	-	-
2013	-	-	-	-	75.00	-	-	-
2014	1.34	-	45.59	10.98	151.40	4.56	22.80	13.68
2015	14.00	-	250.39	111.90	118.00	25.04	125.20	75.12
2016	12.20	-	222.65	91.90	9.00	22.27	111.33	66.80
2017	9.50	-	243.21	83.54	-	24.32	87.00	107.57
2018	7.50	-	191.79	74.80	-	19.18	74.80	78.63
2019	6.50	-	169.63	70.99	-	16.96	70.99	64.72
2020	4.50	-	119.84	50.77	-	11.98	50.77	45.10
2021	2.00	-	54.82	19.30	-	5.48	19.30	24.56
2022	-	-	-	-	47.30	-	-	-

E6.2: Small offshore oil field (Continue)

Year	HG share Profit oil \$M	Domestic Supply Obligation \$M	Research \$M	Tax \$M	IOC Take \$M	HG Take \$M
2010	-	-	-	-	-	-
2011	-	-	-	-	-	-
2012	-	-	-	-	(30.00)	-
2013	-	-	-	-	(75.00)	-
2014	8.21	0.11	0.03	-	(129.69)	12.90
2015	45.07	0.60	0.15	-	(50.37)	70.86
2016	40.08	0.53	0.13	-	58.74	63.01
2017	64.54	0.86	0.22	-	69.73	89.94
2018	47.18	0.63	0.16	-	49.85	67.14
2019	38.83	0.52	0.13	-	42.20	56.44
2020	27.06	0.36	0.09	-	29.57	39.49
2021	14.74	0.20	0.05	-	15.06	20.46
2022	-	-	-	-	(47.30)	-

E7.1: Medium onshore gas field

Year	Production		Gross Rev \$M	Field Opex \$M	Field Capex \$M	Royalty \$M	Cost oil \$M	Profit Oil \$M
	Liquids 000 b/d	Gas mmcf/d						
2002	-	-	-	-	-	-	-	-
2003	-	-	-	-	-	-	-	-
2004	-	-	-	-	-	-	-	-
2005	-	-	-	-	40.00	-	-	-
2006	-	6.07	14.91	1.40	120.00	1.49	7.46	5.96
2007	0.47	85.51	229.95	13.20	38.00	22.99	114.97	90.74
2008	0.45	83.07	284.40	13.20	25.00	28.44	142.20	112.12
2009	0.43	85.04	132.29	12.00	-	13.23	36.25	81.84
2010	0.43	87.20	151.87	13.51	-	15.19	20.24	115.20
2011	0.38	83.14	134.27	14.97	-	13.43	24.56	94.96
2012	0.43	93.22	108.69	14.27	-	10.87	21.66	74.68
2013	0.38	87.59	132.84	15.06	-	13.28	17.03	101.17
2014	0.42	105.12	180.81	19.80	-	18.08	21.36	139.94
2015	0.52	115.00	131.03	19.13	20.00	13.10	39.22	77.78
2016	0.54	120.00	146.95	19.58	32.55	14.69	51.38	79.89
2017	0.54	120.00	180.26	19.97	51.86	18.03	70.07	90.78
2018	0.54	120.00	198.21	20.37	17.99	19.82	38.64	138.37
2019	0.54	120.00	213.38	20.78	18.35	21.34	39.34	151.30
2020	0.50	120.00	227.06	21.19	18.71	22.71	39.96	163.07
2021	0.45	110.00	213.89	21.61	-	21.39	22.86	168.41
2022	0.40	108.00	211.96	22.68	36.65	21.20	58.21	131.42
2023	0.40	108.00	218.63	23.13	51.40	21.86	72.50	123.09
2024	0.35	108.00	221.43	23.59	20.26	22.14	43.69	154.55
2025	0.32	100.00	209.22	23.40	20.66	20.92	43.86	143.45
2026	0.25	89.00	192.20	23.86	21.08	19.22	44.60	127.58
2027	0.20	77.00	165.97	24.34	21.50	16.60	45.45	103.26
2028	0.20	65.00	141.34	24.12	21.93	14.13	45.82	80.70
2029	0.15	55.00	119.91	25.33	-	11.99	26.45	80.94
2030	0.15	43.00	94.75	25.83	-	9.48	27.31	57.42
2031	0.15	30.00	70.34	26.35	-	7.03	28.46	34.29
2032	-	-	-	-	83.77	-	-	-

E7.2: Medium onshore gas field (Continue)

Year	HG share Profit oil \$M	Domestic Supply Obligation \$M	Research \$M	Tax \$M	IOC Take \$M	HG Take \$M
2002	-	-	-	-	-	-
2003	-	-	-	-	-	-
2004	-	-	-	-	-	-
2005	-	-	-	-	(40.00)	-
2006	3.58	-	0.01	-	(111.57)	5.08
2007	55.74	0.03	0.17	-	99.81	78.94
2008	68.76	0.04	0.22	-	148.74	97.46
2009	50.27	0.02	0.16	9.61	47.00	73.29
2010	70.86	0.03	0.22	17.19	34.88	103.49
2011	58.24	0.03	0.18	14.00	33.41	85.88
2012	46.06	0.04	0.14	9.16	28.15	66.27
2013	62.15	0.07	0.20	9.80	32.27	85.50
2014	86.75	0.08	0.27	13.19	42.64	118.37
2015	48.38	0.05	0.15	7.67	22.55	69.35
2016	49.77	0.05	0.15	10.19	19.96	74.85
2017	56.50	0.08	0.17	16.01	17.65	90.78
2018	86.24	0.08	0.26	8.67	44.78	115.07
2019	94.31	0.08	0.28	9.89	48.35	125.90
2020	101.68	0.08	0.31	11.90	50.49	136.67
2021	104.68	0.07	0.32	15.10	50.72	141.55
2022	81.60	0.06	0.25	15.23	34.29	118.34
2023	76.41	0.06	0.23	12.87	32.66	111.44
2024	96.00	0.06	0.29	12.38	46.71	130.87
2025	88.80	0.05	0.27	11.16	43.95	121.21
2026	78.54	0.04	0.25	10.82	38.39	108.87
2027	63.05	0.03	0.20	9.61	30.64	89.49
2028	48.72	0.03	0.16	37.96	(5.71)	101.00
2029	48.57	0.02	0.16	64.63	(30.79)	125.37
2030	34.45	0.02	0.11	66.94	(42.08)	111.00
2031	20.57	0.02	0.07	38.87	(22.58)	66.57
2032	-	-	-	-	(83.77)	-

E8.2: Small onshore gas field (Continue)

Year	HG share Profit oil \$M	Domestic Supply Obligation \$M	Research \$M	Tax \$M	IOC Take \$M	HG Take \$M
1989	-	-	-	-	(10.00)	-
1990	-	-	-	-	(16.00)	-
1991	7.01	-	0.02	-	16.97	9.96
1992	10.23	-	0.03	-	20.48	13.95
1993	23.06	-	0.08	-	15.30	27.68
1994	22.06	-	0.07	-	14.49	26.47
1995	20.31	-	0.07	-	13.30	24.42
1996	33.36	-	0.11	-	21.78	40.04
1997	27.29	-	0.09	-	17.05	34.98
1998	34.84	-	0.11	-	21.55	41.78
1999	18.96	-	0.06	-	10.03	26.69
2000	57.20	-	0.18	-	38.37	68.58
2001	44.07	-	0.15	0.09	29.15	53.02
2002	36.07	-	0.12	6.35	17.57	49.78
2003	50.59	-	0.17	10.07	23.49	70.76
2004	37.63	-	0.13	7.49	17.47	52.77
2005	55.97	-	0.19	11.14	25.99	78.21
2006	36.58	-	0.12	7.36	16.90	51.63
2007	31.81	-	0.11	6.30	14.80	44.70
2008	37.22	-	0.12	7.38	17.31	52.21
2009	11.03	-	0.04	2.02	5.30	15.90
2010	9.94	-	0.03	1.83	4.77	14.71
2011	9.21	-	0.03	1.83	4.28	13.34
2012	4.80	-	0.02	0.84	2.35	7.09
2013	6.85	-	0.02	1.14	3.41	9.83
2014	7.68	-	0.03	1.27	3.82	10.96
2015	3.94	-	0.01	0.65	1.96	5.90
2016	3.70	-	0.01	0.61	1.84	5.57
2017	4.26	-	0.01	0.71	2.12	6.34
2018	4.18	-	0.01	0.69	2.08	6.25
2019	3.91	-	0.01	0.65	1.94	5.89
2020	3.60	-	0.01	0.60	1.79	5.48
2021	3.03	-	0.01	0.50	1.51	4.72
2022	-	-	-	-	-	-

E9.1: Large onshore oil field

Year	Production		Gross	Field	Field	Royalty	Cost	Profit
	Liquids	Gas	Rev	Opex	Capex		oil	Oil
	000 b/d	mmcf/d	\$M	\$M	\$M	\$M	\$M	\$M
1981	-	-	-	-	24.50	-	-	-
1982	-	-	-	-	56.00	-	-	-
1983	6.10	3.50	70.91	21.90	51.00	7.09	22.53	34.52
1984	13.70	11.40	157.98	26.50	62.00	15.80	30.18	97.32
1985	20.70	17.60	227.45	31.20	60.00	22.75	37.05	146.52
1986	20.00	21.30	125.46	32.50	21.00	12.55	36.13	65.74
1987	16.65	22.10	130.03	32.50	12.00	13.00	35.87	69.50
1988	18.00	21.60	118.25	31.10	18.00	11.82	34.26	61.67
1989	20.40	22.30	159.47	30.90	34.50	15.95	35.11	93.84
1990	23.39	24.40	224.14	30.00	21.00	22.41	35.58	145.26
1991	24.95	28.70	212.70	32.00	22.00	21.27	37.75	134.05
1992	26.51	33.00	220.26	34.00	12.00	22.03	41.37	136.97
1993	24.50	36.50	194.39	37.00	9.00	19.44	46.16	112.31
1994	24.97	38.60	183.21	40.00	24.00	18.32	47.50	101.73
1995	20.48	35.50	159.89	43.00	24.00	15.99	48.18	81.97
1996	21.96	39.00	216.09	43.00	16.00	21.61	54.87	121.95
1997	20.83	39.00	192.15	43.00	21.00	19.22	52.75	104.50
1998	23.77	39.00	154.72	43.00	33.00	15.47	49.58	77.16
1999	26.38	39.00	218.29	42.00	24.00	21.83	51.90	125.96
2000	26.90	39.00	358.60	45.00	31.00	35.86	68.03	225.00
2001	24.68	42.80	295.49	44.00	32.00	29.55	65.83	176.78
2002	23.69	42.10	277.31	35.00	43.00	27.73	54.30	172.72
2003	22.23	37.34	326.49	35.00	40.00	32.65	64.28	204.36
2004	20.10	38.73	386.85	40.00	34.99	38.68	73.02	244.78
2005	19.94	40.97	544.68	40.00	32.00	54.47	96.90	352.18
2006	21.96	35.65	617.31	45.00	56.60	61.73	82.40	420.20
2007	23.34	29.47	690.99	50.00	83.00	69.10	82.06	478.23
2008	23.10	25.97	923.91	61.00	135.00	92.39	97.36	650.14
2009	22.95	13.00	535.42	61.00	110.00	53.54	68.24	361.97
2010	23.53	14.67	705.63	61.40	115.60	70.56	71.09	495.77
2011	24.80	19.76	889.44	65.00	142.50	88.94	77.29	637.15
2012	31.30	24.30	1,100.44	87.90	243.40	110.04	98.18	784.61
2013	36.06	26.15	1,324.81	91.50	192.35	132.48	106.84	956.57
2014	31.00	28.34	1,099.68	88.40	262.45	109.97	107.24	776.99
2015	32.18	25.67	602.71	80.30	240.55	60.27	90.27	394.62
2016	30.28	24.38	580.46	77.28	184.28	58.05	87.50	379.66
2017	27.28	23.17	730.53	77.91	160.88	73.05	90.55	497.09
2018	24.66	22.01	664.42	78.53	138.35	66.44	91.44	443.48
2019	22.92	20.91	632.88	74.82	142.73	63.29	88.08	421.70
2020	19.89	19.86	565.05	74.80	131.24	56.51	87.80	367.78
2021	17.02	18.87	501.12	74.30	122.17	50.11	86.46	317.89
2022	13.67	17.93	419.90	73.20	112.67	41.99	84.05	255.20
2023	10.86	17.03	349.55	72.83	101.61	34.95	82.35	200.55
2024	8.78	16.18	295.92	60.93	94.32	29.59	70.22	169.67
2025	7.13	15.37	251.89	60.83	86.70	25.19	68.75	135.83
2026	5.66	14.60	211.46	60.83	-	21.15	67.25	104.94
2027	-	-	-	-	438.91	-	-	-

E9.2: Large onshore oil field (Continue)

Year	HG share Profit oil \$M	Domestic Supply Obligation \$M	Research \$M	Tax \$M	IOC Take \$M	HG Take \$M
1981	-	-	-	-	(24.50)	-
1982	-	-	-	-	(56.00)	-
1983	20.71	0.27	0.07	-	(30.13)	28.14
1984	59.64	0.72	0.19	-	(6.87)	76.35
1985	92.24	1.03	0.27	-	19.96	116.30
1986	40.94	0.45	0.12	-	17.90	54.05
1987	42.98	0.49	0.13	-	28.93	56.61
1988	38.26	0.43	0.12	-	18.52	50.62
1989	58.82	0.66	0.18	-	18.48	75.60
1990	94.16	0.97	0.26	-	55.33	117.81
1991	88.04	0.87	0.23	-	48.28	110.41
1992	90.91	0.85	0.23	-	60.24	114.02
1993	73.13	0.69	0.20	-	54.94	93.45
1994	66.49	0.62	0.18	-	33.60	85.60
1995	51.31	0.54	0.15	-	24.90	67.99
1996	77.48	0.76	0.22	-	57.02	100.08
1997	65.59	0.67	0.19	-	42.49	85.66
1998	49.74	0.45	0.14	-	12.91	65.80
1999	83.19	0.75	0.21	-	46.31	105.98
2000	149.01	1.32	0.38	-	96.03	186.57
2001	114.91	1.04	0.31	-	73.69	145.80
2002	111.58	1.06	0.31	-	58.64	140.67
2003	130.05	1.25	0.37	-	87.18	164.31
2004	152.34	1.58	0.46	-	118.79	193.07
2005	218.76	2.24	0.67	-	196.54	276.13
2006	267.77	2.77	0.76	-	182.68	333.03
2007	309.37	3.14	0.84	-	175.54	382.45
2008	419.98	4.34	1.15	-	210.05	517.86
2009	234.02	2.50	0.64	-	73.72	290.70
2010	322.39	3.39	0.87	-	131.42	397.21
2011	419.12	4.27	1.09	-	168.52	513.42
2012	539.09	4.83	1.23	-	113.94	655.20
2013	670.94	5.60	1.43	-	230.51	810.45
2014	532.31	4.75	1.22	-	100.58	648.25
2015	271.78	2.37	0.61	-	(53.18)	335.04
2016	258.90	2.33	0.60	-	(0.97)	319.88
2017	332.97	3.18	0.82	-	81.72	410.03
2018	291.05	2.94	0.76	-	86.35	361.20
2019	272.31	2.88	0.75	-	76.11	339.22
2020	229.46	2.65	0.69	-	69.71	289.31
2021	197.01	2.31	0.60	-	54.62	250.03
2022	156.37	1.87	0.49	-	33.31	200.72
2023	121.07	1.49	0.40	-	17.20	157.91
2024	101.80	1.26	0.34	-	7.68	132.99
2025	81.50	0.99	0.27	-	(3.58)	107.95
2026	62.96	0.74	0.21	-	65.56	85.06
2027	-	-	-	-	(438.91)	-

E10.1: Medium onshore oil field

Year	Production		Gross	Field	Field	Royalty	Cost	Profit
	Liquids	Gas	Rev	Opex	Capex		oil	Oil
	000 b/d	mmcf/d	\$M	\$M	\$M	\$M	\$M	\$M
1990	-	-	-	-	2.50	-	-	-
1991	0.10	-	0.79	0.84	5.50	0.08	0.39	0.24
1992	0.19	-	1.43	1.04	0.50	0.14	0.71	0.43
1993	0.16	-	1.08	1.04	-	0.11	0.54	0.32
1994	0.22	-	1.38	1.19	-	0.14	0.69	0.41
1995	0.20	-	1.34	1.17	1.00	0.13	0.67	0.40
1996	0.44	-	3.54	1.48	6.00	0.35	1.77	1.06
1997	0.35	-	2.64	1.40	2.00	0.26	1.32	0.79
1998	0.52	-	2.74	1.85	3.00	0.27	1.37	0.82
1999	0.57	-	4.02	1.89	-	0.40	2.01	1.21
2000	0.63	-	6.96	1.95	0.80	0.70	3.48	2.09
2001	0.90	-	8.51	2.29	3.20	0.85	3.19	3.62
2002	0.80	-	7.62	2.10	1.60	0.76	2.10	4.00
2003	0.74	-	8.39	2.05	1.60	0.84	2.05	4.66
2004	0.86	-	12.99	2.15	2.50	1.30	2.15	8.24
2005	1.10	-	22.69	2.35	10.50	2.27	2.35	15.80
2006	1.03	-	24.85	2.90	13.50	2.48	2.90	16.98
2007	1.40	-	36.95	7.50	12.00	3.70	7.50	22.06
2008	1.71	-	62.19	8.00	15.00	6.22	8.00	41.75
2009	1.68	-	37.82	7.95	9.00	3.78	7.95	22.31
2010	1.49	-	43.20	9.00	14.00	4.32	9.00	25.56
2011	1.26	-	43.73	11.00	11.00	4.37	11.00	23.98
2012	1.67	-	57.41	11.90	17.00	5.74	11.90	34.03
2013	1.77	-	63.28	12.65	15.50	6.33	12.65	37.97
2014	1.60	-	54.44	12.00	13.95	5.44	12.00	31.55
2015	1.50	-	26.83	11.55	11.00	2.68	11.55	9.91
2016	1.32	-	24.09	10.73	6.10	2.41	10.73	8.54
2017	1.08	-	27.65	9.39	-	2.76	9.39	12.73
2018	0.92	-	23.53	8.52	5.29	2.35	8.52	10.30
2019	0.77	-	20.10	7.61	-	2.01	7.61	8.47
2020	0.64	-	17.04	7.21	1.10	1.70	7.21	6.42
2021	0.54	-	14.80	6.23	-	1.48	6.23	5.61
2022	0.20	-	5.66	2.86	1.15	0.57	2.83	1.70
2023	0.16	-	4.67	2.34	-	0.47	2.33	1.40
2024	0.13	-	3.91	1.73	1.19	0.39	1.77	1.36
2025	0.10	-	3.10	1.46	-	0.31	1.46	1.02
2026	0.08	-	2.56	1.86	-	0.26	1.28	0.77
2027	-	-	-	-	21.93	-	-	-

E10.2: Medium onshore oil field (Continue)

Year	HG share Profit oil \$M	Domestic Supply Obligation \$M	Research \$M	Tax \$M	IOC Take \$M	HG Take \$M
1990	-	-	-	-	(2.50)	-
1991	0.14	0.00	0.00	-	(5.78)	0.22
1992	0.26	0.00	0.00	-	(0.52)	0.40
1993	0.19	0.00	0.00	-	(0.27)	0.30
1994	0.25	0.00	0.00	-	(0.20)	0.39
1995	0.24	0.00	0.00	-	(1.21)	0.38
1996	0.64	0.01	0.00	-	(4.94)	1.00
1997	0.47	0.01	0.00	-	(1.51)	0.75
1998	0.49	0.01	0.00	-	(2.89)	0.77
1999	0.72	0.01	0.00	-	0.99	1.14
2000	1.25	0.02	0.00	-	2.24	1.97
2001	2.17	0.03	0.01	-	(0.04)	3.06
2002	2.40	0.03	0.01	-	0.72	3.20
2003	2.80	0.04	0.01	-	1.06	3.68
2004	4.94	0.07	0.02	-	2.01	6.33
2005	9.48	0.13	0.03	-	(2.07)	11.91
2006	10.19	0.14	0.03	-	(4.39)	12.84
2007	13.24	0.18	0.04	-	0.30	17.15
2008	25.05	0.33	0.08	-	7.50	31.69
2009	13.38	0.18	0.04	-	3.48	17.39
2010	15.34	0.20	0.05	-	0.29	19.91
2011	14.39	0.19	0.05	-	2.73	19.00
2012	20.42	0.27	0.07	-	2.01	26.50
2013	22.78	0.30	0.08	-	5.64	29.49
2014	18.93	0.25	0.06	-	3.80	24.69
2015	5.95	0.08	0.02	-	(4.45)	8.73
2016	5.13	0.07	0.02	-	(0.36)	7.62
2017	7.64	0.10	0.03	-	7.73	10.53
2018	6.18	0.08	0.02	-	1.08	8.64
2019	5.08	0.07	0.02	-	5.31	7.17
2020	3.85	0.05	0.01	-	3.11	5.62
2021	3.37	0.04	0.01	-	3.67	4.90
2022	1.02	0.01	0.00	-	0.05	1.60
2023	0.84	0.01	0.00	-	1.01	1.32
2024	0.82	0.01	0.00	-	(0.23)	1.22
2025	0.61	0.01	0.00	-	0.71	0.93
2026	0.46	0.01	0.00	-	(0.02)	0.72
2027	-	-	-	-	(21.93)	-

E11.1: Small onshore oil field

Year	Production		Gross	Field	Field	Royalty	Cost	Profit
	Liquids	Gas	Rev	Opex	Capex		oil	Oil
	000 b/d	mmcf/d	\$M	\$M	\$M	\$M	\$M	\$M
1989	-	-	-	-	-	-	-	-
1990	-	-	-	-	2.00	-	-	-
1991	0.40	-	3.15	0.95	1.00	0.31	1.57	0.94
1992	1.26	-	9.46	2.00	-	0.95	4.73	2.84
1993	1.26	-	8.48	2.00	-	0.85	4.24	2.54
1994	1.00	-	6.27	2.00	2.40	0.63	3.14	1.88
1995	1.16	-	7.79	2.00	-	0.78	3.89	2.34
1996	1.00	-	8.04	2.10	1.20	0.80	4.02	2.41
1997	0.78	-	5.87	2.00	-	0.59	2.94	1.76
1998	0.69	-	3.63	2.00	-	0.36	1.82	1.09
1999	0.60	-	4.23	1.10	0.50	0.42	2.12	1.27
2000	0.55	-	6.07	1.10	1.50	0.61	3.04	1.82
2001	0.60	-	5.67	1.10	0.40	0.57	1.35	3.18
2002	0.75	-	7.14	1.10	-	0.71	1.10	4.62
2003	0.64	-	7.25	0.90	0.20	0.73	0.90	4.90
2004	0.54	-	8.16	0.80	-	0.82	0.80	5.72
2005	0.48	-	9.90	0.60	0.30	0.99	0.60	7.32
2006	0.57	-	13.75	0.75	3.00	1.38	0.75	10.25
2007	0.49	-	12.93	1.00	3.50	1.29	1.00	9.35
2008	0.72	-	26.19	1.50	1.80	2.62	1.50	19.45
2009	0.49	-	11.03	2.00	4.00	1.10	2.00	6.83
2010	0.42	-	12.18	2.50	0.50	1.22	2.50	7.24
2011	0.50	-	17.35	2.80	0.50	1.74	2.80	11.08
2012	0.40	-	13.75	2.80	6.00	1.38	2.80	8.20
2013	0.31	-	11.08	2.80	4.50	1.11	2.80	6.07
2014	0.25	-	8.51	3.80	-	0.85	3.80	3.01
2015	0.25	-	4.47	3.00	-	0.45	2.24	1.34
2016	0.29	-	5.29	3.00	0.75	0.53	2.65	1.59
2017	0.33	-	8.45	3.06	0.77	0.84	4.18	2.58
2018	0.35	-	8.95	3.12	1.56	0.90	3.12	4.04
2019	0.31	-	8.09	3.18	-	0.81	3.18	3.29
2020	0.23	-	6.12	3.25	-	0.61	3.06	1.84
2021	0.17	-	4.66	2.21	-	0.47	2.33	1.40
2022	-	-	-	-	3.38	-	-	-

E11.2: Small onshore oil field (Continue)

Year	HG share Profit oil \$M	Domestic Supply Obligation \$M	Research \$M	Tax \$M	IOC Take \$M	HG Take \$M
1989	-	-	-	-	-	-
1990	-	-	-	-	(2.00)	-
1991	0.57	0.01	0.00	-	0.31	0.89
1992	1.70	0.02	0.01	-	4.78	2.68
1993	1.53	0.02	0.01	-	4.08	2.40
1994	1.13	0.02	0.00	1.54	(1.44)	3.31
1995	1.40	0.02	0.00	1.97	1.61	4.17
1996	1.45	0.02	0.00	0.20	2.27	2.47
1997	1.06	0.01	0.00	0.73	1.48	2.39
1998	0.65	0.01	0.00	0.07	0.54	1.10
1999	0.76	0.01	0.00	0.22	1.22	1.41
2000	1.09	0.01	0.00	0.02	1.74	1.73
2001	1.91	0.03	0.01	-	1.66	2.51
2002	2.77	0.04	0.01	-	2.51	3.53
2003	2.94	0.04	0.01	-	2.44	3.72
2004	3.43	0.05	0.01	0.22	2.83	4.52
2005	4.39	0.06	0.01	0.55	3.00	6.00
2006	6.15	0.08	0.02	0.17	2.20	7.80
2007	5.61	0.07	0.02	-	1.44	6.99
2008	11.67	0.16	0.04	1.64	6.76	16.12
2009	4.10	0.05	0.01	-	(0.24)	5.27
2010	4.34	0.06	0.01	-	3.54	5.63
2011	6.65	0.09	0.02	-	5.56	8.50
2012	4.92	0.07	0.02	-	(1.43)	6.38
2013	3.64	0.05	0.01	-	(1.03)	4.81
2014	1.80	0.02	0.01	-	2.02	2.68
2015	0.80	0.01	0.00	-	0.21	1.27
2016	0.95	0.01	0.00	-	0.04	1.50
2017	1.55	0.02	0.01	-	2.20	2.42
2018	2.42	0.03	0.01	-	0.91	3.36
2019	1.98	0.03	0.01	-	2.09	2.82
2020	1.10	0.01	0.00	-	1.14	1.73
2021	0.84	0.01	0.00	-	1.13	1.32
2022	-	-	-	-	(3.38)	-

APPENDIX F : Profile of decommissioning field

F1.1: 5Y Decommissioning Large offshore gas field (Thailand-I)

Year	Production		Field	E&A	Field	Dev.	Transpt	Other	Aband	Sunk	Sunk
	Liquids	Gas	Opex	Costs	Capex	Drilling	Capex	Capex	\$M	Oil	Gas
	000 b/d	mmcf/d	\$M	\$M	\$M	\$M	\$M	\$M	\$M	\$M	\$M
1990	-	-	-	-	10.00	-	-	7.00	-	-	210.00
1991	-	-	-	-	88.00	-	-	10.00	-	-	-
1992	-	-	-	-	107.00	10.00	13.00	10.00	-	-	-
1993	1.22	175.00	40.00	-	65.00	34.00	32.00	10.00	-	-	28.00
1994	4.00	250.00	40.00	-	116.00	14.00	-	10.00	-	-	20.00
1995	5.00	300.00	50.00	-	112.00	66.00	-	10.00	-	-	25.00
1996	6.50	337.00	55.00	-	109.00	10.00	-	-	-	-	35.00
1997	8.50	344.00	60.00	-	130.00	28.00	-	-	-	-	15.00
1998	10.00	435.00	80.00	-	83.00	28.00	-	-	-	-	37.00
1999	13.50	575.00	100.00	-	30.00	10.00	-	-	-	-	-
2000	15.00	548.00	100.00	-	61.00	10.00	-	-	-	-	-
2001	16.21	573.35	109.61	-	35.00	45.00	10.00	45.00	-	-	-
2002	16.10	551.52	110.00	-	80.00	39.00	47.00	-	-	-	7.00
2003	16.60	499.00	105.50	-	120.00	40.00	-	-	-	-	-
2004	17.71	587.52	120.00	-	110.00	-	-	-	-	-	8.00
2005	17.84	592.09	140.00	-	60.00	10.00	-	-	-	-	8.00
2006	17.65	599.20	140.00	-	95.00	30.00	-	-	-	-	-
2007	18.01	607.25	140.00	-	128.00	27.00	-	-	-	-	42.00
2008	18.55	589.30	130.00	-	495.00	160.00	-	-	-	-	29.20
2009	18.20	516.32	130.00	-	375.00	95.00	40.00	-	-	-	28.50
2010	19.70	586.40	150.00	-	350.00	102.00	40.00	-	-	-	18.00
2011	20.56	591.01	160.00	-	450.00	340.00	-	-	-	-	13.00
2012	28.36	773.42	210.00	-	225.00	205.00	-	-	-	-	22.30
2013	32.49	889.06	245.00	-	90.00	206.00	-	-	-	-	64.70
2014	28.95	870.57	245.00	-	450.00	250.00	-	-	-	-	18.00
2015	28.95	904.69	240.00	-	45.00	365.50	-	-	-	-	21.00
2016	23.45	910.00	232.00	-	183.60	264.18	-	-	-	-	-
2017	20.75	900.00	236.64	-	140.45	171.67	52.02	-	-	-	-
2018	17.90	870.00	241.37	-	206.94	210.12	-	-	-	-	-
2019	15.80	870.00	249.38	-	113.66	161.28	54.12	-	-	-	-
2020	13.85	870.00	243.55	-	115.93	164.51	-	-	-	-	-
2021	12.10	750.00	237.38	-	118.25	167.80	-	-	-	-	-
2022	9.95	654.50	230.86	-	120.61	171.15	-	-	-	-	-
2023	8.80	621.00	223.99	-	123.02	86.70	-	-	-	-	-
2024	7.45	612.00	216.76	-	125.48	178.07	-	-	-	-	-
2025	6.55	577.00	215.12	-	127.99	181.63	-	-	-	-	-
2026	5.50	505.00	195.04	-	130.55	185.26	-	-	-	-	-
2027	4.40	430.00	174.07	-	133.17	188.97	-	-	-	-	-
2028	3.75	355.00	152.19	-	135.83	192.75	-	-	-	-	-
2029	2.90	255.00	135.83	-	138.55	196.60	-	-	-	-	-
2030	2.00	175.00	112.16	-	141.32	200.53	-	-	292.70-	-	-
2031	1.45	122.50	87.48	-	-	102.96	-	-	292.70-	-	-
2032	0.80	75.00	89.23	-	-	-	-	-	292.70-	-	-
2033	0.50	45.00	91.02	-	-	-	-	-	292.70-	-	-
2034	-	-	-	-	-	-	-	-	292.70	-	-

F1.2: Deterministic calculation of 5Y decommissioning on Large offshore gas field

(Thailand-I)

Year	Production Liquids 000 b/d	Gas mmcf/d	Gross Rev \$M	Field Opex \$M	Field Capex \$M	Royalty \$M	Tax \$M	IOC Take \$M	HG Take \$M
1990	-	-	-	-	17.00	-	-	(17.00)	-
1991	-	-	-	-	98.00	-	-	(98.00)	-
1992	-	-	-	-	140.00	-	-	(140.00)	-
1993	1.22	175.00	150.01	40.00	141.00	18.75	-	(49.74)	18.75
1994	6.00	250.00	210.09	40.00	140.00	26.26	-	3.83	26.26
1995	7.00	300.00	236.42	50.00	188.00	29.55	-	(31.13)	29.55
1996	8.00	337.00	405.08	55.00	119.00	50.64	-	180.45	50.64
1997	10.50	344.00	390.45	60.00	158.00	48.81	-	123.65	48.81
1998	11.50	435.00	390.78	80.00	111.00	48.85	7.61	143.32	56.46
1999	15.00	575.00	580.15	100.00	40.00	72.52	103.22	264.41	175.73
2000	16.00	548.00	1,040.80	100.00	71.00	130.10	282.87	456.83	412.97
2001	16.21	573.35	986.15	109.61	135.00	123.27	243.72	374.55	366.99
2002	16.10	551.52	829.76	110.00	166.00	103.72	184.70	265.34	288.42
2003	16.60	499.00	1,184.41	105.50	160.00	148.05	329.09	441.77	477.15
2004	17.71	587.52	1,530.57	120.00	110.00	191.32	458.07	651.17	649.39
2005	17.84	592.09	2,295.70	140.00	70.00	286.96	730.52	1,068.22	1,017.48
2006	17.65	599.20	1,897.67	140.00	125.00	237.21	575.51	819.96	812.72
2007	18.01	607.25	2,020.21	140.00	155.00	252.53	603.58	869.11	856.11
2008	18.55	589.30	2,576.07	130.00	655.00	322.01	723.95	745.12	1,045.95
2009	18.20	516.32	1,154.14	130.00	510.00	144.27	188.63	181.24	332.90
2010	19.70	586.40	1,508.62	150.00	492.00	188.58	279.12	398.93	467.69
2011	20.56	591.01	1,574.24	160.00	790.00	196.78	155.14	272.31	351.92
2012	28.36	773.42	1,754.04	210.00	430.00	219.25	242.85	651.93	462.10
2013	32.49	889.06	2,371.99	245.00	296.00	296.50	472.08	1,062.40	768.58
2014	28.89	870.57	2,362.06	245.00	671.00	295.26	482.09	668.71	777.35
2015	28.08	904.69	1,459.83	240.00	368.00	182.48	128.94	540.40	311.42
2016	26.65	910.00	1,525.99	232.00	358.50	190.75	264.13	480.62	454.87
2017	18.00	900.00	1,709.12	236.64	263.67	213.64	365.70	629.47	579.34
2018	14.15	870.00	1,698.73	241.37	372.46	212.34	332.97	539.59	545.31
2019	10.95	870.00	1,730.62	249.38	210.12	216.33	380.07	674.73	596.39
2020	9.85	870.00	1,811.95	243.55	387.51	226.49	395.75	558.65	622.24
2021	8.30	750.00	1,601.74	237.38	163.40	200.22	336.71	664.03	536.93
2022	7.95	654.50	1,440.79	230.86	211.72	180.10	313.81	504.30	493.91
2023	7.00	621.00	1,394.26	223.99	209.06	174.28	312.50	474.43	486.79
2024	6.25	612.00	1,383.24	216.76	296.43	172.91	266.59	430.55	439.50
2025	5.70	577.00	1,326.79	215.12	302.35	165.85	254.70	388.77	420.55
2026	4.90	505.00	1,202.03	195.04	308.40	150.25	203.39	344.94	353.65
2027	3.90	430.00	1,018.80	174.07	314.57	127.35	141.41	261.40	268.76
2028	3.50	355.00	854.09	152.19	320.87	106.76	86.68	187.59	193.44
2029	2.80	255.00	630.00	135.83	327.28	78.75	7.68	80.46	86.43
2030	2.00	175.00	436.07	112.16	626.53	54.51	-	(357.13)	54.51
2031	1.45	122.50	318.64	87.48	388.26	39.83	-	(196.93)	39.83
2032	0.80	75.00	197.68	89.23	292.70	24.71	-	(208.96)	24.71
2033	0.50	45.00	122.97	91.02	292.70	15.37	-	(276.12)	15.37
2034	-	-	-	-	292.70	-	-	(292.70)	-

F2.1: 3Y Decommissioning Large offshore gas field (Thailand-I)

Year	Production		Field Opex \$M	E&A Costs \$M	Field Capex \$M	Dev. Drilling \$M	Transpt Capex \$M	Other Capex \$M	Aband \$M	Sunk Oil \$M	Sunk Gas \$M
	Liquids 000 b/d	Gas mmcf/d									
1990	-	-	-	-	10.00	-	-	7.00	-	-	210.00
1991	-	-	-	-	88.00	-	-	10.00	-	-	-
1992	-	-	-	-	107.00	10.00	13.00	10.00	-	-	-
1993	1.22	175.00	40.00	-	65.00	34.00	32.00	10.00	-	-	28.00
1994	4.00	250.00	40.00	-	116.00	14.00	-	10.00	-	-	20.00
1995	5.00	300.00	50.00	-	112.00	66.00	-	10.00	-	-	25.00
1996	6.50	337.00	55.00	-	109.00	10.00	-	-	-	-	35.00
1997	8.50	344.00	60.00	-	130.00	28.00	-	-	-	-	15.00
1998	10.00	435.00	80.00	-	83.00	28.00	-	-	-	-	37.00
1999	13.50	575.00	100.00	-	30.00	10.00	-	-	-	-	-
2000	15.00	548.00	100.00	-	61.00	10.00	-	-	-	-	-
2001	16.21	573.35	109.61	-	35.00	45.00	10.00	45.00	-	-	-
2002	16.10	551.52	110.00	-	80.00	39.00	47.00	-	-	-	7.00
2003	16.60	499.00	105.50	-	120.00	40.00	-	-	-	-	-
2004	17.71	587.52	120.00	-	110.00	-	-	-	-	-	8.00
2005	17.84	592.09	140.00	-	60.00	10.00	-	-	-	-	8.00
2006	17.65	599.20	140.00	-	95.00	30.00	-	-	-	-	-
2007	18.01	607.25	140.00	-	128.00	27.00	-	-	-	-	42.00
2008	18.55	589.30	130.00	-	495.00	160.00	-	-	-	-	29.20
2009	18.20	516.32	130.00	-	375.00	95.00	40.00	-	-	-	28.50
2010	19.70	586.40	150.00	-	350.00	102.00	40.00	-	-	-	18.00
2011	20.56	591.01	160.00	-	450.00	340.00	-	-	-	-	13.00
2012	28.36	773.42	210.00	-	225.00	205.00	-	-	-	-	22.30
2013	32.49	889.06	245.00	-	90.00	206.00	-	-	-	-	64.70
2014	28.95	870.57	245.00	-	450.00	250.00	-	-	-	-	18.00
2015	28.95	904.69	240.00	-	45.00	365.50	-	-	-	-	21.00
2016	23.45	910.00	239.70	-	183.60	264.18	-	-	-	-	-
2017	20.75	900.00	244.49	-	140.45	171.67	52.02	-	-	-	-
2018	17.90	870.00	249.38	-	206.94	210.12	-	-	-	-	-
2019	15.80	870.00	254.37	-	113.66	161.28	54.12	-	-	-	-
2020	13.85	870.00	248.42	-	115.93	164.51	-	-	-	-	-
2021	12.10	750.00	242.12	-	118.25	167.80	-	-	-	-	-
2022	9.95	654.50	235.48	-	120.61	171.15	-	-	-	-	-
2023	8.80	621.00	228.47	-	123.02	86.70	-	-	-	-	-
2024	7.45	612.00	221.09	-	125.48	178.07	-	-	-	-	-
2025	6.55	577.00	219.42	-	127.99	181.63	-	-	-	-	-
2026	5.50	505.00	198.94	-	130.55	185.26	-	-	-	-	-
2027	4.40	430.00	177.55	-	133.17	188.97	-	-	-	-	-
2028	3.75	355.00	155.23	-	135.83	192.75	-	-	-	-	-
2029	2.90	255.00	138.55	-	138.55	196.60	-	-	-	-	-
2030	2.00	175.00	114.40	-	141.32	200.53	-	-	-	-	-
2031	1.45	122.50	89.23	-	-	102.96	-	-	-	-	-
2032	0.80	75.00	91.02	-	-	-	-	-	292.70	-	-
2033	0.50	45.00	92.84	-	-	-	-	-	439.06	-	-
2034	-	-	-	-	-	-	-	-	731.76	-	-

F2.2: Deterministic calculation of 3Y decommissioning on Large offshore gas field

(Thailand-I)

Year	Production Liquids 000 b/d	Gas mmcf/d	Gross Rev \$M	Field Opex \$M	Field Capex \$M	Royalty \$M	Tax \$M	IOC Take \$M	HG Take \$M
1990	-	-	-	-	17.00	-	-	(17.00)	-
1991	-	-	-	-	98.00	-	-	(98.00)	-
1992	-	-	-	-	140.00	-	-	(140.00)	-
1993	1.22	175.00	150.01	40.00	141.00	18.75	-	(49.74)	18.75
1994	6.00	250.00	210.09	40.00	140.00	26.26	-	3.83	26.26
1995	7.00	300.00	236.42	50.00	188.00	29.55	-	(31.13)	29.55
1996	8.00	337.00	405.08	55.00	119.00	50.64	-	180.45	50.64
1997	10.50	344.00	390.45	60.00	158.00	48.81	-	123.65	48.81
1998	11.50	435.00	390.78	80.00	111.00	48.85	7.61	143.32	56.46
1999	15.00	575.00	580.15	100.00	40.00	72.52	103.22	264.41	175.73
2000	16.00	548.00	1,040.80	100.00	71.00	130.10	282.87	456.83	412.97
2001	16.21	573.35	986.15	109.61	135.00	123.27	243.72	374.55	366.99
2002	16.10	551.52	829.76	110.00	166.00	103.72	184.70	265.34	288.42
2003	16.60	499.00	1,184.41	105.50	160.00	148.05	329.09	441.77	477.15
2004	17.71	587.52	1,530.57	120.00	110.00	191.32	458.07	651.17	649.39
2005	17.84	592.09	2,295.70	140.00	70.00	286.96	730.52	1,068.22	1,017.48
2006	17.65	599.20	1,897.67	140.00	125.00	237.21	575.51	819.96	812.72
2007	18.01	607.25	2,020.21	140.00	155.00	252.53	603.58	869.11	856.11
2008	18.55	589.30	2,576.07	130.00	655.00	322.01	723.95	745.12	1,045.95
2009	18.20	516.32	1,154.14	130.00	510.00	144.27	188.63	181.24	332.90
2010	19.70	586.40	1,508.62	150.00	492.00	188.58	279.12	398.93	467.69
2011	20.56	591.01	1,574.24	160.00	790.00	196.78	155.14	272.31	351.92
2012	28.36	773.42	1,754.04	210.00	430.00	219.25	242.85	651.93	462.10
2013	32.49	889.06	2,371.99	245.00	296.00	296.50	472.08	1,062.40	768.58
2014	28.89	870.57	2,362.06	245.00	671.00	295.26	482.09	668.71	777.35
2015	28.08	904.69	1,459.83	240.00	368.00	182.48	128.94	540.40	311.42
2016	26.65	910.00	1,525.99	232.00	358.50	190.75	264.13	480.62	454.87
2017	18.00	900.00	1,709.12	236.64	263.67	213.64	365.70	629.47	579.34
2018	14.15	870.00	1,698.73	241.37	372.46	212.34	332.97	539.59	545.31
2019	10.95	870.00	1,730.62	249.38	210.12	216.33	380.07	674.73	596.39
2020	9.85	870.00	1,811.95	243.55	387.51	226.49	395.75	558.65	622.24
2021	8.30	750.00	1,601.74	237.38	163.40	200.22	336.71	664.03	536.93
2022	7.95	654.50	1,440.79	230.86	211.72	180.10	313.81	504.30	493.91
2023	7.00	621.00	1,394.26	223.99	209.06	174.28	312.50	474.43	486.79
2024	6.25	612.00	1,383.24	216.76	296.43	172.91	266.59	430.55	439.50
2025	5.70	577.00	1,326.79	215.12	302.35	165.85	254.70	388.77	420.55
2026	4.90	505.00	1,202.03	195.04	308.40	150.25	203.39	344.94	353.65
2027	3.90	430.00	1,018.80	174.07	314.57	127.35	141.41	261.40	268.76
2028	3.50	355.00	854.09	152.19	320.87	106.76	86.68	187.59	193.44
2029	2.80	255.00	630.00	135.83	327.28	78.75	7.68	80.46	86.43
2030	2.00	175.00	436.07	112.16	333.83	54.51	-	(64.43)	54.51
2031	1.45	122.50	318.64	87.48	95.56	39.83	-	95.77	39.83
2032	0.80	75.00	197.68	89.23	292.70	24.71	-	(208.96)	24.71
2033	0.50	45.00	122.97	91.02	439.06	15.37	-	(422.48)	15.37
2034	-	-	-	-	731.76	-	-	(731.76)	-

F3.1: 5Y Decommissioning Large offshore gas field (Thailand-III)

Year	Production		Field	E&A	Field	Dev.	Transpt	Other	Aband	Sunk	Sunk
	Liquids	Gas	Opex	Costs	Capex	Drilling	Capex	Capex		Oil	Gas
	000 b/d	mmcf/d	\$M	\$M	\$M	\$M	\$M	\$M	\$M	\$M	\$M
1990	-	-	-	-	10.00	-	-	7.00	-	-	210.00
1991	-	-	-	-	88.00	-	-	10.00	-	-	-
1992	-	-	-	-	107.00	10.00	13.00	10.00	-	-	-
1993	1.22	175.00	40.00	-	65.00	34.00	32.00	10.00	-	-	28.00
1994	4.00	250.00	40.00	-	116.00	14.00	-	10.00	-	-	20.00
1995	5.00	300.00	50.00	-	112.00	66.00	-	10.00	-	-	25.00
1996	6.50	337.00	55.00	-	109.00	10.00	-	-	-	-	35.00
1997	8.50	344.00	60.00	-	130.00	28.00	-	-	-	-	15.00
1998	10.00	435.00	80.00	-	83.00	28.00	-	-	-	-	37.00
1999	13.50	575.00	100.00	-	30.00	10.00	-	-	-	-	-
2000	15.00	548.00	100.00	-	61.00	10.00	-	-	-	-	-
2001	16.21	573.35	109.61	-	35.00	45.00	10.00	45.00	-	-	-
2002	16.10	551.52	110.00	-	80.00	39.00	47.00	-	-	-	7.00
2003	16.60	499.00	105.50	-	120.00	40.00	-	-	-	-	-
2004	17.71	587.52	120.00	-	110.00	-	-	-	-	-	8.00
2005	17.84	592.09	140.00	-	60.00	10.00	-	-	-	-	8.00
2006	17.65	599.20	140.00	-	95.00	30.00	-	-	-	-	-
2007	18.01	607.25	140.00	-	128.00	27.00	-	-	-	-	42.00
2008	18.55	589.30	130.00	-	495.00	160.00	-	-	-	-	29.20
2009	18.20	516.32	130.00	-	375.00	95.00	40.00	-	-	-	28.50
2010	19.70	586.40	150.00	-	350.00	102.00	40.00	-	-	-	18.00
2011	20.56	591.01	160.00	-	450.00	340.00	-	-	-	-	13.00
2012	28.36	773.42	210.00	-	225.00	205.00	-	-	-	-	22.30
2013	32.49	889.06	245.00	-	90.00	206.00	-	-	-	-	64.70
2014	28.95	870.57	245.00	-	450.00	250.00	-	-	-	-	18.00
2015	28.95	904.69	240.00	-	45.00	365.50	-	-	-	-	21.00
2016	23.45	910.00	239.70	-	183.60	264.18	-	-	-	-	-
2017	20.75	900.00	244.49	-	140.45	171.67	52.02	-	-	-	-
2018	17.90	870.00	249.38	-	206.94	210.12	-	-	-	-	-
2019	15.80	870.00	254.37	-	113.66	161.28	54.12	-	-	-	-
2020	13.85	870.00	248.42	-	115.93	164.51	-	-	-	-	-
2021	12.10	750.00	242.12	-	118.25	167.80	-	-	-	-	-
2022	9.95	654.50	235.48	-	120.61	171.15	-	-	-	-	-
2023	8.80	621.00	228.47	-	123.02	86.70	-	-	-	-	-
2024	7.45	612.00	221.09	-	125.48	178.07	-	-	-	-	-
2025	6.55	577.00	219.42	-	127.99	181.63	-	-	-	-	-
2026	5.50	505.00	198.94	-	130.55	185.26	-	-	-	-	-
2027	4.40	430.00	177.55	-	133.17	188.97	-	-	-	-	-
2028	3.75	355.00	155.23	-	135.83	192.75	-	-	-	-	-
2029	2.90	255.00	138.55	-	138.55	196.60	-	-	-	-	-
2030	2.00	175.00	114.40	-	141.32	200.53	-	-	292.70-	-	-
2031	1.45	122.50	89.23	-	-	102.96	-	-	292.70-	-	-
2032	0.80	75.00	91.02	-	-	-	-	-	292.70-	-	-
2033	0.50	45.00	92.84	-	-	-	-	-	292.70-	-	-
2034	-	-	-	-	-	-	-	-	292.70	-	-

F3.2: Deterministic calculation of 5Y decommissioning on Large offshore gas field
(Thailand-III)

Year	Production Liquids 000 b/d	Gas mmcf	Gross Rev \$M	Field Opex \$M	Field Capex \$M	Royalty \$M	SRB \$M	Tax \$M	IOC Take \$M	HG Take \$M
1990	-	-	-	-	17.00	-	-	-	(17.00)	-
1991	-	-	-	-	98.00	-	-	-	(98.00)	-
1992	-	-	-	-	140.00	-	-	-	(140.00)	-
1993	1.22	175.00	150.01	40.00	141.00	17.95	-	-	(48.94)	17.95
1994	6.00	250.00	210.09	40.00	140.00	27.44	-	-	2.65	27.44
1995	7.00	300.00	236.42	50.00	188.00	31.63	-	-	(33.21)	31.63
1996	8.00	337.00	405.08	55.00	119.00	54.92	-	-	176.16	54.92
1997	10.50	344.00	390.45	60.00	158.00	53.24	-	-	119.22	53.24
1998	11.50	435.00	390.78	80.00	111.00	54.31	-	19.67	125.80	73.98
1999	15.00	575.00	580.15	100.00	40.00	82.18	-	134.65	223.33	216.82
2000	16.00	548.00	1,040.80	100.00	71.00	147.14	-	339.40	383.26	486.54
2001	16.21	573.35	986.15	109.61	135.00	139.75	-	297.11	304.67	436.87
2002	16.10	551.52	829.76	110.00	166.00	117.35	-	229.74	206.66	347.10
2003	16.60	499.00	1,184.41	105.50	160.00	166.66	-	393.82	358.44	560.48
2004	17.71	587.52	1,530.57	120.00	110.00	217.33	-	540.73	542.51	758.06
2005	17.84	592.09	2,295.70	140.00	70.00	326.11	123.17	792.84	843.58	1,242.12
2006	17.65	599.20	1,897.67	140.00	125.00	269.70	-	677.87	685.11	947.57
2007	18.01	607.25	2,020.21	140.00	155.00	287.34	-	712.44	725.44	999.78
2008	18.55	589.30	2,576.07	130.00	655.00	365.97	-	862.97	562.13	1,228.94
2009	18.20	516.32	1,154.14	130.00	510.00	162.86	-	251.47	99.81	414.33
2010	19.70	586.40	1,508.62	150.00	492.00	214.39	-	360.50	291.73	574.89
2011	20.56	591.01	1,574.24	160.00	790.00	223.88	-	239.98	160.38	463.86
2012	28.36	773.42	1,754.04	210.00	430.00	252.76	-	335.72	525.55	588.49
2013	32.49	889.06	2,371.99	245.00	296.00	343.62	-	596.77	890.59	940.39
2014	28.89	870.57	2,362.06	245.00	671.00	341.73	-	606.48	497.85	948.21
2015	28.08	904.69	1,459.83	240.00	368.00	211.41	-	205.71	434.70	417.13
2016	26.65	910.00	1,525.99	232.00	358.50	220.97	-	344.39	370.13	565.36
2017	18.00	900.00	1,709.12	236.64	263.67	246.97	-	455.85	505.99	702.82
2018	14.15	870.00	1,698.73	241.37	372.46	244.95	-	422.83	417.12	667.78
2019	10.95	870.00	1,730.62	249.38	210.12	249.35	-	471.72	550.05	721.07
2020	9.85	870.00	1,811.95	243.55	387.51	261.00	-	491.74	428.15	752.74
2021	8.30	750.00	1,601.74	237.38	163.40	229.18	-	422.34	549.44	651.52
2022	7.95	654.50	1,440.79	230.86	211.72	204.76	-	391.53	401.92	596.29
2023	7.00	621.00	1,394.26	223.99	209.06	197.50	-	388.04	375.68	585.54
2024	6.25	612.00	1,383.24	216.76	296.43	195.70	-	341.65	332.70	537.35
2025	5.70	577.00	1,326.79	215.12	302.35	187.01	-	327.05	295.26	514.05
2026	4.90	505.00	1,202.03	195.04	308.40	167.86	-	269.72	261.01	437.58
2027	3.90	430.00	1,018.80	174.07	314.57	140.39	-	198.57	191.21	338.96
2028	3.50	355.00	854.09	152.19	320.87	115.55	-	135.66	129.82	251.21
2029	2.80	255.00	630.00	135.83	327.28	81.67	-	45.59	39.63	127.26
2030	2.00	175.00	436.07	112.16	626.53	52.50	-	-	(355.13)	52.50
2031	1.45	122.50	318.64	87.48	388.26	34.35	-	-	(191.46)	34.35
2032	0.80	75.00	197.68	89.23	292.70	18.12	-	-	(202.38)	18.12
2033	0.50	45.00	122.97	91.02	292.70	9.17	-	-	(269.92)	9.17
2034	-	-	-	-	292.70	-	-	-	(292.70)	-

F4.1: 3Y Decommissioning Large offshore gas field (Thailand-III)

Year	Production		Field	E&A	Field	Dev.	Transpt	Other	Aband	Sunk	Sunk
	Liquids	Gas	Opex	Costs	Capex	Drilling	Capex	Capex		Oil	Gas
	000 b/d	mmcf/d	\$M	\$M	\$M	\$M	\$M	\$M	\$M	\$M	\$M
1990	-	-	-	-	10.00	-	-	7.00	-	-	210.00
1991	-	-	-	-	88.00	-	-	10.00	-	-	-
1992	-	-	-	-	107.00	10.00	13.00	10.00	-	-	-
1993	1.22	175.00	40.00	-	65.00	34.00	32.00	10.00	-	-	28.00
1994	4.00	250.00	40.00	-	116.00	14.00	-	10.00	-	-	20.00
1995	5.00	300.00	50.00	-	112.00	66.00	-	10.00	-	-	25.00
1996	6.50	337.00	55.00	-	109.00	10.00	-	-	-	-	35.00
1997	8.50	344.00	60.00	-	130.00	28.00	-	-	-	-	15.00
1998	10.00	435.00	80.00	-	83.00	28.00	-	-	-	-	37.00
1999	13.50	575.00	100.00	-	30.00	10.00	-	-	-	-	-
2000	15.00	548.00	100.00	-	61.00	10.00	-	-	-	-	-
2001	16.21	573.35	109.61	-	35.00	45.00	10.00	45.00	-	-	-
2002	16.10	551.52	110.00	-	80.00	39.00	47.00	-	-	-	7.00
2003	16.60	499.00	105.50	-	120.00	40.00	-	-	-	-	-
2004	17.71	587.52	120.00	-	110.00	-	-	-	-	-	8.00
2005	17.84	592.09	140.00	-	60.00	10.00	-	-	-	-	8.00
2006	17.65	599.20	140.00	-	95.00	30.00	-	-	-	-	-
2007	18.01	607.25	140.00	-	128.00	27.00	-	-	-	-	42.00
2008	18.55	589.30	130.00	-	495.00	160.00	-	-	-	-	29.20
2009	18.20	516.32	130.00	-	375.00	95.00	40.00	-	-	-	28.50
2010	19.70	586.40	150.00	-	350.00	102.00	40.00	-	-	-	18.00
2011	20.56	591.01	160.00	-	450.00	340.00	-	-	-	-	13.00
2012	28.36	773.42	210.00	-	225.00	205.00	-	-	-	-	22.30
2013	32.49	889.06	245.00	-	90.00	206.00	-	-	-	-	64.70
2014	28.95	870.57	245.00	-	450.00	250.00	-	-	-	-	18.00
2015	28.95	904.69	240.00	-	45.00	365.50	-	-	-	-	21.00
2016	23.45	910.00	239.70	-	183.60	264.18	-	-	-	-	-
2017	20.75	900.00	244.49	-	140.45	171.67	52.02	-	-	-	-
2018	17.90	870.00	249.38	-	206.94	210.12	-	-	-	-	-
2019	15.80	870.00	254.37	-	113.66	161.28	54.12	-	-	-	-
2020	13.85	870.00	248.42	-	115.93	164.51	-	-	-	-	-
2021	12.10	750.00	242.12	-	118.25	167.80	-	-	-	-	-
2022	9.95	654.50	235.48	-	120.61	171.15	-	-	-	-	-
2023	8.80	621.00	228.47	-	123.02	86.70	-	-	-	-	-
2024	7.45	612.00	221.09	-	125.48	178.07	-	-	-	-	-
2025	6.55	577.00	219.42	-	127.99	181.63	-	-	-	-	-
2026	5.50	505.00	198.94	-	130.55	185.26	-	-	-	-	-
2027	4.40	430.00	177.55	-	133.17	188.97	-	-	-	-	-
2028	3.75	355.00	155.23	-	135.83	192.75	-	-	-	-	-
2029	2.90	255.00	138.55	-	138.55	196.60	-	-	-	-	-
2030	2.00	175.00	114.40	-	141.32	200.53	-	-	-	-	-
2031	1.45	122.50	89.23	-	-	102.96	-	-	-	-	-
2032	0.80	75.00	91.02	-	-	-	-	-	292.70	-	-
2033	0.50	45.00	92.84	-	-	-	-	-	439.06	-	-
2034	-	-	-	-	-	-	-	-	731.76	-	-

F4.2: Deterministic calculation of 3Y decommissioning on Large offshore gas field

(Thailand-III)

Year	Production Liquids 000 b/d	Gas mmcf	Gross Rev \$M	Field Opex \$M	Field Capex \$M	Royalty \$M	SRB \$M	Tax \$M	IOC Take \$M	HG Take \$M
1990	-	-	-	-	17.00	-	-	-	(17.00)	-
1991	-	-	-	-	98.00	-	-	-	(98.00)	-
1992	-	-	-	-	140.00	-	-	-	(140.00)	-
1993	1.22	175.00	150.01	40.00	141.00	17.95	-	-	(48.94)	17.95
1994	6.00	250.00	210.09	40.00	140.00	27.44	-	-	2.65	27.44
1995	7.00	300.00	236.42	50.00	188.00	31.63	-	-	(33.21)	31.63
1996	8.00	337.00	405.08	55.00	119.00	54.92	-	-	176.16	54.92
1997	10.50	344.00	390.45	60.00	158.00	53.24	-	-	119.22	53.24
1998	11.50	435.00	390.78	80.00	111.00	54.31	-	19.67	125.80	73.98
1999	15.00	575.00	580.15	100.00	40.00	82.18	-	134.65	223.33	216.82
2000	16.00	548.00	1,040.80	100.00	71.00	147.14	-	339.40	383.26	486.54
2001	16.21	573.35	986.15	109.61	135.00	139.75	-	297.11	304.67	436.87
2002	16.10	551.52	829.76	110.00	166.00	117.35	-	229.74	206.66	347.10
2003	16.60	499.00	1,184.41	105.50	160.00	166.66	-	393.82	358.44	560.48
2004	17.71	587.52	1,530.57	120.00	110.00	217.33	-	540.73	542.51	758.06
2005	17.84	592.09	2,295.70	140.00	70.00	326.11	123.17	792.84	843.58	242.12
2006	17.65	599.20	1,897.67	140.00	125.00	269.70	-	677.87	685.11	947.57
2007	18.01	607.25	2,020.21	140.00	155.00	287.34	-	712.44	725.44	999.78
2008	18.55	589.30	2,576.07	130.00	655.00	365.97	-	862.97	562.13	1,228.94
2009	18.20	516.32	1,154.14	130.00	510.00	162.86	-	251.47	99.81	414.33
2010	19.70	586.40	1,508.62	150.00	492.00	214.39	-	360.50	291.73	574.89
2011	20.56	591.01	1,574.24	160.00	790.00	223.88	-	239.98	160.38	463.86
2012	28.36	773.42	1,754.04	210.00	430.00	252.76	-	335.72	525.55	588.49
2013	32.49	889.06	2,371.99	245.00	296.00	343.62	-	596.77	890.59	940.39
2014	28.89	870.57	2,362.06	245.00	671.00	341.73	-	606.48	497.85	948.21
2015	28.08	904.69	1,459.83	240.00	368.00	211.41	-	205.71	434.70	417.13
2016	26.65	910.00	1,525.99	232.00	358.50	220.97	-	344.39	370.13	565.36
2017	18.00	900.00	1,709.12	236.64	263.67	246.97	-	455.85	505.99	702.82
2018	14.15	870.00	1,698.73	241.37	372.46	244.95	-	422.83	417.12	667.78
2019	10.95	870.00	1,730.62	249.38	210.12	249.35	-	471.72	550.05	721.07
2020	9.85	870.00	1,811.95	243.55	387.51	261.00	-	491.74	428.15	752.74
2021	8.30	750.00	1,601.74	237.38	163.40	229.18	-	422.34	549.44	651.52
2022	7.95	654.50	1,440.79	230.86	211.72	204.76	-	391.53	401.92	596.29
2023	7.00	621.00	1,394.26	223.99	209.06	197.50	-	388.04	375.68	585.54
2024	6.25	612.00	1,383.24	216.76	296.43	195.70	-	341.65	332.70	537.35
2025	5.70	577.00	1,326.79	215.12	302.35	187.01	-	327.05	295.26	514.05
2026	4.90	505.00	1,202.03	195.04	308.40	167.86	-	269.72	261.01	437.58
2027	3.90	430.00	1,018.80	174.07	314.57	140.39	-	198.57	191.21	338.96
2028	3.50	355.00	854.09	152.19	320.87	115.55	-	135.66	129.82	251.21
2029	2.80	255.00	630.00	135.83	327.28	81.67	-	45.59	39.63	127.26
2030	2.00	175.00	436.07	112.16	333.83	52.50	-	-	(62.42)	52.50
2031	1.45	122.50	318.64	87.48	95.56	34.35	-	-	101.24	34.35
2032	0.80	75.00	197.68	89.23	292.70	18.12	-	-	(202.38)	18.12
2033	0.50	45.00	122.97	91.02	439.06	9.17	-	-	(416.27)	9.17
2034	-	-	-	-	731.76	-	-	-	(731.76)	-

APPENDIX G : Profile of continuity project

G1.1: Large offshore gas field (Thailand-I from 1990 to 2019, modified Thailand-III from 2020 to 2034)

Year	Production		Field Opex \$M	E&A Costs \$M	Field Capex \$M	Dev. Drilling \$M	Transp't Capex \$M	Other Capex \$M	Aband \$M	Sunk Oil \$M	Sunk Gas \$M
	Liquids 000 b/d	Gas mmcfd									
1990	-	-	-	-	10.00	-	-	7.00	-	-	210.00
1991	-	-	-	-	88.00	-	-	10.00	-	-	-
1992	-	-	-	-	107.00	10.00	13.00	10.00	-	-	-
1993	1.22	175.00	40.00	-	65.00	34.00	32.00	10.00	-	-	28.00
1994	4.00	250.00	40.00	-	116.00	14.00	-	10.00	-	-	20.00
1995	5.00	300.00	50.00	-	112.00	66.00	-	10.00	-	-	25.00
1996	6.50	337.00	55.00	-	109.00	10.00	-	-	-	-	35.00
1997	8.50	344.00	60.00	-	130.00	28.00	-	-	-	-	15.00
1998	10.00	435.00	80.00	-	83.00	28.00	-	-	-	-	37.00
1999	13.50	575.00	100.00	-	30.00	10.00	-	-	-	-	-
2000	15.00	548.00	100.00	-	61.00	10.00	-	-	-	-	-
2001	16.21	573.35	109.61	-	35.00	45.00	10.00	45.00	-	-	-
2002	16.10	551.52	110.00	-	80.00	39.00	47.00	-	-	-	7.00
2003	16.60	499.00	105.50	-	120.00	40.00	-	-	-	-	-
2004	17.71	587.52	120.00	-	110.00	-	-	-	-	-	8.00
2005	17.84	592.09	140.00	-	60.00	10.00	-	-	-	-	8.00
2006	17.65	599.20	140.00	-	95.00	30.00	-	-	-	-	-
2007	18.01	607.25	140.00	-	128.00	27.00	-	-	-	-	42.00
2008	18.55	589.30	130.00	-	495.00	160.00	-	-	-	-	29.20
2009	18.20	516.32	130.00	-	375.00	95.00	40.00	-	-	-	28.50
2010	19.70	586.40	150.00	-	350.00	102.00	40.00	-	-	-	18.00
2011	20.56	591.01	160.00	-	450.00	340.00	-	-	-	-	13.00
2012	28.36	773.42	210.00	-	225.00	205.00	-	-	-	-	22.30
2013	32.49	889.06	245.00	-	90.00	206.00	-	-	-	-	75.90
2014	28.95	870.57	245.00	-	450.00	221.00	-	-	-	-	20.00
2015	28.95	904.69	240.00	-	45.00	323.00	-	-	-	-	28.00
2016	23.45	910.00	232.00	-	180.00	178.50	-	-	-	-	-
2017	20.75	900.00	236.64	-	91.80	120.87	51.00	-	-	-	-
2018	17.90	870.00	241.37	-	218.48	153.98	-	-	-	-	-
2019	15.80	870.00	249.38	-	-	157.06	53.06	-	-	-	-
2020	13.85	870.00	243.55	-	227.31	160.20	-	-	-	-	-
2021	12.10	750.00	237.38	-	-	163.40	-	-	-	-	-
2022	9.95	654.50	230.86	-	118.25	93.47	-	-	-	-	-
2023	8.80	621.00	223.99	-	120.61	88.45	-	-	-	-	-
2024	7.45	612.00	216.76	-	123.02	173.41	-	-	-	-	-
2025	6.55	577.00	215.12	-	125.48	176.87	-	-	-	-	-
2026	5.50	505.00	195.04	-	127.99	180.41	-	-	-	-	-
2027	4.40	430.00	174.07	-	130.55	184.02	-	-	-	-	-
2028	3.75	355.00	152.19	-	133.17	187.70	-	-	-	-	-
2029	2.90	255.00	135.83	-	135.83	191.45	-	-	-	-	-
2030	2.00	175.00	112.16	-	138.55	195.28	-	-	-	-	-
2031	1.45	122.50	87.48	-	-	95.56	-	-	-	-	-
2032	0.80	75.00	89.23	-	-	-	-	-	-	-	-
2033	0.50	45.00	91.02	-	-	-	-	-	-	-	-
2034	-	-	-	-	-	-	-	-	1,463.52	-	-

G1.2: Calculation of Large offshore gas field continuity project

Year	Production		Gross Rev \$M	Field Opex \$M	Field Capex \$M	Royalty \$M	SRB \$M	Tax \$M	IOC Take \$M	HG Take \$M
	Liquids 000 b/d	Gas mmcf/d								
1990	-	-	-	-	17.00	-	-	-	(17.00)	-
1991	-	-	-	-	98.00	-	-	-	(98.00)	-
1992	-	-	-	-	140.00	-	-	-	(140.00)	-
1993	1.22	175.00	150.01	40.00	141.00	36.48	-	-	(67.47)	36.48
1994	6.00	250.00	210.09	40.00	140.00	47.82	-	-	(17.73)	47.82
1995	7.00	300.00	236.42	50.00	188.00	53.23	-	-	(54.81)	53.23
1996	8.00	337.00	405.08	55.00	119.00	93.23	-	-	137.86	93.23
1997	10.50	344.00	390.45	60.00	158.00	87.73	-	-	84.72	87.73
1998	11.50	435.00	390.78	80.00	111.00	90.13	-	-	109.65	90.13
1999	15.00	575.00	580.15	100.00	40.00	131.81	-	-	308.34	131.81
2000	16.00	548.00	1,040.80	100.00	71.00	238.11	-	273.43	358.27	511.54
2001	16.21	573.35	986.15	109.61	135.00	227.38	-	247.18	266.98	474.56
2002	16.10	551.52	829.76	110.00	166.00	188.27	-	169.35	196.15	357.61
2003	16.60	499.00	1,184.41	105.50	160.00	272.59	-	323.16	323.16	595.75
2004	17.71	587.52	1,530.57	120.00	110.00	349.21	-	471.68	479.68	820.89
2005	17.84	592.09	2,295.70	140.00	70.00	527.93	-	774.88	782.88	1,302.81
2006	17.65	599.20	1,897.67	140.00	125.00	421.20	-	605.74	605.74	1,026.94
2007	18.01	607.25	2,020.21	140.00	155.00	445.64	-	618.79	660.79	1,064.43
2008	18.55	589.30	2,576.07	130.00	655.00	559.69	-	601.09	630.29	1,160.78
2009	18.20	516.32	1,154.14	130.00	510.00	237.32	-	124.16	152.66	361.48
2010	19.70	586.40	1,508.62	150.00	492.00	305.76	-	271.43	289.43	577.19
2011	20.56	591.01	1,574.24	160.00	790.00	304.37	-	153.43	166.43	457.80
2012	28.36	773.42	1,754.04	210.00	430.00	316.65	-	387.55	409.85	704.19
2013	32.49	889.06	2,371.99	245.00	296.00	447.80	-	653.64	729.54	1,101.44
2014	28.89	870.57	2,362.06	245.00	671.00	467.64	-	479.21	499.21	946.85
2015	28.08	904.69	1,459.83	240.00	368.00	302.18	-	260.82	288.82	563.00
2016	26.65	910.00	1,525.99	232.00	358.50	320.70	-	307.39	307.39	628.10
2017	18.00	900.00	1,709.12	236.64	263.67	369.68	-	419.57	419.57	789.24
2018	14.15	870.00	1,698.73	241.37	372.46	379.45	-	352.72	352.72	732.17
2019	10.95	870.00	1,730.62	249.38	210.12	396.93	-	437.09	437.09	834.03
2020	9.85	870.00	1,811.95	243.55	387.51	-	493.44	314.01	314.01	807.45
2021	8.30	750.00	1,601.74	237.38	163.40	-	442.51	376.73	376.73	819.24
2022	7.95	654.50	1,440.79	230.86	211.72	-	322.14	342.28	342.28	664.42
2023	7.00	621.00	1,394.26	223.99	209.06	-	296.77	346.23	346.23	643.00
2024	6.25	612.00	1,383.24	216.76	296.43	-	272.81	318.28	318.28	591.10
2025	5.70	577.00	1,326.79	215.12	302.35	-	256.43	299.17	299.17	555.61
2026	4.90	505.00	1,202.03	195.04	308.40	-	222.95	260.10	260.10	483.05
2027	3.90	430.00	1,018.80	174.07	314.57	-	173.53	202.46	202.46	375.99
2028	3.50	355.00	854.09	152.19	320.87	-	127.45	148.69	148.69	276.15
2029	2.80	255.00	630.00	135.83	327.28	-	60.25	70.29	70.29	130.55
2030	2.00	175.00	436.07	112.16	333.83	-	5.29	6.17	6.17	11.45
2031	1.45	122.50	318.64	87.48	95.56	-	46.60	54.36	54.36	100.96
2032	0.80	75.00	197.68	89.23	-	-	36.09	42.11	42.11	78.20
2033	0.50	45.00	122.97	91.02	-	-	11.55	13.47	13.47	25.02
2034	-	-	-	-	1,463.52	-	-	-	(1,463.52)	-

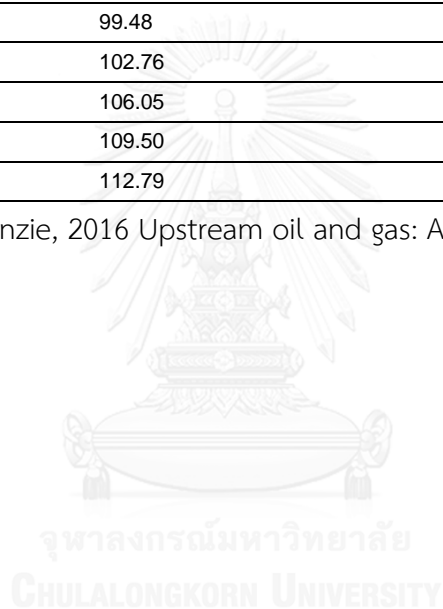
APPENDIX H : Oil and gas price annual projection

H1: Historical oil and gas average price used in calculation from 1980 to 2034 [34]

	Oil price (\$/BBL)	Gas price (\$/MSCF)
1980	37.96	1.59
1981	36.08	1.98
1982	33.55	2.46
1983	30.36	2.59
1984	29.38	2.66
1985	27.97	2.51
1986	15.12	1.94
1987	19.18	1.67
1988	15.97	1.69
1989	19.57	1.69
1990	24.47	1.71
1991	21.55	1.57
1992	20.56	1.77
1993	18.43	2.22
1994	17.18	1.89
1995	18.39	1.73
1996	22.04	2.77
1997	20.63	2.48
1998	14.42	2.08
1999	19.33	2.26
2000	30.26	4.32
2001	25.90	3.98
2002	26.10	3.36
2003	31.05	5.47
2004	41.38	5.89
2005	56.51	8.92
2006	66.09	6.73
2007	72.31	6.97
2008	99.64	8.84
2009	61.68	3.95
2010	79.43	4.38
2011	95.08	3.99
2012	94.18	2.76
2013	97.95	3.73
2014	93.22	4.34
2015	49.00	2.90
2016	50.00	3.13
2017	70.14	3.80

	Oil price (\$/BBL)	Gas price (\$/MSCF)
2018	70.06	4.21
2019	71.50	4.55
2020	72.96	4.88
2021	75.10	5.02
2022	77.48	5.09
2023	79.95	5.25
2024	82.48	5.35
2025	85.02	5.46
2026	87.73	5.67
2027	90.55	5.67
2028	93.46	5.67
2029	96.42	5.71
2030	99.48	5.69
2031	102.76	5.91
2032	106.05	6.09
2033	109.50	6.27
2034	112.79	6.45

(Source: Wood Mackenzie, 2016 Upstream oil and gas: Asset report)



H2: Oil and gas price distribution profile from 2012 to 2040 [37]

WTI (\$/BBL)	Low	Ref	High	Henryhub (\$/MSCF)	Low	Ref	High
2012	95.53	95.53	95.53	2012	2.79	2.79	2.79
2013	97.91	97.91	97.91	2013	3.73	3.73	3.73
2014	91.80	91.80	91.80	2014	4.39	4.37	4.31
2015	45.85	52.72	115.35	2015	3.60	3.69	3.40
2016	45.82	67.28	128.77	2016	3.85	3.70	3.35
2017	46.36	70.14	133.82	2017	4.09	3.80	3.63
2018	47.37	70.06	137.00	2018	4.23	4.21	3.94
2019	49.46	71.50	139.94	2019	4.30	4.55	4.22
2020	51.56	72.96	141.79	2020	4.30	4.88	4.61
2021	53.23	75.10	145.83	2021	4.34	5.02	5.05
2022	54.88	77.48	149.73	2022	4.38	5.09	5.41
2023	56.15	79.95	153.58	2023	4.66	5.25	6.02
2024	57.34	82.48	158.19	2024	4.85	5.35	6.39
2025	58.66	85.02	162.52	2025	5.01	5.46	6.70
2026	59.86	87.73	167.20	2026	5.23	5.67	7.06
2027	61.23	90.55	171.22	2027	5.52	5.67	7.20
2028	61.72	93.46	176.82	2028	5.58	5.67	7.28
2029	62.40	96.42	182.23	2029	5.45	5.71	7.59
2030	62.80	99.48	187.54	2030	5.49	5.69	7.89
2031	63.56	102.76	193.24	2031	5.56	5.91	8.30
2032	64.26	106.05	198.24	2032	5.73	6.09	8.51
2033	65.11	109.50	204.15	2033	5.86	6.27	8.51
2034	66.21	112.79	210.36	2034	6.00	6.45	8.68
2035	67.65	116.25	214.96	2035	6.12	6.60	8.81
2036	68.70	119.89	221.00	2036	6.26	6.76	9.03
2037	69.28	123.53	227.03	2037	6.38	6.84	9.30
2038	70.03	127.48	233.16	2038	6.55	7.02	9.79
2039	70.78	131.80	239.55	2039	7.06	7.38	10.35
2040	72.08	135.67	246.38	2040	7.15	7.85	10.63

(Source: U.S Energy Information Administration (EIA))

VITA

Pariya Pusayapaibul was born in Bangkok, Thailand, on December 23, 1987. He graduated his Bachelor's degree in Mechanical Engineering from Faculty of Engineering, Chulalongkorn University in 2009. He then applied and worked for Toyota Motor Asia Pacific – Engineering & Manufacturing Co., LTD. (TMAP-EM) as a production engineer for a period of time and, afterwards, stepped into Oil and Gas industry in 2011. He took responsibility in PTT exploration and production PLC, (PTTEP), under the offshore maintenance department. In a meanwhile, he was once again accepted to the Master of Petroleum Engineering program in class of 2012 at the Department of Mining and Petroleum Engineering, Faculty of Engineering, Chulalongkorn University. Thereafter, in 2015, he was assigned as a planning engineer under offshore asset planning section in PTTEP.