



COAL BED METHANE ANALYSIS FINAL REPORT
of
FINGAL-55B
for
PURE ENERGY RESOURCES LIMITED
by
ACS LABORATORIES PTY LTD



27th November, 2007

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COAL BED METHANE ANALYSIS - FINAL REPORT 1014-06

FINGAL-55B

Please find enclosed final results of the coal bed methane study for the samples taken from the above well.

If ACS can assist you in any way, or if you require any further information, please do not hesitate to contact the undersigned.

GREGORY COCHRANE

Supervisor – Field & Coal Bed Methane Services

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SUMMARY

This report outlines the methods and results of gas desorption testing and associated coal property analyses performed on coal seams located within the Fingal Coal Fields intersected during exploration drilling by Pure Energy Resources Limited in SEL 32 / 2003, Tasmania undertaken in May, 2007.

ACS Laboratories Pty Ltd was contracted by Pure Energy Resources Limited to provide a mobile field laboratory and field personnel to recover HQ3 core samples, provide core handling and conduct reservoir temperature desorption testing as per the Australian Standard, AS 3980. Further analysis was to take place at the ACS Brisbane based laboratory. The methodology adopted for all sampling and testing is detailed in Chapter 1. The modified gas content data and results of all associated gas and core analyses are presented in a series of tables and graphs in the Chapter 2.

The Fingal-55B well was part of an appraisal program for coal bed methane and was cored from a depth of 123.00m to a total depth of 369.10m. All of the recovered coal was placed into desorption canisters and monitored for the determination of gas content. Subsequent to the desorption program, the coal material was slabbed. Sub-samples were then removed from one half of the core for residual gas, proximate, maceral and adsorption isotherm analyses.

The recovery of the core was generally good with the core being relatively consolidated over most of the coal intervals. The samples however were widely inconsistent with respect to coal content. Some samples consisted mainly of coal; others contained alternating coal and carbonaceous shale bands, while some samples contained significant amounts of non-carbonaceous material (tuffs and shale). The coal was dull with moderate banding, poorly developed cleating which in most instances was filled with calcite.

As received, total gas contents of the seams averaged;

Seam A	– 0.85 scc/g (m ³ /t)
A Lower	– 0.86 scc/g (m ³ /t)
Seam B	– 2.02 scc/g (m ³ /t)
Unnamed 1	0.49 scc/g (m ³ /t)
D Upper	– 0.98 scc/g (m ³ /t)
D Lower	– 0.39 scc/g (m ³ /t)
Unnamed 2	0.32 scc/g (m ³ /t)
Unnamed 3	0.22 scc/g (m ³ /t)
Rouge	– 0.88 scc/g (m ³ /t)
Seam H	– 1.14 scc/g (m ³ /t)

Dry and ash free gas contents of the seams averaged;

Seam A	– 2.13 scc/g (m ³ /t)
A Lower	– 3.20 scc/g (m ³ /t)
Seam B	– 3.79 scc/g (m ³ /t)
Unnamed 1	2.04 scc/g (m ³ /t)
D Upper	– 2.09 scc/g (m ³ /t)
D Lower	– 0.73 scc/g (m ³ /t)
Unnamed 2	0.70 scc/g (m ³ /t)
Unnamed 3	0.49 scc/g (m ³ /t)
Rouge	– 1.54 scc/g (m ³ /t)
Seam H	– 2.02 scc/g (m ³ /t)

The results were of good quality with no sign of canister leakage during the desorption testing.

The coals have high ash contents though the results are skewed by the presence of non-coal material and carbonaceous shales. Given that it is generally accepted that non-coal material does not contribute significantly to the overall gas content of a given coal seam, it was necessary for comparative purposes to normalise the gas content data to a dry, ash-free (DAF) basis.

The composition of the desorbed gases was determined by GC and reported on an air free basis. As the gas contents of most of the samples were very low, only two of the samples (12 and 15) contained sufficient gas for analysis. The desorbed gases from samples 12 and 15 were high in nitrogen with trace carbon dioxide.

A desorbed gas sample was used for isotopic analysis. The results suggest a biogenic source for the gas.

The sorption time, or desorption coefficient, of the coal samples corresponds to the time taken to desorb 63% of the total desorbable gas volume. This measure is used as an independent estimate of the gas diffusion constants for coals. A number of factors can affect the rate of diffusion such as maceral type and the recovery / level of consolidation of the core. In this instance the latter was consistent across the three seams. The main influence on the coefficients of diffusion is from permeability in a distressed state i.e. a direct reflection of cleat development and fracturing (permeability). Taking into account lost gas and desorbed gas ($Q_1 + Q_2$), the sorption time of the coals is considered to be very low but with such low gas contents it is difficult to make any meaningful interpretation of these numbers.

The maceral analysis indicates that most of the coals contain high amounts of mineral matter consisting mainly of shale and carbonaceous shale with varying amounts of disseminated clays and trace pyrite, carbonate and quartz. All of the samples contain high amounts of semifusinite from the inertinite group as well as minor liptinite. Some of the samples also contain high amounts of telocollinite from the vitrinite group. The presence of these higher rank coals is thought to be caused by the presence of a nearby igneous intrusion which may have caused the coals to become heat affected. This is also evident in the adsorption isotherm results where some of the samples have a higher adsorption capacity without a reduction in ash content. These samples contain a high amount of heat-affected coal as well.

A drill stem test (DST) over the relevant coal seams recovered no gas to surface indicating that the coals are under-saturated with respect to gas at this location. The results of the adsorption isotherms confirm this.

The slabbed core is being stored in ACS Brisbane's core facility pending delivery of the core to Pure Energy Resources Limited.

GAS CONTENT RESULTS SUMMARY

Client: Pure Energy Resources Limited
Well: Fingal-55B

Sample #	Seam	Top Depth (m)	As Received Q1		As Received Q2		As Received Q3		As Received Q1 + Q2		As Received Total		DAF Q1		DAF Q2		DAF Q3		DAF Q1 + Q2		DAF Total		Sorpton Time, Days (63%)	
			%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	Q2	(Q1+Q2)				
1	A	166.45	0.03	4	0.70	82	0.12	14	0.73	0.85	0.08	4	1.75	82	0.30	14	1.83	2.13	4.9	4.4				
2	A Lower	170.64	0.11	13	0.74	86	0.01	1	0.85	0.86	0.40	13	2.76	86	0.04	1	3.16	3.20	1.7	1.5				
3	B	188.90	0.06	18	0.25	76	0.02	6	0.31	0.33	0.13	17	0.58	76	0.05	7	0.71	0.76	2.0	2.0				
4	B	187.10	0.02	3	0.73	94	0.03	4	0.75	0.78	0.06	3	1.84	93	0.08	4	1.90	1.98	2.4	2.3				
5	B	189.70	0.02	6	0.29	88	0.02	6	0.31	0.33	0.04	5	0.67	88	0.05	7	0.71	0.76	5.1	5.0				
6	Unnamed 1	209.90	0.07	14	0.39	80	0.03	6	0.46	0.49	0.27	13	1.64	80	0.13	6	1.91	2.04	1.6	1.0				
7	D Upper	238.98	0.06	6	0.87	89	0.05	5	0.93	0.98	0.14	7	1.84	88	0.11	5	1.98	2.09	2.7	2.6				
8	D Lower	244.10	0.01	3	0.28	93	0.01	3	0.29	0.30	0.01	2	0.47	94	0.02	4	0.48	0.50	2.5	2.4				
9	D Lower	245.05	0.04	8	0.42	88	0.02	4	0.46	0.48	0.07	7	0.84	88	0.04	4	0.91	0.95	3.9	3.7				
10	Unnamed 2	264.30	0.03	9	0.28	88	0.01	3	0.31	0.32	0.07	10	0.61	87	0.02	3	0.68	0.70	3.7	2.9				
11	Unnamed 3	297.80	0.01	5	0.20	91	0.01	5	0.21	0.22	0.02	4	0.45	92	0.02	4	0.47	0.49	2.9	2.9				
12	Rouge	328.30	0.12	7	1.51	92	0.01	1	1.63	1.64	0.24	8	2.94	92	0.02	1	3.18	3.20	3.0	2.2				
13	Rouge	342.50	0.02	13	0.13	81	0.01	6	0.15	0.16	0.04	13	0.24	80	0.02	7	0.28	0.30	1.9	1.3				
14	Rouge	346.76	0.02	2	0.76	92	0.05	6	0.78	0.83	0.03	3	1.03	91	0.07	6	1.06	1.13	2.1	2.0				
15	H	365.45	0.05	4	1.05	92	0.04	4	1.10	1.14	0.09	4	1.86	92	0.07	3	1.95	2.02	2.7	2.6				
Averages	Seam	Top Depth (m)	As Received Q1	%	As Received Q2	%	As Received Q3	%	As Received Q1 + Q2	As Received Total	DAF Q1	%	DAF Q2	%	DAF Q3	%	DAF Q1 + Q2	DAF Total	Q2	(Q1+Q2)				
1	A	166.45	0.03	4	0.70	82	0.12	14	0.73	0.85	0.08	4	1.75	82	0.30	14	1.83	2.13	4.9	4.4				
2	A Lower	170.64	0.11	13	0.74	86	0.01	1	0.85	0.86	0.40	13	2.76	86	0.04	1	3.16	3.20	1.7	1.5				
3,4,5	B	188.90	0.12	6	1.83	91	0.07	3	1.95	2.02	0.24	6	3.43	90	0.13	3	3.66	3.79	8.5	7.5				
6	Unnamed 1	209.90	0.07	14	0.39	80	0.03	6	0.46	0.49	0.27	13	1.64	80	0.13	6	1.91	2.04	1.6	1.0				
7	D Upper	238.98	0.06	6	0.87	89	0.05	5	0.93	0.98	0.14	7	1.84	88	0.11	5	1.98	2.09	2.7	2.6				
8,9	D Lower	245.08	0.03	6	0.35	90	0.02	4	0.38	0.39	0.04	6	0.66	90	0.03	4	0.70	0.73	3.2	3.1				
10	Unnamed 2	264.30	0.03	9	0.28	88	0.01	3	0.31	0.32	0.07	10	0.61	87	0.02	3	0.68	0.70	3.7	2.9				
11	Unnamed 3	297.80	0.01	5	0.20	91	0.01	5	0.21	0.22	0.02	4	0.45	92	0.02	4	0.47	0.49	2.9	2.9				
12,13,14	Rouge	338.03	0.05	6	0.80	91	0.02	3	0.85	0.88	0.10	7	1.40	91	0.04	2	1.51	1.54	2.3	1.8				
15	H	365.45	0.05	4	1.05	92	0.04	4	1.10	1.14	0.09	4	1.86	92	0.07	3	1.95	2.02	2.7	2.6				

PROXIMATE ANALYSIS RESULTS SUMMARY

Client: Pure Energy Resources Limited

Well: Fingal-55B

Cannister #	Seam	Top Depth (m)	Ash	Moisture	Volatile Matter	Fixed Carbon
1	A	166.45	55.0	4.9	5.5	34.6
2	A Lower	170.64	66.3	6.9	8.5	18.3
3	B	188.90	51.8	5.0	15.9	27.3
4	B	187.10	55.3	5.2	15.4	24.1
5	B	189.70	51.4	4.8	14.9	28.9
6	Unnamed 1	209.90	67.9	8.3	11.9	11.9
7	D Upper	238.98	47.0	5.5	20.4	27.1
8	D Lower	244.10	34.7	5.0	24.9	35.4
9	D Lower	245.05	44.8	4.8	22.0	28.4
10	Unnamed 2	264.30	47.3	6.9	16.3	29.5
11	Unnamed 3	297.80	49.8	5.6	19.7	24.9
12	Rouge	328.30	42.8	5.7	16.1	35.4
13	Rouge	342.50	43.0	2.9	16.9	37.2
14	Rouge	346.76	22.9	4.0	23.8	49.3
15	H	365.45	36.6	7.0	21.1	35.3
Averages	Seam	Top Depth (m)	Ash	Moisture	Volatile Matter	Fixed Carbon
1	A	166.45	55.00	4.90	5.50	34.60
2	A Lower	170.64	66.30	6.90	8.50	18.30
3,4,5	B	188.90	52.83	5.00	15.40	26.77
6	Unnamed 1	209.90	67.90	8.30	11.90	11.90
7	D Upper	238.98	47.00	5.50	20.40	27.10
8,9	D Lower	245.08	39.75	4.90	23.45	31.90
10	Unnamed 2	264.30	47.30	6.90	16.30	29.50
11	Unnamed 3	297.80	49.80	5.60	19.70	24.90
12,13,14	Rouge	338.03	36.23	4.20	18.93	40.63
15	H	365.45	36.60	7.00	21.10	35.30

DESORBED GAS ANALYSIS RESULTS SUMMARY

Client: Pure Energy Resources Limited

Well: Fingal-55B

Sample #	Seam	Top Depth (m)	Methane	Nitrogen	Carbon Dioxide
12	Rouge	328.30	44.89	0.18	54.93
15	H	365.45	68.53	31.26	0.21

CHAPTER 1

DESCRIPTION OF EXPERIMENTS

1. DESCRIPTION OF EXPERIMENTS

1.1 Gas Content by Seam Temperature Desorption

The gas desorption canisters that were used throughout the program were constructed of stainless steel or powder coated aluminium and designed to accommodate fully recovered HQ3 sized cores in a range of half or full metre lengths. The dead space above the sample, in the case of a partial recovery, was taken up by non porous rubber billets. The canisters were sealed by an 'O'-ring gasket and 'Camlock' lid, and came complete with an outlet valve, safety release valve, and pressure gauge rated to 1000 KPa.

Before transferral of canisters to the well site, each was accurately weighed and correctly labelled. The canisters were individually pressurised with compressed air to 400 KPa and monitored for any leakage prior to use. Following the pressure test, a vacuum was pulled on each canister and the canisters monitored for any air intake prior to use.

The principal field desorption apparatus was comprised of inverted measuring cylinders, associated fittings, and displacement baths containing an acidified solution incorporating 1% NaCl (by weight), 0.5% HCl (by volume) and a colouring additive (methyl red). Measuring cylinders for use in the mobile on-site laboratory were constructed of clear plastic with a maximum capacity of 2000 cubic centimetres. Each cylinder was supplied with two tap valves and associated clear plastic tubing that connected to the gas canisters and an electric vacuum pump respectively.

The water baths were constructed of standard 240 mm diameter PVC piping and end caps, and attached to an aluminium frame that supported the measuring cylinders. The measuring cylinders were arranged so that when the bath was filled with fluid, the open base was submerged approximately 2-4 cm below the height of water in the bath.

Digital thermometers (0.5°C accuracy) and calibrated barometers (0.5 KPa accuracy) were used throughout to monitor ambient atmospheric conditions at each recording point. Electronic 'stop watches' were utilised for the accurate timing of volume readings, and all weights were measured to an accuracy of 0.01 g using digital balances.

On recovery at surface, the cores were quickly washed, marked for orientation and depth and classified to enable desorption monitoring as detailed below. In order to assess the desorbable gas content of the coal seams encountered during drilling, all coal material was analysed. The sampling depths of the cores were derived from the continuous core depth record. This was maintained by means of the 'CBM Core Sampling Timesheet' which consisted of core numbers, driller's depths, core depths, and times that the core was penetrated, left bottom and reached surface (Chapter 6).

The procedure used throughout for gas desorption monitoring followed that outlined in the Australian Standard for the determination of desorbable gas content of coal seams - Direct method (AS 3980-1999). In summary, this procedure incorporated the following systematic steps.

Coring pre-determined depth intervals was carried out by means of a wire line retrievable, HQ3 (61.1mm), triple tube core barrels. The start time at which each core was penetrated, the time at which the core left bottom (t_b - time core retrieved), and the time at which the core arrived at surface (t_s - time at surface) were recorded. Time zero, or commencement of desorption for lost gas calculations, was taken as t_b where the coals were saturated with respect to gas, and as $t_b - t_s/2$ where coals were under-saturated with respect to gas. Once the inner tube reached the surface, the drilling crew laid it out on the core table and pumped the slips (containing the core) out. The core was then quickly cleaned, orientated and any potential coal or carbonaceous shale identified. The samples were immediately placed in desorption canisters and weighed prior to being placed in seam temperature baths for gas content testing. The temperature used for the testing was taken from the mud returns. Upon connection of the canister to the desorption apparatus 'time on test' was recorded, and desorbed gas volumes read at the following intervals (subject to ongoing operations):

- Every 1 minute for 30 minutes
- Every 5 minutes for 1 hour
- Every 15 minutes for 1 hour
- Every 30 minutes for 4 hours
- Every 1 hour for 4 hours

After this schedule the readings were extended to a wider frequency, generally in the range of 6-24 hours, dependent on the volumes produced. At each reading, the following information was recorded on specifically designed data sheets, and subsequently entered into the computer:

- 1) Progressive volume of gas in the measuring cylinder
- 2) Water column height
- 3) Bath water height
- 4) Ambient temperature
- 5) Ambient atmospheric pressure
- 6) Reset value (where appropriate)

Data acquisition continued until desorption had reached equilibrium or flat lined i.e. no additional desorbed gas for five days. The coal was then carefully removed and slabbed with one half of the core used for the determination of residual gas content and proximate analysis.

The procedure adopted for residual gas analysis involved the weighing of a sub-sample to an accuracy of 0.01 g, with the optimal weight being in the range 15-300 g. The sample was initially broken in a hermetically sealed blender and subsequently crushed in a hermetically sealed ball mill to less than 212 μm particle size. The gas volume released by this process was measured by the direct water displacement method and a volume, per unit mass of coal, calculated at standard temperature and pressure conditions.

1.2 Compositional Analysis of Gas

To aid in the overall assessment of coal bed methane resources, samples of evolved gas were collected from each gas desorption canister. Inert gas was purged through the measuring cylinders and rubber hoses to minimise air contamination in desorption samples. A sub-sample of each desorbed gas was transferred into an evacuated stainless steel cylinder. The sampling procedure involved connecting the evacuated cylinder via a rubber hose to the measuring cylinder. The valve from the measuring cylinder was opened, filling the sample cylinder with the gas. The gases were analysed on a portable 'Varian Micro Gas Chromatograph' instrument.

1.3 Isotopic Analysis of Desorbed Gas

The gas sample was introduced into a sample loop (2.0 mL for methane, 10 mL for CO₂) at atmospheric pressure for preparatory gas chromatography (GC) on an Agilent 6890N GC, with a thermal conductivity detector (TCD). Four packed columns are used to separate the gases, a 2 foot 12% UCW982 on PAW 80/100 mesh (pre-column), a 15 foot 25% DC200 on PAW 80/100 mesh, a 10 foot HaysepQ 80/100 mesh, and a 10 foot Molecular Sieve 13X 45/60 mesh column. The oven was maintained at a steady 90°C throughout the 20 minute run.

The separated gas components were then passed through a copper oxide furnace (heated to 900°C) with a pulse of oxygen to allow complete conversion of the hydrocarbons to carbon dioxide and water. The carbon dioxide and water were then separated cryogenically using liquid nitrogen and a slush bath of dry ice/acetone.

The carbon dioxide was collected and the stable isotopic composition was determined by using a Finnigan MAT 252 Isotope Ratio Mass Spectrometer. The carbonate reference was calibrated to NBS#19 (IAEA international standard defining VPDB, Vienna Pee Dee Belemnite). Values reported for the stable carbon isotopes are VPDB per mil (‰), according to the expression;

$$\delta^{13}\text{C} \text{ ‰} = 1000 \times \frac{(^{13}\text{C}/^{12}\text{C}_{\text{sample}} - ^{13}\text{C}/^{12}\text{C}_{\text{reference}})}{^{13}\text{C}/^{12}\text{C}_{\text{reference}}}$$

A number of in-house and international standards are regularly analysed along with the unknown samples. The standards (in-house) have been related to the NGS#1 and NGS#2 international standards.

1.4 Proximate Analysis

A representative sub-sample of coal was removed from each desorption canister for proximate analysis. This sampling strategy was designed to:

- a) Calculate gas contents on a DAF basis for comparison purposes
- b) Determine the factors controlling variations in in-situ gas contents within a given seam

Every attempt was made to exclude all non-coal material from proximate analysis sampling, on the basis that these rocks did not contribute to the overall gas content of the coal seam in question.

The testing procedure adopted throughout for proximate analysis conformed to the appropriate Australian Standard for coal analysis and testing (AS 1038.3-1989). In summary, this procedure involved the drying of a known mass of coal in an oxygen-free (nitrogen flush) oven at 105-110°C for a period of between 1.5 to 3 hours. After removal from the oven, and subsequent to the sample being placed in a desiccator, the coal was weighed, and the loss of mass ascribed to inherent moisture.

The sample was then heated in a cylindrical silica crucible in a muffle furnace at 900°C for seven minutes. The loss of mass recorded during this process equated to the proportion of volatile matter present in the sample. Determination of ash content was achieved by combusting the coal until a constant mass was attained. This was achieved by heating the sample to 500°C for 30 minutes before increasing the temperature to 815°C, until combustion was complete. The percentage of ash was calculated from the mass of the residue remaining after incineration. The amount of fixed carbon was not determined directly, but represented the difference between the sum of all other components.

1.5 Dry and Ash Free Normalisation of Gas Content

As it is generally accepted that non-coal material does not contribute significantly to the overall gas content of a given coal seam, it was necessary for comparative purposes to normalise the gas content data to a dry, ash-free (DAF) basis. This was achieved by using the following equation:

$$DAF \text{ Gas Content} = \frac{\text{gas volume (scc / g)}}{\text{core wt (g)} - \left(\text{core wt} \times \left(\frac{\text{ash (\%)} + \text{moisture (\%)}}{100} \right) \right)}$$

This equation was applied to the lost gas, desorbed gas, and residual gas components so that comparisons could be made between all the data gathered during the exploration program.

Whilst every attempt was made to remove non-coal partings from samples prior to weighing and preparation for proximate analysis, it was not always possible to isolate fine material. Consequently, the corresponding DAF gas content results may be artificially high.

1.6 Calculation of Desorption Coefficient

The sorption time, or desorption coefficient, of a coal sample corresponds to the time taken to desorb 63% of the total desorbable gas volume (Q2). This measure is used as an independent estimate of the gas diffusion constant for a given coal (see Close & Erwin 1989). Two methods for calculating sorption time are widely used in the literature, namely the sorption time method outlined by Close & Erwin (1989) and the more recently adopted GRI or modified sorption time method.

The sorption time method, as outlined by Close & Erwin (1989), was calculated using the following formulae:

$$V_{63\%} = Q2 \times 0.63$$

$$\text{Sorption time} = TCS_{lbl} + (TCS_{ubl} - TCS_{lbl}) \times \frac{V_{63\%} - CDV_{lbl}}{CDV_{ubl} - CDV_{lbl}}$$

where:

TCS_{lbl} = time core sealed (lower bounding limit)

TCS_{ubl} = time core sealed (upper bounding limit)

CDV_{lbl} = cumulative desorbed volume (lower bounding limit)

CDV_{ubl} = cumulative desorbed volume (upper bounding limit)

The modified sorption time method is identical in approach to that outlined above, with the only difference being that this method incorporates the estimated lost gas volume into the cumulative desorbed volume and uses time zero (i.e. the commencement of desorption for lost gas calculations) as the starting point for elapsed time.

$$V_{63\%} = (Q1 + Q2) \times 0.63$$

By incorporating the lost gas into the equation, this method is considered to be a more reliable indicator of the desorption behaviour of a given coal.

1.7 Adsorption Isotherm

Coal sorption isotherms represent the relationship between gas storage capacity of a given coal sample and pressure, and are used to predict the maximum volume of gas that will be released from a coal seam as the reservoir pressure declines during long-term production (Mavor et al. 1990). When compared with measured gas contents and reservoir pressure, the sorption isotherm data also provides a guide as to the relative gas saturation of the coal and the bottom-hole pressure required to initiate significant methane desorption (critical desorption pressure).

A sub-sample of coal was selected by the client. Prior to the adsorption isotherm analysis, a slabbed section of the coal was crushed to less than 250 μm particle size and thoroughly mixed into a heterogeneous blend before sub-dividing a sub-sample for proximate analysis. Crushing the coal increased the surface area and accelerated the adsorption process.

Due to the influence of moisture on the sorptive capacity of coal (Joubert et al. 1973), the equilibrium moisture content of the remaining sample was then determined by a standardised procedure that involved placing the pre-weighed sample in a desiccator over a saturated solution of K_2SO_4 until an equilibrium weight was attained. Once completed, the sample was placed in a test cell maintained at a temperature equivalent to the measured reservoir temperature, and pure methane was introduced into the system. As the test cell pressure was progressively increased, the amount of gas adsorbed was monitored and the results recorded.

This data was then interpreted by using the equation originally developed by Langmuir (1918) that describes the relationship between the gas storage capacity of coal and pressure. The equation is expressed as follows:

$$g = V_L (1 - a_d) \frac{P}{P + P_L}$$

Where g = gas storage capacity (scc/g), V_L = Langmuir Volume (scc/g), a_d = ash fraction (dry basis), P = pressure (MPa), and P_L = Langmuir pressure (MPa).

The Langmuir pressure and Langmuir volume are estimated by fitting the data to the following linearised equation.

$$\frac{P}{g} = a_0 + a_1 P$$

The Langmuir coefficients can then be derived from the intercept a_0 and the slope of the line a_1 , based on the following linear regression relationships.

$$V_L = \frac{1}{a_1 (1 - a_d)}$$

$$P_L = a_0 V_L (1 - a_d)$$

To determine the critical desorption pressure (P_c) for a known gas content, the following relationship can be used.

$$P_c = \frac{P_L g_c}{V_L (1 - a_d) - g_c}$$

Where P_L = Langmuir pressure, V_L = Langmuir volume, a_d = the ash fraction (dry basis), and g_c = the DAF total gas content of the sample, including residual gas content (i.e. Q1 + Q2 + Q3).

The gas saturation level (g_s) of a given coal was calculated as follows:

$$g_s = \frac{g_c \times 100}{\left(\frac{P_{Res} \times V_L}{P_{Res} + P_L} \right)}$$

It is generally agreed that the gas storage capacity of coal is a function of rank, temperature, the moisture content of the coal matrix, and pressure (Mavor et al. 1990, Hawkins et al. 1992). As coal rank can be assumed to be consistent vertically within a single seam, and the temperature used for adsorption experimentation is equivalent to reservoir temperature, the variable most likely to influence the determination of Langmuir constants is the moisture content of the sample. In order to approximate reservoir conditions, the equilibrium moisture procedure was adopted for this sample, and with all other variables remaining constant, the adsorption parameters measured should characterise the coal of interest.

1.8 Maceral Analysis

Sub-samples of coal were selected by the client for maceral analyses. The coal samples were crushed, sub-sampled and prepared as grain mounts.

CHAPTER 2

GAS DESORPTION RESULTS

ACS Laboratories Pty Ltd

GAS DESORPTION DATA SUMMARY

Fingal 55B

1

Seam A

WELL NAME: Fingal 55B

SAMPLE DETAILS

SAMPLE NO 1
 SEAM NAME Seam A
 DEPTH FROM (m) 166.45
 DEPTH TO (m) 166.95
 THICKNESS (m) 0.5
 COAL LENGTH (m) 0.5
 COAL WEIGHT (kg) 2.427
 CORE DIAM (mm) 63
 SAMPLE TYPE Core

CAN DETAILS

CAN NO 1
 CAN LENGTH (m) 0.5
 CAN WEIGHT (kg) 3.440
 CAN + SAMPLE WT (kg) 5.867
 SAMPLE WEIGHT (kg) 2.427
 CAN VOLUME (cc) 2200
 SAMPLE VOLUME(cc) 1559
 CAN VOID SPACE (cc) 641
 ESTIMATED VOID (cc) 0

DESORBED GAS

USBM LOST GAS (scc)	74.3	RESIDUAL GAS (scc/g)	0.12
USBM LOST GAS (scc/g)	0.03	TOTAL RAW GAS (scc/g)	0.85
DESORPTION TEMP (°C)	30.0	DAF LOST GAS (scc/g)	0.08
RAW DESORBED GAS (scc)	1707	DAF DESORBED GAS (scc/g)	1.75
RAW DESORBED GAS (scc/g)	0.70	DAF Q1 + Q2 (scc/g)	1.83
RAW TOTAL DESORBED (scc/g)	0.73	DAF RESIDUAL GAS Q3 (scc/g)	0.30
		DAF TOTAL GAS Q1+2+3 (scc/g)	2.13

CORE DETAILS

	Date	Time
CORE PENETRATED	1/06/2007	10:17:00
CORE LEFT BOTTOM	1/06/2007	11:09:00
CORE AT SURFACE	1/06/2007	11:12:00
COAL IN CANISTER	1/06/2007	11:16:00
CORE ON TEST	1/06/2007	11:16:00
TIME ZERO	1/06/2007	11:10:30

COAL ANALYSIS DATA

ASH %	55.0
VOLATILE MATTER %	5.5
INHERENT MOISTURE %	4.9
FIXED CARBON %	34.6

DESORPTION TIME

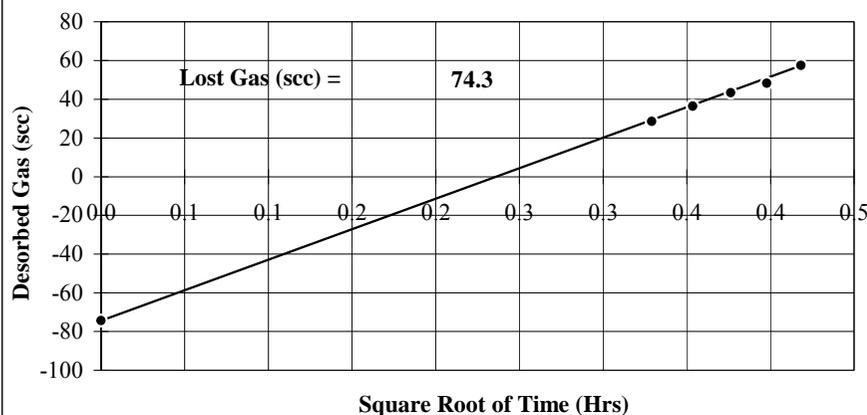
	Days
ON TEST	39.0
63% Q2	4.9
63% Q1+Q2	4.4

GAS ANALYSIS (Air-Free)

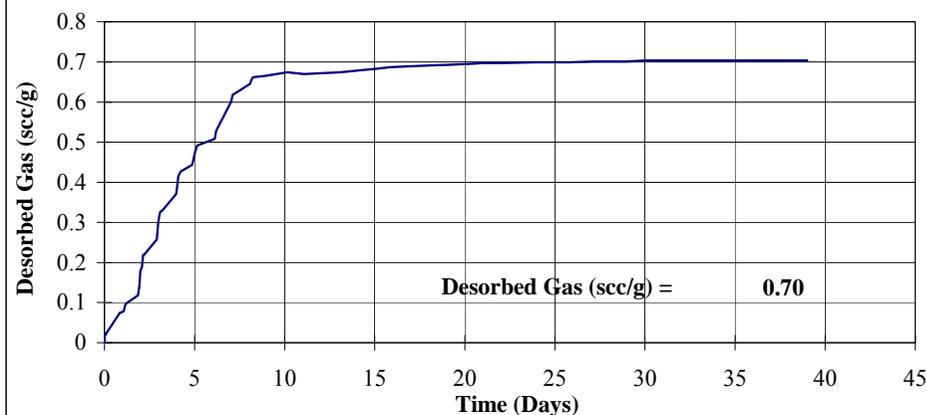
	Early	Mid	Late
CH4 (%)			
CO2 (%)			
N2 (%)			

Insufficient gas content
 Insufficient gas content
 Insufficient gas content

LOST GAS PLOT



DESORBED GAS PLOT



ACS Laboratories Pty Ltd GAS DESORPTION DATA SUMMARY

Fingal 55B

2

Seam A Lower

WELL NAME: Fingal 55B

SAMPLE DETAILS

SAMPLE NO 2
SEAM NAME Seam A Lower
DEPTH FROM (m) 170.64
DEPTH TO (m) 170.93
THICKNESS (m) 0.3
COAL LENGTH (m) 0.3
COAL WEIGHT (kg) 1.517
CORE DIAM (mm) 63
SAMPLE TYPE Core

CAN DETAILS

CAN NO 2
CAN LENGTH (m) 0.5
CAN WEIGHT (kg) 3.910
CAN + SAMPLE WT (kg) 5.427
SAMPLE WEIGHT (kg) 1.517
CAN VOLUME (cc) 2200
SAMPLE VOLUME(cc) 904
CAN VOID SPACE (cc) 1296
ESTIMATED VOID (cc) 392

DESORBED GAS

USBM LOST GAS (scc)	140.7	RESIDUAL GAS (scc/g)	0.01
USBM LOST GAS (scc/g)	0.11	TOTAL RAW GAS (scc/g)	0.86
DESORPTION TEMP (°C)	27.0	DAF LOST GAS (scc/g)	0.40
RAW DESORBED GAS (scc)	969	DAF DESORBED GAS (scc/g)	2.76
RAW DESORBED GAS (scc/g)	0.74	DAF Q1 + Q2 (scc/g)	3.16
RAW TOTAL DESORBED (scc/g)	0.85	DAF RESIDUAL GAS Q3 (scc/g)	0.04
		DAF TOTAL GAS Q1+2+3 (scc/g)	3.20

CORE DETAILS

	Date	Time
CORE PENETRATED	1/06/2007	13:21:00
CORE LEFT BOTTOM	1/06/2007	14:25:00
CORE AT SURFACE	1/06/2007	14:27:00
COAL IN CANISTER	1/06/2007	14:37:00
CORE ON TEST	1/06/2007	14:37:00
TIME ZERO	1/06/2007	14:26:00

COAL ANALYSIS DATA

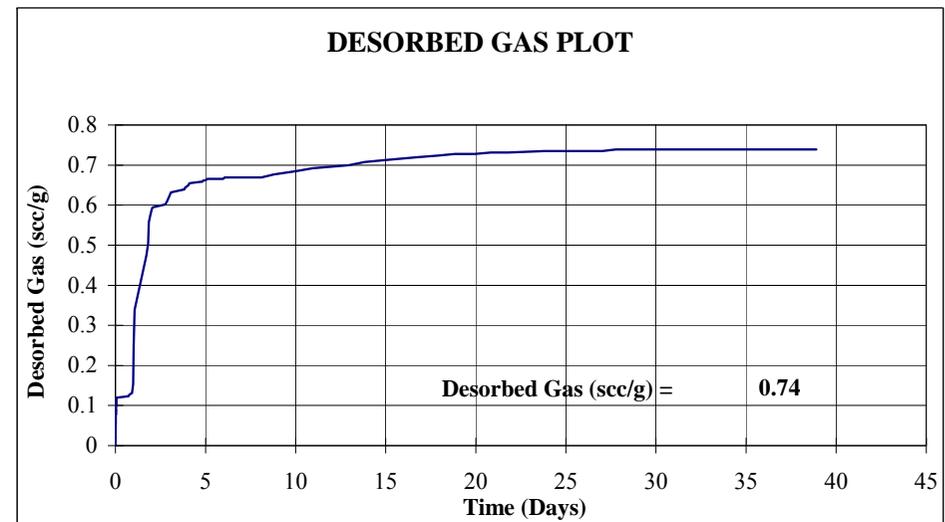
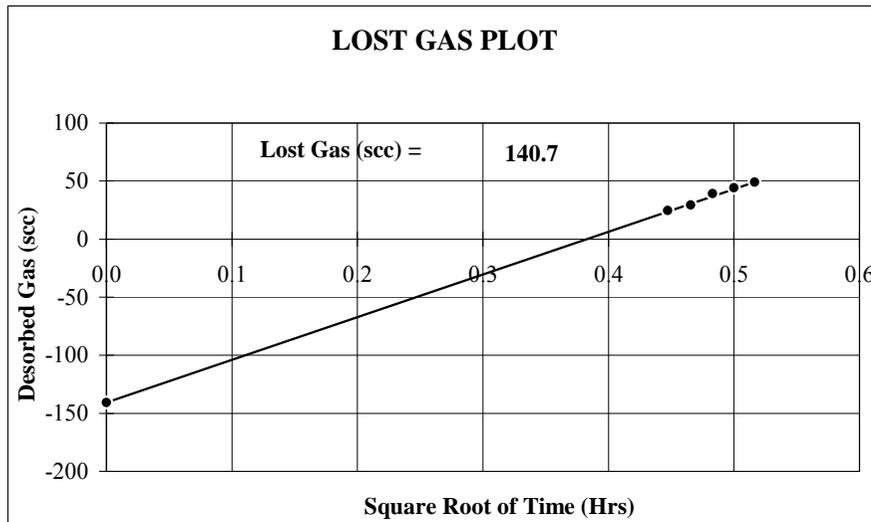
ASH %	66.3
VOLATILE MATTER %	8.5
INHERENT MOISTURE %	6.9
FIXED CARBON %	18.3

DESORPTION TIME

	Days
ON TEST	38.9
63% Q2	1.7
63% Q1+Q2	1.5

GAS ANALYSIS (Air-Free)

	Early	Mid	Late
CH4 (%)	Insufficient gas content		
CO2 (%)	Insufficient gas content		
N2 (%)	Insufficient gas content		



ACS Laboratories Pty Ltd GAS DESORPTION DATA SUMMARY

Fingal 55B

3

Seam B

WELL NAME: Fingal 55B

SAMPLE DETAILS

SAMPLE NO 3
SEAM NAME Seam B
DEPTH FROM (m) 188.90
DEPTH TO (m) 189.40
THICKNESS (m) 0.5
COAL LENGTH (m) 0.5
COAL WEIGHT (kg) 2.651
CORE DIAM (mm) 63
SAMPLE TYPE Core

CAN DETAILS

CAN NO 3
CAN LENGTH (m) 0.5
CAN WEIGHT (kg) 3.980
CAN + SAMPLE WT (kg) 6.631
SAMPLE WEIGHT (kg) 2.651
CAN VOLUME (cc) 2200
SAMPLE VOLUME(cc) 1559
CAN VOID SPACE (cc) 641
ESTIMATED VOID (cc) 0

DESORBED GAS

USBM LOST GAS (scc)	149.3	RESIDUAL GAS (scc/g)	0.02
USBM LOST GAS (scc/g)	0.06	TOTAL RAW GAS (scc/g)	0.33
DESORPTION TEMP (°C)	27.0	DAF LOST GAS (scc/g)	0.13
RAW DESORBED GAS (scc)	663	DAF DESORBED GAS (scc/g)	0.58
RAW DESORBED GAS (scc/g)	0.25	DAF Q1 + Q2 (scc/g)	0.71
RAW TOTAL DESORBED (scc/g)	0.31	DAF RESIDUAL GAS Q3 (scc/g)	0.05
		DAF TOTAL GAS Q1+2+3 (scc/g)	0.76

CORE DETAILS

	Date	Time
CORE PENETRATED	2/06/2007	10:21:00
CORE LEFT BOTTOM	2/06/2007	11:27:00
CORE AT SURFACE	2/06/2007	11:29:00
COAL IN CANISTER	2/06/2007	11:44:00
CORE ON TEST	2/06/2007	11:44:00
TIME ZERO	2/06/2007	11:28:00

COAL ANALYSIS DATA

ASH %	51.8
VOLATILE MATTER %	15.9
INHERENT MOISTURE %	5.0
FIXED CARBON %	27.3

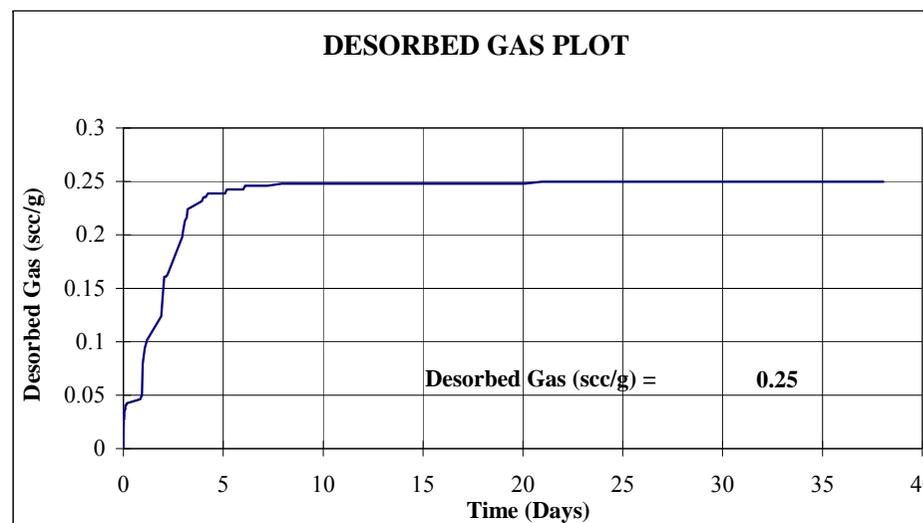
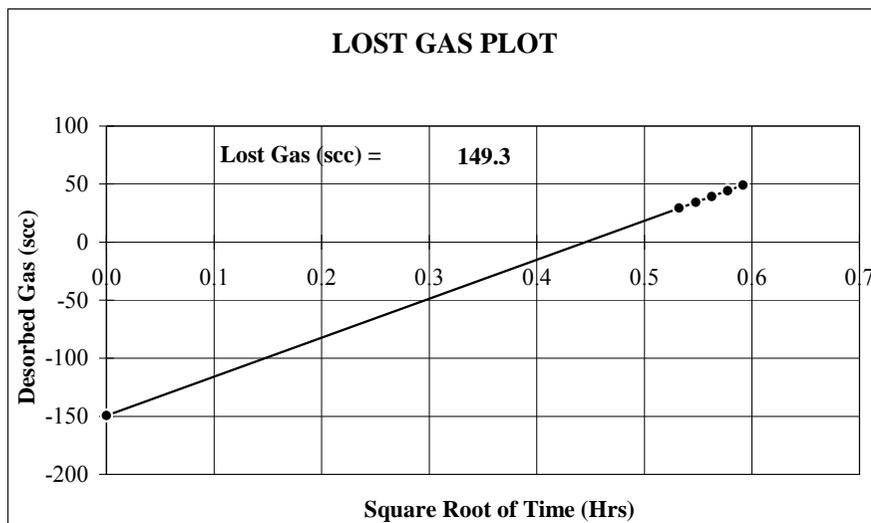
DESORPTION TIME

	Days
ON TEST	38.1
63% Q2	2.0
63% Q1+Q2	2.0

GAS ANALYSIS (Air-Free)

	Early	Mid	Late
CH4 (%)			
CO2 (%)			
N2 (%)			

Insufficient gas content
Insufficient gas content
Insufficient gas content



ACS Laboratories Pty Ltd GAS DESORPTION DATA SUMMARY

Fingal 55B

4

Seam B

WELL NAME: Fingal 55B

SAMPLE DETAILS

SAMPLE NO 4
SEAM NAME Seam B
DEPTH FROM (m) 189.70
DEPTH TO (m) 190.70
THICKNESS (m) 1.0
COAL LENGTH (m) 1.0
COAL WEIGHT (kg) 4.875
CORE DIAM (mm) 63
SAMPLE TYPE Core

CAN DETAILS

CAN NO 8
CAN LENGTH (m) 1.0
CAN WEIGHT (kg) 6.361
CAN + SAMPLE WT (kg) 11.236
SAMPLE WEIGHT (kg) 4.875
CAN VOLUME (cc) 4400
SAMPLE VOLUME(cc) 3117
CAN VOID SPACE (cc) 1283
ESTIMATED VOID (cc) 0

DESORBED GAS

USBM LOST GAS (scc)	106.3	RESIDUAL GAS (scc/g)	0.03
USBM LOST GAS (scc/g)	0.02	TOTAL RAW GAS (scc/g)	0.78
DESORPTION TEMP (°C)	27.0	DAF LOST GAS (scc/g)	0.06
RAW DESORBED GAS (scc)	3536	DAF DESORBED GAS (scc/g)	1.84
RAW DESORBED GAS (scc/g)	0.73	DAF Q1 + Q2 (scc/g)	1.89
RAW TOTAL DESORBED (scc/g)	0.75	DAF RESIDUAL GAS Q3 (scc/g)	0.08
		DAF TOTAL GAS Q1+2+3 (scc/g)	1.97

CORE DETAILS

	Date	Time
CORE PENETRATED	2/06/2007	10:21:00
CORE LEFT BOTTOM	2/06/2007	11:27:00
CORE AT SURFACE	2/06/2007	11:29:00
COAL IN CANISTER	2/06/2007	11:44:00
CORE ON TEST	2/06/2007	11:44:00
TIME ZERO	2/06/2007	11:28:00

COAL ANALYSIS DATA

ASH %	55.3
VOLATILE MATTER %	15.4
INHERENT MOISTURE %	5.2
FIXED CARBON %	24.1

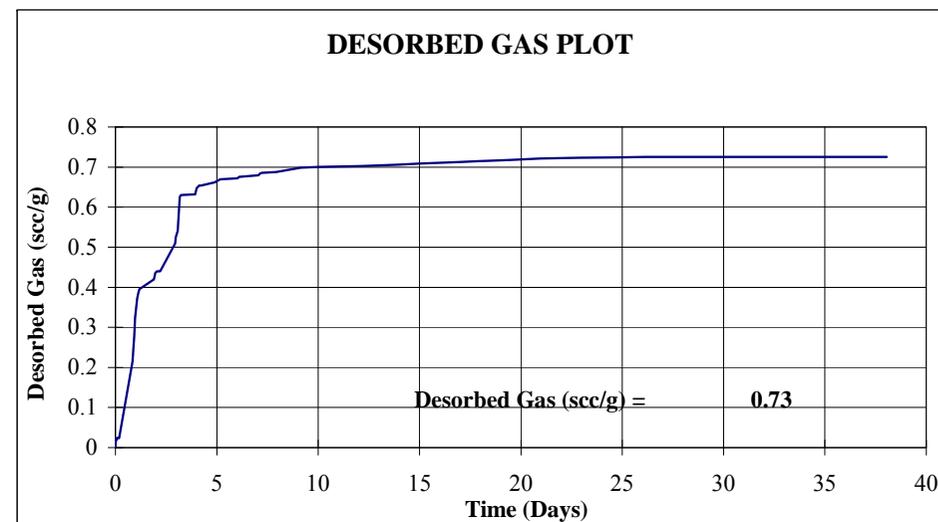
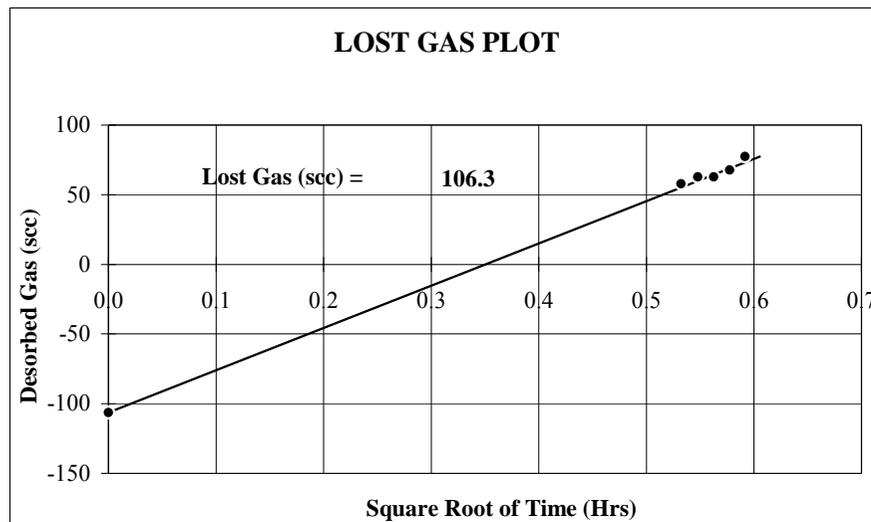
DESORPTION TIME

	Days
ON TEST	38.1
63% Q2	2.4
63% Q1+Q2	2.3

GAS ANALYSIS (Air-Free)

	Early	Mid	Late
CH4 (%)			
CO2 (%)			
N2 (%)			

Insufficient gas content
Insufficient gas content
Insufficient gas content



ACS Laboratories Pty Ltd GAS DESORPTION DATA SUMMARY

Fingal 55B

5

Seam B

WELL NAME: Fingal 55B

SAMPLE DETAILS

SAMPLE NO 5
SEAM NAME Seam B
DEPTH FROM (m) 187.10
DEPTH TO (m) 188.10
THICKNESS (m) 1.0
COAL LENGTH (m) 1.0
COAL WEIGHT (kg) 4.434
CORE DIAM (mm) 63
SAMPLE TYPE Core

CAN DETAILS

CAN NO 7
CAN LENGTH (m) 1.0
CAN WEIGHT (kg) 6.521
CAN + SAMPLE WT (kg) 11.212
SAMPLE WEIGHT (kg) 4.691
CAN VOLUME (cc) 4400
SAMPLE VOLUME(cc) 3117
CAN VOID SPACE (cc) 1283
ESTIMATED VOID (cc) 0

DESORBED GAS

USBM LOST GAS (scc)	68.2	RESIDUAL GAS (scc/g)	0.02
USBM LOST GAS (scc/g)	0.02	TOTAL RAW GAS (scc/g)	0.33
DESORPTION TEMP (°C)	27.0	DAF LOST GAS (scc/g)	0.04
RAW DESORBED GAS (scc)	1299	DAF DESORBED GAS (scc/g)	0.67
RAW DESORBED GAS (scc/g)	0.29	DAF Q1 + Q2 (scc/g)	0.70
RAW TOTAL DESORBED (scc/g)	0.31	DAF RESIDUAL GAS Q3 (scc/g)	0.05
		DAF TOTAL GAS Q1+2+3 (scc/g)	0.75

CORE DETAILS

	Date	Time
CORE PENETRATED	2/06/2007	11:40:00
CORE LEFT BOTTOM	2/06/2007	12:08:00
CORE AT SURFACE	2/06/2007	12:10:00
COAL IN CANISTER	2/06/2007	12:21:00
CORE ON TEST	2/06/2007	12:22:00
TIME ZERO	2/06/2007	12:09:00

COAL ANALYSIS DATA

ASH %	51.4
VOLATILE MATTER %	14.9
INHERENT MOISTURE %	4.8
FIXED CARBON %	28.9

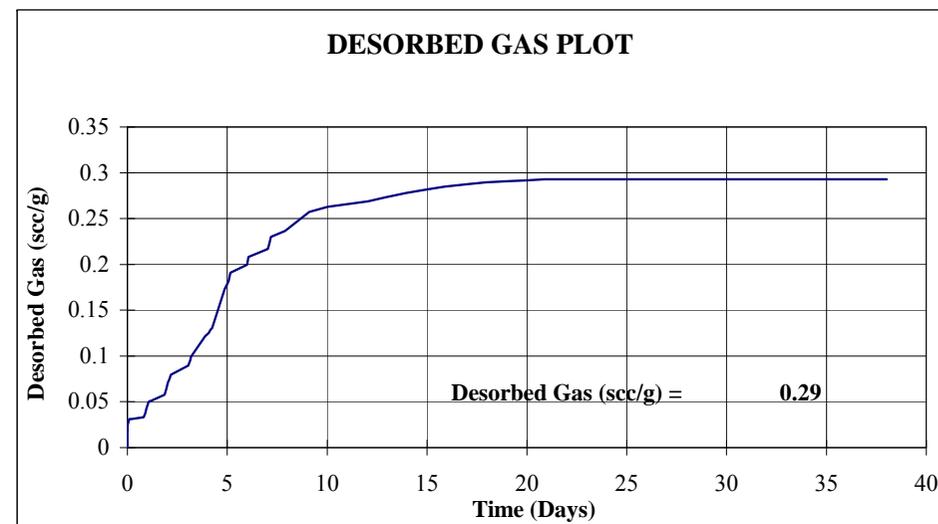
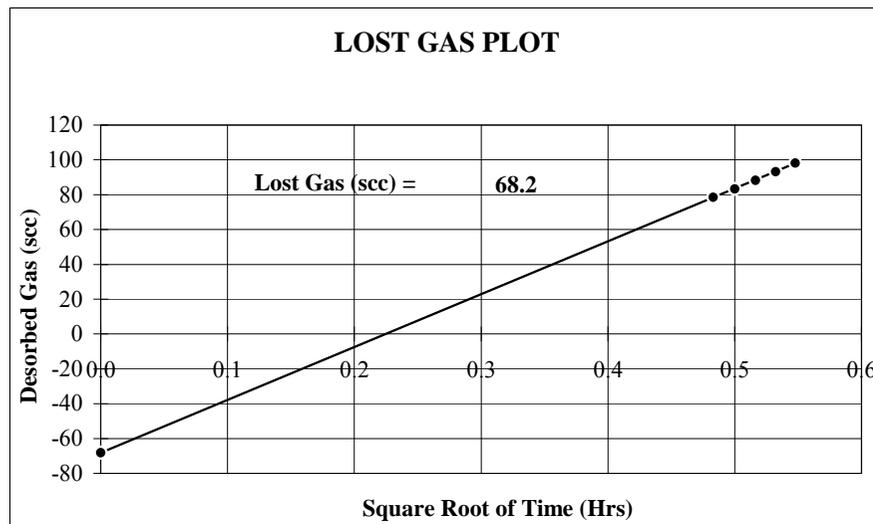
DESORPTION TIME

	Days
ON TEST	38.0
63% Q2	5.1
63% Q1+Q2	5.0

GAS ANALYSIS (Air-Free)

	Early	Mid	Late
CH4 (%)			
CO2 (%)			
N2 (%)			

Insufficient gas content
Insufficient gas content
Insufficient gas content



ACS Laboratories Pty Ltd GAS DESORPTION DATA SUMMARY

Fingal 55B

6

Unnamed

WELL NAME: Fingal 55B

SAMPLE DETAILS

SAMPLE NO 6
SEAM NAME Unnamed
DEPTH FROM (m) 209.90
DEPTH TO (m) 210.30
THICKNESS (m) 0.4
COAL LENGTH (m) 0.4
COAL WEIGHT (kg) 2.466
CORE DIAM (mm) 63
SAMPLE TYPE Core

CAN DETAILS

CAN NO 4
CAN LENGTH (m) 0.5
CAN WEIGHT (kg) 3.296
CAN + SAMPLE WT (kg) 5.762
SAMPLE WEIGHT (kg) 2.466
CAN VOLUME (cc) 2200
SAMPLE VOLUME(cc) 1247
CAN VOID SPACE (cc) 953
ESTIMATED VOID (cc) 0

DESORBED GAS

USBM LOST GAS (scc)	160.5	RESIDUAL GAS (scc/g)	0.03
USBM LOST GAS (scc/g)	0.07	TOTAL RAW GAS (scc/g)	0.49
DESORPTION TEMP (°C)	30.0	DAF LOST GAS (scc/g)	0.27
RAW DESORBED GAS (scc)	965	DAF DESORBED GAS (scc/g)	1.64
RAW DESORBED GAS (scc/g)	0.39	DAF Q1 + Q2 (scc/g)	1.92
RAW TOTAL DESORBED (scc/g)	0.46	DAF RESIDUAL GAS Q3 (scc/g)	0.13
		DAF TOTAL GAS Q1+2+3 (scc/g)	2.04

CORE DETAILS

	Date	Time
CORE PENETRATED	3/06/2007	12:03:00
CORE LEFT BOTTOM	3/06/2007	12:38:00
CORE AT SURFACE	3/06/2007	12:40:00
COAL IN CANISTER	3/06/2007	11:52:00
CORE ON TEST	3/06/2007	11:52:00
TIME ZERO	3/06/2007	12:39:00

COAL ANALYSIS DATA

ASH %	67.9
VOLATILE MATTER %	11.9
INHERENT MOISTURE %	8.3
FIXED CARBON %	11.9

DESORPTION TIME

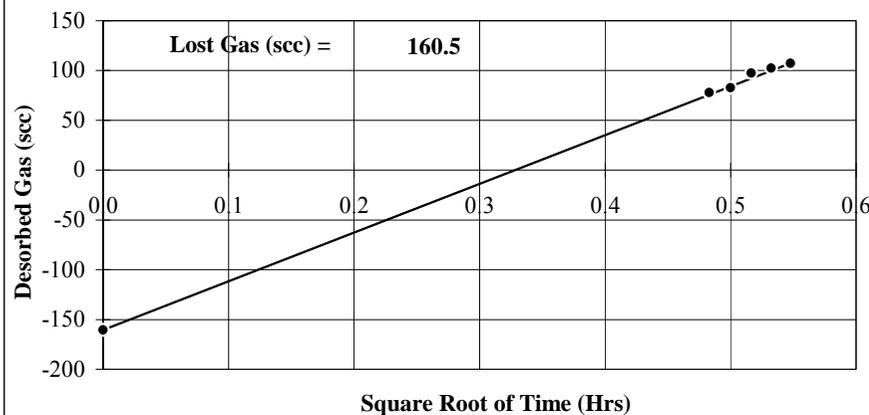
	Days
ON TEST	37.0
63% Q2	1.6
63% Q1+Q2	1.0

GAS ANALYSIS (Air-Free)

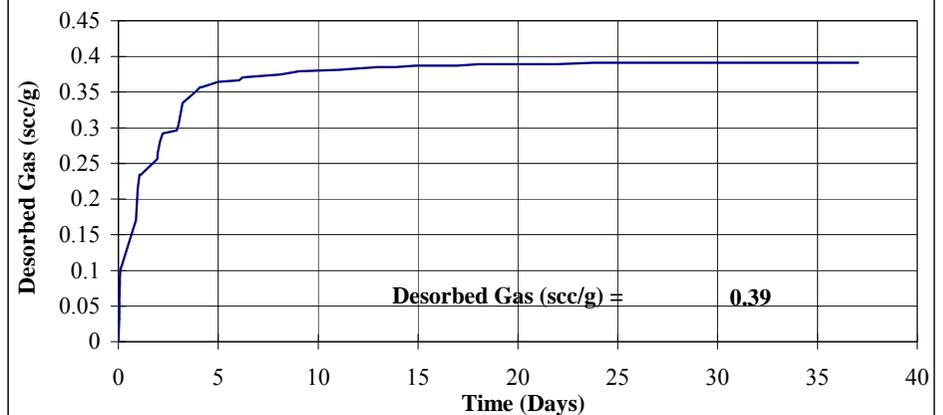
	Early	Mid	Late
CH4 (%)			
CO2 (%)			
N2 (%)			

Insufficient gas content
Insufficient gas content
Insufficient gas content

LOST GAS PLOT



DESORBED GAS PLOT



ACS Laboratories Pty Ltd GAS DESORPTION DATA SUMMARY

Fingal 55B

7

Seam D Upper

WELL NAME: Fingal 55B

SAMPLE DETAILS

SAMPLE NO 7
SEAM NAME Seam D Upper
DEPTH FROM (m) 238.98
DEPTH TO (m) 239.48
THICKNESS (m) 0.5
COAL LENGTH (m) 0.5
COAL WEIGHT (kg) 2.206
CORE DIAM (mm) 63
SAMPLE TYPE Core

CAN DETAILS

CAN NO 5
CAN LENGTH (m) 0.5
CAN WEIGHT (kg) 3.973
CAN + SAMPLE WT (kg) 6.179
SAMPLE WEIGHT (kg) 2.206
CAN VOLUME (cc) 2200
SAMPLE VOLUME(cc) 1559
CAN VOID SPACE (cc) 641
ESTIMATED VOID (cc) 0

DESORBED GAS

USBM LOST GAS (scc)	142.1	RESIDUAL GAS (scc/g)	0.05
USBM LOST GAS (scc/g)	0.06	TOTAL RAW GAS (scc/g)	0.99
DESORPTION TEMP (°C)	30.0	DAF LOST GAS (scc/g)	0.14
RAW DESORBED GAS (scc)	1925	DAF DESORBED GAS (scc/g)	1.84
RAW DESORBED GAS (scc/g)	0.87	DAF Q1 + Q2 (scc/g)	1.97
RAW TOTAL DESORBED (scc/g)	0.94	DAF RESIDUAL GAS Q3 (scc/g)	0.11
		DAF TOTAL GAS Q1+2+3 (scc/g)	2.08

CORE DETAILS

	Date	Time
CORE PENETRATED	4/06/2007	12:05:00
CORE LEFT BOTTOM	4/06/2007	12:43:00
CORE AT SURFACE	4/06/2007	12:45:00
COAL IN CANISTER	4/06/2007	12:50:00
CORE ON TEST	4/06/2007	12:51:00
TIME ZERO	4/06/2007	12:44:00

COAL ANALYSIS DATA

ASH %	47.0
VOLATILE MATTER %	20.4
INHERENT MOISTURE %	5.5
FIXED CARBON %	27.1

DESORPTION TIME

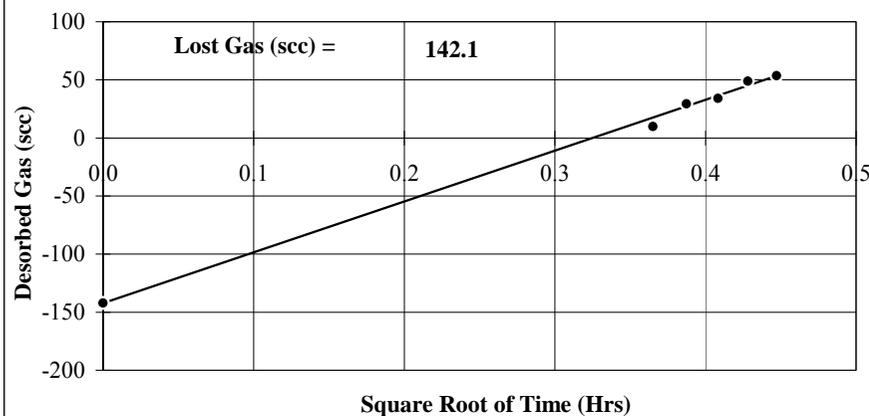
	Days
ON TEST	36.0
63% Q2	2.7
63% Q1+Q2	2.6

GAS ANALYSIS (Air-Free)

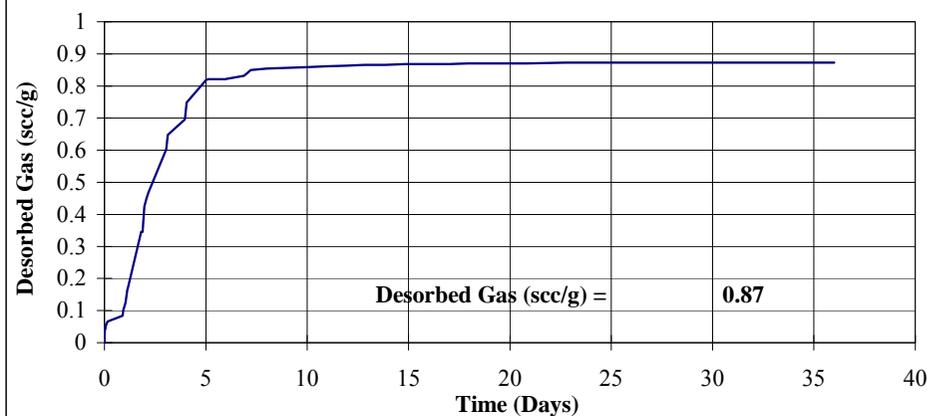
	Early	Mid	Late
CH4 (%)			
CO2 (%)			
N2 (%)			

Insufficient gas content
Insufficient gas content
Insufficient gas content

LOST GAS PLOT



DESORBED GAS PLOT



ACS Laboratories Pty Ltd

GAS DESORPTION DATA SUMMARY

Fingal 55B

8

Seam D Lower

WELL NAME: Fingal 55B

SAMPLE DETAILS

SAMPLE NO 8
 SEAM NAME Seam D Lower
 DEPTH FROM (m) 244.10
 DEPTH TO (m) 245.00
 THICKNESS (m) 0.9
 COAL LENGTH (m) 0.9
 COAL WEIGHT (kg) 2.206
 CORE DIAM (mm) 63
 SAMPLE TYPE Core

CAN DETAILS

CAN NO 5
 CAN LENGTH (m) 1.0
 CAN WEIGHT (kg) 3.973
 CAN + SAMPLE WT (kg) 6.179
 SAMPLE WEIGHT (kg) 2.206
 CAN VOLUME (cc) 4400
 SAMPLE VOLUME(cc) 2806
 CAN VOID SPACE (cc) 1594
 ESTIMATED VOID (cc) 0

DESORBED GAS

USBM LOST GAS (scc)	12.0	RESIDUAL GAS (scc/g)	0.01
USBM LOST GAS (scc/g)	0.01	TOTAL RAW GAS (scc/g)	0.30
DESORPTION TEMP (°C)	30.0	DAF LOST GAS (scc/g)	0.01
RAW DESORBED GAS (scc)	621	DAF DESORBED GAS (scc/g)	0.47
RAW DESORBED GAS (scc/g)	0.28	DAF Q1 + Q2 (scc/g)	0.48
RAW TOTAL DESORBED (scc/g)	0.29	DAF RESIDUAL GAS Q3 (scc/g)	0.02
		DAF TOTAL GAS Q1+2+3 (scc/g)	0.49

CORE DETAILS

	Date	Time
CORE PENETRATED	4/06/2007	14:26:00
CORE LEFT BOTTOM	4/06/2007	15:07:00
CORE AT SURFACE	4/06/2007	15:09:00
COAL IN CANISTER	4/06/2007	15:21:00
CORE ON TEST	4/06/2007	15:21:00
TIME ZERO	4/06/2007	15:08:00

COAL ANALYSIS DATA

ASH %	34.7
VOLATILE MATTER %	24.9
INHERENT MOISTURE %	5.0
FIXED CARBON %	35.4

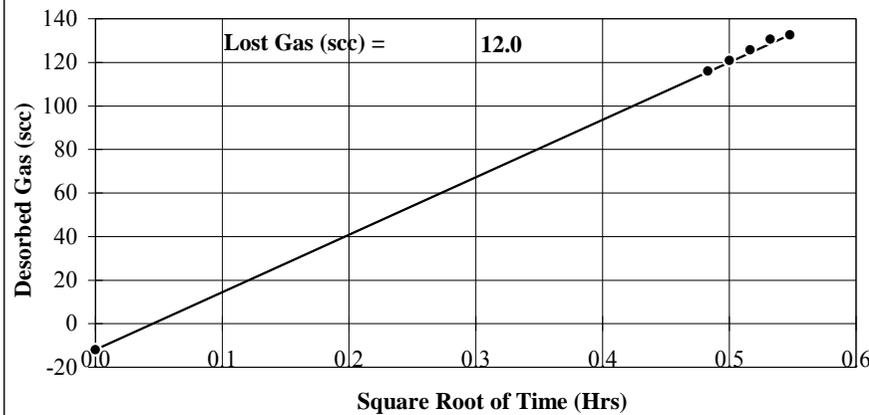
DESORPTION TIME

	Days
ON TEST	35.9
63% Q2	2.5
63% Q1+Q2	2.4

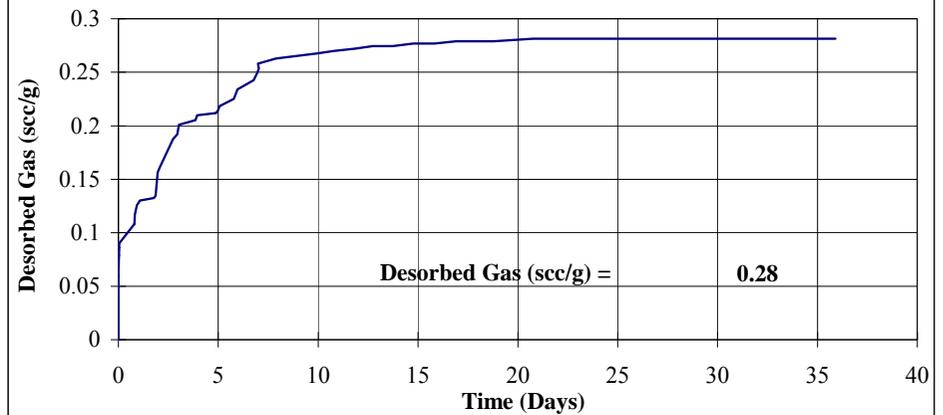
GAS ANALYSIS (Air-Free)

	Early	Mid	Late
CH4 (%)	Insufficient gas content		
CO2 (%)	Insufficient gas content		
N2 (%)	Insufficient gas content		

LOST GAS PLOT



DESORBED GAS PLOT



ACS Laboratories Pty Ltd GAS DESORPTION DATA SUMMARY

Fingal 55B

9

Seam D Lower

WELL NAME: Fingal 55B

SAMPLE DETAILS

SAMPLE NO 9
SEAM NAME Seam D Lower
DEPTH FROM (m) 245.05
DEPTH TO (m) 246.05
THICKNESS (m) 1.0
COAL LENGTH (m) 1.0
COAL WEIGHT (kg) 4.444
CORE DIAM (mm) 63
SAMPLE TYPE Core

CAN DETAILS

CAN NO 10
CAN LENGTH (m) 1.0
CAN WEIGHT (kg) 5.972
CAN + SAMPLE WT (kg) 10.416
SAMPLE WEIGHT (kg) 4.444
CAN VOLUME (cc) 4400
SAMPLE VOLUME(cc) 3117
CAN VOID SPACE (cc) 1283
ESTIMATED VOID (cc) 0

DESORBED GAS

USBM LOST GAS (scc)	164.4	RESIDUAL GAS (scc/g)	0.02
USBM LOST GAS (scc/g)	0.04	TOTAL RAW GAS (scc/g)	0.48
DESORPTION TEMP (°C)	30.0	DAF LOST GAS (scc/g)	0.07
RAW DESORBED GAS (scc)	1874	DAF DESORBED GAS (scc/g)	0.84
RAW DESORBED GAS (scc/g)	0.42	DAF Q1 + Q2 (scc/g)	0.91
RAW TOTAL DESORBED (scc/g)	0.46	DAF RESIDUAL GAS Q3 (scc/g)	0.04
		DAF TOTAL GAS Q1+2+3 (scc/g)	0.95

CORE DETAILS

	Date	Time
CORE PENETRATED	4/06/2007	14:26:00
CORE LEFT BOTTOM	4/06/2007	15:07:00
CORE AT SURFACE	4/06/2007	15:09:00
COAL IN CANISTER	4/06/2007	15:21:00
CORE ON TEST	4/06/2007	15:21:00
TIME ZERO	4/06/2007	15:08:00

COAL ANALYSIS DATA

ASH %	44.8
VOLATILE MATTER %	22.0
INHERENT MOISTURE %	4.8
FIXED CARBON %	28.4

DESORPTION TIME

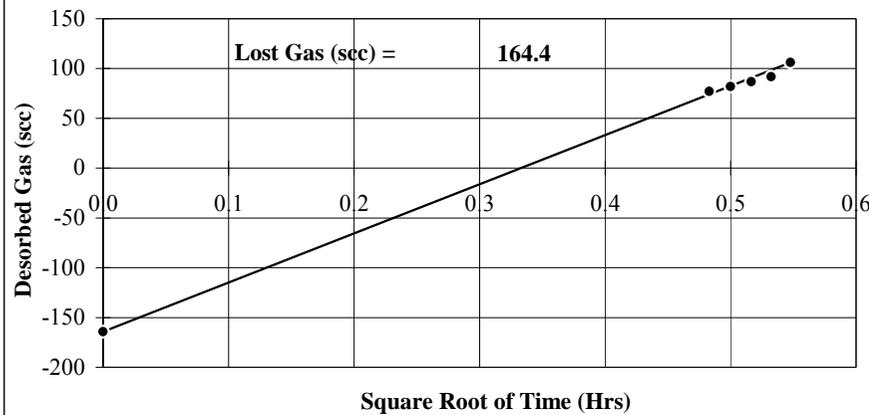
	Days
ON TEST	35.9
63% Q2	3.9
63% Q1+Q2	3.7

GAS ANALYSIS (Air-Free)

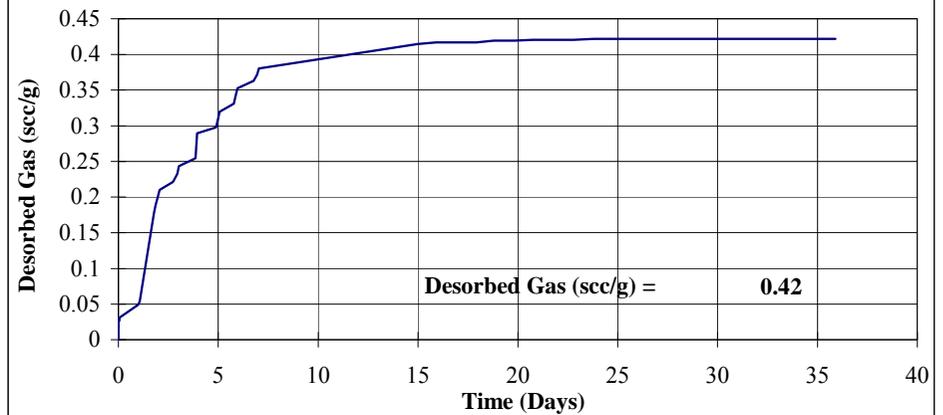
	Early	Mid	Late
CH4 (%)			
CO2 (%)			
N2 (%)			

Insufficient gas content
Insufficient gas content
Insufficient gas content

LOST GAS PLOT



DESORBED GAS PLOT



ACS Laboratories Pty Ltd GAS DESORPTION DATA SUMMARY

Fingal 55B

10

Unnamed Seam

WELL NAME: Fingal 55B

SAMPLE DETAILS

SAMPLE NO 10
SEAM NAME Unnamed Seam
DEPTH FROM (m) 264.30
DEPTH TO (m) 264.80
THICKNESS (m) 0.5
COAL LENGTH (m) 0.5
COAL WEIGHT (kg) 2.398
CORE DIAM (mm) 63
SAMPLE TYPE Core

CAN DETAILS

CAN NO 6
CAN LENGTH (m) 0.5
CAN WEIGHT (kg) 3.935
CAN + SAMPLE WT (kg) 6.333
SAMPLE WEIGHT (kg) 2.398
CAN VOLUME (cc) 2200
SAMPLE VOLUME(cc) 1559
CAN VOID SPACE (cc) 641
ESTIMATED VOID (cc) 0

DESORBED GAS

USBM LOST GAS (scc)	80.5	RESIDUAL GAS (scc/g)	0.01
USBM LOST GAS (scc/g)	0.03	TOTAL RAW GAS (scc/g)	0.32
DESORPTION TEMP (°C)	30.0	DAF LOST GAS (scc/g)	0.07
RAW DESORBED GAS (scc)	670	DAF DESORBED GAS (scc/g)	0.61
RAW DESORBED GAS (scc/g)	0.28	DAF Q1 + Q2 (scc/g)	0.68
RAW TOTAL DESORBED (scc/g)	0.31	DAF RESIDUAL GAS Q3 (scc/g)	0.02
		DAF TOTAL GAS Q1+2+3 (scc/g)	0.71

CORE DETAILS

	Date	Time
CORE PENETRATED	5/06/2007	15:17:00
CORE LEFT BOTTOM	5/06/2007	15:48:00
CORE AT SURFACE	5/06/2007	15:51:00
COAL IN CANISTER	5/06/2007	16:02:00
CORE ON TEST	5/06/2007	16:02:00
TIME ZERO	5/06/2007	15:49:30

COAL ANALYSIS DATA

ASH %	47.3
VOLATILE MATTER %	16.3
INHERENT MOISTURE %	6.9
FIXED CARBON %	29.5

DESORPTION TIME

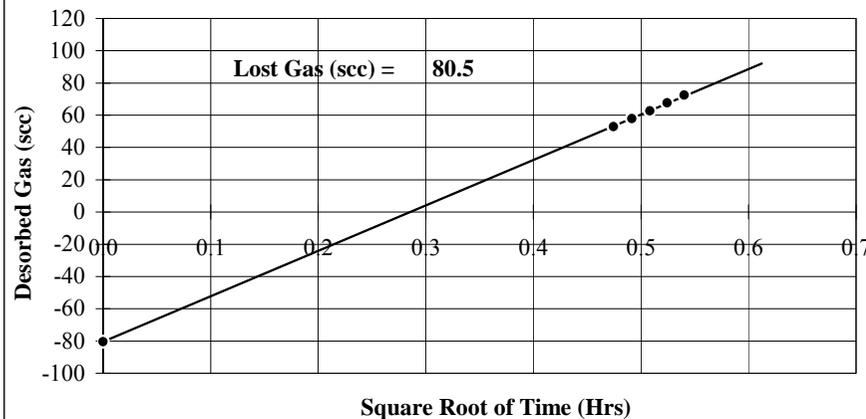
	Days
ON TEST	34.9
63% Q2	3.7
63% Q1+Q2	2.9

GAS ANALYSIS (Air-Free)

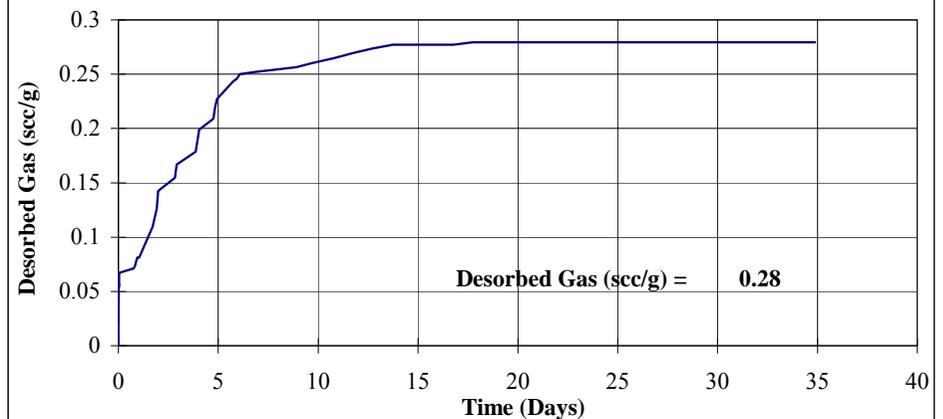
	Early	Mid	Late
CH4 (%)			
CO2 (%)			
N2 (%)			

Insufficient gas content
Insufficient gas content
Insufficient gas content

LOST GAS PLOT



DESORBED GAS PLOT



ACS Laboratories Pty Ltd GAS DESORPTION DATA SUMMARY

Fingal 55B

11

Unnamed Seam

WELL NAME: Fingal 55B

SAMPLE DETAILS

SAMPLE NO 11
SEAM NAME Unnamed Seam
DEPTH FROM (m) 297.80
DEPTH TO (m) 298.80
THICKNESS (m) 1.0
COAL LENGTH (m) 1.0
COAL WEIGHT (kg) 4.724
CORE DIAM (mm) 63
SAMPLE TYPE Core

CAN DETAILS

CAN NO 11
CAN LENGTH (m) 1.0
CAN WEIGHT (kg) 6.441
CAN + SAMPLE WT (kg) 11.165
SAMPLE WEIGHT (kg) 4.724
CAN VOLUME (cc) 4400
SAMPLE VOLUME(cc) 3117
CAN VOID SPACE (cc) 1283
ESTIMATED VOID (cc) 0

DESORBED GAS

USBM LOST GAS (scc)	37.3	RESIDUAL GAS (scc/g)	0.01
USBM LOST GAS (scc/g)	0.01	TOTAL RAW GAS (scc/g)	0.22
DESORPTION TEMP (°C)	30.0	DAF LOST GAS (scc/g)	0.02
RAW DESORBED GAS (scc)	955	DAF DESORBED GAS (scc/g)	0.45
RAW DESORBED GAS (scc/g)	0.20	DAF Q1 + Q2 (scc/g)	0.47
RAW TOTAL DESORBED (scc/g)	0.21	DAF RESIDUAL GAS Q3 (scc/g)	0.02
		DAF TOTAL GAS Q1+2+3 (scc/g)	0.49

CORE DETAILS

	Date	Time
CORE PENETRATED	6/06/2007	15:15:00
CORE LEFT BOTTOM	6/06/2007	16:07:00
CORE AT SURFACE	6/06/2007	16:10:00
COAL IN CANISTER	6/06/2007	16:20:00
CORE ON TEST	6/06/2007	16:21:00
TIME ZERO	6/06/2007	16:08:30

COAL ANALYSIS DATA

ASH %	49.8
VOLATILE MATTER %	19.7
INHERENT MOISTURE %	5.6
FIXED CARBON %	24.9

DESORPTION TIME

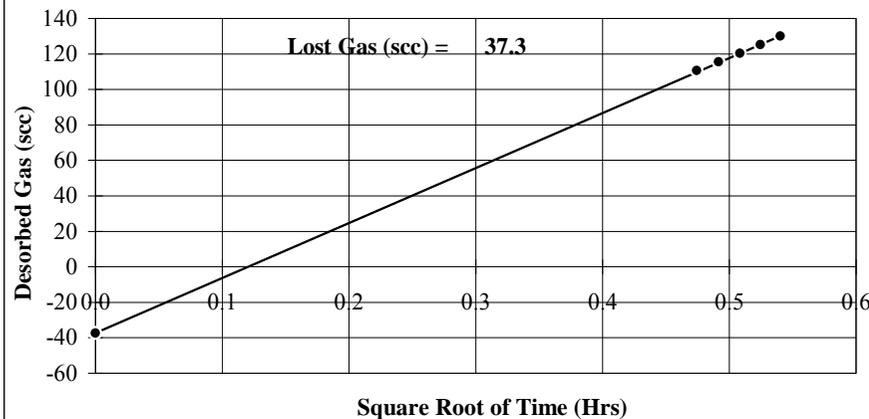
	Days
ON TEST	33.9
63% Q2	2.9
63% Q1+Q2	2.9

GAS ANALYSIS (Air-Free)

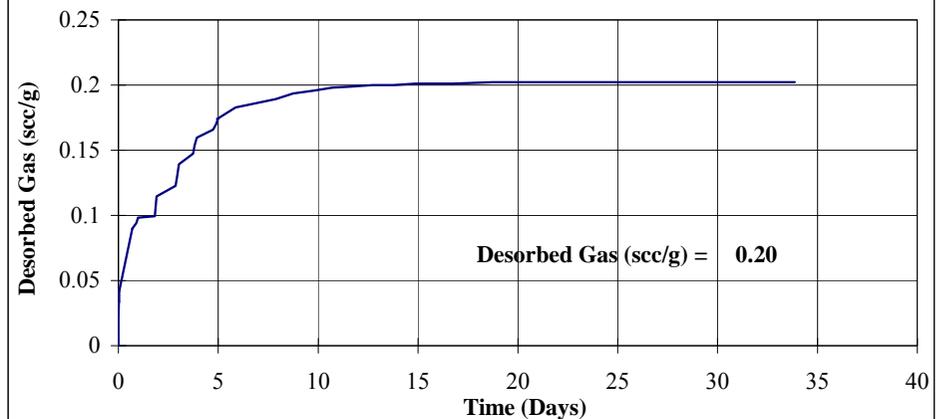
	Early	Mid	Late
CH4 (%)			
CO2 (%)			
N2 (%)			

Insufficient gas content
Insufficient gas content
Insufficient gas content

LOST GAS PLOT



DESORBED GAS PLOT



ACS Laboratories Pty Ltd GAS DESORPTION DATA SUMMARY

Fingal 55B

12

Rouge Seam

WELL NAME: Fingal 55B

SAMPLE DETAILS

SAMPLE NO 12
SEAM NAME Rouge Seam
DEPTH FROM (m) 328.30
DEPTH TO (m) 328.55
THICKNESS (m) 0.3
COAL LENGTH (m) 0.3
COAL WEIGHT (kg) 1.250
CORE DIAM (mm) 63
SAMPLE TYPE Core

CAN DETAILS

CAN NO 16
CAN LENGTH (m) 0.5
CAN WEIGHT (kg) 3.650
CAN + SAMPLE WT (kg) 4.900
SAMPLE WEIGHT (kg) 1.250
CAN VOLUME (cc) 2200
SAMPLE VOLUME(cc) 779
CAN VOID SPACE (cc) 1421
ESTIMATED VOID (cc) 0

DESORBED GAS

USBM LOST GAS (scc)	155.1	RESIDUAL GAS (scc/g)	0.01
USBM LOST GAS (scc/g)	0.12	TOTAL RAW GAS (scc/g)	1.65
DESORPTION TEMP (°C)	27.0	DAF LOST GAS (scc/g)	0.24
RAW DESORBED GAS (scc)	1890	DAF DESORBED GAS (scc/g)	2.94
RAW DESORBED GAS (scc/g)	1.51	DAF Q1 + Q2 (scc/g)	3.18
RAW TOTAL DESORBED (scc/g)	1.64	DAF RESIDUAL GAS Q3 (scc/g)	0.02
		DAF TOTAL GAS Q1+2+3 (scc/g)	3.20

CORE DETAILS

	Date	Time
CORE PENETRATED	9/06/2007	15:07:00
CORE LEFT BOTTOM	9/06/2007	15:57:00
CORE AT SURFACE	9/06/2007	16:00:00
COAL IN CANISTER	9/06/2007	16:05:00
CORE ON TEST	9/06/2007	16:06:00
TIME ZERO	9/06/2007	15:58:30

COAL ANALYSIS DATA

ASH %	42.8
VOLATILE MATTER %	16.1
INHERENT MOISTURE %	5.7
FIXED CARBON %	35.4

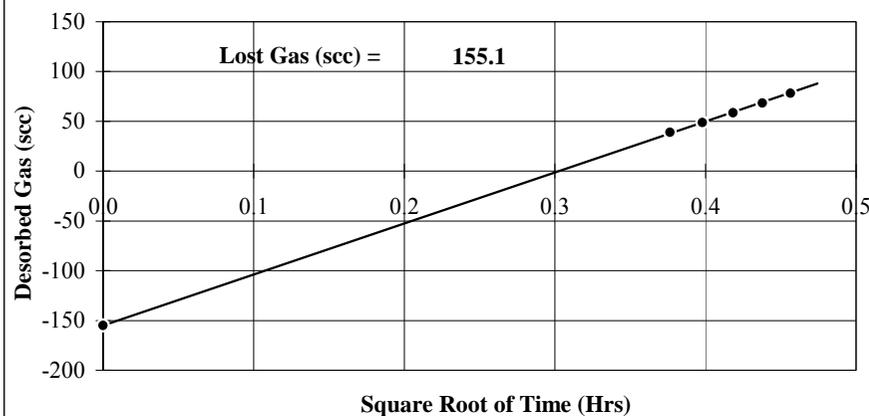
DESORPTION TIME

ON TEST	Days	30.9
63% Q2	3.0	
63% Q1+Q2	2.2	

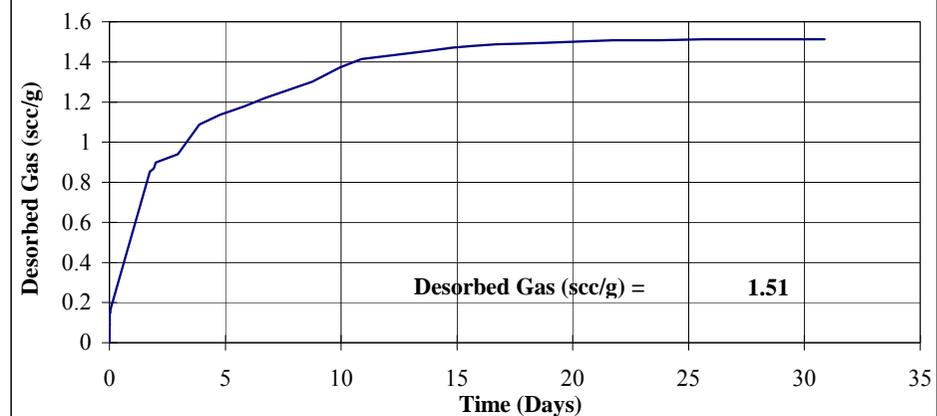
GAS ANALYSIS (Air-Free)

	Early	Mid	Late
CH4 (%)		44.89	
CO2 (%)		0.18	
N2 (%)		54.93	

LOST GAS PLOT



DESORBED GAS PLOT



ACS Laboratories Pty Ltd GAS DESORPTION DATA SUMMARY

Fingal 55B

13

Rouge Seam

WELL NAME: Fingal 55B

SAMPLE DETAILS

SAMPLE NO 13
SEAM NAME Rouge Seam
DEPTH FROM (m) 342.50
DEPTH TO (m) 343.50
THICKNESS (m) 1.0
COAL LENGTH (m) 1.0
COAL WEIGHT (kg) 4.476
CORE DIAM (mm) 63
SAMPLE TYPE Core

CAN DETAILS

CAN NO 12
CAN LENGTH (m) 1.0
CAN WEIGHT (kg) 5.865
CAN + SAMPLE WT (kg) 10.341
SAMPLE WEIGHT (kg) 4.476
CAN VOLUME (cc) 4400
SAMPLE VOLUME(cc) 3117
CAN VOID SPACE (cc) 1283
ESTIMATED VOID (cc) 0

DESORBED GAS

USBM LOST GAS (scc)	96.5	RESIDUAL GAS (scc/g)	0.01
USBM LOST GAS (scc/g)	0.02	TOTAL RAW GAS (scc/g)	0.16
DESORPTION TEMP (°C)	27.0	DAF LOST GAS (scc/g)	0.04
RAW DESORBED GAS (scc)	570	DAF DESORBED GAS (scc/g)	0.24
RAW DESORBED GAS (scc/g)	0.13	DAF Q1 + Q2 (scc/g)	0.28
RAW TOTAL DESORBED (scc/g)	0.15	DAF RESIDUAL GAS Q3 (scc/g)	0.02
		DAF TOTAL GAS Q1+2+3 (scc/g)	0.29

CORE DETAILS

	Date	Time
CORE PENETRATED	10/06/2007	10:40:00
CORE LEFT BOTTOM	10/06/2007	11:25:00
CORE AT SURFACE	10/06/2007	11:29:00
COAL IN CANISTER	10/06/2007	11:36:00
CORE ON TEST	10/06/2007	11:36:00
TIME ZERO	10/06/2007	11:27:00

COAL ANALYSIS DATA

ASH %	43.0
VOLATILE MATTER %	16.9
INHERENT MOISTURE %	2.9
FIXED CARBON %	37.2

DESORPTION TIME

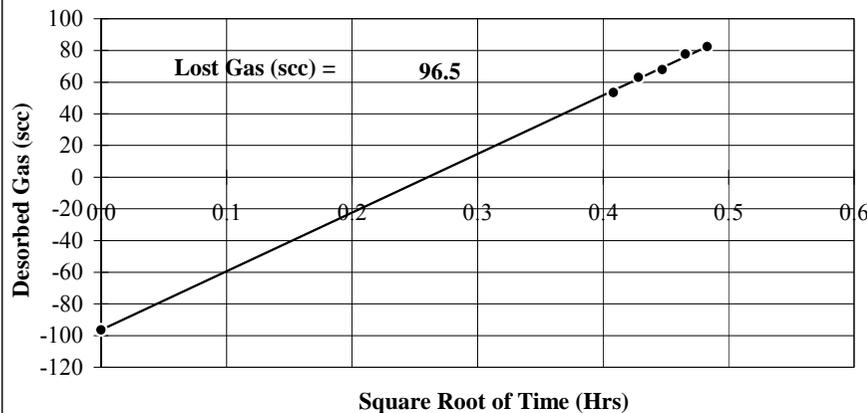
	Days
ON TEST	30.1
63% Q2	1.9
63% Q1+Q2	1.3

GAS ANALYSIS (Air-Free)

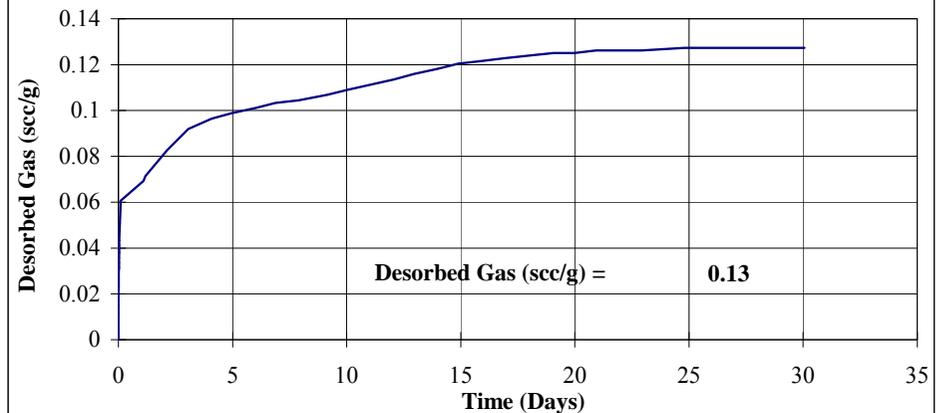
	Early	Mid	Late
CH4 (%)			
CO2 (%)			
N2 (%)			

Insufficient gas content
Insufficient gas content
Insufficient gas content

LOST GAS PLOT



DESORBED GAS PLOT



ACS Laboratories Pty Ltd GAS DESORPTION DATA SUMMARY

Fingal 55B

14

Rouge Seam

WELL NAME: Fingal 55B

SAMPLE DETAILS

SAMPLE NO 14
SEAM NAME Rouge Seam
DEPTH FROM (m) 346.75
DEPTH TO (m) 347.75
THICKNESS (m) 1.0
COAL LENGTH (m) 1.0
COAL WEIGHT (kg) 4.007
CORE DIAM (mm) 63
SAMPLE TYPE Core

CAN DETAILS

CAN NO 13
CAN LENGTH (m) 1.0
CAN WEIGHT (kg) 6.422
CAN + SAMPLE WT (kg) 10.429
SAMPLE WEIGHT (kg) 4.007
CAN VOLUME (cc) 4400
SAMPLE VOLUME(cc) 3117
CAN VOID SPACE (cc) 1283
ESTIMATED VOID (cc) 0

DESORBED GAS

USBM LOST GAS (scc)	84.5	RESIDUAL GAS (scc/g)	0.05
USBM LOST GAS (scc/g)	0.02	TOTAL RAW GAS (scc/g)	0.83
DESORPTION TEMP (°C)	27.0	DAF LOST GAS (scc/g)	0.03
RAW DESORBED GAS (scc)	3029	DAF DESORBED GAS (scc/g)	1.03
RAW DESORBED GAS (scc/g)	0.76	DAF Q1 + Q2 (scc/g)	1.06
RAW TOTAL DESORBED (scc/g)	0.78	DAF RESIDUAL GAS Q3 (scc/g)	0.07
		DAF TOTAL GAS Q1+2+3 (scc/g)	1.13

CORE DETAILS

	Date	Time
CORE PENETRATED	10/06/2007	11:39:00
CORE LEFT BOTTOM	10/06/2007	12:18:00
CORE AT SURFACE	10/06/2007	12:22:00
COAL IN CANISTER	10/06/2007	12:30:00
CORE ON TEST	10/06/2007	12:31:00
TIME ZERO	10/06/2007	12:20:00

COAL ANALYSIS DATA

ASH %	22.9
VOLATILE MATTER %	23.8
INHERENT MOISTURE %	4.0
FIXED CARBON %	49.3

DESORPTION TIME

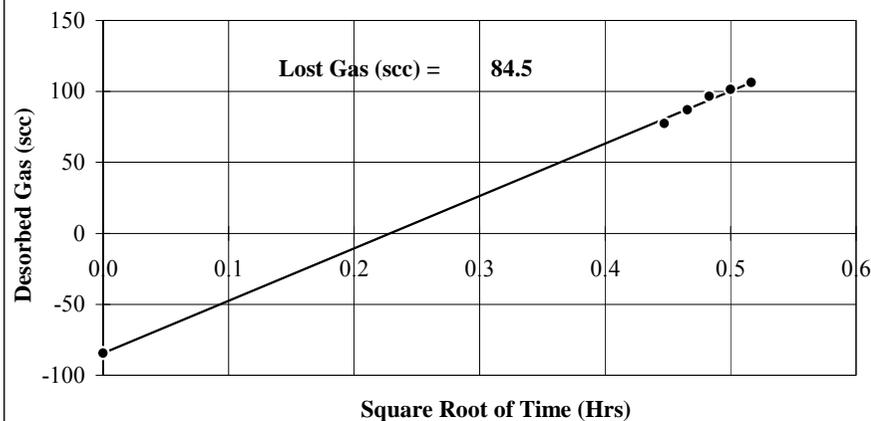
	Days
ON TEST	30.0
63% Q2	2.1
63% Q1+Q2	2.0

GAS ANALYSIS (Air-Free)

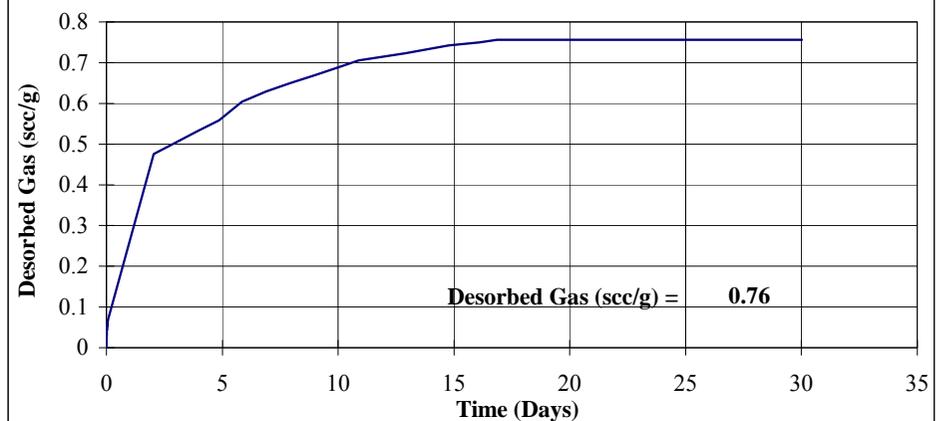
	Early	Mid	Late
CH4 (%)			
CO2 (%)			
N2 (%)			

Insufficient gas content
Insufficient gas content
Insufficient gas content

LOST GAS PLOT



DESORBED GAS PLOT



ACS Laboratories Pty Ltd GAS DESORPTION DATA SUMMARY

Fingal 55B

15

Seam H

WELL NAME: Fingal 55B

SAMPLE DETAILS

SAMPLE NO 15
SEAM NAME Seam H
DEPTH FROM (m) 365.45
DEPTH TO (m) 365.95
THICKNESS (m) 0.5
COAL LENGTH (m) 0.5
COAL WEIGHT (kg) 1.250
CORE DIAM (mm) 63
SAMPLE TYPE Core

CAN DETAILS

CAN NO 17
CAN LENGTH (m) 0.5
CAN WEIGHT (kg) 3.650
CAN + SAMPLE WT (kg) 4.900
SAMPLE WEIGHT (kg) 1.250
CAN VOLUME (cc) 2200
SAMPLE VOLUME(cc) 1559
CAN VOID SPACE (cc) 641
ESTIMATED VOID (cc) 0

DESORBED GAS

USBM LOST GAS (scc)	60.2	RESIDUAL GAS (scc/g)	0.04
USBM LOST GAS (scc/g)	0.05	TOTAL RAW GAS (scc/g)	1.14
DESORPTION TEMP (°C)	27.0	DAF LOST GAS (scc/g)	0.09
RAW DESORBED GAS (scc)	1313	DAF DESORBED GAS (scc/g)	1.86
RAW DESORBED GAS (scc/g)	1.05	DAF Q1 + Q2 (scc/g)	1.95
RAW TOTAL DESORBED (scc/g)	1.10	DAF RESIDUAL GAS Q3 (scc/g)	0.07
		DAF TOTAL GAS Q1+2+3 (scc/g)	2.02

CORE DETAILS

	Date	Time
CORE PENETRATED	11/06/2007	12:32:00
CORE LEFT BOTTOM	11/06/2007	13:19:00
CORE AT SURFACE	11/06/2007	13:23:00
COAL IN CANISTER	11/06/2007	13:33:00
CORE ON TEST	11/06/2007	13:33:00
TIME ZERO	11/06/2007	13:21:00

COAL ANALYSIS DATA

ASH %	36.6
VOLATILE MATTER %	21.1
INHERENT MOISTURE %	7.0
FIXED CARBON %	35.3

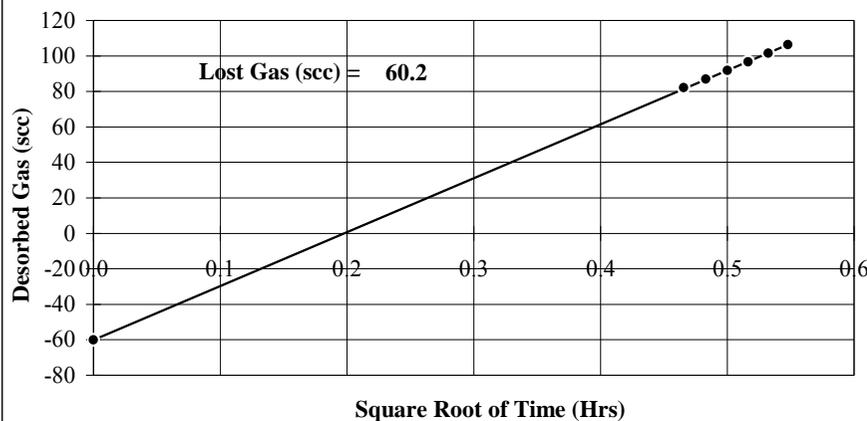
DESORPTION TIME

ON TEST	27.0
63% Q2	2.7
63% Q1+Q2	2.6

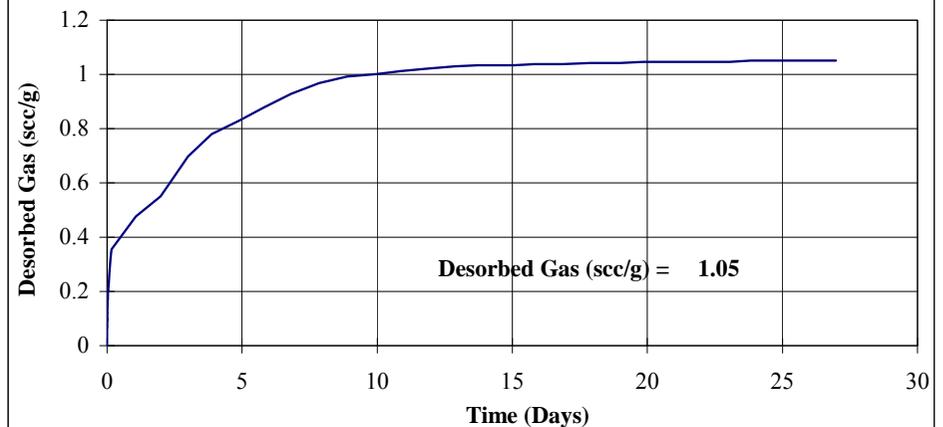
GAS ANALYSIS (Air-Free)

	Early	Mid	Late
CH4 (%)		68.53	
CO2 (%)		0.21	
N2 (%)		31.26	

LOST GAS PLOT



DESORBED GAS PLOT



CHAPTER 3

ISOTOPIC ANALYSIS OF DESORBED GAS

ISOPTOPIC ANALYSIS OF DESORBED GAS

Client: Pure Energy Resources Limited
Well: Fingal-55B

Sample	$\delta^{13}\text{CH}_4$ (‰ VPDB)
12	-75.6
12	-76.9
NGS 2 Standard	-31.8
NGS 2 Standard	-31.4

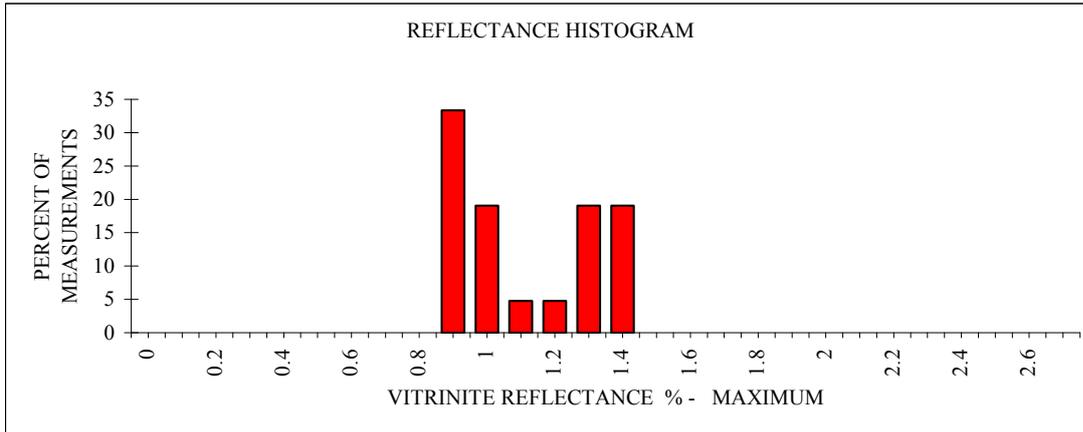
CHAPTER 4

MACERAL ANALYSES

COAL PETROGRAPHY - VITRINITE REFLECTANCE

CLIENT: Pure Energy Resources Limited
 SAMPLE FINGAL 55B
 SAMPLE 3

REPORT 1014-06
 DATE 19/10/07



REFLECTANCE(AS2486; 546NM; OIL RI 1.518; STANDARDS 0.3% - 3.3%)

Ro MAX% No. Mn% MX% S.D. Rr%1)

ONLY FEW VITRINITE GRAINS OK TO MEASURE
 ALL VITRINITE 1.16 21 0.91 1.46 0.21 1.09

VITRINITE REFLECTANCE DISTRIBUTION

	V1	V2	V3	V4	V5	V6	V7	V8	V9	V10	V11	V12	V13
ALL VITRINITE %									33	19	5	5	19

V14 V15

ALL VITRINITE % 19

TOTAL

ALL VITRINITE % 100

1) Note Rr calculated from Rmax

COAL PETROGRAPHY - VITRINITE REFLECTANCE

CLIENT: Pure Energy Resources Limited
 SAMPLE FINGAL 55B
 SAMPLE 3

REPORT 1014-06
 DATE 19/10/07

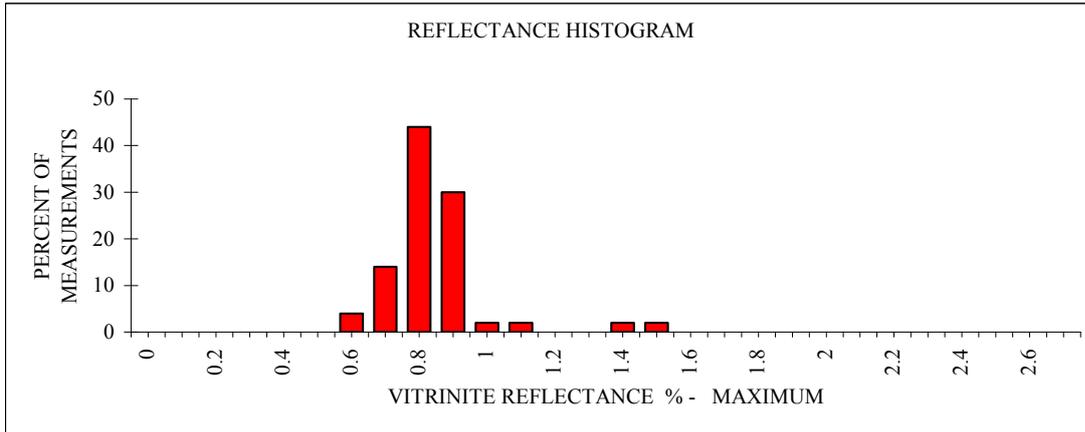
Maceral Group	%	%mmf	Maceral Sub Group	Maceral	%	%mmf
ISO7404:BS6127:AS2856			Telovitrinite	Textinite Texto-ulminite Eu-ulminite Telocollinite	2.7	5.6
Vitrinite	3.2	6.7	Detrovitrinite	Attrinite Densinite Desmocollinite	0.5	1.1
			Gelovitrinite	Corpogelinite Porigelinite Eugelinite		
Liptinite				Sporinite Cutinite Resinite Liptodetrinite Alginite Suberinite Fluorinite Exsudatinite Bituminite		
			Telo-inertinite	Fusinite Semifusinite Funginite	14.9 23.7	30.9 49.1
Inertinite	45.1	93.3	Detro-inertinite	Inertodetrinite Micrinite	5.9	12.3
			Gelo-inertinite	Macrinite	0.5	1.1
Minerals	51.7				51.7	
Points counted	100	100			100.0	100.0
		557				

COMMENTS: Minerals mainly carbonaceous shale & shale; minor disseminated clays, minor carbonate & quartz, trace pyrite.

COAL PETROGRAPHY - VITRINITE REFLECTANCE

CLIENT: Pure Energy Resources Limited
 SAMPLE FINGAL 55B
 SAMPLE 4

REPORT 1014-06
 DATE 19/10/07



REFLECTANCE(AS2486; 546NM; OIL RI 1.518; STANDARDS 0.3% - 3.3%)

	Ro MAX%	No.	Mn%	MX%	S.D.	Rr%1)
ALL VITRINITE	0.89	50	0.65	1.56	0.15	0.83

VITRINITE REFLECTANCE DISTRIBUTION

	V4	V5	V6	V7	V8	V9	V10	V11	V12	V13
ALL VITRINITE %			4	14	44	30	2	2		
	V14	V15	V16	V17						
ALL VITRINITE %	2	2								

TOTAL

ALL VITRINITE %											100
-----------------	--	--	--	--	--	--	--	--	--	--	-----

1) Note Rr calculated from Rmax

COAL PETROGRAPHY - VITRINITE REFLECTANCE

CLIENT: Pure Energy Resources Limited
 SAMPLE FINGAL 55B
 SAMPLE 4

REPORT 1014-06
 DATE 19/10/07

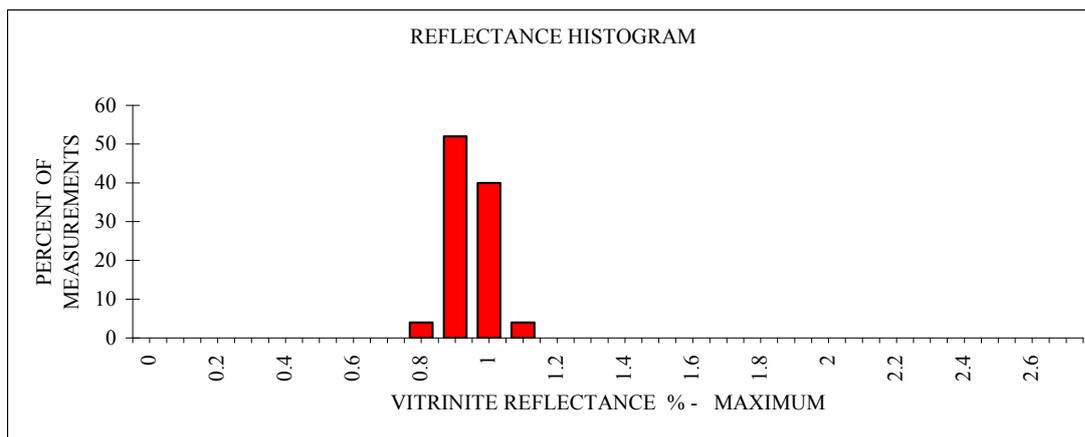
Maceral Group % ISO7404:BS6127:AS2856	%mmf	Maceral Sub Group	Maceral Textinite Texto-ulminite Eu-ulminite Telocollinite	%	%mmf
				26.9	42.6
Vitrinite	28.0	Detrovitrinite	Attrinite Densinite Desmocollinite	1.1	1.8
		Gelovitrinite	Corpogelinite Porigelinite Eugelinite		
			Sporinite	0.2	0.3
			Cutinite	1.5	2.4
			Resinite		
Liptinite	1.7				
COKED COAL	2.6			2.6	4.1
		Telo-inertinite	Fusinite Semifusinite Funginite	3.4 24.3	5.3 38.5
Inertinite	30.8	Detro-inertinite	Inertodetrinite Micrinite	2.4	3.8
		Gelo-inertinite	Macrinite	0.7	1.2
Minerals	36.9			36.9	
	-----			-----	
Points counted	100			100.0	100.0
					536

COMMENTS: Minerals mainly shale; much disseminated clays, much carbonate, minor quartz, slight trace pyrite.
 Coal heat affected in parts.

COAL PETROGRAPHY - VITRINITE REFLECTANCE

CLIENT: Pure Energy Resources Limited
 SAMPLE FINGAL 55B
 SAMPLE 5

REPORT 1014-06
 DATE 19/10/07



REFLECTANCE(AS2486; 546NM; OIL RI 1.518; STANDARDS 0.3% - 3.3%)

	Ro MAX%	No.	Mn%	MX%	S.D.	Rr% ¹⁾
TELOVITRINITE	1.00	43	0.90	1.13	0.06	0.94
DETROVITRINITE	0.92	7	0.82	1.01	0.07	0.86
ALL VITRINITE	0.99	50	0.82	1.13	0.07	0.93

VITRINITE REFLECTANCE DISTRIBUTION

	V5	V6	V7	V8	V9	V10	V11	V12	V13
TELOVITRINITE %					44	38	4		
DETROVITRINITE %				4	8	2			
ALL VITRINITE %				4	52	40	4		

	TOTAL
TELOVITRINITE %	86
DETROVITRINITE %	14
ALL VITRINITE %	100

1) Note Rr calculated from Rmax

COAL PETROGRAPHY - VITRINITE REFLECTANCE

CLIENT: Pure Energy Resources Limited
 SAMPLE FINGAL 55B
 SAMPLE 5

REPORT 1014-06
 DATE 19/10/07

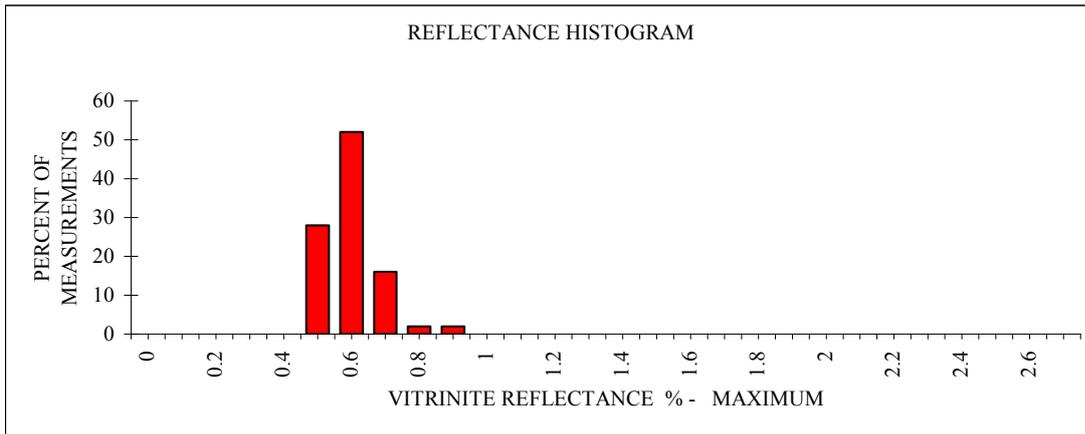
Maceral Group % ISO7404:BS6127:AS2856	%mmf	Maceral Sub Group	Maceral Textinite Texto-ulminite Eu-ulminite Telocollinite	%	%mmf	
				29.0	34.0	
Vitrinite	32.8	38.4	Detrovitrinite	Attrinite Densinite Desmocollinite	3.8	4.4
			Gelovitrinite	Corpogelinite Porigelinite Eugelinite		
				Sporinite	0.4	0.4
				Cutinite	0.4	0.4
Liptinite	0.7	0.8		Resinite Liptodetrinite Alginite Suberinite Fluorinite Exsudatinite Bituminite		
			Telo-inertinite	Fusinite Semifusinite Funginite	4.7 42.0	5.5 49.2
Inertinite	51.9	60.8	Detro-inertinite	Inertodetrinite Micrinite	4.7 0.2	5.5 0.2
			Gelo-inertinite	Macrinite	0.4	0.4
Minerals	14.6				14.6	
	-----	-----			-----	-----
Points counted	100	100			100.0	100.0
		555				

COMMENTS: Minerals mainly carbonaceous shale, minor shale; much disseminated clays, trace carbonate & quartz, slight trace pyrite.

COAL PETROGRAPHY - VITRINITE REFLECTANCE

CLIENT: Pure Energy Resources Limited
 SAMPLE FINGAL 55B
 SAMPLE 7

REPORT 1014-06
 DATE 19/10/07



REFLECTANCE(AS2486; 546NM; OIL RI 1.518; STANDARDS 0.3% - 3.3%)

	Ro MAX%	No.	Mn%	MX%	S.D.	Rr%1)
ALL VITRINITE	0.64	50	0.53	0.96	0.08	0.60

VITRINITE REFLECTANCE DISTRIBUTION

	V1	V2	V3	V4	V5	V6	V7	V8	V9	V10	V11	V12	V13
ALL VITRINITE %					28	52	16	2	2				

TOTAL

ALL VITRINITE %	100
-----------------	-----

1) Note Rr calculated from Rmax

COAL PETROGRAPHY - VITRINITE REFLECTANCE

CLIENT: Pure Energy Resources Limited
 SAMPLE FINGAL 55B
 SAMPLE 7

REPORT 1014-06
 DATE 19/10/07

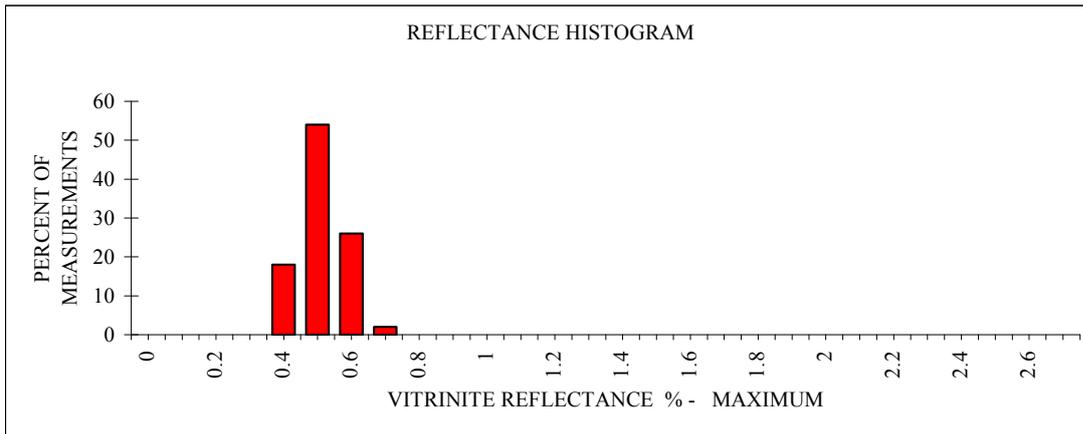
Maceral Group	%	%mmf	Maceral Sub Group	Maceral	%	%mmf
ISO7404:BS6127:AS2856			Telovitrinite	Textinite Texto-ulminite Eu-ulminite Telocollinite	15.4	22.4
Vitrinite	19.9	28.9	Detrovitrinite	Attrinite Densinite Desmocollinite	4.5	6.5
			Gelovitrinite	Corpogelinite Porigelinite Eugelinite		
Liptinite	18.7	27.3		Sporinite Cutinite Resinite Liptodetrinite Alginite Suberinite Fluorinite Exsudatinite Bituminite	7.6 9.5 Trace Trace 1.7	11.1 13.8 2.4
			Telo-inertinite	Fusinite Semifusinite Funginite	1.9 17.1	2.7 24.9
Inertinite	30.1	43.8	Detro-inertinite	Inertodetrinite Micrinite	10.4 0.4	15.1 0.5
			Gelo-inertinite	Macrinite	0.4	0.5
Minerals	31.4				31.4	
Points counted	100	539			100.0	100.0

COMMENTS: Minerals mainly shale & carbonaceous shale; much disseminated clays, minor quartz, trace carbonate & pyrite.

COAL PETROGRAPHY - VITRINITE REFLECTANCE

CLIENT: Pure Energy Resources Limited
 SAMPLE FINGAL 55B
 SAMPLE 8

REPORT 1014-06
 DATE 19/10/07



REFLECTANCE(AS2486; 546NM; OIL RI 1.518; STANDARDS 0.3% - 3.3%)

	Ro MAX%	No.	Mn%	MX%	S.D.	Rr%1)
TELOVITRINITE	0.55	44	0.45	0.7	0.06	0.52
DETROVITRINITE	0.56	6	0.51	0.63	0.05	0.52
ALL VITRINITE	0.55	50	0.45	0.7	0.06	0.52

VITRINITE REFLECTANCE DISTRIBUTION

	V1	V2	V3	V4	V5	V6	V7	V8	V9
TELOVITRINITE %				18	46	22	2		
DETROVITRINITE %					8	4			
ALL VITRINITE %				18	54	26	2		

	TOTAL
TELOVITRINITE %	88
DETROVITRINITE %	12
ALL VITRINITE %	100

1) Note Rr calculated from Rmax

COAL PETROGRAPHY - VITRINITE REFLECTANCE

CLIENT: Pure Energy Resources Limited
 SAMPLE FINGAL 55B
 SAMPLE 8

REPORT 1014-06
 DATE 19/10/07

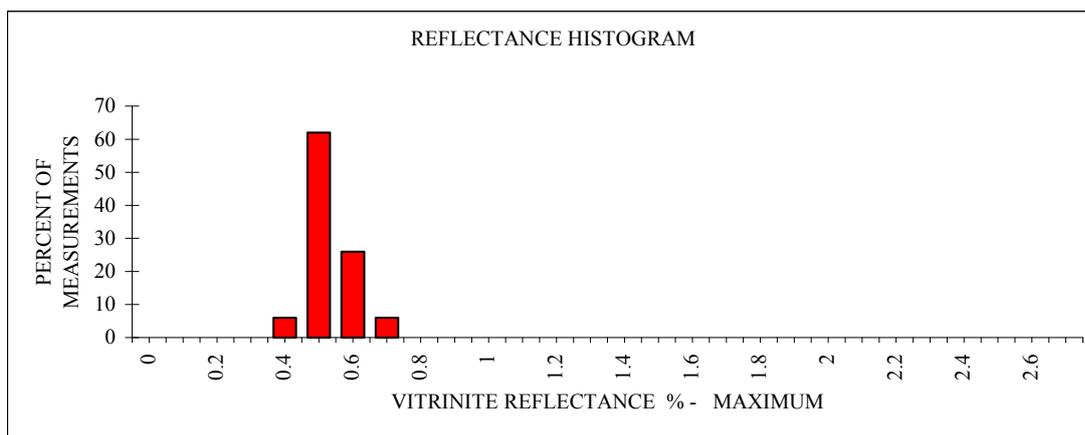
Maceral Group	%	%mmf	Maceral Sub Group	Maceral	%	%mmf
ISO7404:BS6127:AS2856			Telovitrinite	Textinite Texto-ulminite Eu-ulminite Telocollinite	18.0	25.3
Vitrinite	20.5	28.8	Detrovitrinite	Attrinite Densinite Desmocollinite	2.4	3.4
			Gelovitrinite	Corpogelinite Porigelinite Eugelinite		
Liptinite	3.4	4.7		Sporinite Cutinite Resinite Liptodetrinite Alginite Suberinite Fluorinite Exsudatinite Bituminite	0.2 3.2	0.3 4.5
			Telo-inertinite	Fusinite Semifusinite Funginite	6.6 35.1	9.2 49.3
Inertinite	47.3	66.5	Detro-inertinite	Inertodetrinite Micrinite	4.7 0.2	6.6 0.3
			Gelo-inertinite	Macrinite	0.8	1.1
Minerals	28.9				28.9	
	-----	-----			-----	-----
Points counted	100	100			100.0	100.0
		533				

COMMENTS: Minerals mainly shale & carbonaceous shale; much disseminated clays, much carbonate & quartz, slight trace pyrite.

COAL PETROGRAPHY - VITRINITE REFLECTANCE

CLIENT: Pure Energy Resources Limited
 SAMPLE FINGAL 55B
 SAMPLE 9

REPORT 1014-06
 DATE 19/10/07



REFLECTANCE(AS2486; 546NM; OIL RI 1.518; STANDARDS 0.3% - 3.3%)

	Ro MAX%	No.	Mn%	MX%	S.D.	Rr%1)
TELOVITRINITE	0.58	45	0.47	0.74	0.06	0.54
DETROVITRINITE	0.59	5	0.54	0.63	0.04	0.55
ALL VITRINITE	0.58	50	0.47	0.74	0.06	0.55

VITRINITE REFLECTANCE DISTRIBUTION

	V1	V2	V3	V4	V5	V6	V7	V8	V9
TELOVITRINITE %				6	56	22	6		
DETROVITRINITE %					6	4			
ALL VITRINITE %				6	62	26	6		

	TOTAL
TELOVITRINITE %	90
DETROVITRINITE %	10
ALL VITRINITE %	100

1) Note Rr calculated from Rmax

COAL PETROGRAPHY - VITRINITE REFLECTANCE

CLIENT: Pure Energy Resources Limited
 SAMPLE FINGAL 55B
 SAMPLE 9

REPORT 1014-06
 DATE 19/10/07

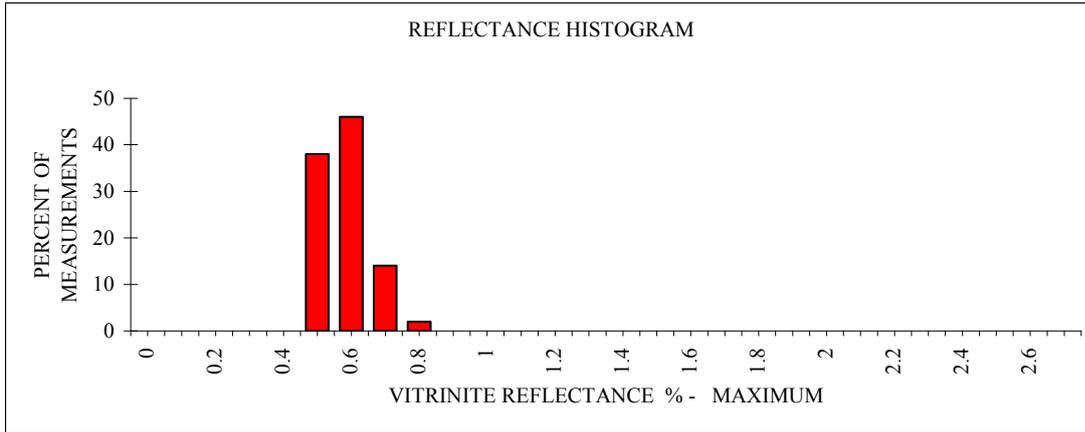
Maceral Group % ISO7404:BS6127:AS2856	%mmf	Maceral Sub Group	Maceral Textinite Texto-ulminite Eu-ulminite Telocollinite	%	%mmf	
				23.1	29.9	
Vitrinite	25.7	33.2	Detrovitrinite	Attrinite Densinite Desmocollinite	2.5	3.3
			Gelovitrinite	Corpogelinite Porigelinite Eugelinite		
				Sporinite	0.7	0.9
				Cutinite	4.7	6.1
Liptinite	5.4	7.0		Resinite Liptodetrinite Alginite Suberinite Fluorinite Exsudatinite Bituminite		
			Telo-inertinite	Fusinite Semifusinite Funginite	5.6 36.2	7.2 46.7
Inertinite	46.3	59.8	Detro-inertinite	Inertodetrinite Micrinite	3.8 0.2	4.9 0.2
			Gelo-inertinite	Macrinite	0.5	0.7
Minerals	22.6				22.6	
	-----	-----			-----	-----
Points counted	100	100			100.0	100.0
		553				

COMMENTS: Minerals mainly shale & carbonaceous shale; much disseminated clays, minor quartz & carbonate, trace pyrite.

COAL PETROGRAPHY - VITRINITE REFLECTANCE

CLIENT: Pure Energy Resources Limited
 SAMPLE FINGAL 55B
 SAMPLE 11

REPORT 1014-06
 DATE 19/10/07



REFLECTANCE(AS2486; 546NM; OIL RI 1.518; STANDARDS 0.3% - 3.3%)

	Ro MAX%	No.	Mn%	MX%	S.D.	Rr% ¹⁾
TELOVITRINITE	0.63	46	0.50	0.83	0.07	0.59
DETRIVITRINITE	0.56	4	0.53	0.58	0.02	0.53
ALL VITRINITE	0.63	50	0.50	0.83	0.07	0.59

VITRINITE REFLECTANCE DISTRIBUTION

	V1	V2	V3	V4	V5	V6	V7	V8	V9	V10
TELOVITRINITE %					30	46	14	2		
DETRIVITRINITE %					8					
ALL VITRINITE %					38	46	14	2		

	TOTAL
TELOVITRINITE %	92
DETRIVITRINITE %	8
ALL VITRINITE %	100

1) Note Rr calculated from Rmax

COAL PETROGRAPHY - VITRINITE REFLECTANCE

CLIENT: Pure Energy Resources Limited
 SAMPLE FINGAL 55B
 SAMPLE 11

REPORT 1014-06
 DATE 19/10/07

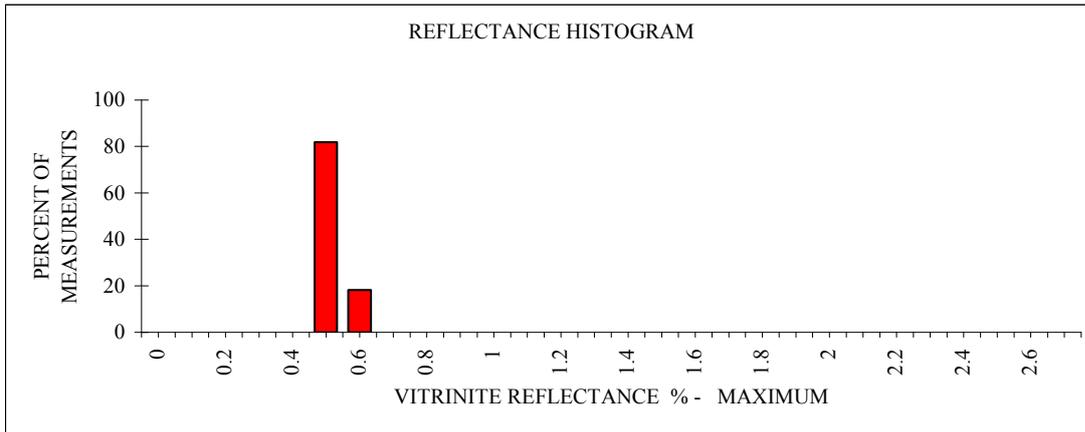
Maceral Group	%	%mmf	Maceral Sub Group	Maceral	%	%mmf
ISO7404:BS6127:AS2856			Telovitrinite	Textinite Texto-ulminite Eu-ulminite Telocollinite	33.5	49.3
Vitrinite	35.9	52.9	Detrovitrinite	Attrinite Densinite Desmocollinite	2.4	3.6
			Gelovitrinite	Corpogelinite Porigelinite Eugelinite		
Liptinite	8.2	12.1		Sporinite Cutinite Resinite Liptodetrinite Alginite Suberinite Fluorinite Exsudatinite Bituminite	1.3 6.9	1.9 10.1
						Trace
			Telo-inertinite	Fusinite Semifusinite Funginite	1.9 19.3	2.7 28.5
Inertinite	23.8	35.1	Detro-inertinite	Inertodetrinite Micrinite	2.2	3.3
			Gelo-inertinite	Macrinite	0.4	0.5
Minerals	32.2				32.2	
Points counted	100	538			100.0	100.0

COMMENTS: Minerals mainly shale & carbonaceous shale; much disseminated clays, minor quartz, trace carbonate, slight trace pyrite.

COAL PETROGRAPHY - VITRINITE REFLECTANCE

CLIENT: Pure Energy Resources Limited
 SAMPLE FINGAL 55B
 SAMPLE 12

REPORT 1014-06
 DATE 19/10/07



REFLECTANCE(AS2486; 546NM; OIL RI 1.518; STANDARDS 0.3% - 3.3%)

	Ro MAX%	No.	Mn%	MX%	S.D.	Rr% ¹⁾
ALL VITRINITE	0.56	11	0.51	0.63	0.05	0.52

Very few suitable vitrinite grains to measure.

VITRINITE REFLECTANCE DISTRIBUTION

	V1	V2	V3	V4	V5	V6	V7	V8	V9	V10
ALL VITRINITE %					82	18				

TOTAL

ALL VITRINITE % 100

1) Note Rr calculated from Rmax

COAL PETROGRAPHY - VITRINITE REFLECTANCE

CLIENT: Pure Energy Resources Limited
 SAMPLE FINGAL 55B
 SAMPLE 12

REPORT 1014-06
 DATE 19/10/07

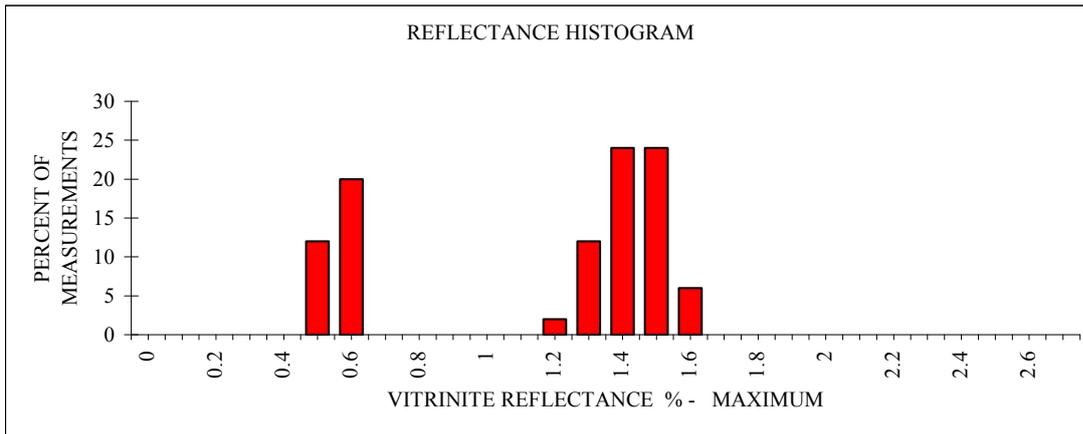
Maceral Group	%	%mmf	Maceral Sub Group	Maceral	%	%mmf
ISO7404:BS6127:AS2856			Telovitrinite	Textinite Texto-ulminite Eu-ulminite Telocollinite	3.2	4.9
Vitrinite	3.9	6.1	Detrovitrinite	Attrinite Densinite Desmocollinite	0.8	1.2
			Gelovitrinite	Corpogelinite Porigelinite Eugelinite		
Liptinite	0.9	1.4		Sporinite Cutinite Resinite Liptodetrinite Alginite Suberinite Fluorinite Exsudatinite Bituminite	0.9	1.4
			Telo-inertinite	Fusinite Semifusinite Funginite	6.4 46.8	9.8 71.8
Inertinite	60.3	92.5	Detro-inertinite	Inertodetrinite Micrinite	6.6	10.1
			Gelo-inertinite	Macrinite	0.6	0.9
Minerals	34.8				34.8	
Points counted	100	532			100.0	100.0

COMMENTS: Minerals mainly carbonaceous shale, much shale; minor disseminated clays & carbonate, trace quartz, slight trace pyrite.

COAL PETROGRAPHY - VITRINITE REFLECTANCE

CLIENT: Pure Energy Resources Limited
 SAMPLE FINGAL 55B
 SAMPLE 13

REPORT 1014-06
 DATE 23/10/07



REFLECTANCE(AS2486; 546NM; OIL RI 1.518; STANDARDS 0.3% - 3.3%)

	Ro MAX%	No.	Mn%	MX%	S.D.	Rr%1)
Higher rank vitrinite	1.48	34	1.20	1.62	0.10	1.39
lower rank vitrinite	0.59	16	0.50	0.68	0.07	0.56
ALL VITRINITE	1.19	50	0.50	1.62	0.43	1.12

VITRINITE REFLECTANCE DISTRIBUTION

	V4	V5	V6	V7	V11	V12	V13
Higher rank vitrinite						2	12
lower rank vitrinite		12	20				
ALL VITRINITE %		12	20			2	12

	V14	V15	V16	V17
Higher rank vitrinite	24	24	6	
lower rank vitrinite				
ALL VITRINITE %	24	24	6	

	TOTAL
Higher rank vitrinite	68
lower rank vitrinite	32
ALL VITRINITE %	100

1) Note Rr calculated from Rmax

COAL PETROGRAPHY - VITRINITE REFLECTANCE

CLIENT: Pure Energy Resources Limited
 SAMPLE FINGAL 55B
 SAMPLE 13

REPORT 1014-06
 DATE 23/10/07

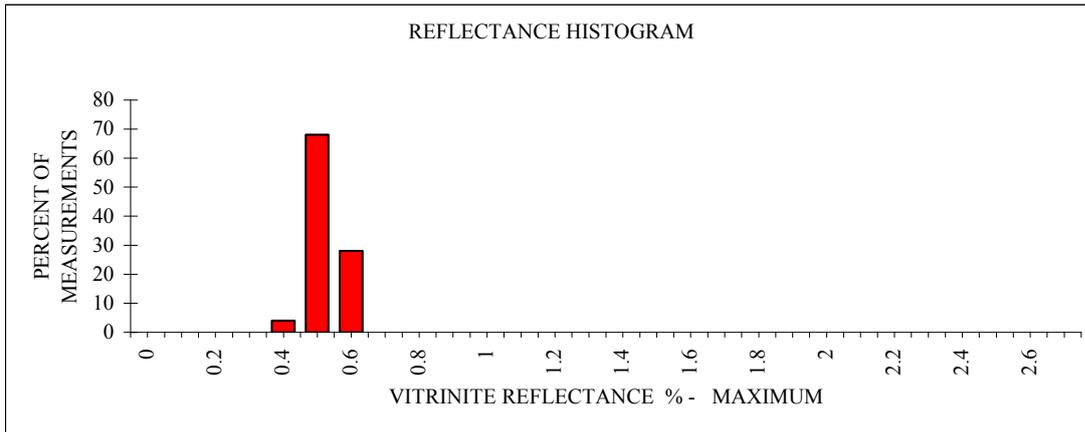
Maceral Group	%	%mmf	Maceral Sub Group	Maceral	%	%mmf
ISO7404:BS6127:AS2856			Telovitrinite	Textinite Texto-ulminite Eu-ulminite Telocollinite	25.8	42.4
Vitrinite	26.3	43.3	Detrovitrinite	Attrinite Densinite Desmocollinite	0.5	0.9
			Gelovitrinite	Corpogelinite Porigelinite Eugelinite		
Liptinite	2.0	3.2		Sporinite Cutinite Resinite Liptodetrinite Alginite Suberinite Fluorinite Exsudatinite Bituminite	0.4 1.6	0.6 2.6
						trace
Inertinite	32.6	53.5	Telo-inertinite	Fusinite Semifusinite Funginite	2.0 28.3	3.2 46.5
			Detro-inertinite	Inertodetrinite Micrinite	1.8	2.9
			Gelo-inertinite	Macrinite	0.5	0.9
Minerals	39.1				39.1	
Points counted	100	100			100.0	100.0
		562				

COMMENTS: Minerals mainly shale, much disseminated clays, minor carbonate and quartz, trace pyrite and possibly heat affected/coked coal.

COAL PETROGRAPHY - VITRINITE REFLECTANCE

CLIENT: Pure Energy Resources Limited
 SAMPLE FINGAL 55B
 SAMPLE 14

REPORT 1014-06
 DATE 19/10/07



REFLECTANCE(AS2486; 546NM; OIL RI 1.518; STANDARDS 0.3% - 3.3%)

	Ro MAX%	No.	Mn%	MX%	S.D.	Rr%1)
TELOVITRINITE	0.57	43	0.49	0.66	0.05	0.53
DETROVITRINITE	0.57	7	0.49	0.64	0.06	0.53
ALL VITRINITE	0.57	50	0.49	0.66	0.05	0.53

VITRINITE REFLECTANCE DISTRIBUTION

	V1	V2	V3	V4	V5	V6	V7	V8	V9	V10
TELOVITRINITE %				2	60	24				
DETROVITRINITE %				2	8	4				
ALL VITRINITE %				4	68	28				

	TOTAL
TELOVITRINITE %	86
DETROVITRINITE %	14
ALL VITRINITE %	100

1) Note Rr calculated from Rmax

COAL PETROGRAPHY - VITRINITE REFLECTANCE

CLIENT: Pure Energy Resources Limited
 SAMPLE FINGAL 55B
 SAMPLE 14

REPORT 1014-06
 DATE 19/10/07

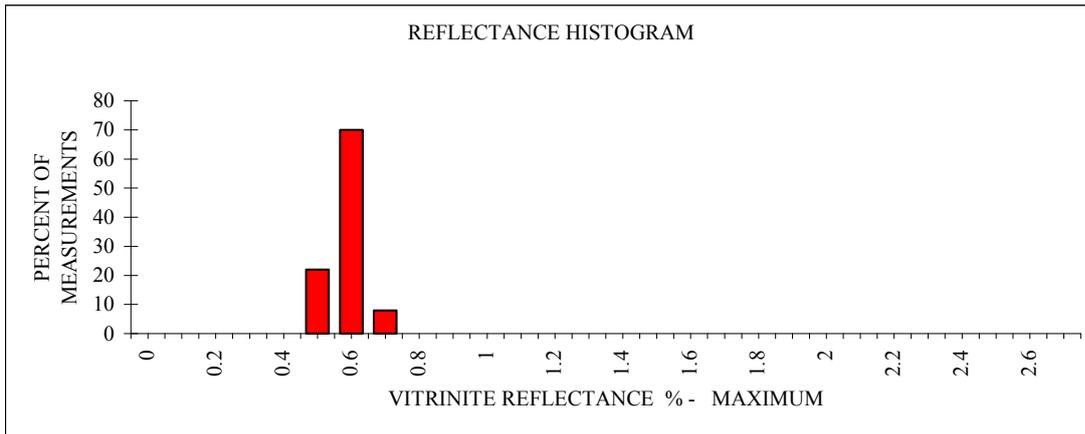
Maceral Group	%	%mmf	Maceral Sub Group	Maceral	%	%mmf
ISO7404:BS6127:AS2856			Telovitrinite	Textinite Texto-ulminite Eu-ulminite Telocollinite	8.3	9.3
Vitrinite	9.6	10.8	Detrovitrinite	Attrinite Densinite Desmocollinite	1.4	1.5
			Gelovitrinite	Corpogelinite Porigelinite Eugelinite		
Liptinite	5.3	6.0		Sporinite Cutinite Resinite Liptodetrinite Alginite Suberinite Fluorinite Exsudatinite Bituminite	0.7 4.6	0.8 5.2
			Telo-inertinite	Fusinite Semifusinite Funginite	3.3 67.3	3.7 75.5
Inertinite	74.2	83.2	Detro-inertinite	Inertodetrinite Micrinite	1.9	2.1
			Gelo-inertinite	Macrinite	1.7	1.9
Minerals	10.8				10.8	
	-----	-----			-----	-----
Points counted	100	100			100.0	100.0
		581				

COMMENTS: Minerals mainly disseminated clays & quartz, minor carbonate, trace pyrite.

COAL PETROGRAPHY - VITRINITE REFLECTANCE

CLIENT: Pure Energy Resources Limited
 SAMPLE FINGAL 55B
 SAMPLE 15

REPORT 1014-06
 DATE 19/10/07



REFLECTANCE(AS2486; 546NM; OIL RI 1.518; STANDARDS 0.3% - 3.3%)

	Ro MAX%	No.	Mn%	MX%	S.D.	Rr%1)
TELOVITRINITE	0.63	44	0.55	0.71	0.04	0.60
DETROVITRINITE	0.58	6	0.54	0.65	0.04	0.55
ALL VITRINITE	0.63	50	0.54	0.71	0.04	0.59

VITRINITE REFLECTANCE DISTRIBUTION

	V1	V2	V3	V4	V5	V6	V7	V8	V9	V10
TELOVITRINITE %					14	66	8			
DETROVITRINITE %					8	4				
ALL VITRINITE %					22	70	8			

	TOTAL
TELOVITRINITE %	88
DETROVITRINITE %	12
ALL VITRINITE %	100

1) Note Rr calculated from Rmax

COAL PETROGRAPHY - VITRINITE REFLECTANCE

CLIENT: Pure Energy Resources Limited
 SAMPLE FINGAL 55B
 SAMPLE 15

REPORT 1014-06
 DATE 19/10/07

Maceral Group	%	%mmf	Maceral Sub Group	Maceral	%	%mmf
ISO7404:BS6127:AS2856			Telovitrinite	Textinite Texto-ulminite Eu-ulminite Telocollinite	19.9	23.2
Vitrinite	24.1	28.1	Detrovitrinite	Attrinite Densinite Desmocollinite	4.2	4.9
			Gelovitrinite	Corpogelinite Porigelinite Eugelinite		
Liptinite	4.7	5.5		Sporinite Cutinite Resinite Liptodetrinite Alginite Suberinite Fluorinite Exsudatinite Bituminite	0.4 4.4	0.4 5.1
			Telo-inertinite	Fusinite Semifusinite Funginite	11.0 37.2	12.8 43.4
Inertinite	56.9	66.4	Detro-inertinite	Inertodetrinite Micrinite	7.4	8.6
			Gelo-inertinite	Macrinite	1.3	1.5
Minerals	14.2				14.2	
Points counted	100	527			100.0	100.0

COMMENTS: Minerals mainly carbonaceous shale, minor shale; much disseminated clays, minor carbonate & quartz, slight trace pyrite.

CHAPTER 5

ADSORPTION ISOTHERMS

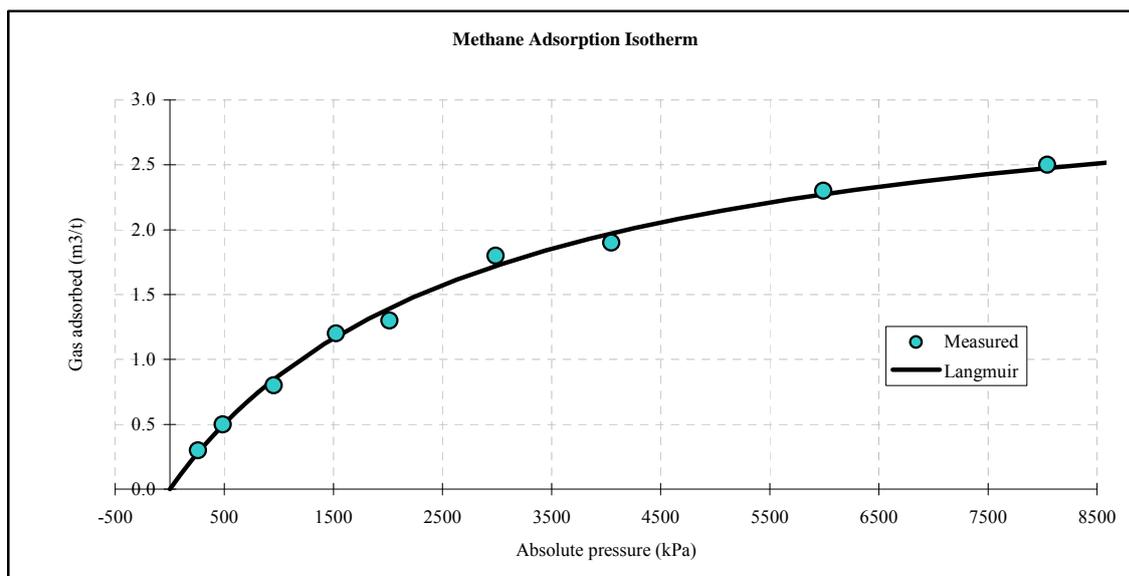
ADSORPTION ISOTHERM AT 18°C

CLIENT: Pure Energy Resources Limited
 SAMPLE: Fingal-55B Sample 3
 SAMPLE DEPTH: 188.90 m

SEAM: B
 REPORT: 1014-06

Isotherm		$C = V_L \cdot P / (P + P_L)$
C: gas content, P: pressure		
V _L and P _L : Langmuir Volume and Pressure		
Gauge pressure (P) kPa	Gas adsorbed (C, m ³ /t) fitted	
0	0.00	
310	0.31	
621	0.57	
1276	0.98	
2551	1.51	
5102	2.05	
6067	2.18	

Coal density		
(He, g/cc)	1.83	
Proximate analysis (%)		
	daf	
Air dried moisture	5.0	-
Volatiles	15.9	36.81
Fixed C	27.3	63.19
Ash	51.8	-
Total	100.0	100.00



Langmuir Isotherm Parameters

Gas adsorbed (desorbable)	Gas adsorbed (total gas)	V_L(abs, daf)
V _L (gauge) = 3.22 m ³ /t	V _L (abs) = 3.34 m ³ /t	12.19
P _L (gauge) = 2911 kPa	P _L (abs) = 2810 kPa	
	Gas content at 1 atm.	0.12 m ³ /t

Abs. Pressure (kPa)	Total adsorbed gas (m ³ /t)
259	0.3
485	0.5
954	0.8
1523	1.2
2015	1.3
2987	1.8
4047	1.9
5991	2.3
8044	2.5

CH4 storage capacity of coal at seam depth (based on isotherm)
1.25 m ³ /t

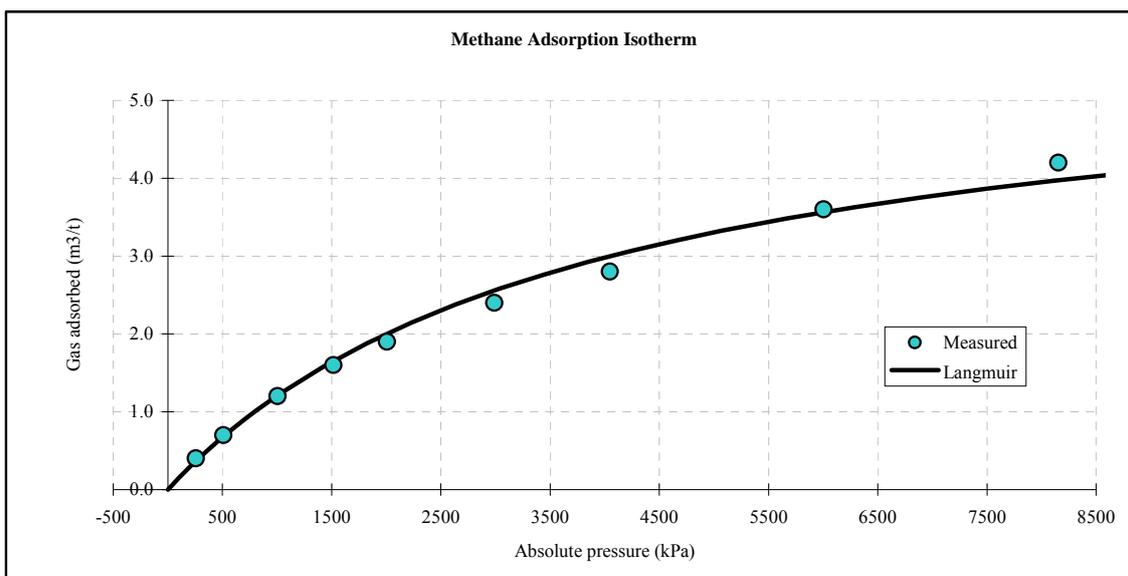
ADSORPTION ISOTHERM AT 18°C

CLIENT: Pure Energy Resources Limited
SAMPLE: Fingal-55B Sample 4
SAMPLE DEPTH: 187.10 m

SEAM: B
REPORT: 1014-06

Isotherm		$C = V_L \cdot P / (P + P_L)$
C: gas content, P: pressure		
V _L and P _L : Langmuir Volume and Pressure		
Gauge pressure (P) kPa	Gas adsorbed (C, m ³ /t) fitted	
0	0.00	
310	0.41	
621	0.77	
1276	1.39	
2551	2.24	
5102	3.21	
6067	3.45	

Coal density		
(He, g/cc)	1.81	
Proximate analysis (%)		
		daf
Air dried moisture	5.2	-
Volatiles	15.4	38.99
Fixed C	24.1	61.01
Ash	55.3	-
Total	100.0	100.00



Langmuir Isotherm Parameters

Gas adsorbed (desorbable)		Gas adsorbed (total gas)	
V _L (gauge) =	5.70 m ³ /t	V _L (abs)=	5.85 m ³ /t
P _L (gauge) =	3951 kPa	P _L (abs)=	3850 kPa
		Gas content at 1 atm.	0.15 m ³ /t
			V _L (abs, daf) 12.19

Abs. Pressure (kPa)	Total adsorbed gas (m ³ /t)
257	0.4
508	0.7
1006	1.2
1517	1.6
2005	1.9
2989	2.4
4048	2.8
6005	3.6
8153	4.2

CH4 storage capacity of coal at seam depth (based on isotherm)
1.80 m ³ /t

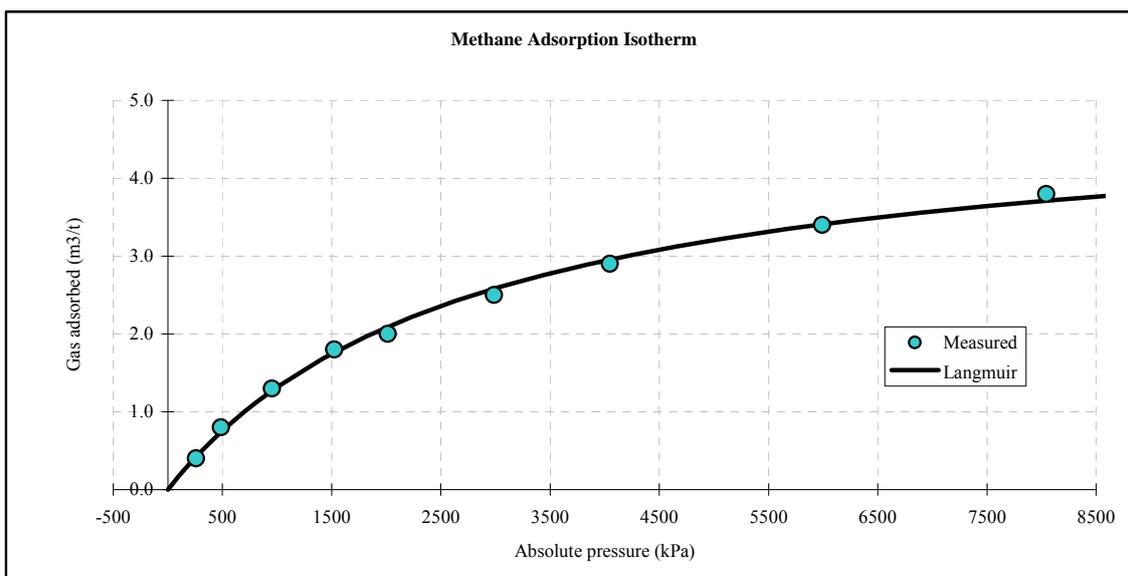
ADSORPTION ISOTHERM AT 18°C

CLIENT: Pure Energy Resources Limited
SAMPLE: Fingal-55B Sample 5
SAMPLE DEPTH: 189.70 m

SEAM: B
REPORT: 1014-06

Isotherm		$C = V_L \cdot P / (P + P_L)$
C: gas content, P: pressure		
V _L and P _L : Langmuir Volume and Pressure		
Gauge pressure (P) kPa	Gas adsorbed (C, m ³ /t) fitted	
0	0.00	
310	0.47	
621	0.85	
1276	1.47	
2551	2.26	
5102	3.08	
6067	3.27	

Coal density		
(He, g/cc)	1.81	
Proximate analysis (%)		
		daf
Air dried moisture	4.8	-
Volatiles	14.9	34.02
Fixed C	28.9	65.98
Ash	51.4	-
Total	100.0	100.00



Langmuir Isotherm Parameters

Gas adsorbed (desorbable)		Gas adsorbed (total gas)	
V _L (gauge) =	4.84 m ³ /t	V _L (abs)=	5.01 m ³ /t
P _L (gauge) =	2911 kPa	P _L (abs)=	2810 kPa
		Gas content at 1 atm.	0.17 m ³ /t
			V _L (abs, daf) 12.19

Abs. Pressure (kPa)	Total adsorbed gas (m ³ /t)
259	0.4
485	0.8
954	1.3
1523	1.8
2015	2.0
2987	2.5
4047	2.9
5991	3.4
8044	3.8

CH4 storage capacity of coal at seam depth (based on isotherm)
1.88 m ³ /t

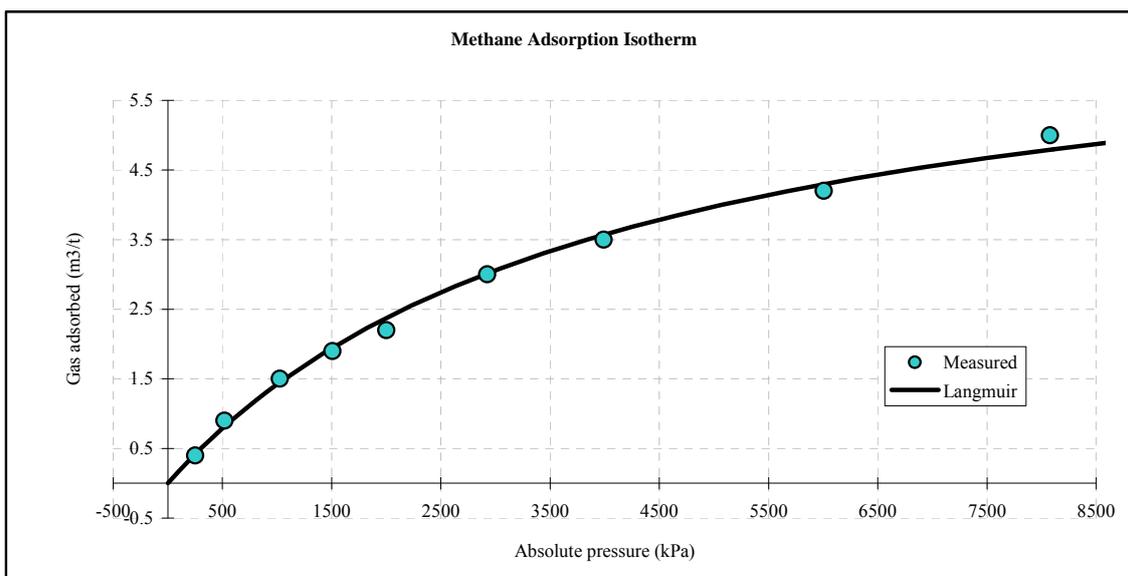
ADSORPTION ISOTHERM AT 19°C

CLIENT: Pure Energy Resources Limited
SAMPLE: Fingal-55B Sample 7
SAMPLE DEPTH: 238.98 m

SEAM: D Upper
REPORT: 1014-06

Isotherm		$C = V_L \cdot P / (P + P_L)$
C: gas content, P: pressure		
V _L and P _L : Langmuir Volume and Pressure		
Gauge pressure (P) kPa	Gas adsorbed (C, m ³ /t) fitted	
0	0.00	
310	0.49	
621	0.91	
1276	1.65	
2551	2.67	
5102	3.87	
6067	4.17	

Coal density		
(He, g/cc)	1.60	
Proximate analysis (%)		
		daf
Air dried moisture	5.5	-
Volatiles	20.4	42.95
Fixed C	27.1	57.05
Ash	47.0	-
Total	100.0	100.00



Langmuir Isotherm Parameters

Gas adsorbed (desorbable)		Gas adsorbed (total gas)	
V _L (gauge) =	7.03 m ³ /t	V _L (abs)=	7.21 m ³ /t
P _L (gauge) =	4171 kPa	P _L (abs)=	4070 kPa
		Gas content at 1 atm.	0.18 m ³ /t
			V _L (abs, daf) 12.19

Abs. Pressure (kPa)	Total adsorbed gas (m ³ /t)
250	0.4
520	0.9
1025	1.5
1509	1.9
2002	2.2
2924	3.0
3990	3.5
6007	4.2
8076	5.0

CH4 storage capacity of coal at seam depth (based on isotherm)
2.52 m³/t

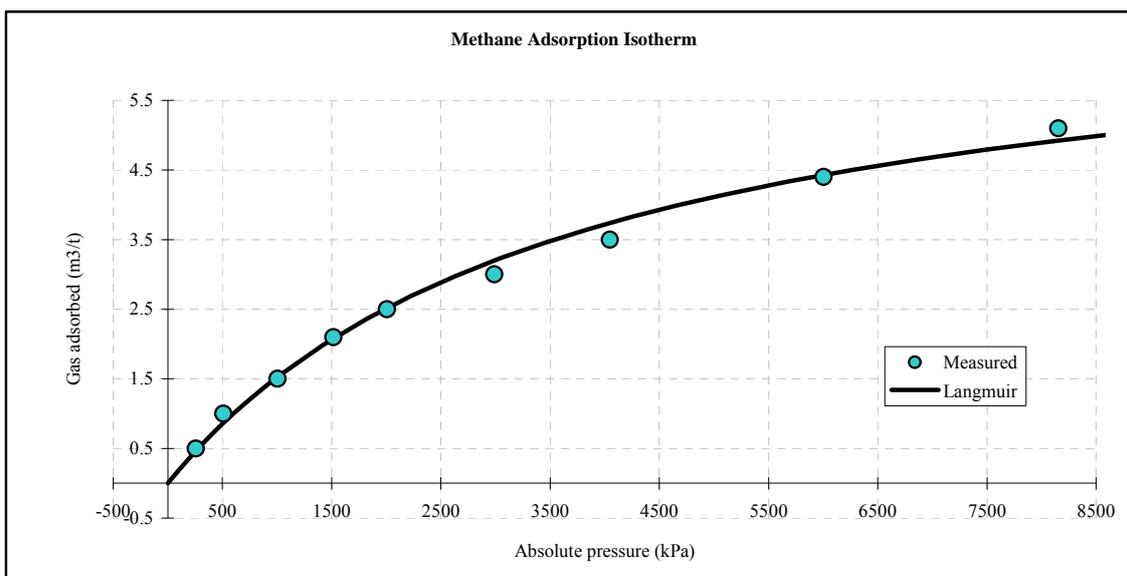
ADSORPTION ISOTHERM AT 19°C

CLIENT: Pure Energy Resources Limited
SAMPLE: Fingal-55B Sample 8
SAMPLE DEPTH: 244.10 m

SEAM: D Lower
REPORT: 1014-06

Isotherm		$C = V_L \cdot P / (P + P_L)$
C: gas content, P: pressure		
V _L and P _L : Langmuir Volume and Pressure		
Gauge pressure (P) kPa	Gas adsorbed (C, m ³ /t) fitted	
0	0.00	
310	0.53	
621	0.98	
1276	1.75	
2551	2.80	
5102	3.99	
6067	4.28	

Coal density		
(He, g/cc)	1.60	
Proximate analysis (%)		
		daf
Air dried moisture	5.0	-
Volatiles	24.9	41.29
Fixed C	35.4	58.71
Ash	34.7	-
Total	100.0	100.00



Langmuir Isotherm Parameters

Gas adsorbed (desorbable)		Gas adsorbed (total gas)	
V _L (gauge) =	6.97 m ³ /t	V _L (abs)=	7.16 m ³ /t
P _L (gauge) =	3801 kPa	P _L (abs)=	3700 kPa
		Gas content at 1 atm.	0.19 m ³ /t
			V _L (abs, daf) 12.19

Abs. Pressure (kPa)	Total adsorbed gas (m ³ /t)
257	0.5
508	1.0
1006	1.5
1517	2.1
2005	2.5
2989	3.0
4048	3.5
6005	4.4
8153	5.1

CH4 storage capacity of coal at seam depth (based on isotherm)
2.68 m³/t

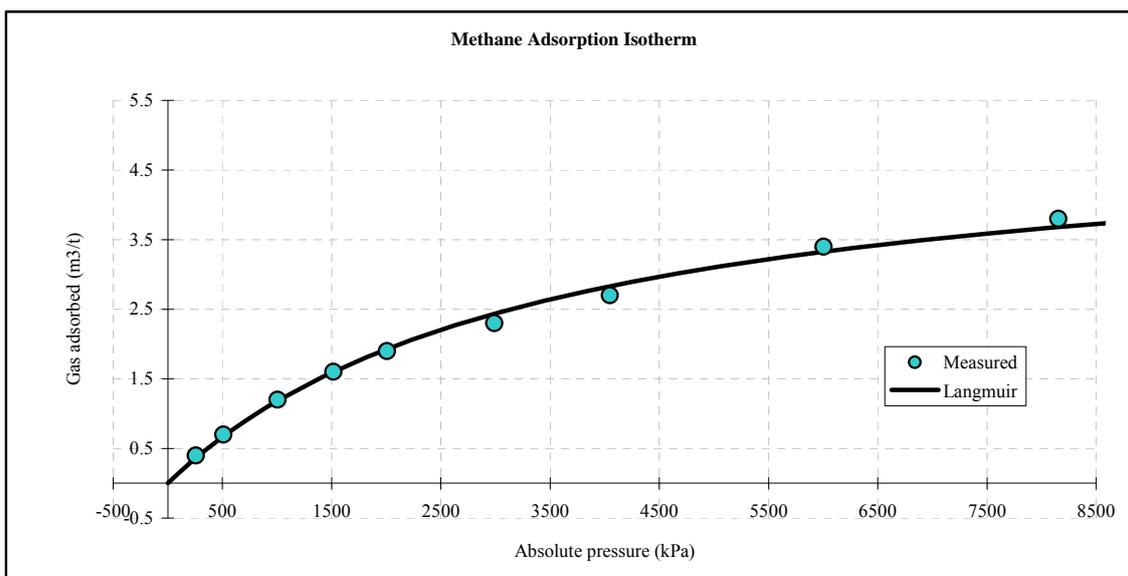
ADSORPTION ISOTHERM AT 19°C

CLIENT: Pure Energy Resources Limited
SAMPLE: Fingal-55B Sample 9
SAMPLE DEPTH: 245.05 m

SEAM: D Lower
REPORT: 1014-06

Isotherm		$C = V_L \cdot P / (P + P_L)$
C: gas content, P: pressure		
V _L and P _L : Langmuir Volume and Pressure		
Gauge pressure (P) kPa	Gas adsorbed (C, m ³ /t) fitted	
0	0.00	
310	0.41	
621	0.76	
1276	1.35	
2551	2.13	
5102	3.00	
6067	3.21	

Coal density		
(He, g/cc)	1.64	
Proximate analysis (%)		
		daf
Air dried moisture	4.8	-
Volatiles	22.0	43.65
Fixed C	28.4	56.35
Ash	44.8	-
Total	100.0	100.00



Langmuir Isotherm Parameters

Gas adsorbed (desorbable)		Gas adsorbed (total gas)	
V _L (gauge) =	5.08 m ³ /t	V _L (abs) =	5.23 m ³ /t
P _L (gauge) =	3531 kPa	P _L (abs) =	3430 kPa
		Gas content at 1 atm.	0.15 m ³ /t
			V _L (abs, daf) = 12.19

Abs. Pressure (kPa)	Total adsorbed gas (m ³ /t)
257	0.4
508	0.7
1006	1.2
1517	1.6
2005	1.9
2989	2.3
4048	2.7
6005	3.4
8153	3.8

CH ₄ storage capacity of coal at seam depth (based on isotherm)
2.05 m³/t

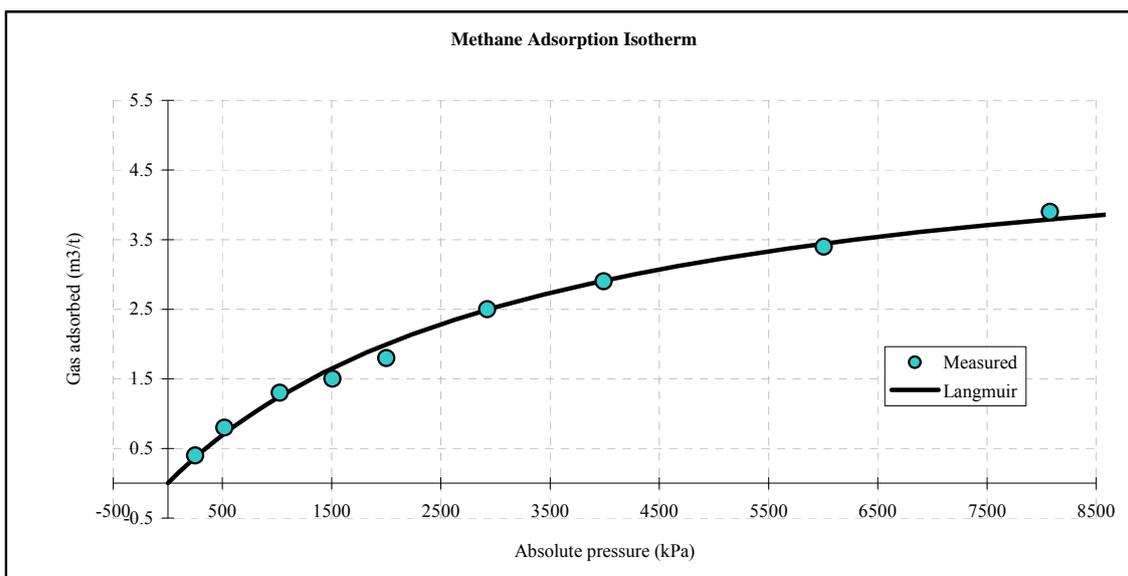
ADSORPTION ISOTHERM AT 21°C

CLIENT: Pure Energy Resources Limited
SAMPLE: Fingal-55B Sample 11
SAMPLE DEPTH: 297.80 m

SEAM: Unnamed
REPORT: 1014-06

Isotherm		$C = V_L \cdot P / (P + P_L)$
C: gas content, P: pressure		
V _L and P _L : Langmuir Volume and Pressure		
Gauge pressure (P) kPa	Gas adsorbed (C, m ³ /t) fitted	
0	0.00	
310	0.43	
621	0.79	
1276	1.40	
2551	2.21	
5102	3.10	
6067	3.32	

Coal density		
(He, g/cc)	1.71	
Proximate analysis (%)		
		daf
Air dried moisture	5.6	-
Volatiles	19.7	44.17
Fixed C	24.9	55.83
Ash	49.8	-
Total	100.0	100.00



Langmuir Isotherm Parameters

Gas adsorbed (desorbable)		Gas adsorbed (total gas)	
V _L (gauge) =	5.23 m ³ /t	V _L (abs)=	5.39 m ³ /t
P _L (gauge) =	3501 kPa	P _L (abs)=	3400 kPa
		Gas content at 1 atm.	0.16 m ³ /t
			V _L (abs, daf) 12.19

Abs. Pressure (kPa)	Total adsorbed gas (m ³ /t)
250	0.4
520	0.8
1025	1.3
1509	1.5
2002	1.8
2924	2.5
3990	2.9
6007	3.4
8076	3.9

CH4 storage capacity of coal at seam depth (based on isotherm)
2.37 m ³ /t

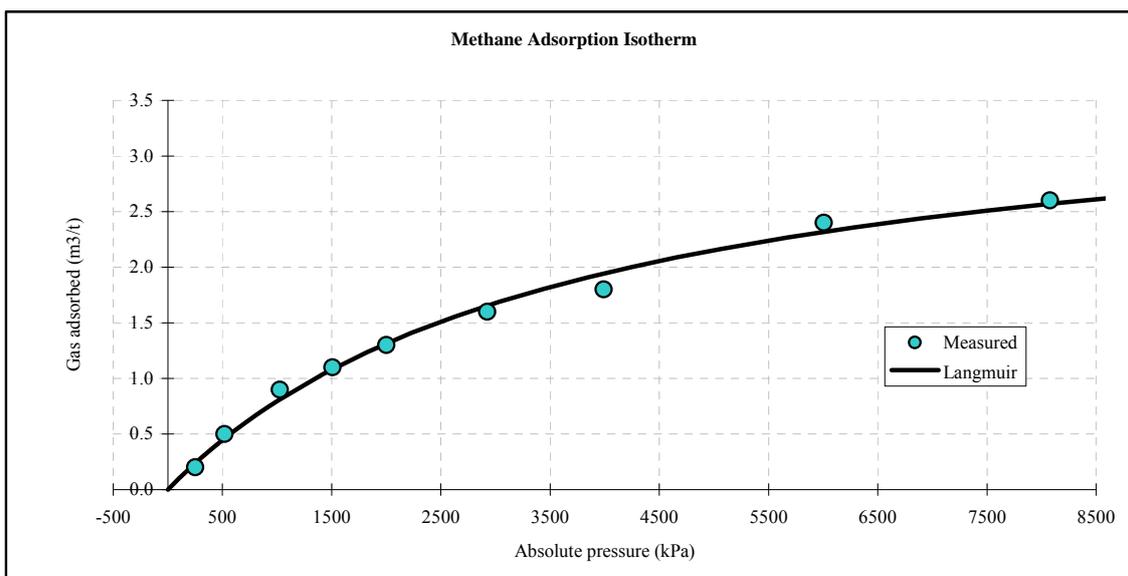
ADSORPTION ISOTHERM AT 22°C

CLIENT: Pure Energy Resources Limited
SAMPLE: Fingal-55B Sample 12
SAMPLE DEPTH: 328.30 m

SEAM: Rouge
REPORT: 1014-06

Isotherm		$C = V_L \cdot P / (P + P_L)$
C: gas content, P: pressure		
V _L and P _L : Langmuir Volume and Pressure		
Gauge pressure (P) kPa	Gas adsorbed (C, m ³ /t) fitted	
0	0.00	
310	0.27	
621	0.51	
1276	0.92	
2551	1.46	
5102	2.09	
6067	2.24	

Coal density		
(He, g/cc)	1.76	
Proximate analysis (%)		
		daf
Air dried moisture	5.7	-
Volatiles	16.1	31.26
Fixed C	35.4	68.74
Ash	42.8	-
Total	100.0	100.00



Langmuir Isotherm Parameters

Gas adsorbed (desorbable)		Gas adsorbed (total gas)	
V _L (gauge) =	3.65 m ³ /t	V _L (abs)=	3.75 m ³ /t
P _L (gauge) =	3811 kPa	P _L (abs)=	3710 kPa
		Gas content at 1 atm.	0.10 m ³ /t
			V _L (abs, daf) 12.19

Abs. Pressure (kPa)	Total adsorbed gas (m ³ /t)
250	0.2
520	0.5
1025	0.9
1509	1.1
2002	1.3
2924	1.6
3990	1.8
6007	2.4
8076	2.6

CH ₄ storage capacity of coal at seam depth (based on isotherm)
1.66 m ³ /t

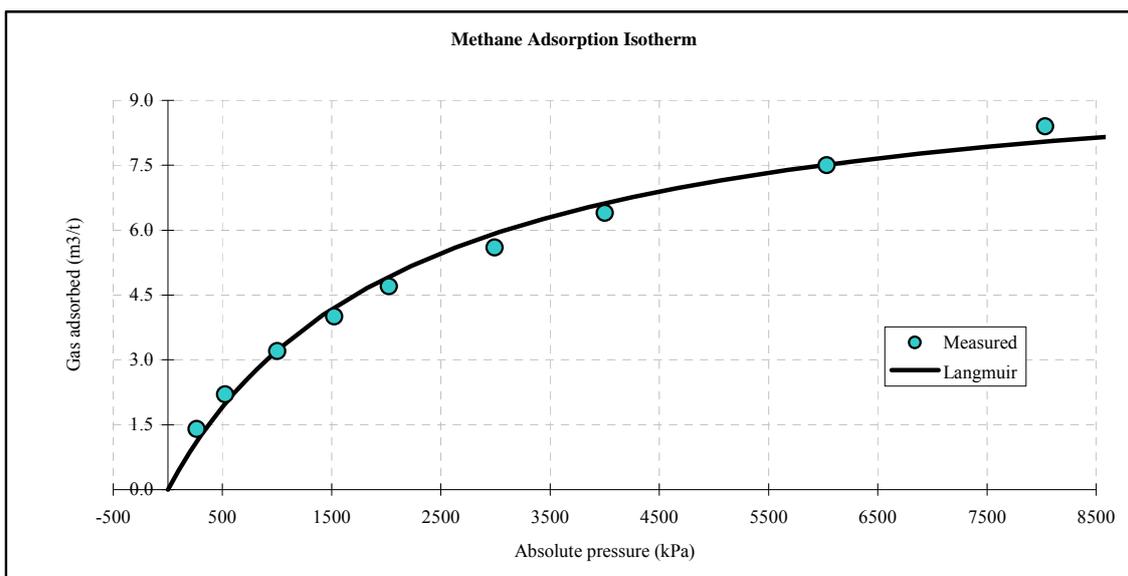
ADSORPTION ISOTHERM AT 24°C

CLIENT: Pure Energy Resources Limited
SAMPLE: Fingal-55B Sample 13
SAMPLE DEPTH: 342.50 m

SEAM: Rouge
REPORT: 1014-06

Isotherm		$C = V_L \cdot P / (P + P_L)$
C: gas content, P: pressure		
V _L and P _L : Langmuir Volume and Pressure		
Gauge pressure (P) kPa	Gas adsorbed (C, m ³ /t) fitted	
0	0.00	
310	1.17	
621	2.09	
1276	3.51	
2551	5.16	
5102	6.76	
6067	7.10	

Coal density		
(He, g/cc)	1.71	
Proximate analysis (%)		
		daf
Air dried moisture	2.9	-
Volatiles	16.9	31.24
Fixed C	37.2	68.76
Ash	43.0	-
Total	100.0	100.00



Langmuir Isotherm Parameters

Gas adsorbed (desorbable)		Gas adsorbed (total gas)	
V _L (gauge) =	9.78 m ³ /t	V _L (abs)=	10.23 m ³ /t
P _L (gauge) =	2281 kPa	P _L (abs)=	2180 kPa
		Gas content at 1 atm.	0.45 m ³ /t
			V _L (abs, daf) 12.19

Abs. Pressure (kPa)	Total adsorbed gas (m ³ /t)
265	1.4
524	2.2
1003	3.2
1524	4.0
2025	4.7
2992	5.6
4002	6.4
6032	7.5
8033	8.4

CH4 storage capacity of coal at seam depth (based on isotherm)
5.80 m ³ /t

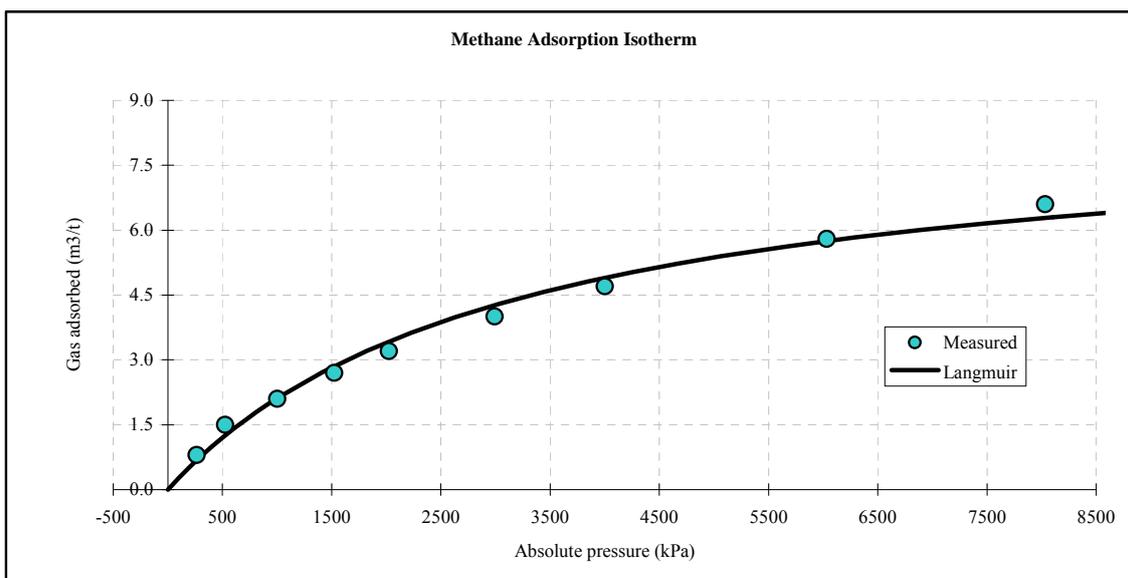
ADSORPTION ISOTHERM AT 24°C

CLIENT: Pure Energy Resources Limited
SAMPLE: Fingal-55B Sample 14
SAMPLE DEPTH: 346.75 m

SEAM: Rouge
REPORT: 1014-06

Isotherm		$C = V_L \cdot P / (P + P_L)$
C: gas content, P: pressure		
V _L and P _L : Langmuir Volume and Pressure		
Gauge pressure (P) kPa	Gas adsorbed (C, m ³ /t) fitted	
0	0.00	
310	0.74	
621	1.36	
1276	2.39	
2551	3.73	
5102	5.18	
6067	5.52	

Coal density		
(He, g/cc)	1.55	
Proximate analysis (%)		
		daf
Air dried moisture	4.0	-
Volatiles	23.8	32.56
Fixed C	49.3	67.44
Ash	22.9	-
Total	100.0	100.00



Langmuir Isotherm Parameters

Gas adsorbed (desorbable)		Gas adsorbed (total gas)	
V _L (gauge) =	8.47 m ³ /t	V _L (abs)=	8.74 m ³ /t
P _L (gauge) =	3241 kPa	P _L (abs)=	3140 kPa
		Gas content at 1 atm.	0.27 m ³ /t
			V_L(abs, daf)
			12.19

Abs. Pressure (kPa)	Total adsorbed gas (m ³ /t)
265	0.8
524	1.5
1003	2.1
1524	2.7
2025	3.2
2992	4.0
4002	4.7
6032	5.8
8033	6.6

CH ₄ storage capacity of coal at seam depth (based on isotherm)
4.32 m ³ /t

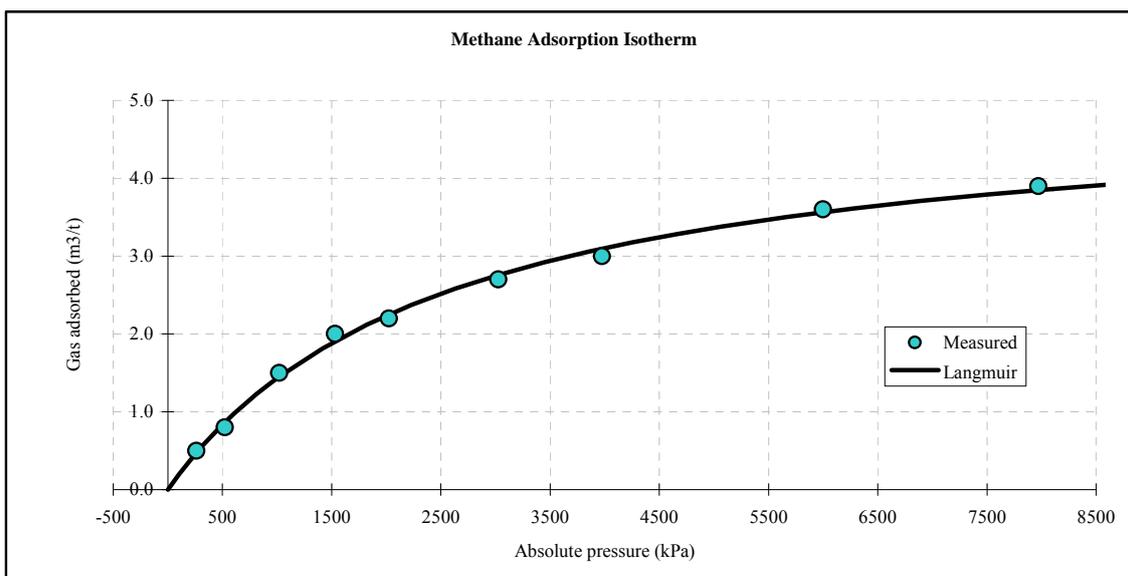
ADSORPTION ISOTHERM AT 26°C

CLIENT: Pure Energy Resources Limited
SAMPLE: Fingal-55B Sample 15
SAMPLE DEPTH: 365.45 m

SEAM: H
REPORT: 1014-06

Isotherm		$C = V_L \cdot P / (P + P_L)$
C: gas content, P: pressure		
V _L and P _L : Langmuir Volume and Pressure		
Gauge pressure (P) kPa	Gas adsorbed (C, m ³ /t) fitted	
0	0.00	
310	0.51	
621	0.93	
1276	1.59	
2551	2.40	
5102	3.22	
6067	3.40	

Coal density		
(He, g/cc)	1.55	
Proximate analysis (%)		
		daf
Air dried moisture	7.0	-
Volatiles	21.1	37.41
Fixed C	35.3	62.59
Ash	36.6	-
Total	100.0	100.00



Langmuir Isotherm Parameters

Gas adsorbed (desorbable)		Gas adsorbed (total gas)	
V _L (gauge) =	4.89 m ³ /t	V _L (abs)=	5.08 m ³ /t
P _L (gauge) =	2651 kPa	P _L (abs)=	2550 kPa
		Gas content at 1 atm.	0.19 m ³ /t
			V _L (abs, daf) 12.19

Abs. Pressure (kPa)	Total adsorbed gas (m ³ /t)
261	0.5
521	0.8
1021	1.5
1530	2.0
2024	2.2
3025	2.7
3975	3.0
6000	3.6
7972	3.9

CH ₄ storage capacity of coal at seam depth (based on isotherm)
2.80 m ³ /t

CHAPTER 6

CORE SAMPLING TIMESHEET

CBM CORE SAMPLING TIMESHEET

Client:	Pure Energy Resources Limited	Well:	Fingal 55B
Job Number:		Start Date:	31/05/2007
Sheet Number:	1	Engineer:	IJM
Start Depth	123.0m	TD	369.1m
Cored	242.7m	Recovered	242.9m 100%

Daily Summary	31-May	30.4	4-Jun	28.5	8-Jun	0.0	Daily Ave 24.6
	1-Jun	24.0	5-Jun	17.9	9-Jun	29.3	
	2-Jun	16.3	6-Jun	36.1	10-Jun	18.0	
	3-Jun	24.9	7-Jun	0.0	11-Jun	20.7	

Run No.	Top Depth	Bottom Depth	Meters Cored	Meters Recovered	Difference +/-	Time Core Penetrated	Time Core Left Bottom	Time Core Reached Surface	Date
1	123.0	126.4	3.40	0.04	-3.36	10:15	10:33	10:35	31-May
2	126.4	129.4	3.00	3.00	0.00	10:45	11:33	11:35	31-May
3	129.4	132.4	3.00	3.00	0.00	11:45	12:31	12:35	31-May
4	132.4	135.4	3.00	3.00	0.00	12:39	13:05	13:08	31-May
5	135.4	138.4	3.00	3.00	0.00	13:14	13:42	13:45	31-May
6	138.4	141.4	3.00	3.00	0.00	13:46	14:02	14:04	31-May
7	141.4	144.4	3.00	3.00	0.00	14:10	14:34	14:36	31-May
8	144.4	147.4	3.00	3.00	0.00	14:42	15:05	15:06	31-May
9	147.4	150.4	3.00	3.00	0.00	15:12	15:36	15:38	31-May
10	150.4	153.4	3.00	3.00	0.00	15:43	16:10	16:12	31-May
11	153.4	156.4	3.00	3.00	0.00	7:20	8:06	8:08	1-Jun
12	156.4	159.4	3.00	2.60	-0.40	8:15	8:46	8:48	1-Jun
13	159.4	161.0	1.60	1.70	0.10	8:51	9:21	9:24	1-Jun
14	161.0	164.0	3.00	2.90	-0.10	9:29	10:09	10:11	1-Jun
15	164.0	167.0	3.00	3.00	0.00	10:17	11:07	11:12	1-Jun
16	167.0	169.2	2.20	2.30	0.10	11:46	12:47	12:49	1-Jun
17	169.2	172.2	3.00	2.94	-0.06	13:21	14:25	14:27	1-Jun
18	172.2	175.2	3.00	3.00	0.00	14:45	15:37	15:39	1-Jun
19	175.2	177.4	2.20	2.06	-0.14	15:51	7:57	8:01	1-Jun
20	177.4	180.4	3.00	2.25	-0.75	8:09	8:53	8:55	2-Jun
21	180.4	183.0	2.60	3.06	0.46	9:04	9:33	9:35	2-Jun
22	183.0	186.0	3.00	3.00	0.00	9:42	10:11	10:13	2-Jun
23	186.0	186.8	0.80	0.88	0.08	10:21	10:41	10:43	2-Jun
24	186.8	189.4	2.60	2.96	0.36	10:47	11:27	11:29	2-Jun
25	189.4	190.7	1.30	1.10	-0.20	11:40	12:08	12:10	2-Jun
26	190.7	193.7	3.00	3.10	0.10	12:20	13:03	13:05	2-Jun
27	193.7	196.7	3.00	3.00	0.00	8:23	9:07	9:09	3-Jun
28	196.7	199.7	3.00	3.00	0.00	9:17	10:03	10:05	3-Jun
29	199.7	202.7	3.00	3.00	0.00	10:14	10:47	10:49	3-Jun
30	202.7	205.7	3.00	3.00	0.00	11:03	11:22	11:24	3-Jun
31	205.7	208.7	3.00	3.00	0.00	11:34	11:53	11:55	3-Jun
32	208.7	210.4	1.70	1.85	0.15	12:03	12:38	12:40	3-Jun
33	210.4	213.4	3.00	3.00	0.00	12:59	13:32	13:34	3-Jun
34	213.4	215.6	2.20	2.05	-0.15	13:45	14:33	14:35	3-Jun
35	215.6	218.6	3.00	3.10	0.10	14:44	15:44	15:46	3-Jun
36	218.6	221.6	3.00	2.90	-0.10	7:18	7:58	8:01	4-Jun

CBM CORE SAMPLING TIMESHEET

Client:	Pure Energy Resources Limited	Well:	Fingal 55B
Job Number:		Start Date:	31/05/2007
Sheet Number:	2	Engineer:	IJM
Start Depth	123.0m	TD	369.1m
Cored	242.7m	Recovered	242.9m 100%

Run No.	Top Depth	Bottom Depth	Meters Cored	Meters Recovered	Difference +/-	Time Core Penetrated	Time Core Left Bottom	Time Core Reached Surface	Date
37	221.6	224.6	3.00	3.00	0.00	8:09	8:34	8:37	4-Jun
38	224.6	227.6	3.00	3.00	0.00	8:45	9:06	9:08	4-Jun
39	227.6	230.6	3.00	3.00	0.00	9:16	9:40	9:42	4-Jun
40	230.6	233.6	3.00	3.00	0.00	9:51	10:44	10:46	4-Jun
41	233.6	236.6	3.00	3.03	0.03	11:30	11:55	11:58	4-Jun
42	236.6	239.6	3.00	3.00	0.00	12:05	12:43	12:45	4-Jun
43	239.6	242.6	3.00	3.00	0.00	12:54	13:40	13:43	4-Jun
44	242.6	244.1	1.50	1.45	-0.05	13:50	14:16	14:18	4-Jun
45	244.1	247.1	3.00	3.00	0.00	14:26	15:07	15:09	4-Jun
46	247.1	249.9	2.80	3.80	1.00	12:30	13:12	13:14	5-Jun
47	249.9	253.0	3.10	3.05	-0.05	13:30	14:00	14:05	5-Jun
48	253.0	256.0	3.00	3.00	0.00	14:14	14:35	14:37	5-Jun
49	256.0	259.0	3.00	3.00	0.00	14:49	15:06	15:08	5-Jun
50	259.0	262.0	3.00	3.00	0.00	15:17	15:48	15:51	5-Jun
51	262.0	265.0	3.00	3.00	0.00	16:00	16:32	16:37	5-Jun
52	265.0	268.0	3.00	3.00	0.00	7:20	7:50	7:55	6-Jun
53	268.0	270.4	2.40	2.40	0.00	8:12	8:51	5:53	6-Jun
54	270.4	273.4	3.00	3.00	0.00	9:03	9:26	9:29	6-Jun
55	273.4	276.4	3.00	2.90	-0.10	9:39	10:16	10:19	6-Jun
56	276.4	279.4	3.00	3.00	0.00	10:29	10:59	11:02	6-Jun
57	279.4	282.4	3.00	3.00	0.00	11:12	11:45	11:48	6-Jun
58	282.4	285.4	3.00	3.00	0.00	11:57	12:20	12:23	6-Jun
59	285.4	288.4	3.00	2.90	-0.10	12:31	13:01	13:04	6-Jun
60	288.4	291.4	3.00	3.00	0.00	13:12	13:45	13:48	6-Jun
61	291.4	294.4	3.00	3.00	0.00	13:54	14:24	14:27	6-Jun
62	294.4	297.4	3.00	3.00	0.00	14:34	15:03	15:06	6-Jun
63	297.4	300.4	3.00	3.00	0.00	15:15	16:07	16:10	6-Jun
64	300.4	301.1	0.70	0.65	-0.05	16:27	17:07	17:10	6-Jun
65	301.1	303.4	2.30	2.30	0.00	9:44	10:14	10:17	9-Jun
66	303.4	306.4	3.00	2.95	-0.05	10:24	10:48	10:51	9-Jun
67	306.4	309.4	3.00	3.05	0.05	11:01	11:26	11:29	9-Jun
68	309.4	312.4	3.00	3.00	0.00	11:38	12:02	12:05	9-Jun
69	312.4	315.4	3.00	3.00	0.00	12:13	12:35	12:28	9-Jun
70	315.4	318.4	3.00	2.95	-0.05	12:47	13:03	13:05	9-Jun
71	318.4	321.4	3.00	3.00	0.00	13:13	13:45	13:48	9-Jun
72	321.4	324.4	3.00	3.00	0.00	13:57	14:19	14:22	9-Jun
73	324.4	327.4	3.00	3.00	0.00	14:29	14:55	14:58	9-Jun
74	327.4	330.4	3.00	3.00	0.00	15:07	15:57	16:00	9-Jun
75	330.4	333.4	3.00	3.00	0.00	7:15	7:58	8:01	10-Jun
76	333.4	336.4	3.00	3.00	0.00	8:11	8:48	8:52	10-Jun
77	336.4	339.4	3.00	2.90	-0.10	9:03	9:36	9:39	10-Jun
78	339.4	342.4	3.00	3.05	0.05	9:51	10:26	10:30	10-Jun
79	342.4	345.4	3.00	3.00	0.00	10:40	11:25	11:29	10-Jun

CBM CORE SAMPLING TIMESHEET

Client:	Pure Energy Resources Limited	Well:	Fingal 55B
Job Number:		Start Date:	31/05/2007
Sheet Number:	3	Engineer:	IJM
Start Depth	123.0m	TD	369.1m
Cored	242.7m	Recovered	242.9m 100%

Run No.	Top Depth	Bottom Depth	Meters Cored	Meters Recovered	Difference +/-	Time Core Penetrated	Time Core Left Bottom	Time Core Reached Surface	Date
80	345.4	348.4	3.00	3.00	0.00	11:39	12:18	12:22	10-Jun
81	348.4	351.4	3.00	3.05	0.05	8:20	9:09	9:13	11-Jun
82	351.4	354.4	3.00	3.00	0.00	9:28	9:58	10:02	11-Jun
83	354.4	357.4	3.00	3.00	0.00	10:13	10:44	10:47	11-Jun
84	357.4	360.4	3.00	3.00	0.00	10:55	11:43	11:47	11-Jun
85	360.4	363.4	3.00	2.95	-0.05	11:54	12:19	12:23	11-Jun
86	363.4	366.1	2.70	2.70	0.00	12:32	13:19	13:23	11-Jun
87	366.1	369.1	3.00	3.00	0.00	13:33	14:56	14:49	11-Jun