

## **MIRACH ENERGY LIMITED**

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**Competent Person's Report  
Block D, Cambodia  
As of December 31, 2013**



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As of December 31, 2013**

**Prepared For:**

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**Prepared By:**

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**March 2014**

# MIRACH ENERGY LIMITED

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March 18, 2014

**Mirach Energy Limited**  
3902 Cosco Tower  
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Hong Kong  
China

Reference: **Mirach Energy Limited**  
**Competent Person's Report as of December 31, 2013 for**  
**Block D in Cambodia**

Dear Sirs

Pursuant to your request, we have prepared an independent evaluation of the crude oil and natural gas prospective resources for the interests of Mirach Energy Limited ("Mirach") in Block D offshore of Cambodia as of December 31, 2013.

This Competent Person's Report ("CPR") was prepared for securities reporting, banking and financing, and corporate transactions. The prospective resources have been prepared in accordance with the 2007 SPE/WPC/AAPG/SPEE Petroleum Resource Management System ("PRMS"). McDaniel & Associates Consultants Ltd. ("McDaniel") previously evaluated this asset for Mirach as part of a CPR issued in March 2013 with an effective date of December 31, 2012.

This updated CPR was prepared from February to March 2014 and was based on technical data to the end of December 2013. In preparing this report, we relied upon factual information including ownership, technical well and seismic data, contracts, and other relevant data supplied by Mirach. The extent and character of all factual information supplied were relied upon by us in preparing this report and has been accepted as represented. Mirach has provided McDaniel with written representation that no new data or information has been acquired between December 31, 2013 and the date of this report, which might materially impact our opinions in this report.

**1 EXECUTIVE SUMMARY**

Mirach has the following interest in the subject block in Cambodia as summarized in Table 1 below. A regional map showing the location of the Blocks is presented in Figure 1.

Contract	Country	Operating Company	Mirach Interest (1)	Status	Contract Expiry (2)	Area (sq.km)	Comment
Block D PSC	Cambodia	CPHL (Cambodia)	48%	Exploration	March 2013	5,507	1st well 2013

- (1) In Block D, the Cambodian Government has an option upon a commercial discovery to take a 5 percent interest, which would reduce the Mirach interest to 45.6 percent.
- (2) The third exploration stage expired in March 2013. In February 2013 Mirach applied for a two year extension which is pending approval.

**Table 1 - Mirach Asset Summary**



**Figure 1 – Regional Location Map for Block D**

The Block D Contract in Cambodia officially expired in March 2013 at the end of third exploration stage. As provided for under the terms of the Block D Contract, CPHL applied for a two-year extension in February 2013 but this has not yet been officially approved. CPHL believes the delay in receiving approval relates to the changes to government departments that are being implemented following the general election held in July 2013. The extension if granted would likely include a carry-over commitment from the earlier exploration stages to drill three exploration wells. In addition, a 30-year production period would apply to any subsequent commercial discovery on the

block. Several prospects have been identified based on the 132 lines of 2-D seismic and 400 square kilometre 3-D seismic survey, but no wells have been drilled to date. Five prospects have been assigned prospective resources within this report. As there have been no discoveries, reserves and contingent resources have not been assigned.

### 1.1 Prospective Resources

Prospective Resources were assigned to the prospects identified by Mirach in Block. A summary of the resource estimates, as of December 31, 2013, is presented in Table 2. A more detailed description of the prospective resources calculations is presented in Section 4.5. The oil and condensate (or gas) initially in-place is shown in the first column on a property gross basis for illustrative purposes only and is by definition not a recoverable volume.

#### Prospective Resources: Crude Oil and Condensate (MMbbl)

Block D Prospect (1) (6)	Property Gross (Unrisked)					Prospect Geological Chance of Discovery (2)	Risked Mean		
	Initially In-Place (Mean)	Low Estimate (P90)	Best Estimate (P50)	Mean	High Estimate (P10)		Property Gross (3)	Company Gross (4)	Company Net (5)
S1	143	11.8	27.1	31.4	59.3	42%	8.2	3.7	2.2
S2	201	7.1	26.8	44.1	107.1	34%	9.3	4.2	2.6
S3	939	77.3	170.9	191.0	420.5	32%	28.3	12.9	7.7
S4	298	19.7	49.4	62.7	139.6	16%	4.7	2.2	1.3
S5	171	10.8	29.4	37.5	79.0	30%	7.4	3.4	2.1
<b>Total (7)</b>	<b>1,751</b>	<b>126.6</b>	<b>303.6</b>	<b>366.8</b>	<b>805.4</b>		<b>57.9</b>	<b>26.4</b>	<b>15.9</b>

#### Prospective Resources: Natural Gas (Bcf)

Block D Prospect (1) (6)	Property Gross (Unrisked)					Prospect Geological Chance of Discovery (2)	Risked Mean		
	Initially In-Place (Mean)	Low Estimate (P90)	Best Estimate (P50)	Mean	High Estimate (P10)		Property Gross (3)	Company Gross (4)	Company Net (5)
S3	210	16.5	73.1	129.6	323.5	5%	6.3	2.9	-
S4	36	2.6	12.1	22.1	55.7	3%	0.7	0.3	-
<b>Total (7)</b>	<b>246</b>	<b>19.2</b>	<b>85.2</b>	<b>151.7</b>	<b>379.2</b>		<b>7.0</b>	<b>3.2</b>	<b>-</b>

- (1) Separate zones within each prospect were added probabilistically using monte-carlo simulation.
- (2) The prospect geological chance of discovery is based on the success of any one of the prospect zones and assumes independence and consequently is not equivalent to the [Risked Mean]/[Unrisked Mean]
- (3) Prospect risked mean resources are equal to the summed product of the unrisked mean resources for each zone multiplied by the geological chance of success of each zone.
- (4) Company gross prospective resources are based on the working interest share of the property gross prospective resources assuming CNPA exercise their option to take a 5 percent interest.
- (5) Company Net resources are based on the Mirach share of Cost Oil and Profit Oil revenues assuming CNPA exercise their option to take a 5 percent interest. For Natural Gas the net is zero as the gas is considered noncommercial.
- (6) The Block D S3 and S4 prospects contain a Pre-Tertiary zone which could be either crude oil (with no free gas) or natural gas (with no oil rim). The unrisked crude oil resources assume the zone contains only oil and the unrisked natural gas resources assume the zone contains only gas which means on an unrisked basis the prospective resources are mutually exclusive. This is accounted for though in the risked estimates which include the chance of the prospect being oil or gas filled.
- (7) The total may appear to differ from the sum of the underlying assets due to rounding differences.

**Table 2 - Mirach Prospective Resources Summary**



The geological chance of discovery for the prospects ranges from 16 to 42 percent. These estimates do not include the chance of commercial success, which is very difficult to determine at this stage. The gas prospective resources assigned are unlikely to be commercial because there is no infrastructure in place and the volumes of gas are relatively small and would likely be used for power generation within the CPHL facilities. The net present value estimates listed in Section 1.2 therefore only include the crude oil volumes for Block D.

## 1.2 Net Present Value of the Risked Mean Prospective Resources

The net present value of the risked mean prospective resources was based on future production and revenue analyses. A corporate summary of the net present values of Mirach's share of the prospective resources, based on forecast prices and costs as of December 31, 2013, are presented in Table 3. The total net present value of the risked mean resources at a 10 percent discount rate is estimated to be US \$ 305 million.

Prospect	Net Present Values at December 31, 2013 (US\$ MM)(1)(2)				
	Discounted At				
	0%	5%	10%	15%	20%
CAM-S1	99	70	50	36	26
CAM-S2	114	78	55	39	27
CAM-S3	380	224	135	79	42
CAM-S4	52	33	21	13	7
CAM-S5	85	61	44	32	23
<b>Total (3)</b>	<b>731</b>	<b>467</b>	<b>305</b>	<b>198</b>	<b>123</b>

(1) Based on forecast prices and costs at December 31, 2013 (see Price Forecast in Section 3).

(2) The net present values may not necessarily represent the fair market value of the resources.

(3) The total may appear to differ from the sum of the underlying assets due to rounding differences.

**Table 3 - Mirach Risked Mean Prospective Resources Net Present Value Summary**

## 2 RESERVES AND RESOURCES DEFINITIONS

The definitions employed in this evaluation conform to the 2007 Petroleum Resource Management System jointly published by the Society of Petroleum Engineers ("SPE"), World Petroleum Council ("WPC"), American Association of Petroleum Geology ("AAPG") and the Society of Petroleum Evaluation Engineers ("SPEE").

### 2.1 Resources

The term "resources" is intended to encompass all quantities of petroleum naturally occurring on or within the Earth's crust, discovered and undiscovered (recoverable and unrecoverable), plus those quantities already produced. Further, it includes all types of petroleum whether currently considered "conventional" or "unconventional."

The resources classification framework is summarized in Figure 2 and a summary of the definitions is given below.

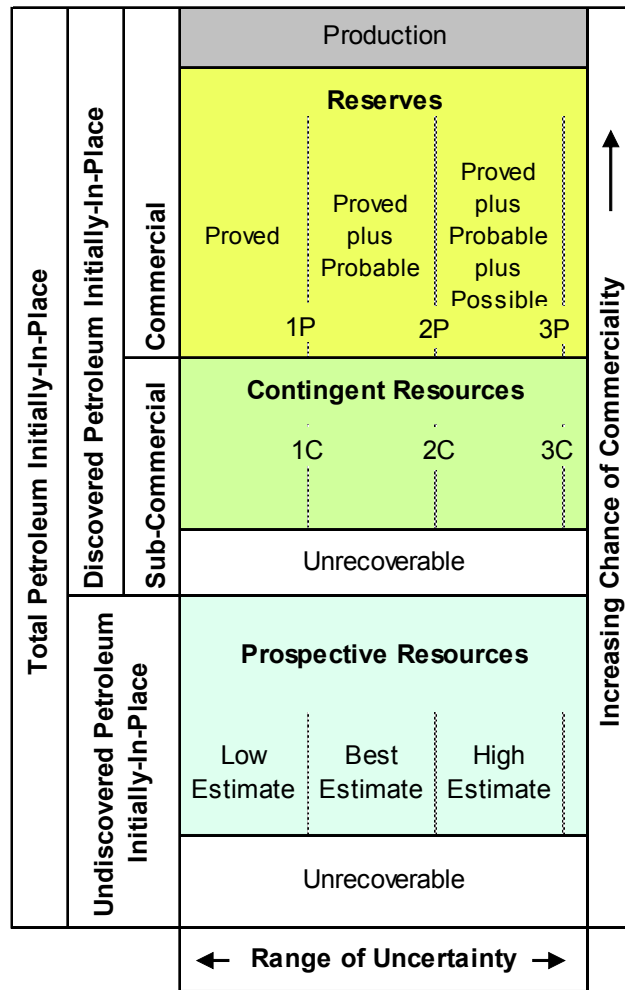


Figure 2 – Resource Classification Framework

The “Range of Uncertainty” reflects a range of estimated quantities potentially recoverable from an accumulation by a project, while the vertical axis represents the “Chance of Commerciality”, that is, the chance that the project that will be developed and reach commercial producing status.

The quantities estimated to be initially-in-place are defined as Total Petroleum-initially-in-place, Discovered Petroleum-initially-in-place and Undiscovered Petroleum-initially-in-place, and the recoverable portions are defined separately as Reserves, Contingent Resources, and Prospective Resources. Reserves constitute a subset of resources, being those quantities that are discovered (i.e. in known accumulations), recoverable, commercial and remaining.

### Reserves

Reserves are those quantities of petroleum anticipated to be commercially recoverable by application of development projects to known accumulations from a given date forward under defined conditions. Reserves must further satisfy four criteria: they must be discovered, recoverable, commercial, and remaining (as of the evaluation date) based on the development project(s) applied. Reserves are further categorized in accordance with

the level of certainty associated with the estimates and may be sub-classified based on project maturity and/or characterized by development and production status.

The reserve classification system is covered in Section 2.3.

### **Contingent Resources**

Contingent Resources are those quantities of petroleum estimated, as of a given date, to be potentially recoverable from known accumulations, but the applied project(s) are not yet considered mature enough for commercial development due to one or more contingencies. Contingent Resources may include, for example, projects for which there are currently no viable markets, or where commercial recovery is dependent on technology under development, or where evaluation of the accumulation is insufficient to clearly assess commerciality. Contingent Resources are further categorized in accordance with the level of certainty associated with the estimates and may be sub-classified based on project maturity and/or characterized by their economic status.

### **Prospective Resources**

Prospective Resources are those quantities of petroleum estimated, as of a given date, to be potentially recoverable from undiscovered accumulations by application of future development projects. Prospective Resources have both an associated chance of discovery and a chance of development. Prospective Resources are further subdivided in accordance with the level of certainty associated with recoverable estimates assuming their discovery and development and may be sub-classified based on project maturity (see Section 2.6).

## **2.2 Range of Uncertainty**

The range of uncertainty of the recoverable and/or potentially recoverable volumes may be represented by either deterministic scenarios or by a probability distribution. When the range of uncertainty is represented by a probability distribution, a Low, Best, and High Estimate shall be provided such that:

- There should be at least a 90 percent probability (P90) that the quantities actually recovered will equal or exceed the Low Estimate.
- There should be at least a 50 percent probability (P50) that the quantities actually recovered will equal or exceed the Best Estimate.
- There should be at least a 10 percent probability (P10) that the quantities actually recovered will equal or exceed the High Estimate.

When using the deterministic scenario method, typically there should also be Low, Best, and High Estimates, where such estimates are based on qualitative assessments of relative uncertainty using consistent interpretation guidelines. Under the deterministic incremental (risk-based) approach, quantities at each level of uncertainty are estimated discretely and separately.

These same approaches to describing uncertainty may be applied to Reserves, Contingent Resources, and Prospective Resources. While there may be significant risk that sub-commercial and undiscovered accumulations will not achieve commercial production, it is useful to consider the range of potentially recoverable quantities independently of such a risk or consideration of the resource class to which the quantities will be assigned.

### **2.3 Reserves Categories and Status**

For Reserves, the general cumulative terms Low/Best/High Estimates are denoted as 1P/2P/3P, respectively. The associated incremental quantities are termed Proved, Probable and Possible. Reserves are a subset of, and must be viewed within context of, the complete resources classification system.

#### **Proved Reserves**

Proved Reserves are those quantities of petroleum, which, by analysis of geoscience and engineering data, can be estimated with reasonable certainty to be commercially recoverable, from a given date forward, from known reservoirs and under defined economic conditions, operating methods, and government regulations. If deterministic methods are used, the term reasonable certainty is intended to express a high degree of confidence that the quantities will be recovered. If probabilistic methods are used, there should be at least a 90 percent probability that the quantities actually recovered will equal or exceed the estimate.

#### **Probable Reserves**

Probable Reserves are those additional Reserves which analysis of geoscience and engineering data indicate are less likely to be recovered than Proved Reserves but more certain to be recovered than Possible Reserves. It is equally likely that actual remaining quantities recovered will be greater than or less than the sum of the estimated Proved plus Probable Reserves (2P). In this context, when probabilistic methods are used, there should be at least a 50 percent probability that the actual quantities recovered will equal or exceed the 2P estimate.

#### **Possible Reserves**

Possible Reserves are those additional Reserves which analysis of geoscience and engineering data suggest are less likely to be recoverable than Probable Reserves. The total quantities ultimately recovered from the project have a low probability to exceed the sum of Proved plus Probable plus Possible (3P) Reserves, which is equivalent to the high estimate scenario. In this context, when probabilistic methods are used, there should be at least a 10 percent probability that the actual quantities recovered will equal or exceed the 3P estimate.

Reserves status categories define the development and producing status of wells and reservoirs.

#### **Developed Reserves**

Developed Reserves are expected quantities to be recovered from existing wells and facilities. Reserves are considered developed only after the necessary equipment has been installed, or when the costs to do so are relatively minor compared to the cost of a well. Where required facilities become unavailable, it may be necessary to reclassify Developed Reserves as Undeveloped. Developed Reserves may be further sub-classified as Producing or Non-Producing.

#### **Developed Producing Reserves**

Developed Producing Reserves are expected to be recovered from completion intervals that are open and producing at the time of the estimate. Improved recovery reserves are considered producing only after the improved recovery project is in operation.

#### **Developed Non-producing Reserves**

Developed Non-Producing Reserves include shut-in and behind-pipe Reserves. Shut-in Reserves are expected to be recovered from (1) completion intervals which are open at the time of the estimate but which have not yet started producing, (2) wells which were shut-in for market conditions or pipeline connections, or, (3) wells not capable of production for mechanical reasons. Behind-pipe Reserves are expected to be recovered from zones in existing wells, which will require additional completion work or future re-completion prior to start of production.

#### **Undeveloped Reserves**

Undeveloped Reserves are expected quantities expected to be recovered through future investments: (1) from new wells on undrilled acreage, (2) from deepening existing wells to a different (but known) reservoir, (3) from infill wells that will increase recovery, or (4) where a relatively large expenditure (e.g. when compared to the cost of drilling a new well) is required to (a) recomplete an existing well or (b) install production or transportation facilities for primary or improved recovery projects.

### **2.4 Contingent Resource Categories**

For Contingent Resources, the general cumulative terms Low/Best/High Estimates are denoted as 1C/2C/3C respectively. No specific terms are defined for incremental quantities within Prospective Resources.

### **2.5 Prospective Resource Categories**

For Prospective Resources, the general cumulative terms Low/Best/High Estimates apply. No specific terms are defined for incremental quantities within Prospective Resources.

## 2.6 Prospective Resource Sub Classes

Prospective resources can be sub classified in terms of project maturity into prospects, leads and plays.

### **Prospect**

A project associated with a potential accumulation that is sufficiently well defined to represent a viable drilling target.

### **Lead**

A project associated with a potential accumulation that is currently poorly defined and requires more data acquisition and/or evaluation in order to be classified as a prospect.

### **Play**

A project associated with a prospective trend of potential prospects, but which requires more data acquisition and/or evaluation in order to define specific leads or prospects.

### 3 PRICE FORECASTS

The net present value estimates were based on the McDaniel & Associates January 1, 2014 price forecast. A summary of the reference crude oil price forecasts and the export prices for the various properties is presented in Table 4.

Year	Brent (1) Crude Oil Price \$US/bbl	Block D Oil Export Price (3) \$US/bbl	Inflation Forecast %
2013	105.00	100.00	2
2014	102.50	97.40	2
2015	100.20	95.00	2
2016	97.70	92.39	2
2017	98.00	92.59	2
2018	99.40	93.88	2
2019	101.30	95.67	2
2020	103.40	97.66	2
2021	105.40	99.54	2
2022	107.60	101.62	2
2023	109.70	103.61	2
2024	111.90	105.68	2
2025	114.20	107.86	2
2026	116.40	109.93	2
2027	118.80	112.20	2
2028	121.18	114.45	2
2029	123.60	116.74	2
2030	126.07	119.07	2
2031	128.59	121.45	2
2032	131.16	123.88	2

**Pricing Assumptions:**

- (1) Brent price forecast based on the McDaniel & Associates January 1, 2014 price forecast
- (2) Block D Crude oil export price based on a US \$5/bbl differential to Brent (increased with inflation) and accounts for quality differences and transportations costs.

**Table 4 – Price Forecast Summary**

## 4 BLOCK D CONTRACT

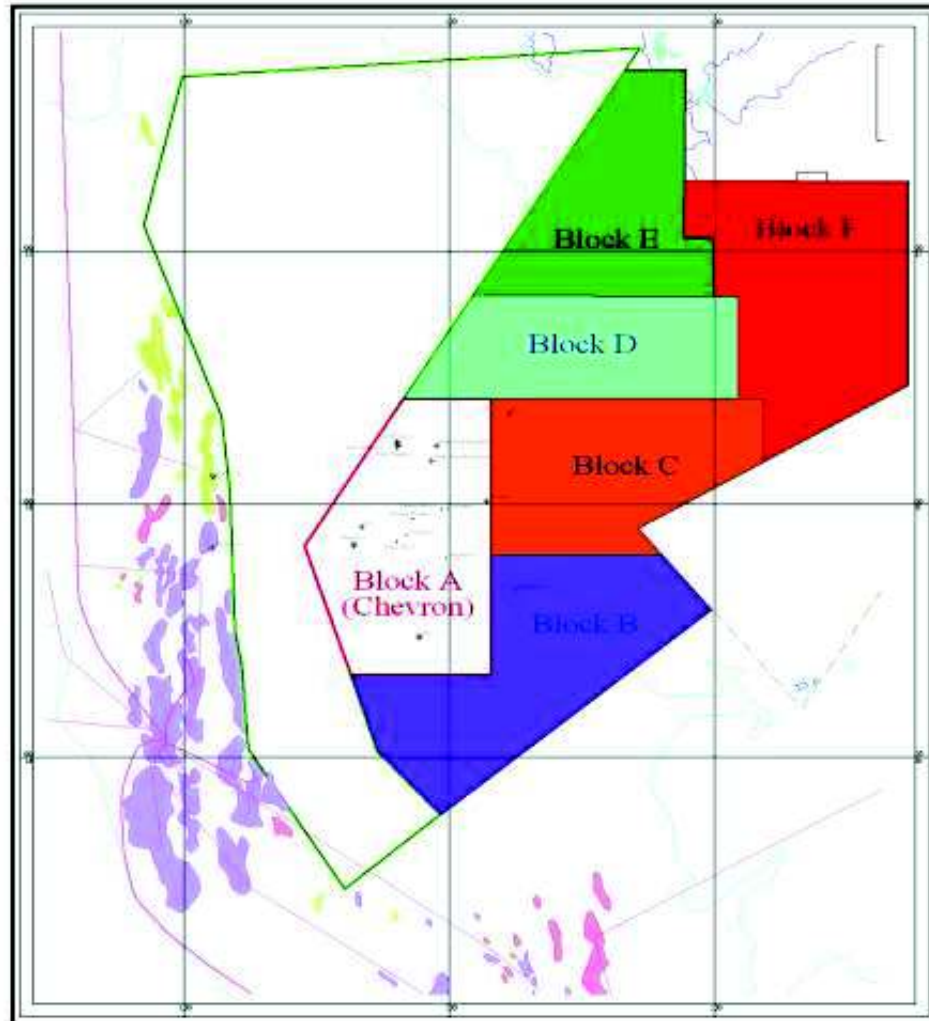
### 4.1 Property Overview

The Cambodian offshore area is divided into six offshore blocks (A to F) with Block D covering an area of 5,507 square kilometres. Block D borders Blocks A, C, E and F, and the Cambodia-Thailand joint development area. In Block A to the southwest (operated by ChevronTexaco), there have been a number of oil and gas discoveries to date. A regional location map for the block is presented in Figure 3 and a schematic map of the area showing the location of the offshore Cambodian blocks is presented in Figure 4.



Figure 3 – Block D Regional Location Map





**Figure 4 – Cambodia Offshore License Map**

In 2006, CPHL acquired a 400 square kilometre 3-D seismic survey over a section of Block D. During 2007 and 2008 a number of prospects were identified within the block. In 2010, the 3-D seismic was reprocessed resulting in an improvement in data quality. In 2013, CPHL completed an Environmental Impact Assessment as a pre-cursor to drilling the first exploration well. CPHL expects to sign a contract with China Oil Field Services Ltd (“COSL”) to drill this well most likely in late 2014 or early 2015.

#### **4.2 Ownership and Contract Terms**

The Block D Petroleum Agreement (the “Block D Contract” or “Contract”) is between the Cambodian Government represented by the Cambodian National Petroleum Authority (“CNPA”) and China Zhenrong Cambodian Energy Co. Ltd the Contractor. In February 2007, China Zhenrong Cambodian Energy Co. Ltd changed its name to CPHL (Cambodia) Company Limited. Mirach has acquired a 48 percent working interest in CPHL.

The Contract has an effective date of March 27, 2006 and covers both the exploration period and any subsequent production period. The exploration period is divided into three stages (lasting three years, two years and two years respectively). If a commercial discovery is made a Production Permit can be then be applied for lasting 30 years.

CPHL entered the third exploration stage in March 2011, which officially expired in March 2013. As provided for under the terms of the Contract, CPHL applied for a two-year extension in February 2013 but this has not yet been officially approved. CPHL believes the delay in receiving approval relates to the changes to government departments that are being implemented following the general election held in July 2013. The CNPA now comes under a newly formed Ministry of Mining and Energy, but at the end of 2013 the positions in the ministry had not been announced publically.

The Contract is a production sharing type contract (“PSC”) with the Government taking a share of the profit (net) oil and a 12.5 percent royalty. CNPA has the option to take a five percent interest upon a commercial discovery. Corporate tax is also payable at 30 percent on any net oil.

#### **4.3 Source and Quality of Data**

Virtually all of the data employed in the preparation of this CPR was obtained directly from CPHL.

The seismic data provided to McDaniel consists of 6,762 kilometres of interpreted 2-D seismic lines (132 lines) and 400 square kilometres of 3-D which are of fair to good data quality. The 3-D data was reprocessed in 2009 and 2010 but Mirach has not interpreted this reprocessed seismic beyond verifying that it does not materially impact the prospects mapped prior to the reprocessing. McDaniel has confirmed through a quick review of the reprocessed data that this is reasonable and consequently the maps and closure areas presented in this evaluation are based on the seismic data prior to reprocessing. On most seismic lines, reflections are discontinuous because of the presence of numerous high-angle faults and lateral facies changes. However, the seismic data quality is sufficient to generate reliable structural maps. The two seismic datasets have not yet been merged (but will be in due course) and separate 2-D and 3-D interpretations were provided. Two sets of structure maps created by CPHL and based on the two different seismic interpretations were reviewed and found to be reasonable. The 3-D seismic interpretation was considered more reliable, but none of the prospects, as currently mapped, are entirely contained within the 3-D seismic area and hence the 2-D seismic interpretation had also to be used.

Wireline logs were provided in digital format for 10 of the wells drilled in the surrounding blocks. All the wells were loaded into McDaniel’s petrophysical analysis software with the main focus on wells B1-1 and Kaoh Tang-1 which are the closest to Block D.

A report on the CPHL study of the exploration potential of Block D dated February 2010 was provided together with a number of regional studies including a Core Lab study undertaken in 1998 on behalf of the Government and the results of a Woodside Petroleum study undertaken in 2000.

A CPHL map (top of the basement) of the Block D area showing the location of the seismic and the wells drilled in the adjacent blocks is presented in Figure 5.

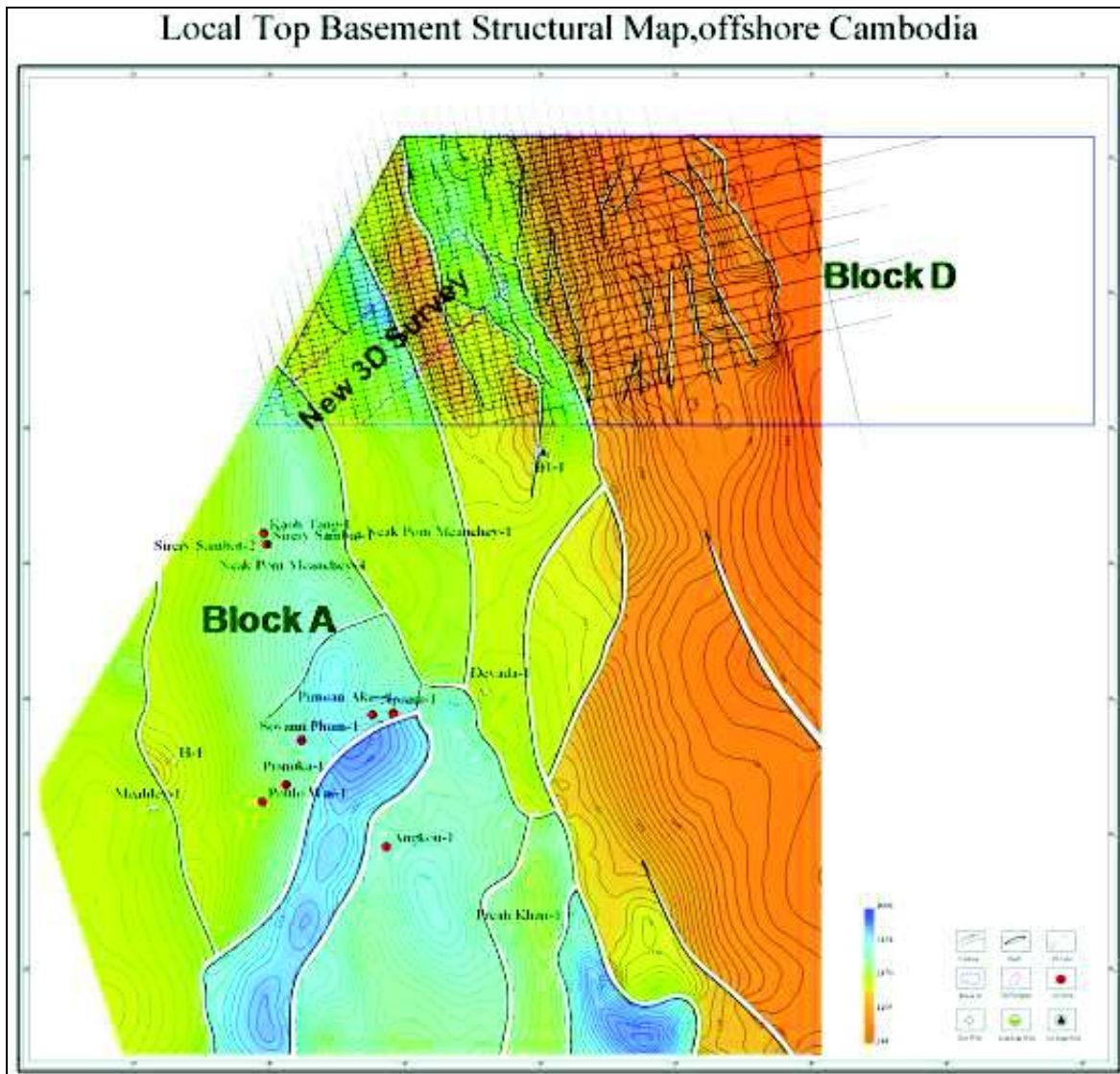


Figure 5 – Block D Basement Top Structure Map (Source CPHL)

#### 4.4 Regional and Block D Geology

The block lies on the edge of the Khmer Basin, a proven petroleum province and the third largest sub-basin in the Gulf of Thailand. A regional structure map for the Gulf of Thailand area is presented in Figure 6.

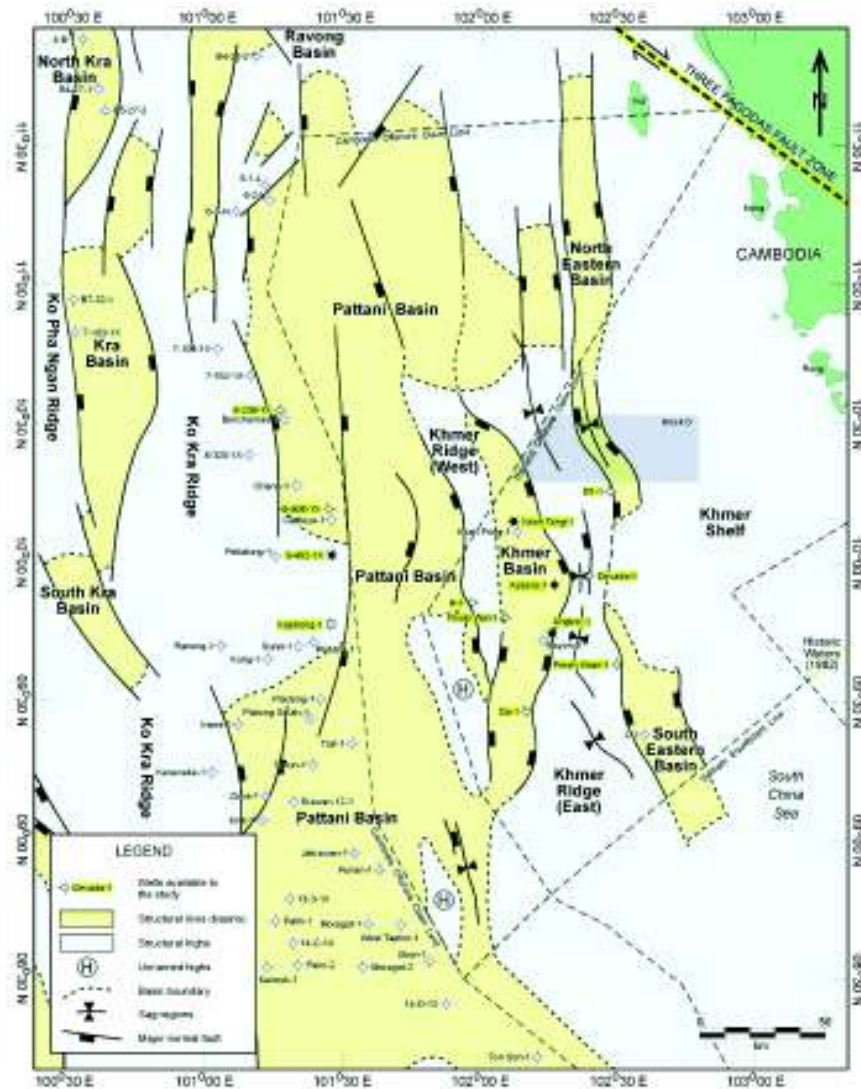


Figure 6 – Block D Regional Structure Location Map (Source CNPA)

#### 4.4.1 Structure

The Gulf of Thailand was a large Pre-Tertiary rift basin that separated into sub-basins through extensional faulting which resulted in a horst and graben surface. The sub-basins filled with Tertiary sediments. The structural history of the Tertiary can be divided into three periods; fault depression, depression and thermal subsidence periods.

Fault depression occurred in the early synrift period coinciding with strong extension in the basin. At this time the first of the Tertiary sediments, named the SQ1 Formation, followed by the SQ2 Formation were deposited.

The depression period is marked by continued basin extension combined with large-scale transgression forming marine depositional environments in which the sediments of the SQ3 and SQ4 formations were laid down.



The thermal subsidence period occurred post rifting. Extension stopped and the basin began to subside mainly due to compaction and the lowering of geotemperature. SQ5 was deposited in this time period. As the main basin experienced tilting during this time, the strata eventually dipped to the west, which resulted in a series of induced en-echelon faults.

The structural events resulted in the formation of seven structural belts within Block D. They trend through the western half of the block in a north-south to northwest-southeast direction. From west to east (from deeper basement structure to shallower), they are as follows:

- Western Slope (on the slope edge of the Khmer basin)
- Western Low Uplift
- Western Sag (known as the Northern Khmer basin)
- Central Uplift
- Eastern Sag (known as the North Eastern basin)
- Eastern Slope
- Eastern Uplift

Two groups of faults, including near-North-Northwest-trending major faults and near-North-Northeast-trending induced faults, are developed in Block D forming numerous potential fault traps. The Central Uplift may also have large associated structural closures.

#### **4.4.2 Stratigraphy**

The paleomorphology of Block D during the Tertiary is a slope area, which resulted in a wedge of sediments thickening in a southeast direction. Further to the south and to the west, the Tertiary package lies directly onto a basement of metamorphic rock. However, in Block D it is suggested that Triassic and Permian rock underlie the Tertiary beds as they do onshore to the east, where an angular unconformity separates Tertiary and Pre-Tertiary sediments.

In the Tertiary, six separated sequences have been identified with increasing marine influence from older to younger deposits. From bottom to top they are sequentially named SQ1 to SQ6, and are separated by unconformities. They consist of thin sands interbedded with thick mudstone, limestones, and coals. The source of the sands are believed to be derived from the east.

In general, the SQ1 and SQ2 are dominated by lake sediments deposited in the Oligocene. The SQ3 to SQ6 is dominated by marine sediments with local incursions of continental fluvial depositions, which have been reworked into shoreline sands. Occasional turbidite deposits are also interbedded in these sections of rock. The majority of this section was deposited in the Miocene.

The SQ2 and SQ3 are the most prospective and their depositional environment interpretation will be discussed in further detail.

The lower portion of SQ2, named SQ2-1, consists mainly of thick lake facies (mudstones) with local intrusions of fan deltas, basin floor fans, and alluvial plain facies. The upper portion of the SQ2, the SQ2-2, contains thick mudstones with some alluvial plain facies. The SQ3 represents the start of a shallower marine facies with submarine fans and deltas being developed.

The upper portion is still dominated with shallow marine facies but now shows more littoral environments including the formation of barrier bars.

#### **4.4.3 Reservoir**

Sands within the SQ2 and SQ3 sequences are the best potential reservoirs within the Block D Contract area. The results of the Block A wells indicate that the SQ2 and SQ3 are on average 200 metres and 350 metres thick respectively with a net sand content of 10 to 20 percent. Within the SQ2, a single sand layer is relatively thin with an average thickness of six metres and a maximum thickness of 18 metres. The SQ3 average single sand thickness is eight metres.

In addition, there may be potential reservoirs if fractured metamorphic rock or carbonates are encountered within the Pre-Tertiary. Whether these reservoir types exist within Block D is unknown. Within Block A the Pre-Tertiary has been variable consisting of metamorphic rock, igneous rock (basalt and pyroclastics), limestone, dolomite, shale and quartz sandstone. CPHL believes that the presence of the buried hills within the Pre-Tertiary of Block D could suggest the formations may have been exposed to surface weathering, which could have enhanced their reservoir potential. For fractured metamorphic basement the main porosity type will be fracture porosity. Indirect evidence of this was found in Block A, in the Devada-1 well, where the presence of fractures was inferred from the wireline logs and the drill cuttings in the metamorphic basement rock. Fractured metamorphic basement plays are known to exist within the region (China and Vietnam); however, there are no known fields within the Gulf of Thailand. It may also be possible to encounter Permian carbonates within the Pre-Tertiary section as this type of reservoir exists within the Gulf of Thailand in the Chumphon and Songkha sub-basins.

#### **4.4.4 Source**

Study work suggests the most likely source material within Block D lies within the SQ2-1 and the SQ1 sequences. Drill cuttings examined in Block A show that both of these sequences are composed of lake facies shales containing abundant organic matter. These shales can be up to 1,000 metres thick in the central part of the Khmer Trough.

It is likely that any oil generated will have been sourced locally in the sub-basins like the Northern Khmer Basin and the North Eastern Basin where depths would be sufficient for proper maturity levels in the lower SQ zones. These sources are connected through the numerous fractures to the reservoir rock in the various trapping configurations. Although most of the migration is believed to be vertical as opposed to lateral, there could be oil migrating from the deep Khmer Basin up-dip into Block D, especially onto the Western Slope of the block.

In surrounding basins it has been shown that the Pre-Tertiary sources rocks may also be developed and mature enough to generate hydrocarbons.

Two types of crude oil have been discovered in the area: high wax, low sulfur oil; and a low wax, low sulfur oil.

#### **4.4.5 Seal**

The thick mudstone in the SQ2-2 sequence acts as the main source rock and the first regional seal in the Block D Area. The SQ6 sequence consists mainly of mudstone and is interpreted to be the second regional seal in Block D Area. On seismic these mudstones appear as a high amplitude reflector with good continuity. The SQ3, SQ4 and SQ5 sequences also contain mudstone seals but these are localized to specific areas and are not as continuous as the regional SQ2-2 and SQ6 seals.

In Block D, the faulting has occurred over a long time period, even into the age of SQ6 sequence. On seismic it can be seen that some faults reach up to the seabed, which implies there is risk that even the regional seals may be breached in places by faults.

#### **4.5 Prospective Resources**

Prospective Resources have been assigned to five prospects identified by CPHL within the Contract Area and are referred to as S1, S2, S3, S4 and S5. Each prospect has potential in a number of different zones of which the Pre-Tertiary basement and the Tertiary SQ2 and SQ3 are thought to be the most prospective.

A top structure map of the SQ2 Formation based on the 2-D seismic interpretation and created by CPHL is presented in Figure 1 of the Appendix and includes the five prospect outlines applicable to the SQ2 and SQ3 zones (the prospect outlines were picked by McDaniel within the seismic project using the gridded time horizons and therefore do not exactly overlay the top depth structure map). The SQ3 was not mapped separately as the zone is believed to be parallel to the underlying SQ2 and influenced by the same underlying structure. Another top structure map of the SQ2 Formation, this time based on the 3-D seismic, is presented in Figure 2 of the Appendix. A top structure map of the Pre-Tertiary basement is presented in Figure 3 of the Appendix and includes the two prospect outlines applicable to this zone.

The prospective resources for each zone were aggregated probabilistically, as statistically the High (“P10”) Estimate at the prospect level is less than the sum of the P10 estimates at the zone level.

A summary of the prospective resources for each prospect and prospect zone is presented in Table 3 of the Appendix on a property gross basis. The prospective resources at a prospect level are summarized in Table 2 in Section 1.1 and are repeated below for ease of reference. It should be noted that the “mean” is considered the most representative average to use when assessing a portfolio of assets as it captures the full range of outcomes.

**Prospective Resources: Crude Oil and Condensate (MMbbl)**

Block D Prospect (1) (6)	Property Gross (Unrisked)					Prospect Geological Chance of Discovery (2)	Risked Mean		
	Initially In-Place (Mean)	Low Estimate (P90)	Best Estimate (P50)	Mean	High Estimate (P10)		Property Gross (3)	Company Gross (4)	Company Net (5)
S1	143	11.8	27.1	31.4	59.3	42%	8.2	3.7	2.2
S2	201	7.1	26.8	44.1	107.1	34%	9.3	4.2	2.6
S3	939	77.3	170.9	191.0	420.5	32%	28.3	12.9	7.7
S4	298	19.7	49.4	62.7	139.6	16%	4.7	2.2	1.3
S5	171	10.8	29.4	37.5	79.0	30%	7.4	3.4	2.1
<b>Total (7)</b>	<b>1,751</b>	<b>126.6</b>	<b>303.6</b>	<b>366.8</b>	<b>805.4</b>		<b>57.9</b>	<b>26.4</b>	<b>15.9</b>

**Prospective Resources: Natural Gas (Bcf)**

Block D Prospect (1) (6)	Property Gross (Unrisked)					Prospect Geological Chance of Discovery (2)	Risked Mean		
	Initially In-Place (Mean)	Low Estimate (P90)	Best Estimate (P50)	Mean	High Estimate (P10)		Property Gross (3)	Company Gross (4)	Company Net (5)
S3	210	16.5	73.1	129.6	323.5	5%	6.3	2.9	-
S4	36	2.6	12.1	22.1	55.7	3%	0.7	0.3	-
<b>Total (7)</b>	<b>246</b>	<b>19.2</b>	<b>85.2</b>	<b>151.7</b>	<b>379.2</b>		<b>7.0</b>	<b>3.2</b>	<b>-</b>

- (1) Separate zones within each prospect were added probabilistically using monte-carlo simulation.
- (2) The prospect geological chance of discovery is based on the success of any one of the prospect zones and assumes independence and consequently is not equivalent to the [Risked Mean]/[Unrisked Mean]
- (3) Prospect risked mean resources are equal to the summed product of the unrisked mean resources for each zone multiplied by the geological chance of success of each zone.
- (4) Company gross prospective resources are based on the working interest share of the property gross prospective resources assuming CNPA exercise their option to take a 5 percent interest.
- (5) Company Net resources are based on the Mirach share of Cost Oil and Profit Oil revenues assuming CNPA exercise their option to take a 5 percent interest. For Natural Gas the net is zero as the gas is considered noncommercial.
- (6) The Block D S3 and S4 prospects contain a Pre-Tertiary zone which could be either crude oil (with no free gas) or natural gas (with no oil rim). The unrisked crude oil resources assume the zone contains only oil and the unrisked natural gas resources assume the zone contains only gas which means on an unrisked basis the prospective resources are mutually exclusive. This is accounted for though in the risked estimates which include the chance of the prospect being oil or gas filled.
- (7) The total may appear to differ from the sum of the underlying assets due to rounding differences.

**Table 5 – Block D Prospective Resources Summary**

**4.5.1 Assessment Methodology**

Prospective resources for each prospect zone are based on probabilistic volumetric calculations. Low (P90) and High (P10) estimates were used to define the distributions which are assumed to be log normal.

The SQ2 and SQ3 zones are likely to be oil bearing as discussed in Section 4.4.4. The parameters used for evaluating the SQ2 and SQ3 zones were pool area, average net pay, porosity, oil saturation together with estimated pressure volume temperature (“PVT”) parameters (the API oil gravity was assumed to vary between 35 and 40) and recovery factors. For any one prospect the pool area for the SQ2 and the pool area for SQ3 was assumed to be the same. The parameters, excluding pool area are summarized in Table 6 and apply to all the prospects.



Parameter	SQ2 Zone		SQ3 Zone	
	P90	P10	P90	P10
Average Net Pay,ft	45	85	65	105
Porosity, %	16	25	17	26
Oil Saturation, %	55	70	55	70
Oil FVF, rb/stb	1.30	1.50	1.30	1.50
Oil Recovery Factor, %	10.0	40.0	10.0	40.0

**Table 6 – Block D SQ2 and SQ3 Input Parameters**

The basement zone is interpreted to be prospective in the S3 and S4 prospects. The zone was assessed assuming a 50 percent chance of encountering natural gas (with virtually no condensate) and a 50 percent chance of fairly heavy oil (API gravity of 15). The unrisks prospective resources presented in Table 1 of the Appendix assume the zone contains only oil and the unrisks natural gas resources assume the zone contains only gas which means on an unrisks basis the prospective resources are mutually exclusive. This is accounted for though in the risks estimates which include the chance of the prospect being oil or gas filled. In addition, two alternative reservoir rocks were considered: one being a fractured basement rock with no matrix porosity; and the other being a weathered Permian carbonate. Analysis shows that the effective pore volume of both these reservoirs within the specific structural setting of the prospects is likely to be similar, as the much lower porosity of the fractured basement reservoir is offset by the greater thickness. The parameters used for the basement were pool area, average gross pay, porosity, oil and gas saturation together with estimated PVT parameters and recovery factors. Porosity, net-to-gross, oil and gas saturation, PVT parameters and recovery factors were assumed to be the same for both prospects, whereas the pool area and gross pay were varied. The common parameters are summarized in Table 7 assuming a fractured basement reservoir.

Parameter	P90	P10
Net-to-Gross, %	60	85
Porosity, %	0.1	1.5
Oil or Gas Saturation, %	60	80
Oil FVF, rb/stb	1.10	1.20
Oil Recovery Factor, %	10.0	25.0
Gas Expansion Factor	117	119
Gas Recovery Factor, %	50	80
Gas Shrinkage, %	2.5	5

**Table 7 – Block D Basement Input Parameters**

For the SQ2 and SQ3 zones a geometric correction factor (frequently referred to as a shape factor) of 0.9 was used to account for the reduction in net pay at the edges of the field. For the basement zone a gross pay map was used and consequently a shape factor was not required.

Each prospect zone was risks using five parameters: source, migration, reservoir, structure and seal. Source, migration and structure were assumed to be fully dependent for the SQ2 and SQ3 zones within the same prospect. This means that if a source is present for one zone it will also be present for the other zones in the same prospect. The influx of sand is interpreted to be from the east and so the reservoir chance was varied to reflect the higher sand/shale ratio likely to exist there

(0.9 in the east to 0.7 in the west). Conversely, the seal chance was increased in a westward direction, as the increase in shale is likely to improve the chance of sealing faults. The seal on the SQ3 was given a slightly higher risk as it is overlain by only one regional seal (compared to the two for the SQ2). Structure chance of success was taken to be 0.6 except in the cases where the pool outline is at least partly defined on 3-D seismic where a 0.7 chance was assigned.

**4.5.2 S1 Prospect**

The S1 prospect lies in the southwest corner of Block D (see Figure 1 and Figure 2 of the Appendix) and as such is the only prospect, which is within the Khmer Basin. The prospect area is broken up by a number of faults and the closure area is uncertain. Pool areas of 543 and 2,850 acres were estimated for the P90 and P10 respectively.

The prospect was risked using the parameters summarized in Table 8. The source risk is considered very low as the prospect is interpreted to lie within the Khmer Basin, which has a proven source.

Parameter	SQ2 Zone	SQ3 Zone
Source	0.95 (Dependent)	
Migration & Time	0.90 (Dependent)	
Reservoir	0.70	0.70
Structure	0.70 (Dependent)	
Seal	0.65	0.60

**Table 8 – Block D Prospect S1 Geological Chance of Discovery**

**4.5.3 S2 Prospect**

The Tertiary at the S2 Prospect is highly faulted and interpreted to be a flower structure on the 3-D seismic (Figure 2 of the Appendix). It is likely that traps will have formed in this structural setting but it maybe that individual fault blocks will be small with some having hydrocarbons but others having breached. Pool areas of 200 and 5,500 acres were estimated for the P90 and P10 respectively with an allowance made for the extension of the prospect into the 2-D seismic area.

The prospect was risked using the parameters summarized in Table 9. The seal risk was increased due to the greater degree of faulting.

Parameter	SQ2 Zone	SQ3 Zone
Source	0.90 (Dependent)	
Migration & Time	0.80 (Dependent)	
Reservoir	0.80	0.80
Structure	0.70 (Dependent)	
Seal	0.55	0.50

**Table 9 – Block D Prospect S2 Geological Chance of Discovery**

#### 4.5.4 S3 Prospect

The S3 Prospect is potentially the largest of the five prospects with potential in the Tertiary (SQ2 and SQ3) and the basement (see Figure 1 and Figure 3 of the Appendix). A dip line from the 3-D seismic is presented in Figure 7 and shows what appears to be a basement horst with an associated compactional drape of Tertiary sediments, which in turn have some vertical offset due to the reactivation of the faulting during the Tertiary on the down-dip and up-dip sides of the block.

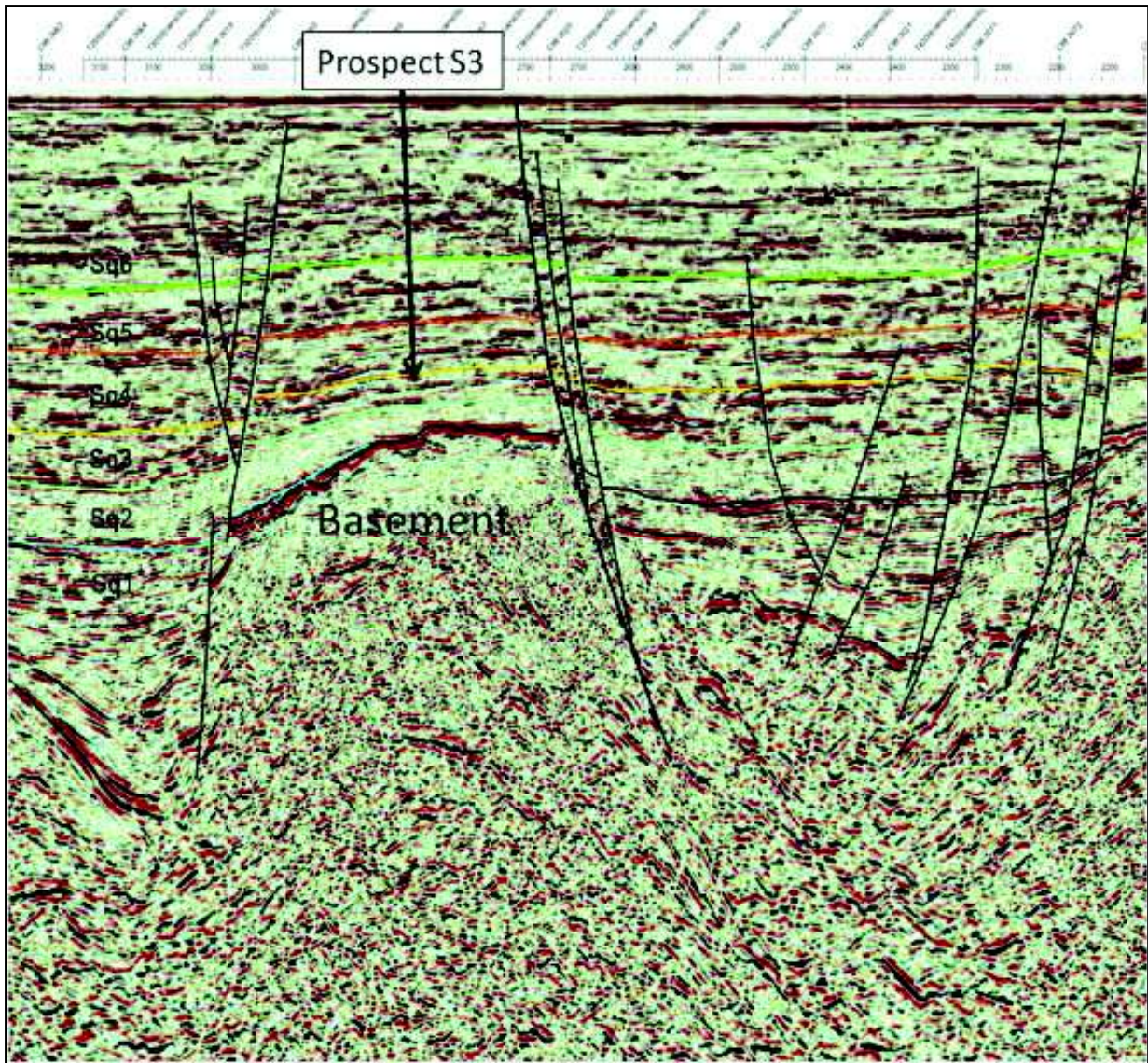


Figure 7 – Block D Prospect S3 Dip Line from 3-D Seismic Survey



However, any large closure within the Tertiary is subtle and relies on the 2-D seismic to close the structure in a strike direction. A P10 and P90 pool area of 875 acres and 17,500 acres were chosen to reflect the uncertainty. The smaller area reflects the possibility that only one of a number of potential small closures evident on the 3-D seismic is successful. The larger pool area reflects a much greater closure area defined by the 2-D seismic. The closure at the basement level is more robust and potentially very large with a P90 of 15,000 and a P10 of 35,000 acres assigned.

The high (P10) un-risked prospective resources for the SQ2 and SQ3 zones are 165 and 228 MMbbls respectively. As such, these volumes are much larger than anything reportedly found in Block A after drilling 27 wells. CPHL believe that the structural setting of this prospect is unlike anything present in Block A allowing for the formation of a bigger trap and that a better analogue would be the large fields present in the Pattani Basin of Thailand. However, there was no geological data available as part of this evaluation to be able to corroborate this.

The prospect was risked using the parameters summarized in Table 10. As discussed in Section 4.5.1 the basement was assigned a probability of containing oil of 0.5 which, as gas is not considered commercial, reduces the overall chance of discovery by 50 percent.

Parameter	SQ2 Zone	SQ3 Zone	Basement
Source	0.70 (Dependent)		0.5
Migration & Time	0.80 (Dependent)		0.6
Reservoir	0.80	0.80	0.6
Structure	0.70 (Dependent)		0.9
Seal	0.60	0.55	0.6

**Table 10 – Block D Prospect S3 Geological Chance of Discovery**

#### 4.5.5 S4 Prospect

The S4 Prospect lies just to the north of well B1-1 and is prospective in the SQ2, SQ3 and basement zones (see Figure 1 and Figure 3 of Appendix 3). For the Tertiary the closure to the south is uncertain and pool areas of 330 and 6,600 acres were assigned for the P90 and P10 respectively. The basement is slightly better defined and pool areas of 3,000 and 9,000 acres were assigned for the P90 and P10 respectively. It is not clear why the well B1-1 failed but source and seal were assumed to be an issue and so the S4 Prospect has been risked accordingly with the parameters summarized in Table 11. As discussed in Section 4.5.1 the basement was assigned a probability of containing oil of 0.5 which, as gas is not considered commercial reduces the overall chance of success by 50 percent.

Parameter	SQ2 Zone	SQ3 Zone	Basement
Source	0.40 (Dependent)		0.5
Migration & Time	0.80 (Dependent)		0.6
Reservoir	0.90	0.90	0.6
Structure	0.60 (Dependent)		0.7
Seal	0.50	0.45	0.5

**Table 11 – Block D Prospect S4 Geological Chance of Discovery**

#### 4.5.6 S5 Prospect

The S5 Prospect appears reasonably well defined on 2-D seismic (see Figure 1 of the Appendix). Pool areas of 400 and 4,000 acres were assigned to be P90 and P10 input parameters respectively.

The prospect was risked using the parameters summarized in Table 12. A structure chance of 0.6 was assigned as there is no 3-D seismic over the prospect and even though the prospect appears to be clear on 2-D seismic the trap is complex with faulting and dip reversal.

Parameter	SQ2 Zone	SQ3 Zone
Source	0.80 (Dependent)	
Migration & Time	0.80 (Dependent)	
Reservoir	0.90	0.90
Structure	0.60 (Dependent)	
Seal	0.60	0.55

Table 12 – Block D Prospect S5 Geological Chance of Discovery

#### 4.6 Net Present Values of the Prospective Resources

Estimates of the net present value (“NPV”) of the prospective resources were based on future production and revenue analyses. The net present value estimates are presented in US Dollars and include an allowance for Cambodian taxes. The process of estimating values for prospective resources is much more complex than for reserves because of the wide range of likely outcomes that could occur following the drilling of an exploration well, especially where multiple zones may be prospective. A simplifying assumption was made to treat each zone as a separate prospect in the NPV calculations which results in somewhat more conservative estimates of the NPV. In addition the information available to prepare revenue forecasts for the exploration prospect such as drilling costs, timing of exploration and development drilling and facility requirements is more limited at this time so the NPV’s should be considered preliminary.

The economic analysis employed in this report consisted of the preparation of a fiscal model for each prospect containing production forecasts, price forecasts, operating and capital cost forecasts and government payments for the mean resource volumes. All natural gas has been assumed to be cost and revenue neutral and has not been accounted for in the valuation. The unrisked mean NPV was then combined with the dry hole cost and the geological chance of success to determine the risked mean NPV. Mirach’s share of the resulting NPV’s are summarized in Table 3 and repeated below for ease of reference.

Prospect	Net Present Values at December 31, 2013 (US\$ MM)(1)(2)				
	Discounted At				
	0%	5%	10%	15%	20%
CAM-S1	99	70	50	36	26
CAM-S2	114	78	55	39	27
CAM-S3	380	224	135	79	42
CAM-S4	52	33	21	13	7
CAM-S5	85	61	44	32	23
<b>Total (3)</b>	<b>731</b>	<b>467</b>	<b>305</b>	<b>198</b>	<b>123</b>

- (1) Based on forecast prices and costs at December 31, 2013 (see Price Forecast in Section 3).
- (2) The net present values may not necessarily represent the fair market value of the resources.
- (3) The total may appear to differ from the sum of the underlying assets due to rounding differences.

Table 13 – Block D Risked Mean Prospective Resources Net Present Value Summary (Mirach Share)

The prospects are subject to the fiscal terms defined within the Block D Contract with the Government taking a share of the profit (net) oil, a 12.5 percent royalty and corporation tax of 30 percent on any net oil. In addition, it is assumed CNPA will exercise their option to take a five percent interest upon any commercial discovery. The price forecasts used are presented in Section 3.

## 5 GLOSSARY OF TECHNICAL TERMS AND ABBREVIATIONS

The following is a glossary of technical terms and a list of the abbreviations used in this report:

Term/Abbreviation	Meaning
"2-D Seismic"	seismic data acquired in a grid of lines that is relatively broad spaced, and is processed in two dimensions
"3-D Seismic"	seismic data acquired in a grid that is relatively close-spaced and dense, and is processed in three dimensions
"AAPG"	American Association of Petroleum Geology
"abandonment" (of well)	a term to describe the sealing of a well with cement plugs, and removing the wellhead with no intention of re-entering the well
"AIM"	Alternative Investment Market on the London Stock Exchange
"anticline"	a hydrocarbon trap where the reservoir has a convex geometry
"API"	a specific gravity scale developed by the American Petroleum Institute for measuring the relative density of various petroleum fluids, expressed in degrees
"appraisal well"	a well drilled as part of an appraisal drilling programme which is carried out to determine the physical extent, reserves and likely production rate of a field
"bbl"	one barrel of oil; 1 barrel = 35 Imperial gallons (approx.), or 159 litres (approx.); 7.5 barrels = 1 tonne (approximately depending upon the oil density); 6.29 barrels = 1 cubic metre
"bbl/MMcf"	barrels per million of cubic feet
"Bcf"	billion cubic feet
"block"	term commonly used to describe contract areas or tract, as in "block of land"
"bopd"	barrels of oil production per day
"bounding fault"	a fault that defines the limit of a prospect of hydrocarbon accumulation
"bpd"	barrels per day
"BS&W"	means base sediments and water
"bwpd"	barrels of water production per day
"Carboniferous"	geological period between 354 and 295 million years ago
"chance of discovery"	the chance that the potential accumulation will result in the discovery of petroleum
"clastic sequence"	rock series consisting of predominantly sedimentary rock made up of clasts (fragments) derived from pre-existing rocks transported and re-deposited before becoming lithified
"completion"	the operation of perforating, stimulating and equipping an oil or gas well
"condensate"	hydrocarbons which are in the gaseous state under reservoir conditions and which become liquid when temperature or pressure is reduced. A mixture of pentanes and higher hydrocarbons

Term/Abbreviation	Meaning
"contingent resources"	Quantities of petroleum estimated, as at a given date, to be potentially recoverable from known accumulations, but applied project(s) are not yet considered mature enough for commercial development due to one of more contingencies
"Cretaceous"	geological strata formed during the period 140 million to 65 million years ago
"CNPA"	Cambodian National Petroleum Authority
"cost oil"	the sum of a party's investment and operating costs recovered from the production of oil from the relevant field
"CPR"	Competent Person's Report
"dip"	the inclination of a horizontal structure from the horizontal
"discovery"	A defined term under PRMS. "A discovery is one petroleum accumulation, or several petroleum accumulations collectively, for which one or several exploratory wells have established through testing, sampling, and/or logging the existence of a significant quantity of potentially moveable hydrocarbons."
"DMO"	Domestic Market Obligation
"exploration phase"	the phase of operations which covers the search for oil or gas by carrying out detailed geological and geophysical surveys followed up where appropriate by exploratory drilling
"exploration well"	a well in an unproven area or prospect, may also be known as a "wildcat well"
"fault"	a break in the earth's crust where there has been displacement of one side relative to the other. Sometimes a layer of non-porous rock may be next to an oil-bearing porous interval along a fault and form a trap for the oil
"field"	a geographical area under which an oil or gas reservoir lies
"formation"	a unit of rock
"gas field"	a field containing natural gas but no oil
"graben"	a normally faulted elongate trough or block of rock, down-thrown on both sides
"GOC"	gas oil contact
"GOR"	gas oil ratio
"gross pay"	the total thickness of hydrocarbon bearing sediments
"GRV"	gross rock volume
"HKW"	highest known water
"hydrocarbon"	a compound containing only the elements hydrogen and carbon. May exist as a solid, a liquid or a gas. The term is mainly used in a catch-all sense for oil, gas and condensate
"Jurassic"	geological strata (or period) formed during the period from 144 million to 205 million years ago
"kg/m <sup>3</sup> "	Kilograms per cubic metre
"km"	kilometres
"LKO"	lowest known oil
"LTO"	lowest tested oil
"mD"	milli Darcy (permeability)
"M"	thousands
"MM"	millions
"Mbbbl"	thousands of barrels
"MMbbbl"	millions of barrels

<b>Term/Abbreviation</b>	<b>Meaning</b>
"Mcfpd"	thousands of cubic feet per day
"MMcfpd"	millions of cubic feet per day
"MFO"	marginal field operations
"natural gas"	gas, occurring naturally, and often found in association with crude petroleum
"net pay"	the total thickness of hydrocarbon bearing sediments that is classified as reservoir
"oil"	a mixture of liquid hydrocarbons of different molecular weights
"oil field"	a geographic area under which an oil reservoir lies
"OOIP"	original oil in place
"operator"	the company that has legal authority to undertake petroleum operations.
"OWC"	oil water contact
"P10"	the term used to describe the volume of reserves defined as having a better than 10% chance of being technically and economically viable.
"P50"	the term used to describe the volume of reserves defined as having a better than 50% chance of being technically and economically viable.
"P90"	the term used to describe the volume of reserves defined as having a better than 90% chance of being technically and economically viable.
"permeability"	the property of a formation which quantifies the flow of a fluid through the pore spaces and into the wellbore
"Permian"	a geological period between 250 to 295 million years ago
"petroleum"	a generic name for hydrocarbons, including crude oil, natural gas liquids, natural gas and their products
"pool"	a individual and separate accumulation of petroleum in a reservoir
"porosity"	the percentage of void in a porous rock compared to the total rock volume
"PRMS"	Petroleum Resource Management System
"probabilistic"	a method of estimating an uncertain outcome whereby a range of values is used for each parameter in a calculation. Results are generally expressed as a range with an associated probability of occurrence
"profit oil"	means a party's share of production from the relevant field in excess of Cost Oil
"property gross"	the total reserves or resources for the property
"prospective resources"	Quantities of petroleum estimated, as at a given date, to be potentially recoverable from undiscovered accumulations by application of future development projects. Prospective resources have both an associated chance of discovery and a chance of development
"PSC"	a production sharing contract
"PVT"	pressure-volume-temperature relationship for fluid
"recompletion"	to repeat the initial "completion" of a well, at a later stage, to either enhance production from the existing "zone", or to allow production from a new zone
"reserves"	generally the amount of economically recoverable oil or gas in a particular reservoir that is available for production
"reservoir"	the underground formation where oil and gas has accumulated. It consists of a porous and permeable rock to hold the oil or gas, and a cap rock that prevents its escape
"risked"	after accounting for chance of success or discovery
"saturated oil"	an oil at reservoir conditions that is at its "bubble point"
"SPE"	Society of Petroleum Engineers



<b>Term/Abbreviation</b>	<b>Meaning</b>
"SPEE"	Society of Petroleum Evaluation Engineers
"stratigraphic trap"	a mode of trapping hydrocarbons which is not dependent on structural entrapment
"structural high"	an area where rocks have been elevated due to tectonic activity
"swabbing"	the process of mechanically producing a pressure drop in the wellbore by rapidly pulling out of the hole, usually with a cup shaped tool
"Tcf"	trillion cubic feet
"TD"	total depth of a well, when drilling has finished
"Triassic"	geological period between 250 and 205 million years ago
"TVSS"	true vertical subsea (depth relative to a sea level datum)
"US\$"	United States dollars
"US\$ M"	thousands United States dollars
"US\$ MM"	millions United States dollars
"USGS"	United States Geological Survey
"up-dip"	at a structurally higher elevation within dipping strata
"under-saturated oil"	an oil at reservoir conditions that is at a pressure above its "bubble point" (compare with "saturated oil"). Reductions in pressure can cause the oil to become saturated
"unrisked"	prior to taking into account the chance of discovery
"well log"	a record of geological formation penetrated during drilling, including technical details of the operation
"WPC"	World Petroleum Congress
"zone"	a general term meaning an interval or unit of rock. A zone in a well would be an interval typically defined by a top and bottom depth. A fault zone would be the unit of rock associated and the area around a fault

## 6 PROFESSIONAL QUALIFICATIONS

McDaniel & Associates Consultants Ltd. has over 50 years of experience in the evaluation of oil and gas properties. McDaniel is registered with the Association of Professional Engineers and Geoscientists of Alberta (APEGA). All of the professionals involved in the preparation of this report have in excess of 5 years of experience in the evaluation of oil and gas properties. Mr. Bryan Emslie, Senior Vice President, Mr. Paul Taylor, Senior Petroleum Engineer and Mr. Kristian Jensen, Senior Geologist, all with McDaniel & Associates, were responsible for the preparation of this report. Mr. Emslie has over 30 years of experience in the evaluation of oil and gas properties and is a registered Professional Engineer with APEGA. Mr. Taylor has over 25 years of experience and is a Chartered Petroleum Engineer with the UK Engineering Council. Mr. Jensen has in excess of 10 years and is a Fellow of the Royal Geological Society (UK). All of the persons involved in the preparation of this report and McDaniel & Associates are independent of Mirach.

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Sincerely,

**McDANIEL & ASSOCIATES CONSULTANTS LTD.**  
**APEGA PERMIT NUMBER: P3145**

  
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## **APPENDIX**

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### **ADDITIONAL TABLES & FIGURES**

**Mirach Energy Limited**  
**Block D - Cambodia**  
**Summary of Prospective Resource Estimates - Property Gross Values**  
**Effective December 31, 2013**

Table 1

**Prospective Resources - Crude Oil**

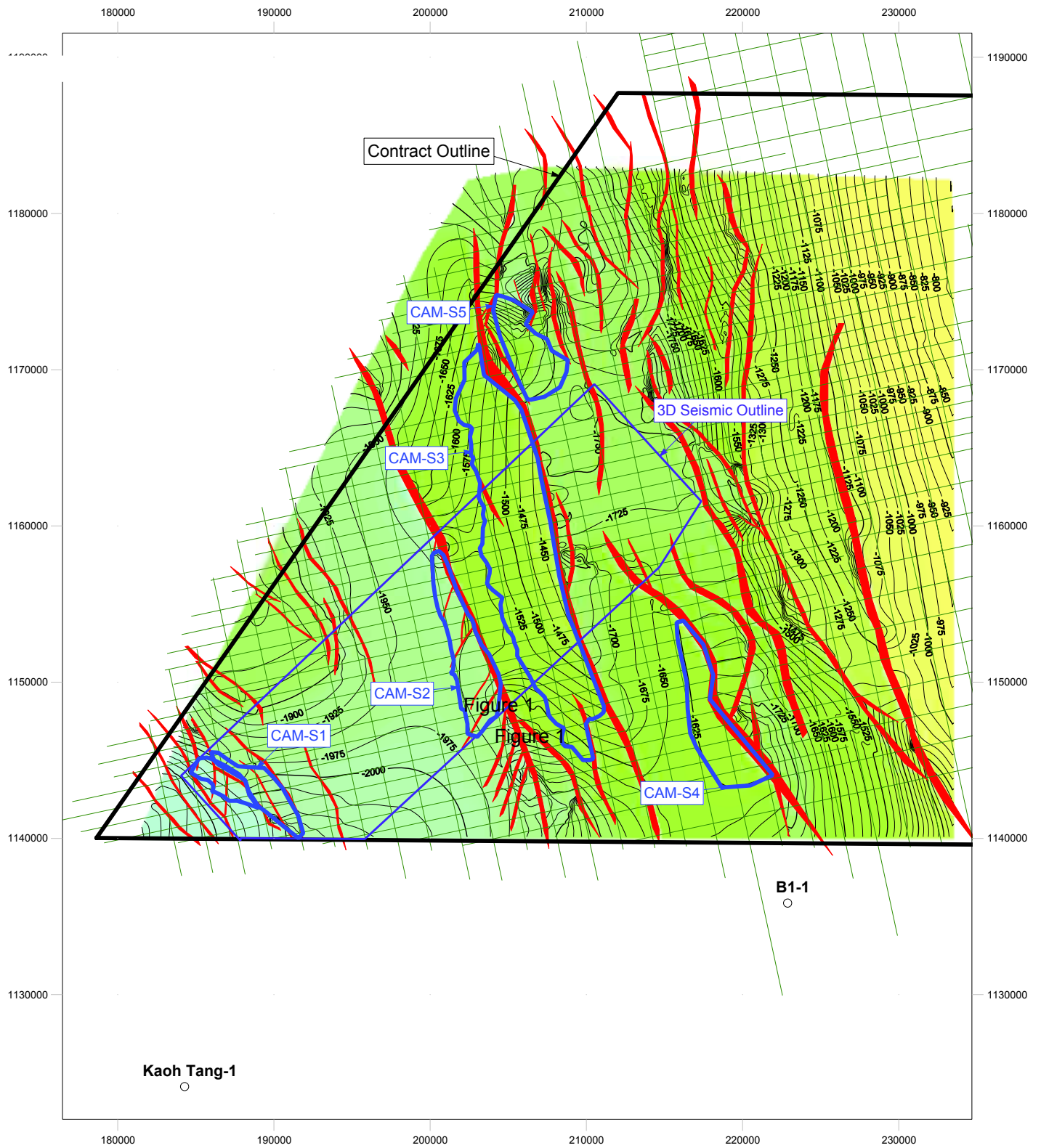
Lead/Prospect	Zone	Prospective Resources - Unrisked (1) (2) (3) (4)				Risky Resources Chance of	
		Low Mbbbl	Best Est. Mbbbl	Mean Mbbbl	High Mbbbl	Mean Mbbbl	Discovery %
CAM-S1	SQ2	3,002	9,546	13,141	30,356	3,579	27
CAM-S1	SQ3	4,305	13,405	18,213	41,736	4,578	25
<b>CAM-S1</b>	<b>Total</b>	<b>11,760</b>	<b>27,104</b>	<b>31,354</b>	<b>59,268</b>	<b>8,157</b>	
CAM-S2	SQ2	1,274	8,048	18,498	50,834	4,102	22
CAM-S2	SQ3	1,813	11,301	25,637	70,447	5,168	20
<b>CAM-S2</b>	<b>Total</b>	<b>7,112</b>	<b>26,761</b>	<b>44,135</b>	<b>107,083</b>	<b>9,271</b>	
CAM-S3	SQ2	5,478	30,029	61,140	164,600	11,504	19
CAM-S3	SQ3	7,803	42,165	84,737	227,855	14,615	17
CAM-S3	Pre-Tertiary (oil case)	5,348	24,805	45,163	115,044	2,195	5
<b>CAM-S3</b>	<b>Total</b>	<b>77,252</b>	<b>170,948</b>	<b>191,040</b>	<b>420,488</b>	<b>28,315</b>	
CAM-S4	SQ2	2,066	11,325	23,059	62,078	1,992	9
CAM-S4	SQ3	2,943	15,902	31,958	85,934	2,485	8
CAM-S4	Pre-Tertiary (oil case)	857	4,117	7,717	19,779	243	3
<b>CAM-S4</b>	<b>Total</b>	<b>19,737</b>	<b>49,356</b>	<b>62,734</b>	<b>139,567</b>	<b>4,720</b>	
CAM-S5	SQ2	2,380	9,707	15,737	39,595	3,263	21
CAM-S5	SQ3	3,400	13,630	21,811	54,646	4,146	19
<b>CAM-S5</b>	<b>Total</b>	<b>10,766</b>	<b>29,436</b>	<b>37,548</b>	<b>79,035</b>	<b>7,409</b>	
<b>Crude Oil Total</b>		<b>126,628</b>	<b>303,605</b>	<b>366,811</b>	<b>805,441</b>	<b>57,871</b>	

**Prospective Resources - Natural Gas**

Lead/Prospect	Zone	Prospective Resources - Unrisked (1) (2) (3) (4)				Risky Resources Chance of	
		Low MMcf	Best Est. MMcf	Mean MMcf	High MMcf	Mean MMcf	Discovery %
CAM-S3	Pre-Tertiary (gas case)	16,521	73,104	129,579	323,478	6,298	5
<b>CAM-S3</b>	<b>Total</b>	<b>16,521</b>	<b>73,104</b>	<b>129,579</b>	<b>323,478</b>	<b>6,298</b>	
CAM-S4	Pre-Tertiary (gas case)	2,645	12,134	22,141	55,676	697	3
<b>CAM-S4</b>	<b>Total</b>	<b>2,645</b>	<b>12,134</b>	<b>22,141</b>	<b>55,676</b>	<b>697</b>	
<b>Natural Gas Total</b>		<b>19,166</b>	<b>85,239</b>	<b>151,721</b>	<b>379,154</b>	<b>6,995</b>	


- (1) There is no certainty that any portion of the prospective resources will be discovered. If discovered, there is no certainty that it will be economically viable or technically feasible to produce any portion of the resources.
- (2) These are partially risked prospective resources that have been risked for chance of discovery, but have not been risked for chance of development.
- (3) Individual zone estimates statistically aggregated to the prospect/lead level.
- (4) The CAM-S3 and S4 prospects contain a Pre-Tertiary zone which could be either crude oil (with no free gas) or natural gas (with no oil rim). The unrisked crude oil resources assume the zone contains only oil and the unrisked natural gas resources assume the zone contains only gas which means on an unrisked basis the prospective resources are mutually exclusive.  
This is accounted for though in the risked estimates which include the chance of the prospect being oil or gas filled.

Figure 1



Well Legend	Map Abbreviations
● Oil producer	OWC - Oil Water Contact
● Oil well	GOC - Gas Oil Contact
★ Gas producer	GWC - Gas Water Contact
★ Gas well	NT - Not Tested
○ Status unknown	NP - Not Present
○ Abandoned	NDE - Not Deep Enough
○ Water injector	LTO - Lowest Tested Gas
○ Drilling location	LTO - Lowest Tested Oil
	LKO - Lowest Known Oil

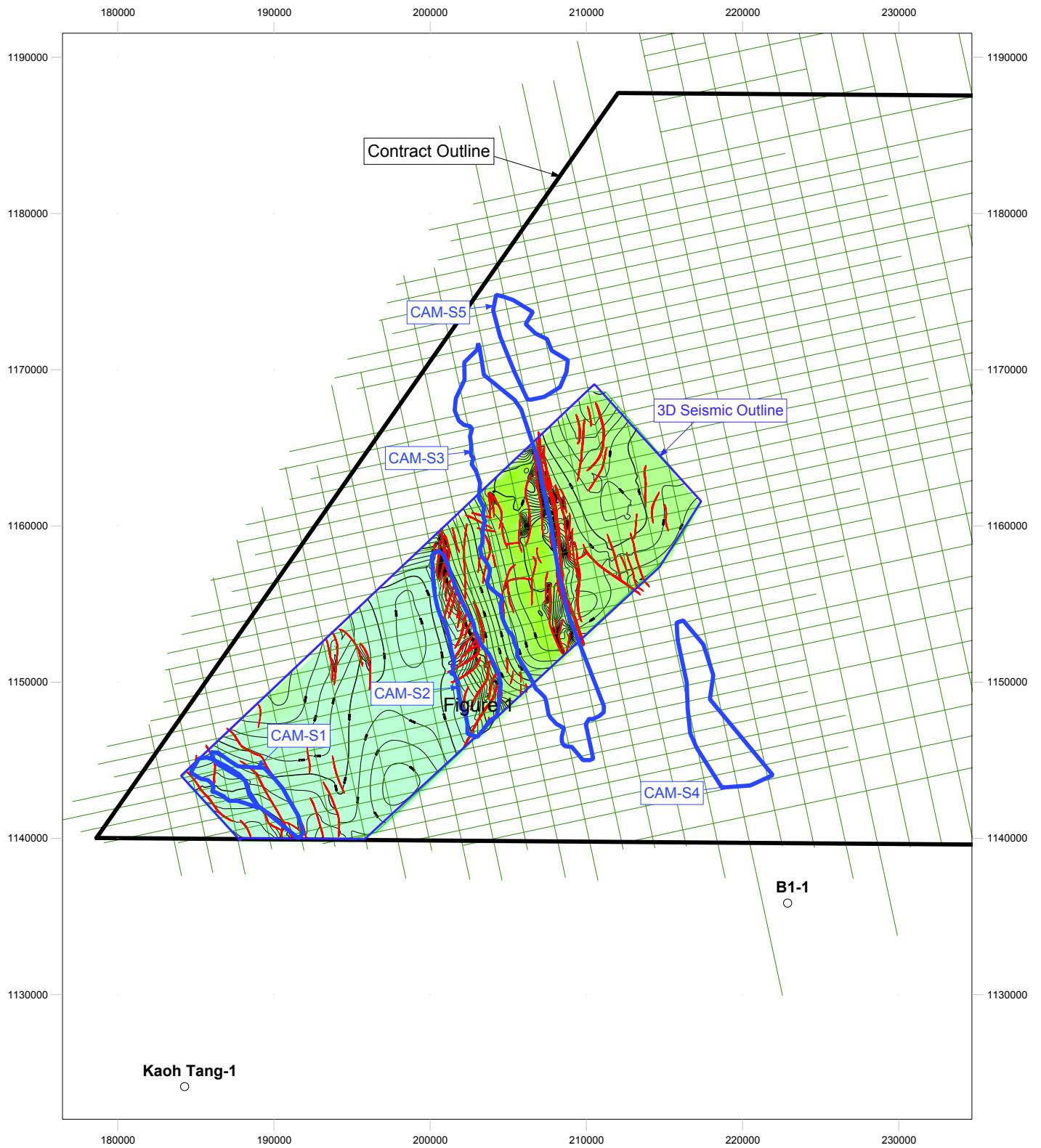




**Mirach Energy Company Ltd.**  
 Block D - Cambodia  
 Top Structure Map  
 SQ-2 Zone  
 Based on 2-D Seismic


Units – meters | 13 October, 2011





Well Legend	Map Abbreviations
● Oil producer	OWC - Oil Water Contact
● Oil well	GOC - Gas Oil Contact
★ Gas producer	GWC - Gas Water Contact
★ Gas well	NT - Not Tested
○ Status unknown	NP - Not Present
○ Abandoned	NDE - Not Deep Enough
○ Water injector	LTG - Lowest Tested Gas
○ Drilling location	LTO - Lowest Tested Oil
	LKO - Lowest Known Oil

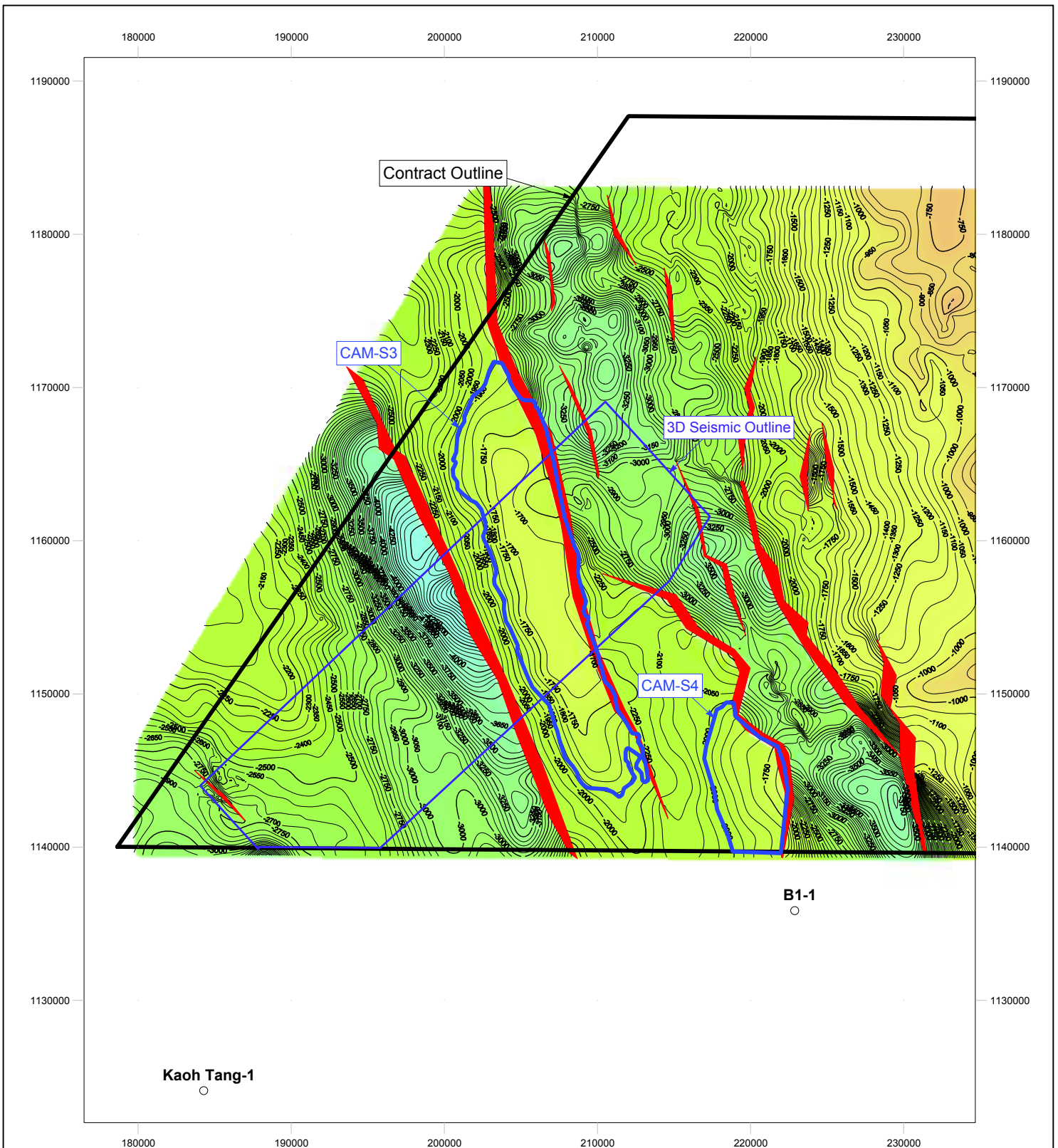


  
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 & Associates Consultants Ltd.

Mirach Energy Company Ltd.  
 Block D - Cambodia  
 Top Structure Map  
 SQ-2 Zone  
 Based on 3-D Seismic


<> | Units – meters | 13 October, 2011

Figure 3



Well Legend	Map Abbreviations
● Oil producer	OWC - Oil Water Contact
● Oil well	GOC - Gas Oil Contact
★ Gas producer	GWC - Gas Water Contact
★ Gas well	NT - Not Tested
○ Status unknown	NP - Not Present
⊕ Abandoned	NDE - Not Deep Enough
⊕ Water injector	LTG - Lowest Tested Gas
○ Drilling location	LTO - Lowest Tested Oil
	LKO - Lowest Known Oil





**Mirach Energy Company Ltd.**  
 Block D - Cambodia  
 Top Structure Map  
 Basement  
 Based on 2-D Seismic

Units – meters    13 October, 2011