

2. FORMATION EVALUATION

2.1 Mudlogging

Mudlogging services were provided by Halliburton SDL. Their personnel were responsible for the collection of cuttings samples, the cleaning and marking of core, and the collection of core chip samples. Rate of penetration, total gas, gas chromatography, pump strokes, pit level and H₂S concentration were monitored and the appropriate parameters plotted on a continuous mudlog at a scale of 1:500. (Note: Only ROP and pump strokes were monitored to the 5 inch casing point due to loss of circulation at 65m). A copy of the mudlog is included in this report as Enclosure 1 (PetNTew4928).

2.1.1 Cuttings

Lightly washed and dried cuttings samples were collected over 5m intervals until circulation was lost at 65m. Each sample was divided into two with one sample being sent to the Northern Territory Department of Mines & Energy in Darwin and the other stored at Pacific's office in Alice Springs.

2.1.2 Core

Balmain 1 was continuously cored from 604m to total depth at 1050m. Upon recovery the core was immediately checked for hydrocarbon shows. The core was then oriented, cleaned with a damp rag, and indelibly marked indicating depth at 20cm intervals and core orientation. Representative chip samples were taken from the core at 2m intervals and placed in Samplex sample tray. The sample trays were retained by Pacific. Shows were then examined under ultraviolet light and fluorescing intervals described. Intervals with encouraging shows were sealed and forwarded to AMDEL Core Services in Adelaide for photography and analyses. All core will be stored in Pacific's office in Alice Springs.

2.2 Electric Logs

The following logs were recorded by BPB Slimline Services and are included in this report as enclosures 2 to 7 (plans PetNTcw4929 to 4934). Depths given are loggers depths.

Suite 1 (8½ inch hole)

RR2 : 55 to 14m
Velocity Survey : 1 level, 30.3m (seismic datum)

Suite 2 (6 inch hole)

Run 2

RR2 : 573 to 317m
MG1 (Gamma Ray) : 570 to 317m
MS1 : 570 to 317m

Run 3

RR2 : 340 to 106m
MG1 (Gamma Ray) : 340 to 112m
MS2 : 565 to 107m
Velocity Survey : Approximately 10 levels

The Suite 2 logs were recorded using open ended drillpipe to guide the sondes through the cavernous Tindall Limestone. The pipe was run to 317m for Run 2 then pulled back to 112m for Run 3. The pipe was then pulled out of the hole and, after shooting the seismic datum, attempts were made to log the last 55.5m of open hole. A dummy sonde was run but would not pass 76m (standing water level). As representative logs over most of the 6 inch hole had been recorded, logging was abandoned at this stage.

- Note: 1. Due to the narrow drillpipe ID the multi channel sonic logs were run without centralisers. The MS1 log was discarded in favour of the MS2 log which was less noisy.
2. Significant back-fill prevented log acquisition over the bottom 31m of the hole.

Suite 3

RR2	:	1048 to 600m
MG1	:	1049 to 600m
NN1	:	1048 to Surface
DD3	:	1047 to 600m
MS2	:	1047 to 600m
Velocity Survey	:	Approximately 10 levels (including seismic datum)

2.3 Formation Tests

Two bottom hole drill stem tests were conducted with the packer set in the open hole. The closed chamber technique with a nitrogen cushion was used in each test. The nitrogen cushion was blown down in stages during the main flow period.

In summary, the results were:

DST 1

Interval	:	777.55 to 790.50 (Driller)
Unit	:	"Hayfield Mudstone"
1st Flow	:	16 minutes
1st Shut In	:	60 minutes
2nd Flow	:	251 minutes
2nd Shut In	:	570 minutes
Recovery	:	4.5 litres of oil and 24.5 litres of oil and water cut rat-hole mud.

DST 2

Interval	:	879.78 to 887.07m (Driller)
Unit	:	"Jamison Sandstone"
1st Flow	:	16 minutes
1st Shut In	:	121 minutes
2nd Flow	:	211 minutes
2nd Shut In	:	840 minutes
Recovery	:	80.5 litres of foetid, salty formation water.

Full details of the testing operations and the pressure data are included in this report as appendices 4 and 5.

2.4 Geothermal Gradient

A geothermal gradient of 36.4°C per km has been calculated using extrapolated bottomhole temperatures recorded whilst logging.

A discussion of the method used, a table of temperature data and plots are given in Appendix 6.

2.5 Synthetic Seismogram

Well velocity data were acquired by Velocity Data Pty Ltd. A total of 26 levels were recorded in three stages using dynamite as the energy source.

Synthetic seismograms were produced by Velseis Pty Ltd. The synthetic processing report and seismograms are included as Appendix 7.

2.6 Analyses

2.6.1 Source Rock Geochemistry

Nineteen small core samples were taken from the Kyalla Member with a bias toward the darkest and apparently most organic rich beds such that source rock potential and maturity levels could be assessed. All samples were submitted to AMDEL Core Services for TOC determination followed by Rock Eval Pyrolysis where applicable. Results are provided in Appendix 8.

2.6.2 Reservoir Analysis

Twenty-two core samples from the "Hayfield Sand" and ninety-one core samples from the "Jamison Sandstone" were sent to AMDEL Core Services for routine core analysis. Three samples from the "Hayfield Sand" were also submitted for full diameter core analysis. Results of these analyses are given in Appendix 9.

2.6.3 Water Analysis

Samples of mud filtrate and drill stem test recoveries were submitted for standard water analysis. A full set of these results are provided in Appendix 10.

2.6.4 Gas Analysis

Gas samples were collected in the final stages of chamber blowdown during DSTs 1 and 2. Results are presented in Appendix 11.

2.6.5 Oil Analysis

Samples of liquid hydrocarbon were taken from DST recoveries and extracted from core samples. Results of these analyses are presented in Appendix 12.

2.6.6 Core Photography

Core over the intervals 701.72 to 706.53m, 781.13 to 781.58m, 782.0 to 782.17m, 783.91 to 784.02m, 784.52 to 788.92m, 789.56 to 789.81m, 790.06 to 790.21m, 880.92 to 881.24m and 881.27 to 882.94m was photographed by Challenger Geological Services under white and ultra-violet light. The photographs are presented in Appendix 13.

3. GEOLOGICAL DATA

(Note: all depths are loggers depths unless otherwise stated).

3.1 Geological Summary

Balmain 1 was designed to test a lateral resistivity anomaly identified using the compensated transient electromagnetic (CTEM) technique. The anomaly was interpreted to occur at the approximate depth of the "Jamison Sandstone" which flowed minor amounts of oil and gas in **Jamison 1**. A secondary objective existed within a sandy interval near the base of the "Hayfield Mudstone" which flowed minor amounts of gas in **Jamison 1** and **Mason 1**.

The well spudded in unconsolidated to poorly consolidated clays, silts and minor sands, believed to be of Cretaceous and Tertiary age, which persisted to 52.5m. The resistivity and gamma-ray logs suggest the well intersected a thinned Cambrian Jinduckin Formation at this depth although returns were obscured by cement after drilling out the 7 inch casing shoe at 56.5m (Driller). Returns were lost entirely after 65m (Driller) however the top of the Tindall Limestone was determined to be at 81.5m from the gamma-ray log.

The well was drilled without returns from 65m (Driller) to the 5 inch casing point at 604m (Driller). Interpretation of the electric logs and penetration rates indicate the well intersected the Antrim Plateau Volcanics at 263m and a Cambrian sand, probably a correlative of the Bukalara Sandstone, at 346m. The sand is significantly thicker than that intersected in **Jamison 1**, but is believed to be Cambrian rather than Proterozoic as rapid penetration rates suggest excellent porosity. Electric logs indicate the top of the "Hayfield Mudstone" was encountered at 404m.

Upon coring out the 5 inch casing shoe, **Balmain 1** intersected a predominantly dark greenish grey mudstone with fining-upward siltstone beds and laminations. Hydrocarbon fluorescence was first noted in partially mineralised fractures and adjoining bedding partings at 637.6m (Driller). Fluorescence in a coarse siltstone first occurred at 659m (Driller) and peaked at 20 percent banded fluorescence in fining upward siltstone beds between 702.2m and 706.5m (Driller). At 779.9m the well entered the very fine to fine grained quartz sands of the "Hayfield Sand" which persisted to 790.0 metres. Oil shows and elevated gas readings over the interval 786.0 to 789.8m (Driller) were particularly encouraging and a closed chamber DST over the sand recovered 4.5 litres of oil and 24.5 litres of oil and water cut rat-hole mud.

Drilling recommenced in the mudstone dominant "Hayfield Mudstone" which exhibited an occasional very fine grained sand content below 838.5m (Driller) indicating proximity to the underlying "Jamison Sandstone". However gas readings dropped off sharply and when the "Jamison Sandstone" was intersected at 854.0m it was found to be water wet.