Integrity Experience Analysis Advice Results

RISC

Central Petroleum Ltd

Mount Kitty PSTM Seismic Interpretation and Depth Conversion Report

Amadeus Basin EP(A)-125

Australia

Strictly Confidential

Date 10th August 2007

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Declaration

Central Petroleum Ltd ("Central") have commissioned Resource Investment Strategy Consultants ("RISC") to provide an independent review of the prospectivity of the Mount Kitty area in the Amadeus Basin, including seismic processing review, seismic interpretation, depth conversion, prospect/lead delineation and volumetrics. The review is intended to be used by Central to create a strategy to develop their business interest in the area, including the potential to acquire more seismic data and/or drill a well.

The assessment of petroleum assets is subject to uncertainty because it involves judgments on many variables that cannot be precisely assessed, including reserves, future oil and gas production rates, the costs associated with producing these volumes, access to product markets, product prices and the potential impact of fiscal/regulatory changes.

The statements and opinions attributable to RISC are given in good faith and in the belief that such statements are neither false nor misleading. In carrying out its tasks, RISC has considered and relied upon information obtained from Central as well as information in the public domain. The information provided to RISC has included both hard copy and electronic information supplemented with discussions between RISC and key Central staff.

Whilst every effort has been made to verify data and resolve apparent inconsistencies, neither RISC nor its servants accept any liability for its accuracy, nor do we warrant that our enquiries have revealed all of the matters, which an extensive examination may disclose. In particular, we have not independently verified property title, encumbrances, regulations that apply to this asset(s).

We believe our review and conclusions are sound but no warranty of accuracy or reliability is given to our conclusions.

RISC has no pecuniary interest, other than to the extent of the professional fees receivable for the preparation of this report, or other interest in the assets evaluated, that could reasonably be regarded as affecting our ability to give an unbiased view of these assets.

Our review was carried out only for the purpose referred to above and may not have relevance in other contexts.

DOCUMENT CONTROL

Mt Kitty Interpretation and Depth Conversion

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1 INTRODUCTION

Central Petroleum Limited ("Central") has invited Resource Investment Strategy Consultants (RISC) to perform an independent technical review of the prospectivity of the Mount Kitty area in the Amadeus Basin, including seismic processing review, seismic interpretation, depth conversion, prospect/lead delineation and volumetrics. Central intend to use the results of this review to assist in development of a strategy for their business interests in this area, including the potential to acquire more seismic data and/or drill a well.

Central provided a completed a first pass seismic interpretation of the post stack time migrated data in Kingdom as a starting point. RISC has;

- Reviewed this interpretation, the seismic processing, the velocity and well data
- Performed a detailed seismic interpretation of the pre-stack time migrated data for the main horizons of interest; the Base Cambrian Unconformity, Aralka Sandstone, Top Gillen Member Salt, the Heavitree Formation and the Basement.
- Depth converted horizons
- Identified potential leads, calculated volumetrics and identified a potential well site location.

RISC carried out the geoscience work using Kingdom for seismic interpretation and Petrosys for mapping. Volumetrics were calculated using REP 5.

The main deliverables of this project are the Kingdom and Petrosys interpretation files and maps. This report describes the approaches that RISC used, and summarises the results and information relevant to their understanding.

2 OPPORTUNITY

The Mount Kitty area in EP(A)-125 is currently assigned to Central Petroleum, and lies south of the Palm Valley Gas Field, and southeast of the Mereenie Oil Field (Figure 1). The area of interest is covered by a sparse 2D grid of about 308 km, with limited well control; 2 wells.

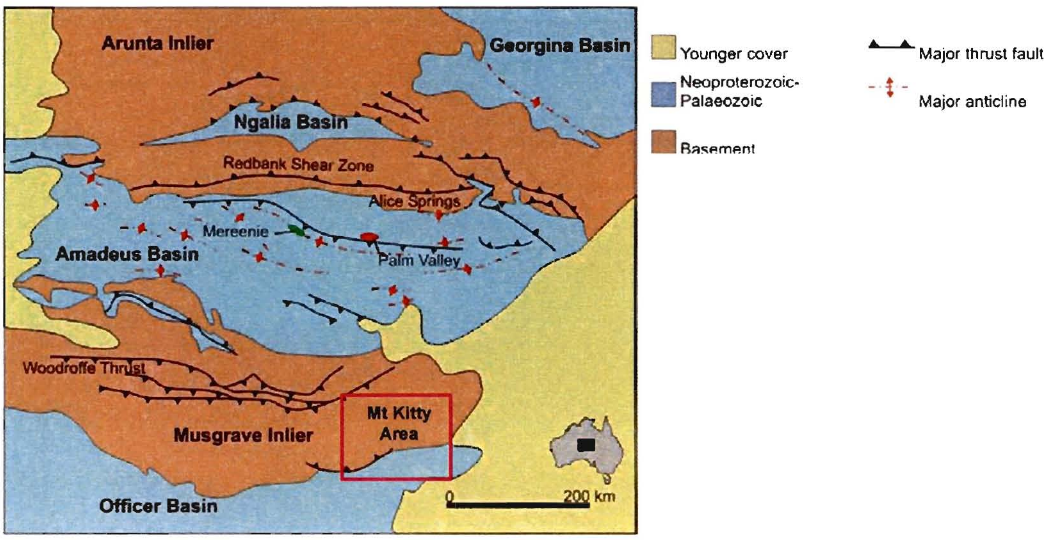

Figure 1 - Mt Kitty Location Map

The Proterozoic Heavitree Quartzite forms the primary reservoir target of interest, sealed by the overlying Bitter Springs/Gillen Member Salt (Figure 2).

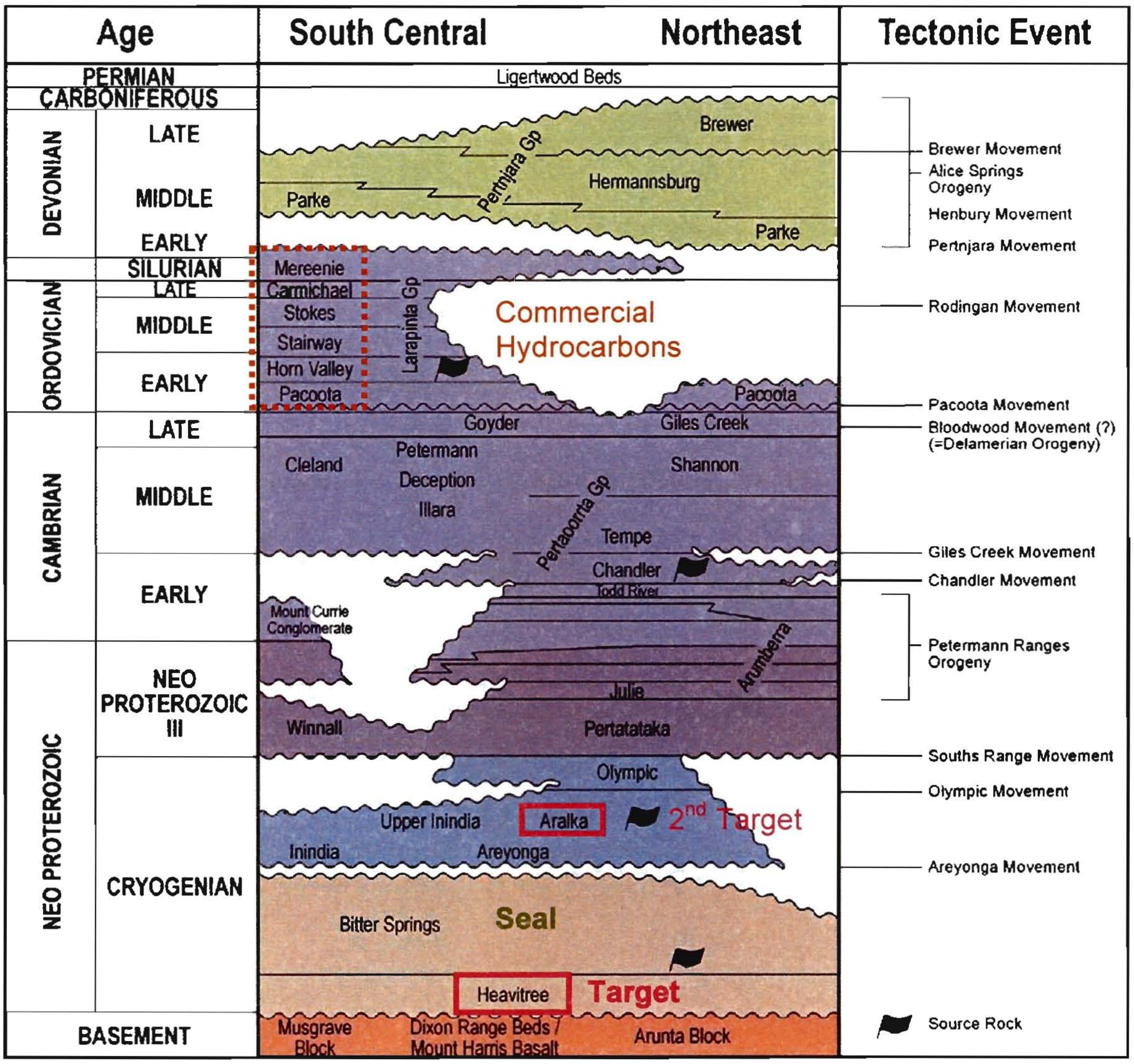

Figure 2 - Amadeus Basin General Stratigraphy

3 INTERPRETATION

Background

Central have recently acquired and processed 308km of 2D data in the Amadeus Basin. The nearest penetration of the Heavitree is found in an offset well called Magee-1 (1992, Pacific O&G) drilled about 90km to the NE of the acquired 2D grid (Figure 3). The 4.5m thick 9% logged porosity Heavitree section was flow tested at 63.1mscfd at a surface flowing pressure of 38psi. The gas produced had a very high component of Nitrogen (43%) and Helium (6%) along with Methane (40%) and Ethane (6%).

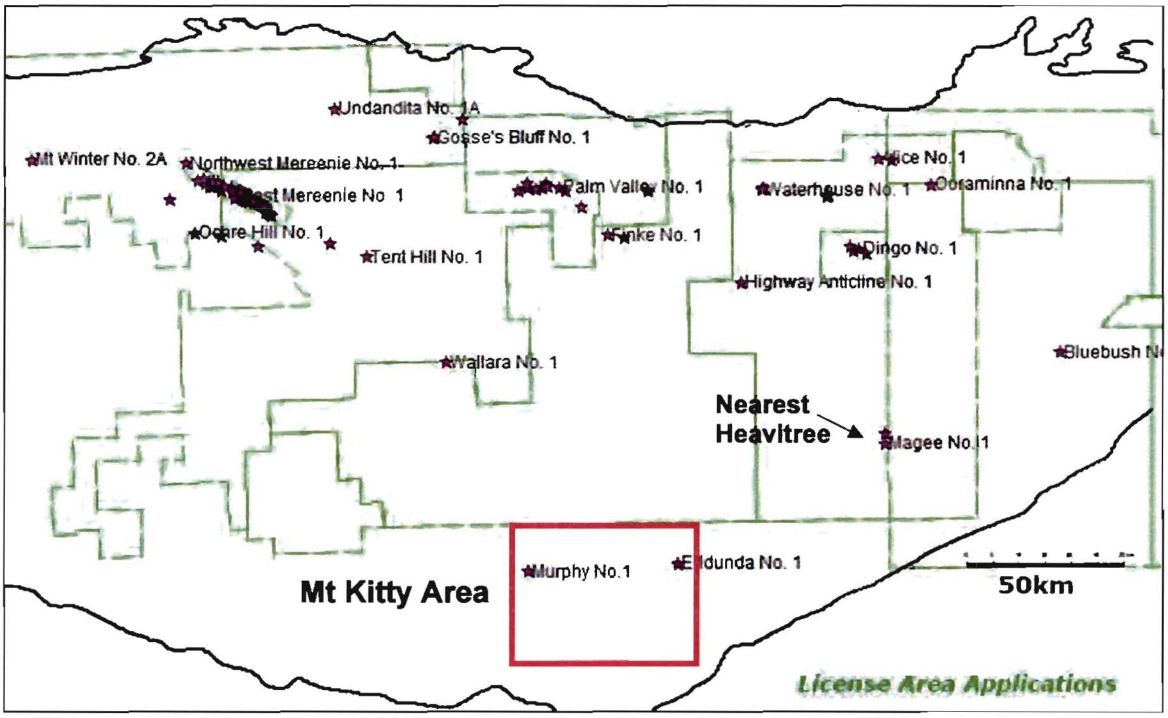

Figure 3 – Amadeus Basin Well Location Map

Seismic Interpretation

Seismic data quality is generally fair, although the survey is in an area of complex structuration which limits effective imaging based on 2D data. In addition the key basement/Heavitree horizon is overlain by a laterally extensive salt layer called the Gillen Salt which impairs seismic data quality of the sub-salt interval. The high impedance salt interface causes a large portion of the acoustic wave energy to be reflected back to the surface, with only a minor amount transmitted through the salt body. This results in the poor reflectivity of sub-salt reflectors and an uncertain pick for the top Heavitree and Basement horizons. However, the data clearly indicates a broad basement high.

With no nearby penetration of the Heavitree there is no ability to directly tie the recently acquired seismic data directly to the subsurface, and interpretation was based on seismic character; the Heavitree is expected to be represented by high amplitude reflections beneath the salt, if present. In order to minimize the risk of miss-interpretation of the Heavitree, it was only picked in areas of better data quality which allowed interpretation with reasonable confidence (Attachment 4/5). This resulted in a Heavitree isopach map being generated over only a portion of the broad basement high (Attachment 6). However, the potential remains for the Heavitree to be more laterally extensive, as indicated by Lindsay (1999). Unfortunately there are no local penetrations of either the Heavitree or Basement formations to help mitigate this risk.

A risk remains that the interpreted formation is not actually the Heavitree, or in fact the Basement, but an intra-salt formation, similar to the setting at the Murphy-1 well. On some seismic lines there is an apparent internal character within the interpreted Basement (Figure 4). Unfortunately this was not common enough to map in detail.

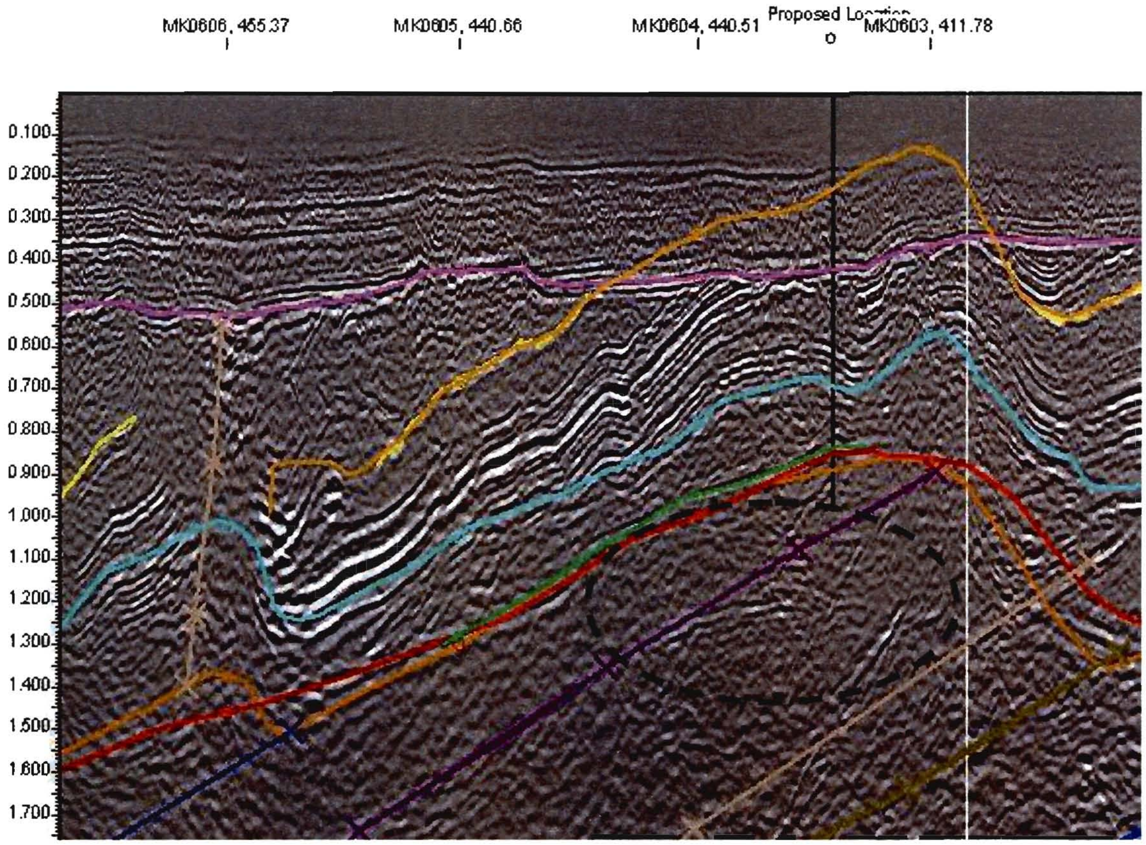

Figure 4 – Intra-basement reflectivity was seen (MK0608) but not consistently enough to understand its structural history

Depth Conversion

Depth conversion was based on the seismic stacking velocity data from the recent PSTM processing (Figure 5), and was carried out in the Petrosys mapping software. Using the depth conversion algorithms in Petrosys the stacking velocity data was used to calculate an average velocity for each of the interpreted horizons; this was then used to calculate the corresponding depth values. A single depth interpretation was created for the horizons above the salt: Base Cambrian (Attachment 1), Aralka Sandstone (Attachment 2) and the Top Gillen Salt (Attachment 3). While two depth conversions were undertaken for the sub-salt horizons-Heavitree (Attachment 4/5) and the Basement (Attachment 9/10). The first using the previously mentioned average velocity method, the second using a salt flood velocity model. The Murphy-1 well to the east provided the average velocity data used to determine an average salt velocity of 5200m/s (Figure 6).

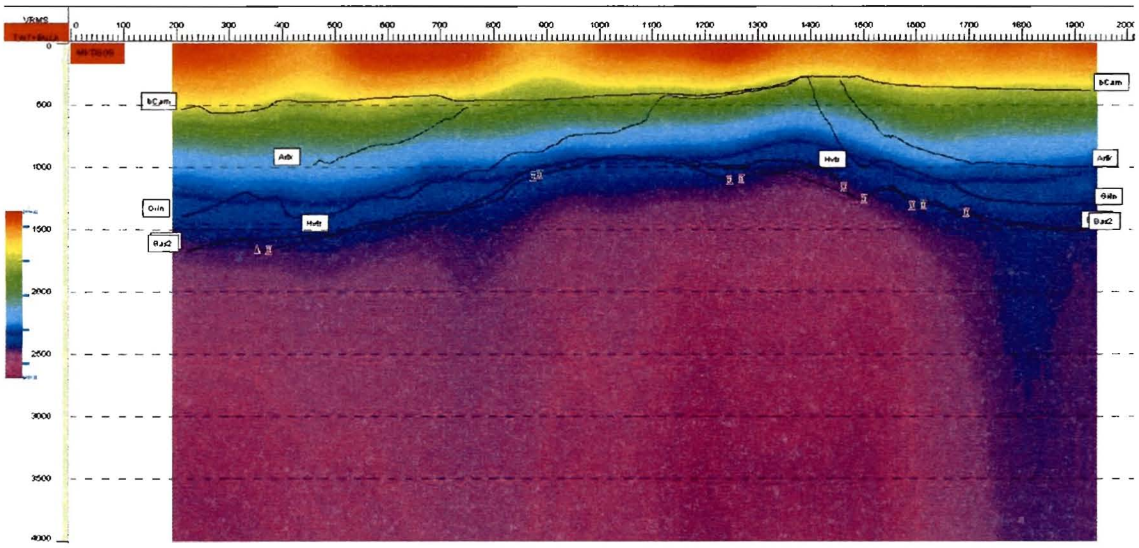

Figure 5 – MK0609 seismic stacking velocity (2500m/s-5100m/s) profile with TWT interpretation

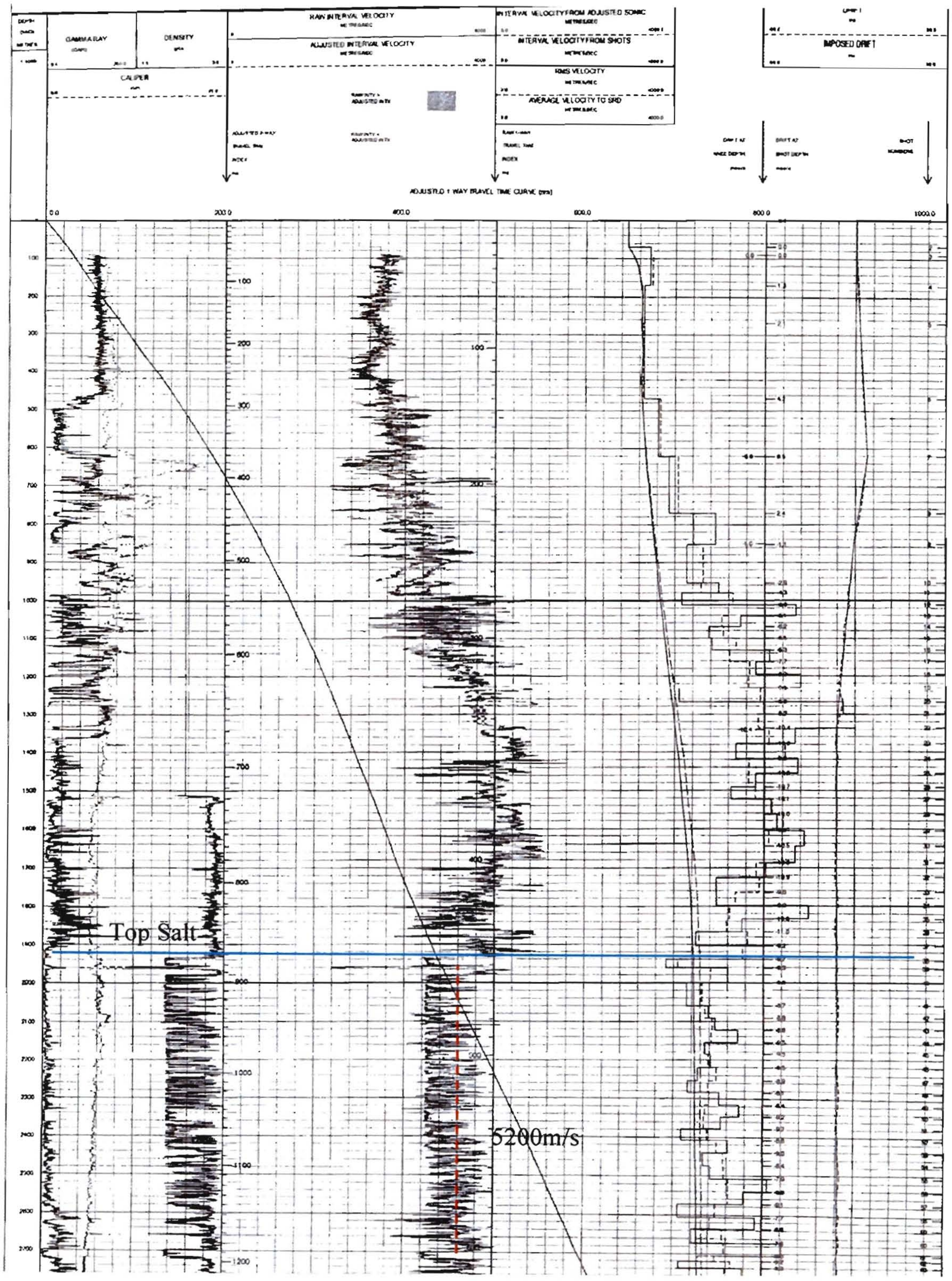

Figure 6 – Murphy-1 Seismic Calibration Log

The alternative depth conversions provide an idea of the uncertainty in depth values that can be expected for the sub-salt horizons. Logically, this effect is larger in areas where the salt is thicker. However, the salt isochron map (Figure 7) demonstrates a reasonably constant thickness of salt over the majority of the mapped high, and overall this alternative depth conversion was shown to have inconsequential differences in the calculation of potential gross rock volumes (GRV) (Figure 8). This map shows a proposed potential location selected to test the mapped Heavitree in a structurally high position (at Lat 25 29 55.56S, Lon 132 47 56.96E, TD: 2300m).

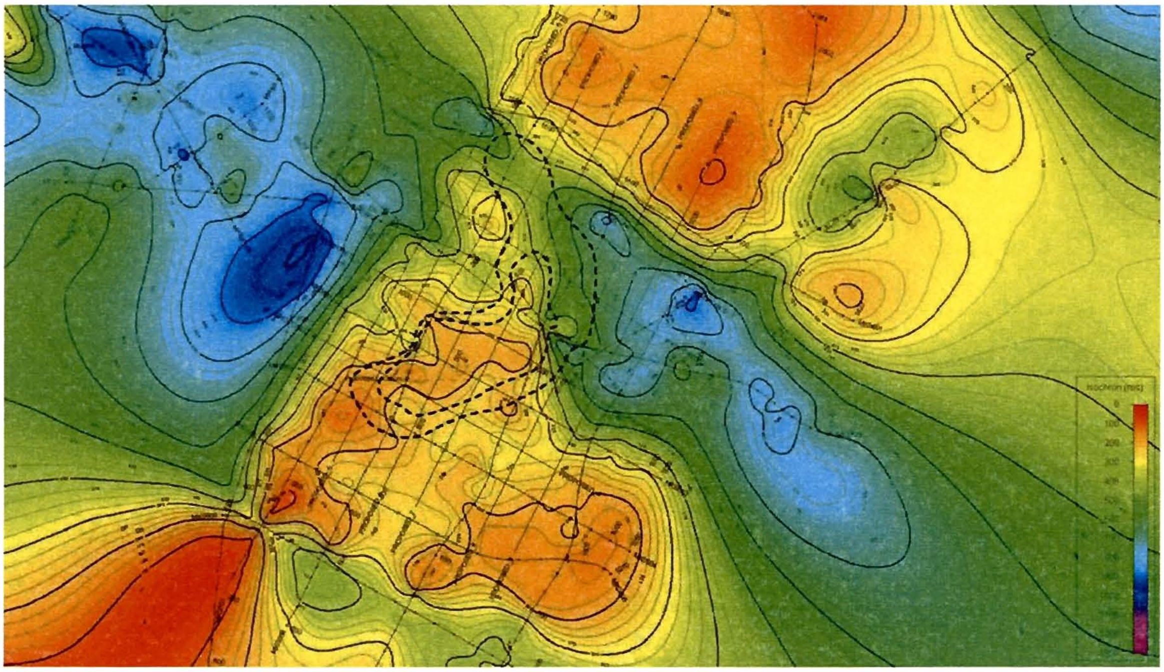

Figure 7 – Gillen Salt isochron demonstrating reasonably constant thickness over the mapped basement high (black dashed)

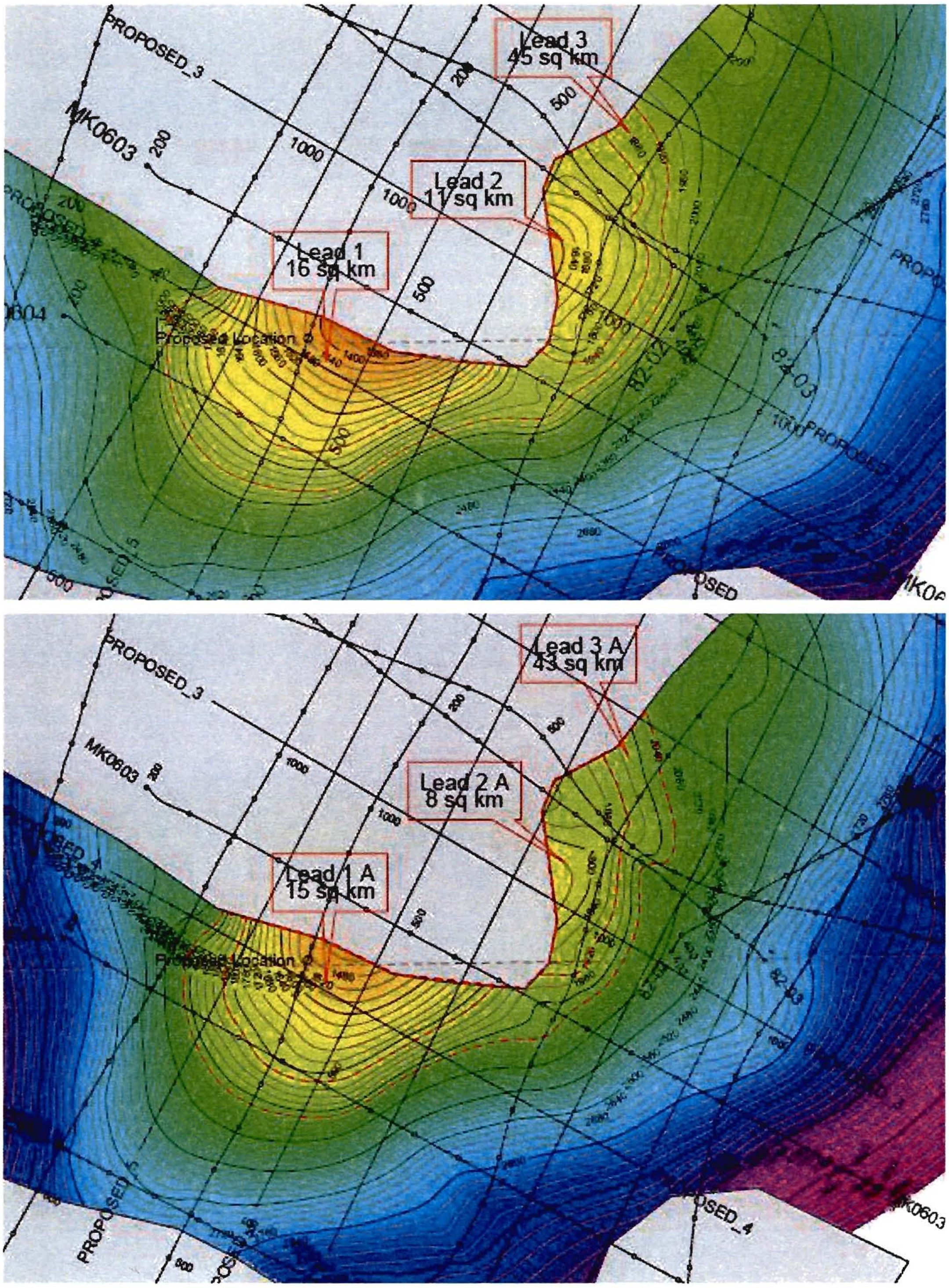

Figure 8 - Heavitree Formation alternative depth conversions (top-average velocity, bottom-salt flood velocity)

Additional Observations and comments

Heavitree Distribution

The seismic interpretation does not allow confirmation of the presence of the Heavitree mapped over the whole area of the broad basement high as the Heavitree and Basement events lose significant amplitude over the crest of the structure. There is the possibility that the Heavitree was removed during the Peterman Ranges Orogeny when the southern Amadeus Basin underwent major compression. Shaw et al., (1991) have created a structural cross section of the Amadeus from deep seismic sections and geological information (Figure 9) which demonstrates a potential thrust model which has been used to create an alternative Basement interpretation (Attachment 11/12). If such thrust faults were active post-Heavitree deposition it could have resulted in the removal of the Heavitree reservoirs on the mapped structural high.

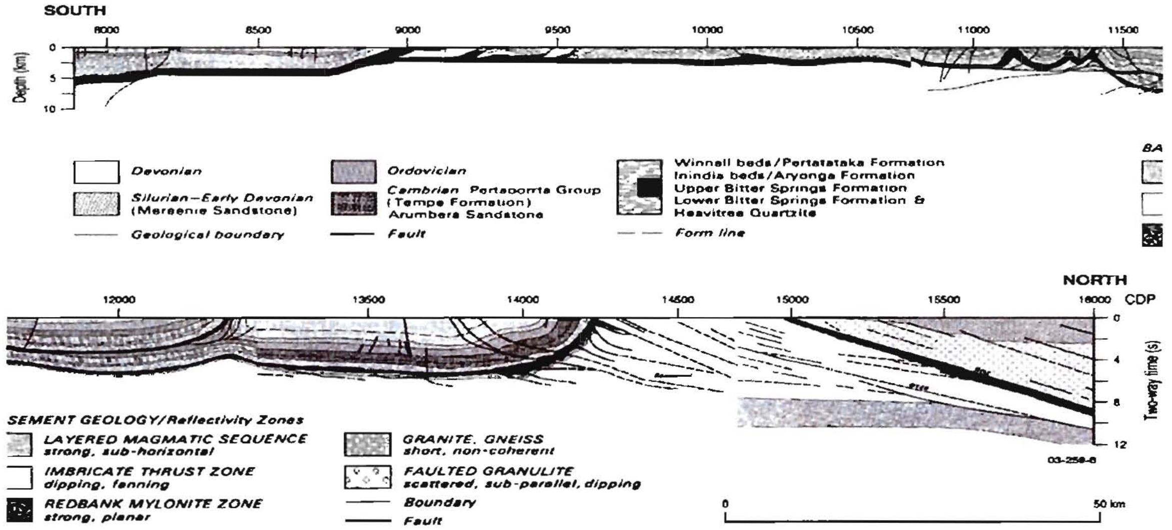

Figure 9 – Structural cross section of the Amadeus Basin as described by Shaw et al., (1991)

Gillen Salt Movement

The interpretation of seismic line MK0610 indicates that the Gillen Salt does not locally have salt buoyancy forces at work. When the seismic line is flattened on the extrapolated Aralka Sandstone surface (Figure 10) the stages of basin development become more apparent. Post salt deposition the basin was quiescent as the initial overlying sediment deposition is parallel to the top salt interface. This was followed by an early stage of salt movement interpreted to be driven by the Areyonga Movement (Figure 2). This resulted in the uplift and erosion of the initial post salt sediments (unconformity indicated by the green line below). This was followed by another period of quiescence, notable for a lack of salt buoyancy effects on the overlying deposition. For example, the Aralka Sandstone was deposited during this time and is encompassed by parallel reflectors.

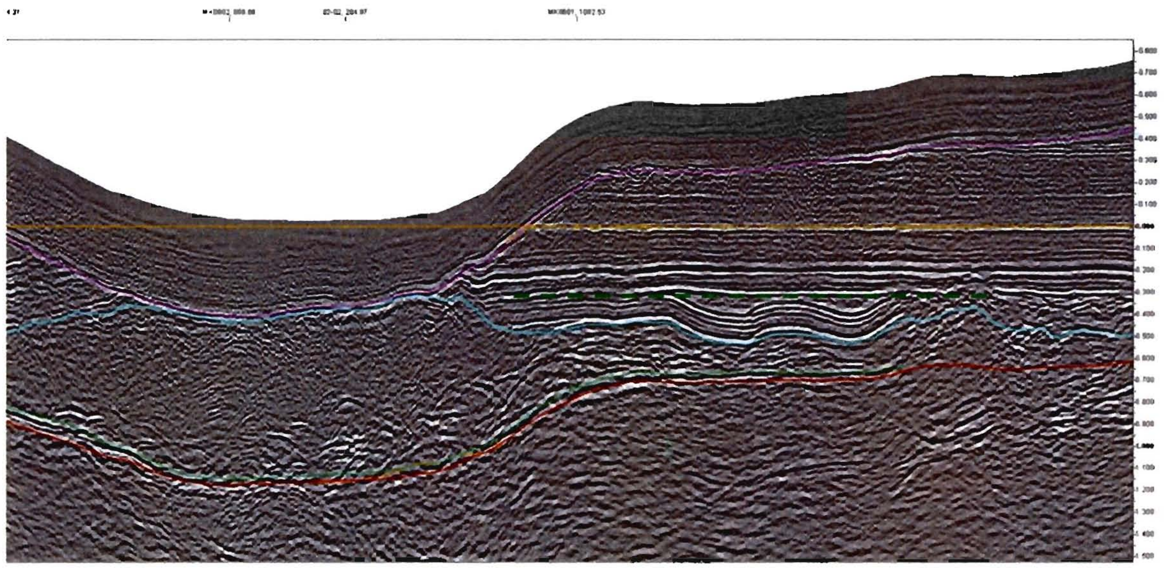

Figure 10 – Seismic line MK0610 flattened on an extrapolated Aralka Sandstone surface (orange). Base Cambrian – Pink, Top Gillen Salt – Turquoise, Basement – Red

The salt subsequently underwent a major period of movement – likely related to the Petermann Ranges Orogeny, resulting in the uplift and erosion in portions of the entire overlying section. This can be seen on seismic line MK0610 when flattened on the Base Cambrian Unconformity reflector (Figure 11). During this time the Gillen Salt would have outcropped on the surface and also appears to have been a minor topographic low as indicated by the sediment onlap. The area has from that time until the present day, as indicated by the overlying reflectors, been in another period of quiescence with the basin demonstrating a slight deepening (thickening) to the south.

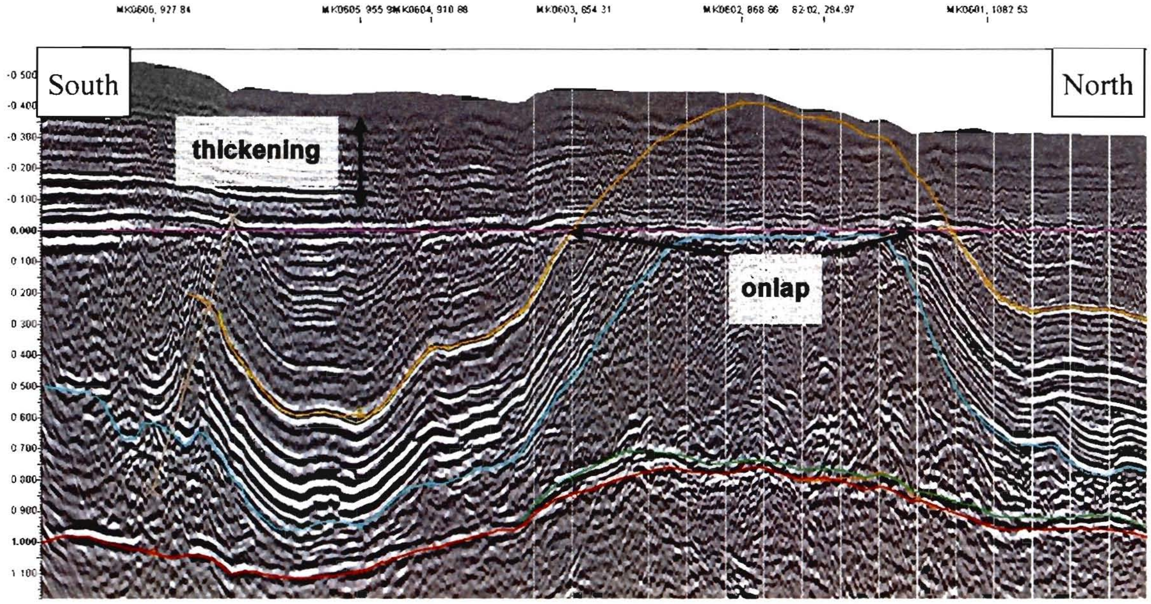

Figure 11 – Seismic line MK0610 flattened on the Base Cambrian Unconformity (pink)

Aralka Sandstone - Secondary Objective

An objective of additional interest, the Aralka Sandstone within the Mt Kitty area, is a stratigraphic truncation play of Neo-Proterozoic sandstone where the Peterman Ranges Orogeny locally uplifted and eroded large portions of the Neo-Proterozoic to Early Cambrian section. This is illustrated in the Murphy-1 well to the west, where the Aralka Sandstone has been eroded and the Middle Cambrian Pertaoorrta Group unconformably overlies the Inindia Beds. To the north and east of the Mt Kitty area in the Erldunda-1 well, the Petermann Ranges Orogeny provided more limited uplift/erosion as the Pertatataka Formation conformably overlies the Areyonga Formation. This results in variable sealing facies for the Aralka Sandstone play within the Mt Kitty area. The overlying sealing facies is the Pertaoorrta through Pertatataka Formation and consists primarily of siltstones to shales with minor sand. Therefore, potential exists to generate a subcrop trap for the Aralka Sandstone.

This is a high risk play which hasn't been proven locally, and would ideally be tested with the same wellbore as the primary Heavitree objective. Unfortunately, no Aralka closures overly those within the Heavitree. There are two mapped Aralka closures with an area over 30 km^2.

4 POTENTIAL RESOURCES AND MATERIALITY

Gross rock volumes were estimated for both the Aralka (see attachment 2) and Heavitree. However, the potential resource volumes were only evaluated for the Heavitree.

The GRV of the Heavitree was estimated assuming column heights of 400m, and an upside case of 600m. The potential columns were assessed based on consideration of limited analogous data comprising of Palm Valley (~300m), Mereenie (~250m) and the sub salt Schoonebeek Gas Field (~350m), onshore Netherlands. To capture any additional upside, the smooth model Basement interpretation was used along with a constant Heavitree thickness (100m) to calculate a highside volume that could be contained within the overall structure (Attachment 8/14).

Indicative volumes were calculated using REP5 assuming the input parameters listed in the table below. Reservoir properties were based on data provided by Central with input from RISC. The resulting calculation for RISC's Heavitree interpretation (Attachment 13) gives potential gas in place (GIIP) volumes from 6 to 190 Bcf. The high case, assuming 100m Heavitree extends over the whole smoothed Basement full structure results in GIIP of 23 to 550 Bcf (Attachment 14).

	P90	P50	P10
Net to Gross	20	40	60
Porosity	.5	2	8
Water Saturation	29	40	55
FVF	129	150	175
Gas Recovery Factor	61	70	80

5 RISKS

The main risks are related to the immaturity of the play with the primary risks being reservoir presence and trap geometry. Using the more conservative approach of attributing GRV where the Heavitree Formation can be picked with additional confidence, the geological probability of success (GPOS) is still only 10%; resulting in a mean expected reserve size of only 5 Bcf. In the more aggressive highside scenario of the full structure assumption, the GPOS reduces to 5%; resulting in an expected mean reserve size of only 9 Bcf. The considerable uncertainty is driven by the sparse spacing of the acquired 2D seismic grid and uncertainty in structural imaging. The seismic line spacing is on the order of 4-6km, resulting in 20km^2 area "holes" where the structural crest is likely to exist. An example of the uncertainty is demonstrated in the considerably structural variation between the adjacent seismic lines MK0608 and MK0609.

Risk reduction can be achieved by acquiring additional seismic and a proposed 190 linear kilometre, 9 line 2D seismic infill acquisition program has been designed to achieve this (Attachments 1 thru 12). It is noted that a large portion of the previous Amadeus wells have failed due to being drilled off structure (NTGS Report, 2005).

6 CONCLUSIONS

- Top Salt can be interpreted on the seismic with relative confidence. Base Salt, Heavitree and Basement interpretation is difficult and has higher uncertainty.
- The broad structural high can be interpreted with reasonable confidence over about a third of the structure
- In the event of a discovery, it would be difficult to determine the actual size of the accumulation with the current data set.

7 RECOMMENDATIONS:

- A PSDM may enable better resolution of the sub-salt; and it is recommended to conduct a test on line MK0608. If successful, the remaining lines should also be processed.
- Integrate the gravity and magnetic modelling (SEEBASE) in the new interpretation to test the seismic interpretation of the structure.
- Run some economic sensitivities to determine the viability and attractiveness of the proposed 9 additional 2D seismic lines (Attachments 1 thru 12) as an infill grid (190km) to reduce risk prior to drilling.

8 REFERENCES

Lindsay, J.F., 1999 – Heavitree Quartzite, a Neoproterozoic (ca 800-760Ma), high-energy, tidally influenced, ramp association, Amadeus Basin, central Australia, Australian Journal of Earth Sciences, 46, 127-139

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NTGS Report, 2005 - Importance of Fault Seal and Strategic Assessment of Future Petroleum Exploration Potential of the Amadeus Basin, A Collaborative Evaluation by the Northern Territory Geological Survey, FaultSeal Pty Ltd and Executive Insight, Pty Ltd

9 LIST OF TERMS

The following lists, along with a brief definition, abbreviated terms that are commonly used in the oil and gas industry and which may be used in this report.

Abbreviation	Definition
Bcf	Billion (109) cubic feet
GIIP	Gas Initially In Place
GPOS	Geological Probability of Success
GRV	Gross rock volume
m	Metres
mss	Metres subsea
NTG	Net to Gross (ratio)
P90, P50, P10	90%, 50% & 10% probabilities respectively that the stated quantities will be equalled or exceeded. The P90, P50 and P10 quantities correspond to the Proved (1P), Proved + Probable (2P) and Proved + Probable + Possible (3P) confidence levels respectively.
POS	Probability of Success
Prospective Resources	Those quantities of petroleum which are estimated, on a given date, to be potentially recoverable from undiscovered accumulations according to the definitions of the Society of Petroleum Engineers, World Petroleum Congresses and American Association of Petroleum Geologists.
PSDM	Pre-stack depth migration
PSTM	Pre-stack time migration
QC	Quality control
Reserves	Reserves are those quantities of hydrocarbons which are anticipated to be commercially recovered from known accumulations from a given date forward according to the definitions of the Society of Petroleum Engineers and World Petroleum Congresses.
RISC	Resource Investment Strategy Consultants (t/a RISC Pty Ltd Authors of this report)
Sw	Water saturation

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