

# AUSTRALIAN PACIFIC COAL REPORT ON DRILLING EPC1827

11 October 2011



## Australian Pacific Coal ASX: AQC

Australian Pacific Coal (AQC) is an emerging ASX coal explorer focused on the Bowen Basin, Queensland.

Through a series of acquisitions, AQC has positioned itself with both metallurgical and thermal coal projects potentially suited for underground and open cut mining.

The focus of AQC's operations is to value add the coal projects through evaluation of resource potential of the projects followed up with drilling as required to prove up the resource. Early stage drilling has commenced on selected projects.

Following on from the value add process, AQC's exploitation opportunities for individual coal projects include development of the project in its own right, farm-in, joint venture exploration, joint venture development or outright sale.

AQC's long term strategic focus is based on seeking out and identifying potentially lucrative resource investment opportunities.

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## Report on Drilling of Secondary Shallow Target – EPC1827 Cooroorah

### KEY POINTS

- The Cooroorah shallow target is a secondary target separate to the main Cooroorah Inferred Resource of 107 million tonnes of coal.
- Drilling of shallow coal targets in the northern extent of EPC 1827 identified two significant seams believed to be the Leo and Aquarius seams of the Burngrove Formation
- 636.48m was drilled between 9<sup>th</sup> and 16<sup>th</sup> July at four sites to provide core samples of the shallow seams for quality analysis
- Coal quality analysis shows that both intersected seams in the shallow secondary target lack suitable coking characteristics.
- Results indicate that there are high inherent ash levels in the coal. The shallow targets of the Leo and Aquarius seams are low yielding and do not possess desirable coking coal properties to justify further investigation.

## **EPC1827 - Cooroorah**

### **Area Coal Pty Ltd**

# **Report on Drilling of Secondary Shallow Target**

## **July 2011**

**Submitted by:**

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**10/10/2011**

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## Competent Person's Statement

*The information in this announcement which relates to Exploration Results, Mineral Resources or Ore Reserves, is based on information compiled for Australian Pacific Coal Limited which has been reviewed by S.W. (Bill) Hayes, who is a Fellow of the Australasian Institute of Mining and Metallurgy. Mr Hayes is the principal of Fairpark Pty Ltd trading as S.W. Hayes & Associates (ACN 010 459 891) and has over 40 years of exploration and mining experience in a variety of mineral deposit styles. Mr Hayes has sufficient experience which is relevant to the style of mineralisation and type of deposit under consideration and to the activity that he is undertaking to qualify as a Competent Person as defined in the 2004 edition of the Australasian Code for Reporting of Exploration Results, Exploration Targets, Mineral Resources and Ore Reserves. S.W. Hayes & Associates consents to the inclusion in this announcement of the matters based on their review of the information in the form and context in which it appears.*

## SUMMARY

EPC1827 (Cooroorah) was granted to Area Coal Pty Ltd on the 25<sup>th</sup> November 2009 for a period of 5 years, and comprises 7 sub-blocks covering approximately 22km<sup>2</sup>. The tenement is located 15km north-east of Blackwater in eastern central Queensland's Bowen Basin, between the operating mines of Curragh and Jellinbah.

The Cooroorah shallow coal target is separate to the main Cooroorah Inferred Resource of 107 million tonnes of coal. It is located in the north of EPC1827 between the Jellinbah Fault, and the Jellinbah Mine ML boundaries. Historical shallow drilling intersected coal in this area, and from assessment of geophysical logs it was considered to be of sufficient potential quality to warrant drill testing.

A total of 636.48m was drilled between the 9th and 16th July at four sites comprising 588.67m of open-hole chip drilling and 47.81m of core drilling. The purpose of the drillholes was to provide coal core samples of the shallow seams for quality analysis, and then open-hole drill further to test for additional seams.

The Leo seam and the stratigraphically deeper Aquarius seam of the Burngrove Formation were intersected. The Leo seam, intersected in drillhole RDH01C, had a total thickness of 2.03m comprising four main coal plies with a cumulative thickness of 1.67m. The Aquarius seam, intersected in drillholes RDH02C and RDH03C, had 6 to 8 coal plies with total average seam thickness of approximately 4.3m and maximum cumulative coal ply thickness of 3.17m.

Coal quality analysis shows that both of the intersected seams lack suitable coking characteristics. The low amplitude response of coal densities identified by geophysical logging in the holes drilled confirms the low-yield, high-ash results of the coal quality analysis.

Results indicate that there are high inherent ash levels in the coal, probably due to fine tuffaceous and clay material that cannot be easily separated by coal beneficiation. The shallow targets of the Leo and Aquarius seams in EPC1827 are low yielding and do not possess desirable coking coal properties to justify further investigation.



# 1.0 INTRODUCTION

## 1.1 Location and Access

EPC1827 is located 15km north-east of Blackwater in eastern central Queensland (Figure 1), about 180km west of Rockhampton. The Capricorn Highway and high capacity Central Railway run through Blackwater to the south of the EPC and the majority of coal mined in the district is transported via the train line through to the Gladstone Coal Terminal, a distance of approximately 300km by rail.

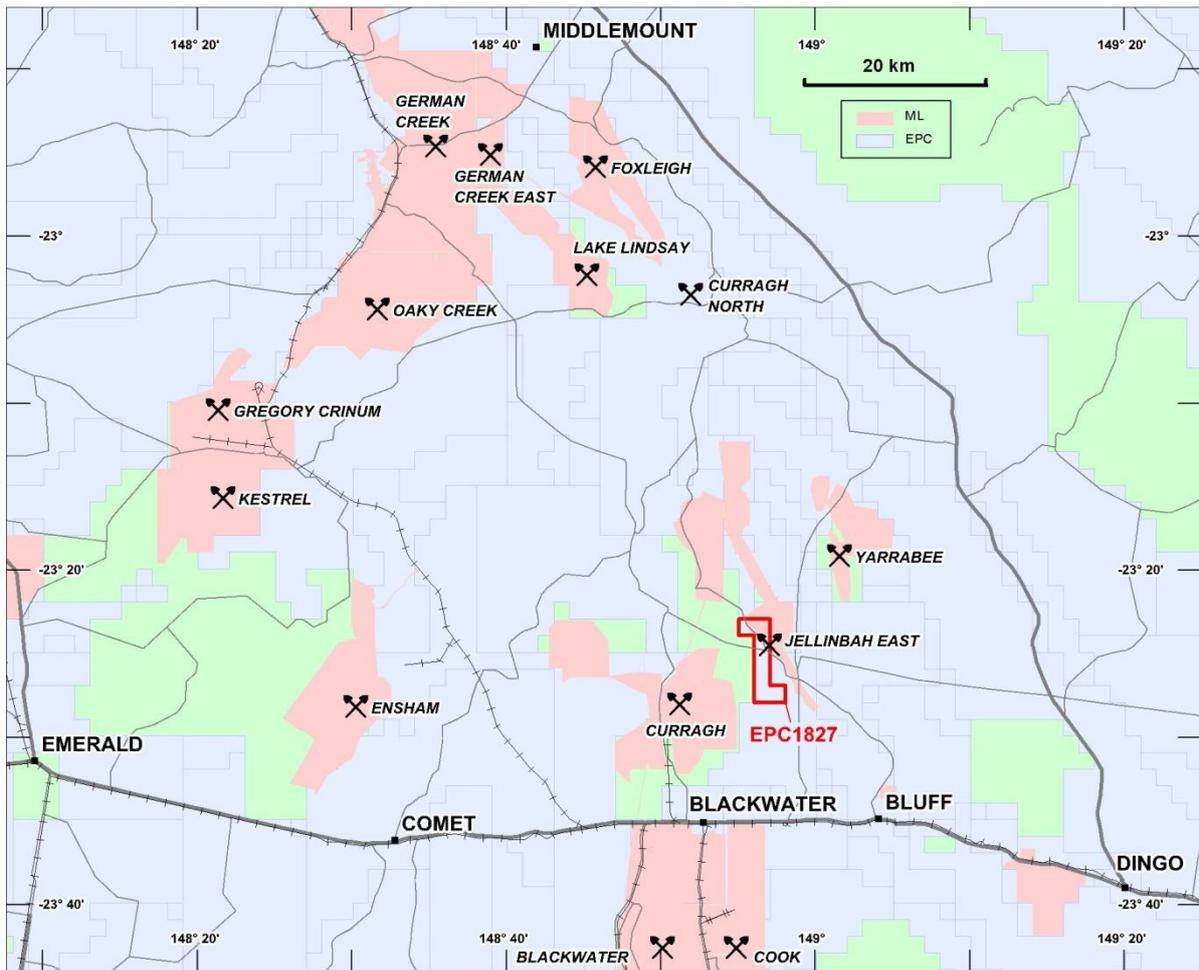


Figure 1 – Tenement Location Map

The EPC is located between the operating mines of Jellinbah to the east, and Curragh to the west. Access to the EPC from the Capricorn Highway is via the Bluff-Jellinbah Road to the New Caledonia property and then via a network of farm tracks.

## 1.2 Tenement Status

EPC1827 (Cooroorah) was granted to Area Coal Pty Ltd on the 25<sup>th</sup> November 2009 for a period of 5 years, and comprises seven sub-blocks covering approximately 22km<sup>2</sup>. Exploration within the tenement is limited to the area excluded from pre-existing mining leases (ML's).

Sub-block details are as follows:

<b>BIM</b>	<b>Block</b>	<b>Sub-Block</b>
CLER 2940	Q R W	
<u>CLER 3012</u>	<u>B G M N</u>	
<b>Total</b>		<b>7 Sub-Blocks</b>

## 1.3 Shallow Target Area

The Cooroorah shallow coal target is separate to Area Coal's main Cooroorah Coal Resource. It is located in the north of EPC1827 between the Jellinbah Fault, to the south-west, and the Jellinbah ML boundaries to the north-east. Historical shallow drilling intersected coal in this area, and from assessment of geophysical logs it was considered to be of sufficient potential quality to warrant drill testing.

Historical geophysical logs indicated low density coal plies with the potential for low to moderate yielding, hard coking coal similar to Aquila's Washpool Coal Project 20km west of the EPC. This exploration program was drilled to test for a similar scenario.

## 2.0 PREVIOUS EXPLORATION

Previous exploration drilling in and surrounding EPC1827 has been undertaken by the Geological Survey of Queensland (GSQ), and coal and coal bed methane (CBM) exploration companies. Data utilised in the assessment of the shallow target area was taken from drilling conducted by Australian Coal Enterprises Pty Ltd between 1996 and 2000. From thirty-six drillholes, fifteen were compiled, on the basis that they possess wireline logs, to assess the area and generate drilling targets. The remaining drillholes, referred to as the "WL" Series on Figure 2, were drilled in the north-western sub-block and were not fully compiled as they do not have wireline logs to facilitate positive seam correlation.

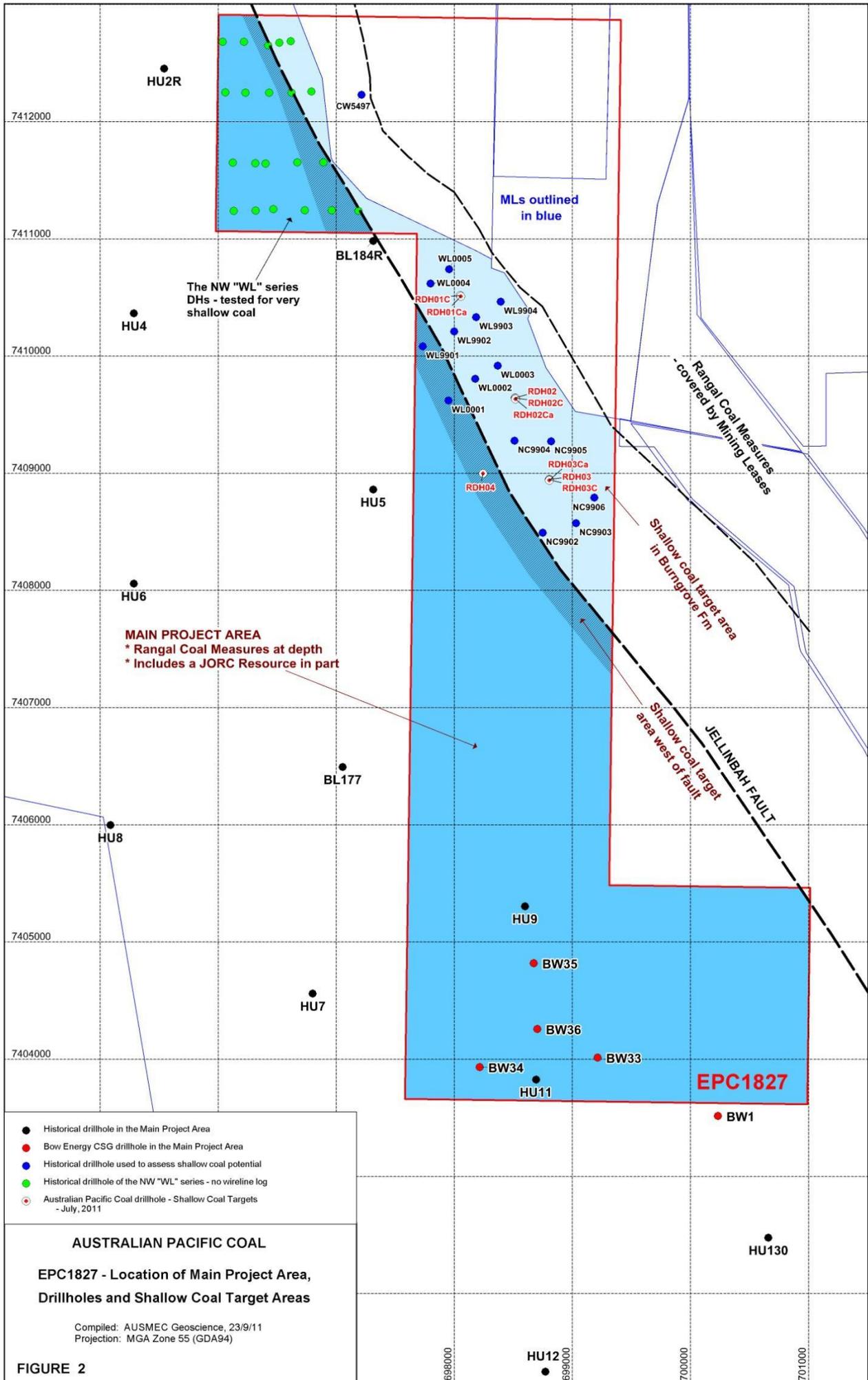
Eleven of the fifteen drillholes compiled for this exercise intersected coal of the Burngrove Formation east of the Jellinbah Fault, from between 2.8m and 44.4m depth from surface. Two drillholes, NC9902 and WL9901, on the western side of the fault, intersected shallow

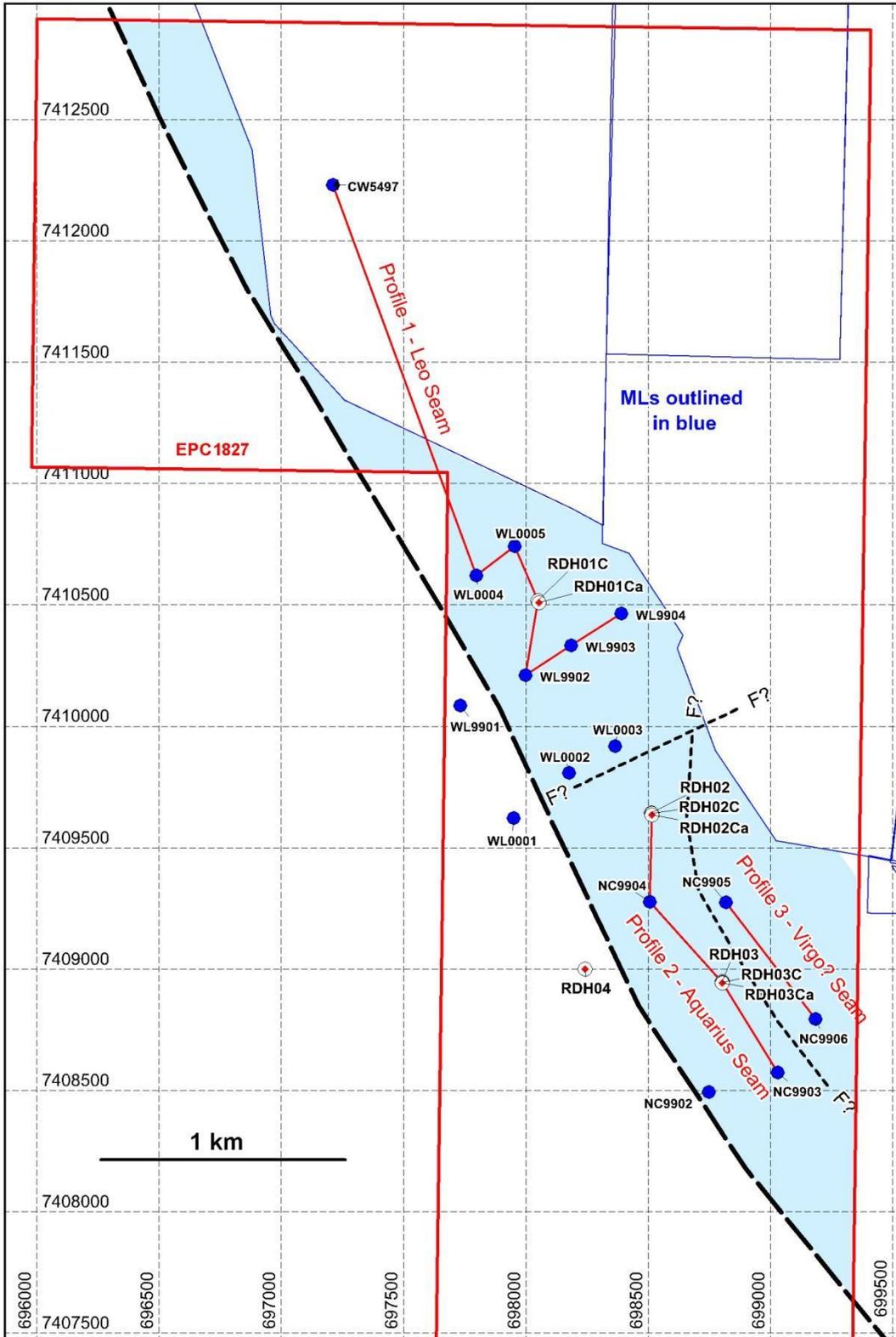


coal seams 4.56m and 8.86m thick respectively. These seams do not have the same wireline log signatures as those to the east of the fault.

Although not compiled, some of the "WL" Series of drillholes in the north-western corner of the EPC also intersected shallow coal seams west of, and adjacent to, the mapped position of the Jellinbah Fault. These cannot be confidently correlated with drillholes further to the south due to the absence of wireline logs. With the exception of two drillholes (WL0017 & WL0022), drilling within 100m to 250m of the western side of the fault intersected coal from 6m to 47m depth from surface (Figure 2).

Ten of these previously drilled holes have been included in the profiles of Figures 4, 5 & 6 to assist in seam correlations. Figure 3 shows drillhole locations.



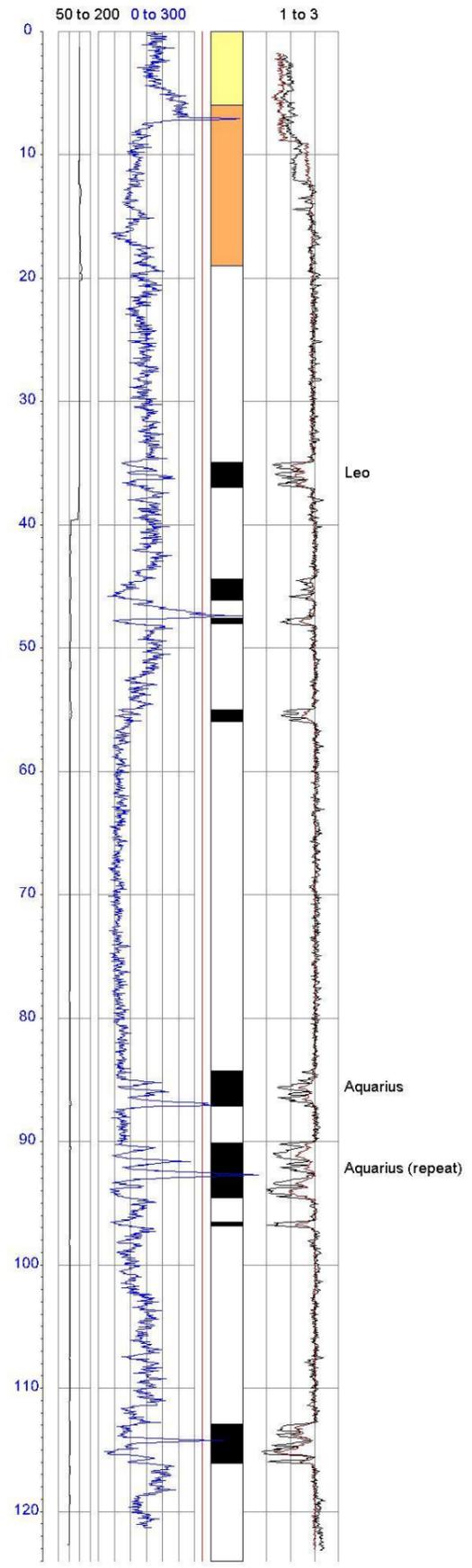
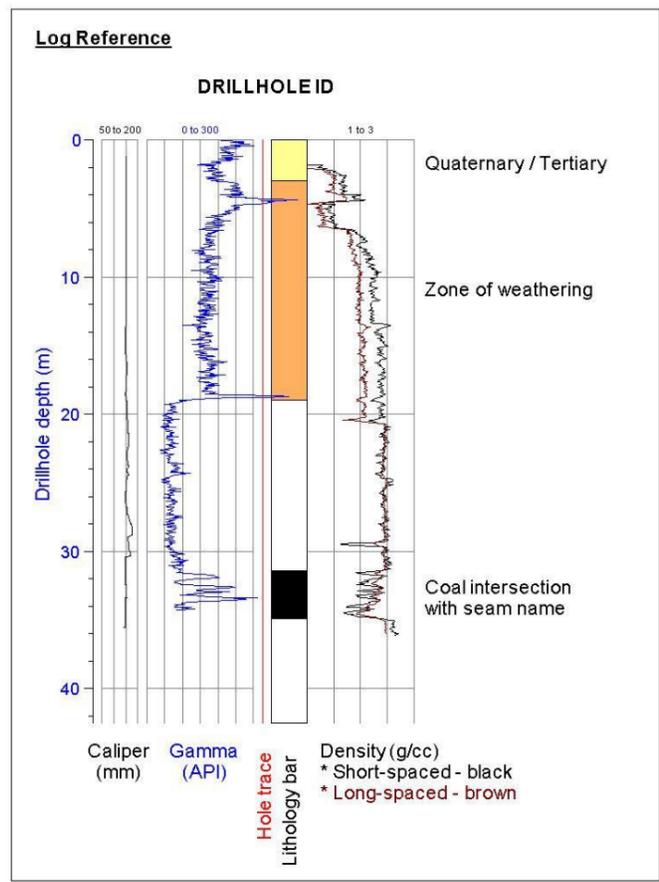
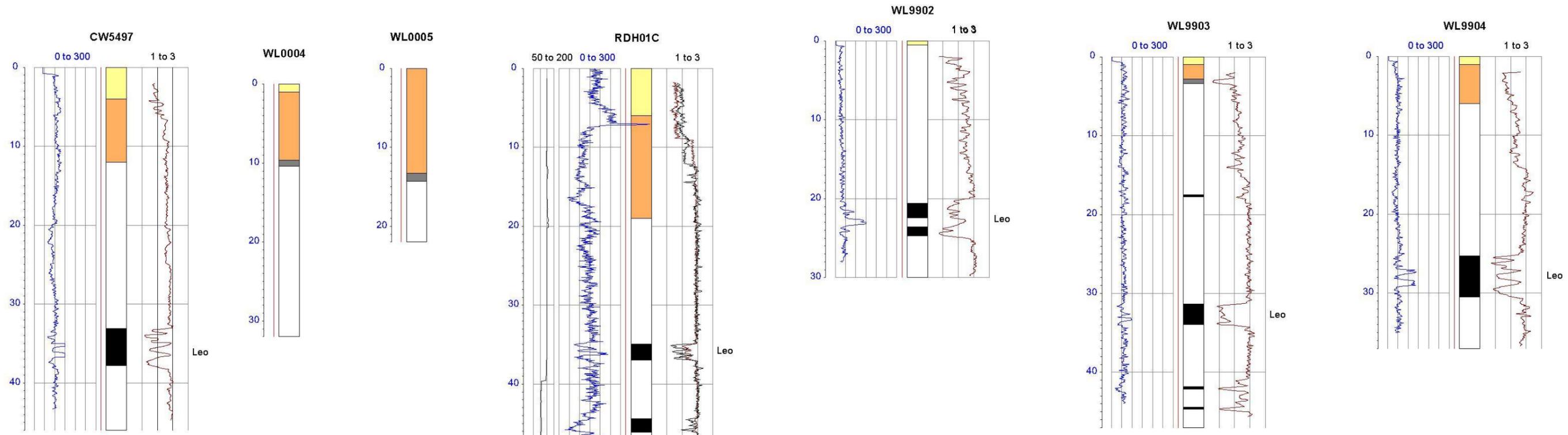


- Historical drillhole used to assess shallow coal potential
- ◆ Australian Pacific Coal drillhole, shallow coal targets - July, 2011

**AUSTRALIAN PACIFIC COAL**  
**EPC1827 - Shallow Coal Target Areas**  
**Location of Drillhole Profiles**

Compiled: AUSMEC Geoscience, 23/9/11  
 Projection: MGA Zone 55 (GDA94)

**FIGURE 3**



**AUSTRALIAN PACIFIC COAL**

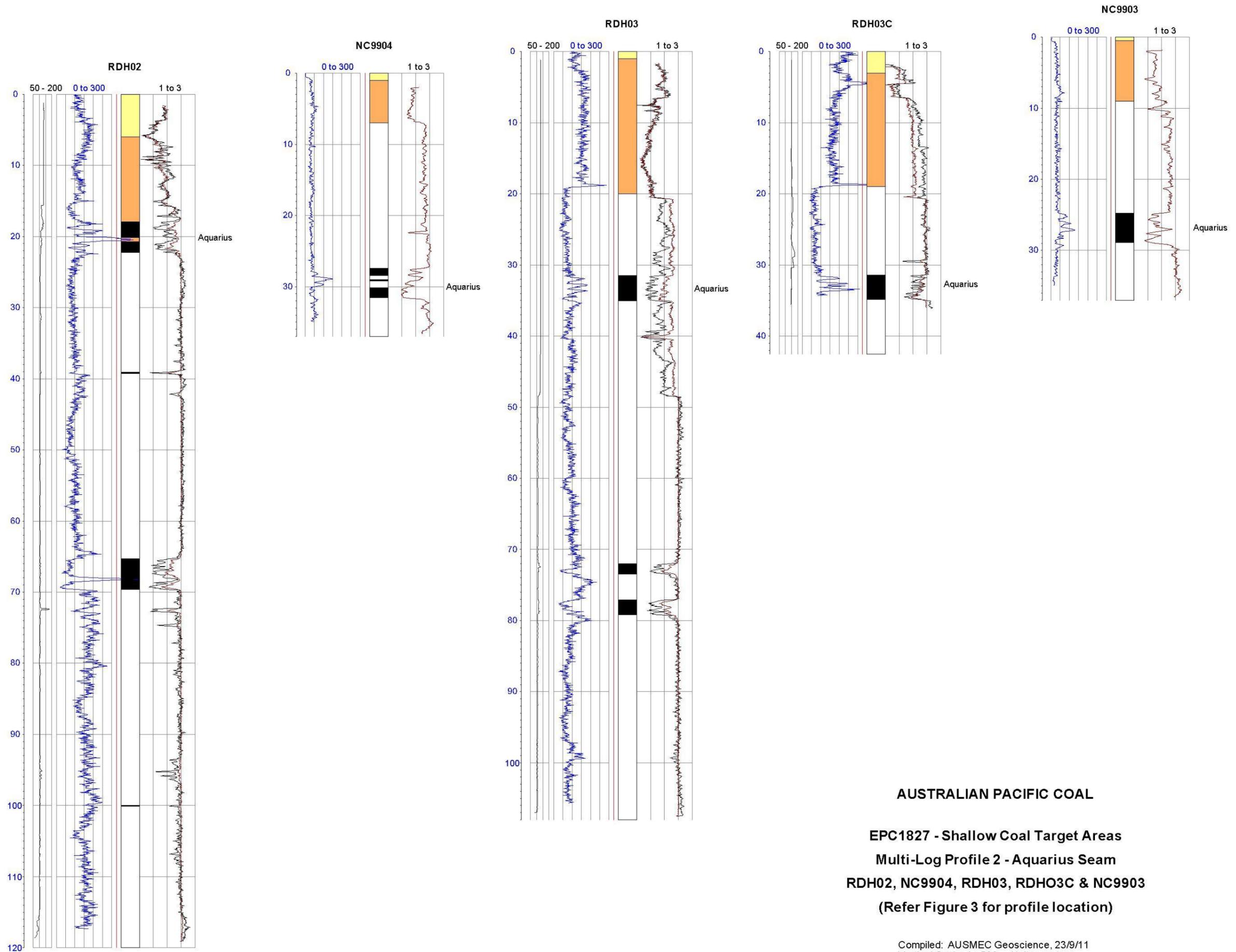
**EPC1827 - Shallow Coal Target Areas**

**Multi-Log Profile 1 - Leo Seam**

**CW5497, WL0004, WL0005, RDHO1C, WL9902, WL9903 & WL9904**

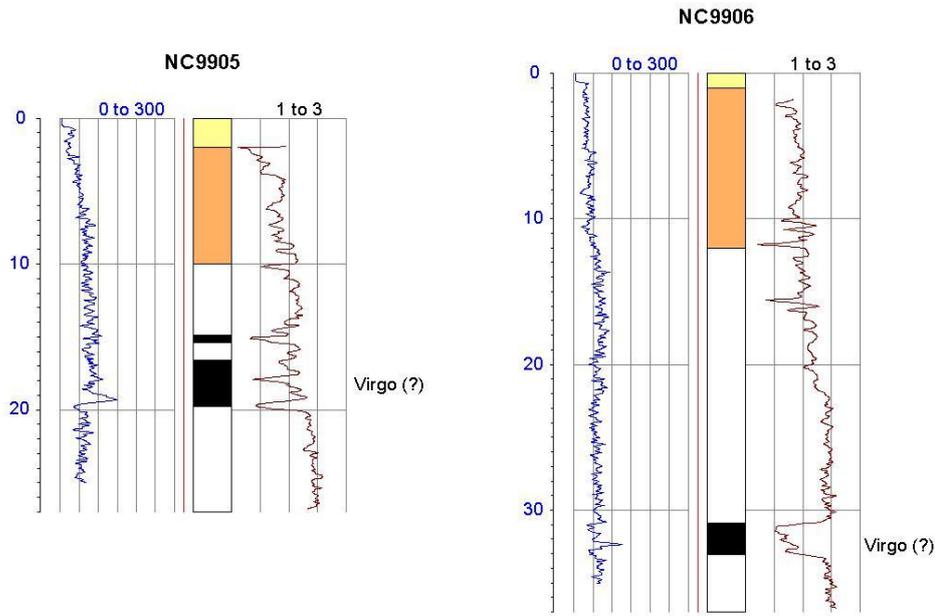
**(Refer Figure 3 for profile location)**

Compiled: AUSMEC Geoscience, 23/9/11  
 Vertical Scale: 1 : 500 Units: metres



**AUSTRALIAN PACIFIC COAL**  
**EPC1827 - Shallow Coal Target Areas**  
**Multi-Log Profile 2 - Aquarius Seam**  
**RDH02, NC9904, RDH03, RDH03C & NC9903**  
**(Refer Figure 3 for profile location)**

Compiled: AUSMEC Geoscience, 23/9/11  
 Vertical Scale: 1 : 500 Units: metres



**AUSTRALIAN PACIFIC COAL**

**EPC1827 - Shallow Coal Target Areas**

**Multi-Log Profile 3 - Virgo (?) Seam**

**NC9905 & NC9906**

**(Refer Figure 3 for profile location)**

Compiled: AUSMEC Geoscience, 23/9/11  
 Vertical Scale: 1 : 500 Units: metres

### 3.0 REGIONAL GEOLOGY

Three Permo-Triassic units of the Bowen Basin occur within EPC1827. These are, in ascending stratigraphic order, the Late Permian Burngrove Formation and Rangal Coal Measures (RCM) of the Blackwater Group, and the overlying Triassic Rewan Formation (Appendix 1).

Within EPC1827 these units are divided into two structural blocks by the north-west trending Jellinbah Fault; a major reverse fault which has a throw of up to 600m.

The area has an extensive but relatively thin Tertiary and Quaternary cover of sand and clay-bound sediments.

#### 3.1 Stratigraphy

##### 3.1.1 Late Permian

###### ***Burngrove Formation***

The Burngrove Formation is the lowest stratigraphic unit intersected by drilling in EPC1827. It typically consists of light green, light grey and grey mudstone and siltstone with minor fine grained sandstone beds. The top of the Formation is marked by the Virgo seam, the uppermost member of the formation.

To the east of the Jellinbah Fault the Burngrove Formation occurs at surface beneath a thin soil horizon. West of the fault the Burngrove Formation has been intersected just outside the EPC boundary at approximately 400m depth.

The Burngrove Formation contains a number of thick coal seams with high inherent ash and numerous tuffaceous claystone and mudstone bands. These seams may contain a low-yielding, hard coking coal product.

###### ***Rangal Coal Measures***

The Rangal Coal Measures (RCM) conformably overlie the Burngrove Formation, and consist of grey mudstone and siltstone, light grey fine lithic sandstone and numerous coal seams. To the west of the Jellinbah Fault, the footwall, upper seams of the RCM occur between about 200m and 400m depth in and around the EPC boundary.

The RCM coal seams are mined in the adjacent Jellinbah and Curragh coal mines, are persistent across the Bowen Basin and are the dominant coal measure in the Blackwater region. Three potentially economic coal seams, the Aries, Pollux and Pisces have been



found in EPC1827. The coal seams dip to the east ( $3^{\circ}$ – $5^{\circ}$ ), with the uppermost Aries seam intersected at 188m depth in GSQ drillhole Humboldt 7 (HU7) to the west of the EPC, and at 344m depth in GSQ drillhole HU9 further east within the EPC.

### **3.1.2 Early Triassic**

#### ***Rewan Formation***

The Rewan Formation overlies the Rangal Coal Measures. The strata consists of dull grey-green interbedded mudstone, siltstone and fine lithic sandstone. The boundary between these and the underlying RCM is commonly indentified by the colour change from grey-green to grey sediments.

The Rewan Formation occurs beneath thin Cainozoic cover to the west of the Jellinbah Fault and reaches depths over 375m in EPC1827.

### **3.1.3 Cainozoic Sediments**

Tertiary sediments that unconformably overlie the Permian and Triassic sequences consist of quartzose sandstone, siltstone, and claystone and occur predominantly in the south-east of the EPC. Quaternary sediments consisting of clay, silt, sand and gravel occur along the north-eastern margin of the EPC. Within the shallow target area these typically do not reach more than 12m depth.

## **3.2 Weathering**

The base of the weathering profile ranges from 15 to 40m depth. Tertiary sediments overlying the Late Permian sequence are typically completely weathered.

## **3.3 Geological Structure**

Regionally, EPC1827 lies on the eastern flank of the Comet Ridge, a broad anticlinal structure that lies between the Denison Trough and the Mimosa Syncline, in the Bowen Basin. The area is structurally complex, dominated by compressional fold-and-thrust style features.

The most prominent structural feature within the EPC is the Jellinbah Fault, a major reverse fault which dips steeply to the east and is up-thrown to the east. Maximum displacement is up to 600m, but the amount of dislocation varies according to the intensity of folding on the upthrust side of the fault (Stains, 1987).

The strata have a north-north-westerly strike and regional dip of  $3^{\circ}$  to  $5^{\circ}$  to the north-east. This dip continues only as far east as the Jellinbah Fault. Immediately beyond this major

break, the dip is up to 15° in drilling further to the east and the strata are folded to varying degrees of intensity within this folded zone (Stains, 1987).

#### 4.0 WORK UNDERTAKEN IN SHALLOW TARGET AREA

A total of 636.48m was drilled between the 9<sup>th</sup> and 16<sup>th</sup> July at four sites comprising 588.67m of open-hole chip drilling and 47.81m of four inch (100mm) core drilling. The purpose of the drillholes was to provide coal core samples of the shallow seams for quality analysis, and then open-hole drill further to a maximum of 120m depth to test for additional seams. Chipped and cored intervals of all holes were lithologically logged and all coal cores were also photographed and wrapped in plastic for subsequent sampling and coal quality analysis. All drilled holes underwent geophysical logging.

Duplicate core holes were also drilled and bulk sampled for RecyCoal Limited<sup>1</sup> (RecyCoal) analysis in the United Kingdom. RecyCoal expressed an interest in establishing a joint venture processing operation with the Company and as such were provided with duplicate coal samples to test their suitability to the RecyCoal beneficiation process.

In all, nine holes (Table 1) were drilled at four drill pad sites, successfully providing coal samples for coal quality analysis and improving understanding of deeper seams and seam morphology in the shallow target area.

Drillhole	Easting*	Northing*	Elevation**	Datum	Total Depth (m)
RDH01C	698049	7410518	137	GDA94	124.00
RDH01Ca	698053	7410510	137	GDA94	43.52
RDH02	698513	7409644	141	GDA94	120.00
RDH02C	698515	7409641	141	GDA94	30.37
RDH02Ca	698516	7409634	141	GDA94	30.13
RDH03	698803	7408948	146	GDA94	108.00
RDH03C	698803	7408945	146	GDA94	42.52
RDH03Ca	698803	7408942	148	GDA94	41.92
RDH04	698243	7409000	148	GDA94	96.00

Table 1 – Drillhole Survey Data

\*Handheld GPS survey \*\*Google DEM

#### 4.1 Drilling Outcomes

The shallow target seams were intersected in drillholes RDH01C/a, RDH02/C/Ca and RDH03/C/Ca, as well as intersecting multiple additional seams at depth in the deep drillholes

<sup>1</sup> RecyCoal Limited is a UK based waste coal recovery business providing a fast, efficient and environmentally positive process for efficiently recovering coal that other systems are unable to process.

RDH01C, RDH02 and RDH03 (Appendix 2). Drillhole RDH04 did not intersect any coal, but it did delineate the western extent of the Jellinbah Fault.

The two Burngrove Formation seams intersected are interpreted to be the Leo seam and the stratigraphically deeper Aquarius seam. Repeat sections of the Aquarius seam in RDH01C are thought to be the result of faulting associated with the Jellinbah Fault. Similar repeat seam intersections may also occur in RDH02 and RDH03.

The Leo seam intersected in RDH01C has a total thickness of 2.03m comprising four main coal plies with a cumulative thickness of 1.67m. Elsewhere, in historical drillholes nearby, this seam is up to 5m total thickness (refer Figure 4 -Multi-Log Profile 1).

The coal sequence of the Aquarius seam, intersected in RDH02C and RDH03C, comprise 8 and 6 coal plies respectively, punctuated by claystone partings between 0.01m and 0.53m thick. The total average thickness of the seam is approximately 4.3m. Aquarius seam coal plies attain a maximum cumulative thickness of 3.17m in RDH02C (refer Figure 5 - Multi-Log Profile 2).

The table below is a summary of target seam thicknesses as drilled in the current program.

Drillhole	Site	Seam	Cumulative Coal Thickness (m)	Cumulative Parting Thickness (m)	Total Thickness (m)
RDH01C	DH1	Leo	1.67	0.36	2.03
RDH01C	DH1	Aquarius*	--	--	4.48
RDH02C	DH2	Aquarius	3.17	1.74	4.91
RDH03C	DH3	Aquarius	2.57	0.92	3.49

Table 2 – Target Seam Intersections      \*No core. Thickness determined from geophysical logs.

The limit of weathering in all coal-bearing drillholes is at approximately 19m. The top of the target seams were intersected at 35.01m, 17.68m and 31.43m depth in RDH01C, RDH02C and RDH03C respectively. With the exception of the very top of the Aquarius seam in RDH02/C/Ca, all target seams are below the base of weathering.

Bedding dip angles measured in cored intervals were typically between 3° and 8°. The maximum dip was 12° in RDH03Ca.

## 4.2 Geophysical Logging

Geophysical logging of all drilled holes including gamma, calliper and long and short spaced density was conducted by Geologging Data Services. Geophysical logs were used primarily to identify seam signatures for the purpose of correlation but also as an indicator of relative densities in the coal seams.

Logs obtained from the current drilling program confirm that the shallow coal intersected at three sites is from two different seams interpreted to be the Leo and Aquarius seams.

The Leo seam intersected in RDH01C is a seam of approximately two metres thickness with good indications it covers most of the northern half of the investigation area (CW5497) (refer Figures 3 & 4). The target seam intersected in RDH02 and RDH03 is a shallow occurrence of the stratigraphically lower Aquarius seam, 3.49m and 4.91m thick respectively (refer Figures 3 & 5). This seam is also intersected at depth in RDH01C indicating continuity and a seam dip to the north-west or an intervening fault. Results have disproved the initial interpretations of a single continuous flat-lying shallow seam.

### 4.3 Coal Quality

Each of the three coal seam cores were corrected to geophysical log responses, divided into identified seam plies, sampled in detail and dispatched to Preplab Testing Services Pty Ltd in Gladstone for analysis. A three-stage testing procedure consisting of Raw Coal, Washability and Product Composite analyses was undertaken on a selection of samples from RHD01C and RDH03C. RDH02C was not analysed in the initial testing phase on the basis that it is partially weathered towards the top of the seam and was not considered essential for an initial indication of coal quality from each of the identified seams.

#### 4.3.1 Raw Coal Analysis

Stage 1 - raw coal proximate analysis results (on air dried basis), for the sampled intervals in RDH01C (Leo seam), are presented below in Table 3. The 2.03m thick Leo seam is made up of 1.67m coal and 0.36m of parting material. Four samples taken from plies 1, 2, and 4 were analysed, accounting for 1.37m of the total 1.67m of cumulative coal. Results of the proximate analysis indicate high ash of up to 54.1% (average 47.3%), low volatile matter (average 10.8%) and low sulphur (average 0.37%) composition.

Stage 1 - Raw Coal Proximate Analysis:- RDH01C (Leo seam)						
Sample No:	PL01C_000023 - 24	PL01C_000025	PL02C_000031	PL04C_000037/ 38	Average	Units
Inherent Moisture:	1.4	2.1	1.1	1.1	1.425	(% ad)
Ash:	42.6	43.2	49.3	54.1	47.3	(% ad)
Volatile Matter:	13.8	10.9	9.8	8.7	10.8	(% ad)
Fixed Carbon:	42.2	43.8	39.8	36.1	40.475	(% ad)
Other Analysis						
Total Sulphur:	0.21	0.4	0.39	0.5	0.375	(% ad)
Calorific Value:	N/R	N/R	N/R	N/R	N/R	(MJ/kg ad)
Relative Density:	1.78	1.7	1.8	1.86	1.785	(g/cc ad)

Table 3 – RDH01C Raw Coal Data



Raw coal proximate analysis results (on air dried basis), for the sampled intervals in RDH03C (Aquarius seam), are presented below in Table 4. The 3.49m thick Leo seam is made up of 2.57m coal and 0.92m of parting material. Five samples taken from plies 1, 2, 4, 5 and 6 were analysed, accounting for 1.59m of the total 2.57m of cumulative coal. Comparing proximate analysis results with those of the Leo seam, the Aquarius seam possesses higher ash values of up to 65% (average 52.6%), lower volatile matter (average 8.6%), lower inherent moisture (0.7%) and higher relative densities (average 1.85g/cc). Sulphur content is similar at 0.36% in both the Leo and Aquarius seams.

Stage 1 - Raw Coal Proximate Analysis:- RDH03C (Aquarius Seam)							
Sample No:	PL01C_000001	PL02C_000008/9	PL04C_000013 /14	PL05C_000017	PL06C_000019	Average	Units
Inherent Moisture:	0.7	0.6	0.5	0.8	1.0	0.7	(% ad)
Ash:	65	56.6	57.8	45.3	38.5	52.6	(% ad)
Volatile Matter:	6.6	9.1	7.6	9.3	10.6	8.6	(% ad)
Fixed Carbon:	27.7	33.7	34.1	44.6	49.9	38.0	(% ad)
Other Analysis:							
Total Sulphur:	0.22	0.38	0.41	0.34	0.44	0.36	(% ad)
Calorific Value:	N/R	N/R	N/R	N/R	N/R	N/R	(MJ/kg ad)
Relative Density:	2.02	1.92	1.94	1.76	1.63	1.85	(g/cc ad)

Table 4 – RDH03C Raw Coal Data

Full results of coal quality analysis are provided in Appendix 3.

#### 4.3.2 Washability

Stage 2 - washability analysis was conducted for each of the Stage 1 samples at specific gravity (SG) 1.35, 1.40, 1.45, 1.50 and 1.55. Each float-sink fraction was then analysed for ash content.

Washability results indicate that in the  $\leq 10\%$  to  $\leq 15\%$  range of cumulative ash content, yields range from 8.3 % to 11.3% in RDH01C (Leo seam) and 7.9% to 25.5% in RDH03C (Aquarius seam). These low yields occur at relative densities in the CF1.50 to CF1.55 range. Ply 6 in the Aquarius seam (RDH03C) produced the highest yielding washability results (Table 5). At SG CF1.50, the sample yielded 25.5% by mass at 11.9% cumulative ash.

<b>Stage 2 – Washability Analysis:- RDH03C (Aquarius seam)</b>					
<b>Relative Density</b>		<b>Fractional</b>		<b>Cumulative</b>	
<b>Sinks</b>	<b>Floats</b>	<b>Yield%(ad)</b>	<b>Ash (%ad)</b>	<b>Yield% (ad)</b>	<b>Ash (%ad)</b>
	F1.35	11	3.3	11	3.3
S1.35	F1.40	3.9	10.5	14.9	5.2
S1.40	F1.45	3.4	17.3	18.3	7.4
S1.45	F1.50	7.2	23.4	25.5	11.9
S1.50	F1.55	8.9	28.7	34.4	16.3
S1.55		65.6	50.6	100	38.8
<b>Total:</b>		100	38.8		

Table 5 – RDH03C Ply 6 Washability Data

In RDH01C, ply 4 at the base of the Leo seam produced the highest yielding washability results. The sample yielded 11.3% by mass at 10.1% cumulative ash. Full results of seam washability analysis are presented in Appendix 3.

#### **4.3.3 Product Composite**

Stage 3 – product composite analysis was undertaken on two samples; one from each seam. Analysis confirms high to moderate crucible swell numbers of 8.0 and 3.5 in the CF1.50 fraction of selected plies in RDH01C and RDH03C respectively. These properties although favourable to coking coals are not matched with favourable fluidity and dilatation analysis results. Samples possess essentially no fluidity or dilatation characteristics both resulting in maximum fluidities of zero dial divisions per minute.

Although coal samples did not undergo reflectance analysis, it is thought that the ultra fine clays and poor rank are largely responsible for the poor fluidity characteristics.

#### **4.3.4 Interpretation of Coal Quality Results**

The low amplitude response of coal densities identified by geophysical logging in the holes drilled confirm the low-yield, high-ash results from coal quality analysis of the Burngrove Formation coal seams.

Results indicate that there are high fine inherent ash level in the coal, probably due to fine tuffaceous and clay material that cannot be easily separated by coal beneficiation even in good laboratory conditions.

## 5.0 RECYCOAL TESTING

RecyCoal were provided with duplicate core samples of each of the target seams for the purpose of assessing suitability to their Hybrid Dual Density Natural Medium Coal Washing Plant and undertaking coal quality analysis.

It was commented that the number of samples analysed was very low to be able to draw any permanent conclusions, however the testing would be useful for indicating whether further commercial exploration is warranted.

### 5.1 Process

Coal core samples taken from duplicate cored drillholes RDH01Ca, RDH02Ca and RDH03Ca were dispatched to the UK for analysis overseen by the Technical Manager of RecyCoal at their laboratory at Langton in the UK and by an independent laboratory, TES Bretby.

Coal seam cores, sampled in bulk and then sealed in plastic sample bags after lithological logging at site, required preparation before analysis. To minimise the degradation of samples, all the preparation and analysis was carried out at ESG (NAMAS approved) laboratories at TES Bretby under RecyCoal's instruction.

Preparation consisted of crushing the samples at 25mm to 12mm, removing the -0.5mm fractions, and then floating the remaining +0.5mm fractions at various SG's. Individual floats at each density were then crushed and analysed.

The results and summary of the RecyCoal analysis are presented in the following sections. Full results are reported by drillhole and bag number in appendix 4.

### 5.2 Results

There was a very small percentage (around 1%-3% yields) of floats in the 1.30 to 1.50 specific gravity (SG) range. This contained low ash content of around 2% at 1.30 SG, believed to represent the bright bands of coal noted in the lithological logs. Ash volume increases significantly to around 35% as the SG increases to the 1.60 to 1.65 range (refer Appendix 4 - full analysis tables).

Volatile Matter (VM) tends to decrease as the SG increases, from around 20% VM at 1.30 SG to around 10% at 1.60 SG.

Sulphur levels ranged from 0.51% to 0.85%.

Net Calorific Value (CV) decreased as the SG increased.

The British Standard Swelling Number also decreased as the SG increased. The higher swell numbers observed at lower SG's however came from very low percentage yields.

It was also noted that only 0.5% of the sample was made up of -0.5mm size fractions across all drillholes. During extraction and processing, this would differ when worked over compared with core samples.

### **5.3 Summary**

In summary, the logged cores showed thin bands of bright coal in amongst a dull, high-ash hard coal. The bright bands were a relatively small proportion of the core. Having analysed the samples in bulk for their washability, cores were then looked at to correlate the results, and believed to be a reasonable summary of the cores taken.

Floats at a specific gravity of 1.5 produce very low yields of 5.1%, 2.5% and 3.4% in RDH01Ca, RDH02Ca and RDH3Ca respectively. On two of the samples the swell was ranging between 2.5 and 6.0, and on the other less than 2.4. Net CV's are well above 6,000kcal but ash increases significantly above SG 1.4. These elements are considered likely to be the thin bright bands of coal referred to in the lithological logs.

Between SG's of 1.5 and 1.65 the floats are 27.75%, 3.0% and 9.2% in RDH01Ca, RDH02Ca and RDH3Ca respectively with Net CV's of around 5,000kcal and ash of over 30%. These are believed to be the better elements of the dull hard coals around the bright bands. Sinks above 1.65 SG were not analysed as the ashes were sufficiently high at 1.65 to negate any benefit.

On the basis of the cores analysed there is a yield, unlikely to be above 5% by weight, of coking coal and a low non-commercial yield of thermal coal. Given the likely mining costs involved pre-processing these samples is unlikely to justify a commercially viable proposition in the current market.

## **6.0 DISCUSSION AND CONCLUSIONS**

Drilling of shallow coal targets in the northern extent of EPC1827 identified two significant coal seams believed to be the Leo and Aquarius seams of the Burngrove Formation.

Combining this information with the results of previous drilling, it has been interpreted that the area around RDH01 has the undulating but relatively flat-lying Leo seam in the shallow



subsurface (refer profile in Figure 4), while the area around RDH02 and RDH03 has the flat-lying Aquarius seam in the shallow subsurface (refer profile in Figure 5).

In addition, previous drillholes NC9905 & NC9906 in the east of the area appear to have intersected a separate seam, and this has tentatively been correlated as the Virgo seam at the top of the Burngrove Formation (refer profile in Figure 6).

Figure 3 shows inferred faults separating these areas, but this is just to separate them as a detailed structural study has not been attempted.

Coal quality analysis shows that both of the intersected seams give very low yields for the lower densities of coal and even these lack suitable coking characteristics. Independent quality analysis by RecyCoal, on duplicate coal seam samples, confirms these characteristics.

The Leo seam possesses marginally better raw coal quality characteristics, with lower ash and relative densities than the Aquarius seam. Washability is more consistent and slightly higher yielding in the Leo seam although the Aquarius seam did yield significantly higher toward the base of the seam in RDH03C. Crucible swell numbers (CSN) favoured the Leo seam with 8.0 versus 3.5 from the higher yielding lower ply of the Aquarius seam.

High ash and generally low coal quality are a common characteristic of the Burngrove Formation / Fort Cooper Coal Measures across the Bowen Basin (Hunt, 1984). While explorers in recent times have had success identifying anomalous areas with favourable coal quality characteristics, such as Aquila's Washpool deposit, the shallow targets of the Leo and Aquarius seams in EPC1827 are low yielding and do not possess desirable coking coal properties. On the basis of these findings, no further investigation of the shallow secondary target is recommended.



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## **Appendix 1**

### General Stratigraphy

<b>GENERAL STRATIGRAPHY FOR THE AREA OF EPC1827</b>			
<b>AGE</b>	<b>GROUP</b>	<b>FORMATION</b>	<b>MAIN SEAMS</b>
<b>QUATERNARY</b>			
<b>TERTIARY</b>			
<b>TRIASSIC</b>		<b>REWAN FM</b>	
<b>LATE PERMIAN</b>	<b>BLACKWATER GROUP</b>	<b>RANGAL COAL MEASURES</b>	Cancer Aries Castor Pollux Pisces
		<b>BURNGROVE FORMATION</b>	Virgo Libra Leo Aquarius Scorpio Centaur
		<b>FAIR HILL FORMATION</b>	Phoenix Pegasus Hercules Canis Lepus Fair Hill
	<b>BACK CREEK GROUP</b>	<b>MACMILLAN FORMATION</b>	
		<b>GERMAN CREEK FORMATION</b>	Pleiades Aquila Tieri Corvus German Ck

Mammoth

## **Appendix 2**

### Drillhole Summary Data



### Drill Hole Summary

			<b>Hole Name</b>	RDH01C
<b>Site No.</b>	Site 1 – DH1	<b>Start – End Date</b>	08/07/11 – 10/07/2011	
<b>Easting</b>	698049 GPS	<b>Northing</b>	7410518 GPS	
<b>Elevation</b>	148 GPS	<b>Datum</b>	GDA	
<b>Tenure</b>	EPC1827	<b>Map Zone</b>	55	
<b>Tenure Holder</b>	Area Coal	<b>Company Rep / Geo</b>	John Stegler	
<b>Hole Objective</b>	Core Target Seam ~25 – 30m and chip to 120m			

<b>HOLE DETAILS As Drilled</b>					
Interval	HOLE SIZE	DEPTH (mGL)	BIT TYPE	CEMENT	DRILLED / INSTALLED
Pre-collar	7 7/8"	12	PCD	Nil	8/07/11
Casing	6"	12	n/a	Nil	8/07/11
Open hole to core depth	5 5/8"	20.25	Hammer	Nil	9/07/11
Core	140mm	39.78	4C medium	Nil	9/07/11
Open hole to TD	99mm	124	PCD	Nil	10/07/11

<b>DRILLING DATA</b>					
<b>Drilling Contractor</b>	Depco Drilling	<b>Drilling system</b>	Top Head Drive	<b>Rotary hole</b>	Air core
<b>Rig</b>	Gardener Denver	<b>Fluid</b>	Water injection	<b>Additives</b>	none

<b>CORE RUN DATA As Drilled</b>							
Run number	From	To	Drilled	Recovered	loss / gain	Cumulative loss	Adjusted Depth
1	20.25	24.72	4.47	4.41	- 0.06	- 0.06	24.66
2	24.72	28.28	3.56	3.61	+0.05	- 0.01	28.27
3	28.28	32.72	4.44	4.50	+ 0.06	+0.05	32.77
4	32.72	37.22	4.50	4.54	+0.04	-+0.09	37.31
5	37.22	39.72	2.50	2.47	-0.03	+ 0.06	39.78

<b>STRATIGRAPHY Corrected</b>					
<b>Horizon/Seam Name</b>	<b>From</b>	<b>To</b>	<b>Thickness</b>	<b>Interburden</b>	<b>Data Source</b>
Base of Tertiary	0.00	6.00	6.00	0.00	Chips
Bas of Weathering	0.00	19.00	19.00	0.00	Chips
Leo Seam	34.93	36.97	2.04	0.00	Core/Geophysics
Seam	44.40	46.10	1.70	7.43	Chips/Geophysics
Seam	47.58	48.10	0.52	1.48	Chips/Geophysics
Seam	54.98	56.02	1.04	6.88	Chips/Geophysics
Seam	84.30	87.16	2.86	28.28	Chips/Geophysics
Seam	90.10	94.57	4.47	2.94	Chips/Geophysics
Seam	96.50	96.91	0.41	1.93	Geophysics
Seam	112.92	116.06	3.14	16.01	Chips/Geophysics

<b>LITHOLOGICAL Corrected</b>		
		<b>Chipped Interval</b>
0	2	SOIL, sandy. Medium brown
2	4.5	SAND, medium grain size, clayey. Light to medium brown
4.5	6.0	CLAY, silty. Medium Orange Brown. Highly weathered. <b><i>Base of Tertiary</i></b>
6.0	9.0	SILTSTONE light to medium grey cream, highly weathered
9.0	10.0	SILTSTONE. Abundant limonite staining, medium to dark grey brown, highly weathered.
10.0	12.0	SILTSTONE. Ferruginous staining throughout, light to medium grey, moderately weathered.
12.0	14.0	SILTSTONE (40%) medium to dark grey, weathered SANDSTONE (60%) fine to medium grained, ferruginous staining throughout, mottled grey purple.
14.0	15.0	SILTSTONE minor sandstone bands medium grey, slightly weathered
15.0	17.0	SANDSTONE medium grained, lithic with minor oxide staining, slightly weathered
17.0	19.0	SILTSTONE (80%) minor carbonaceous lenses medium to dark grey, slightly weathered SANDSTONE (20%)medium grained, light grey. <b><i>Base of Weathering</i></b>
19.0	20.17	MUDSTONE silty towards top of unit, carbonaceous towards base of unit fresh
		<b>Start of Core</b>
20.17	28.19	SILTSTONE minor carbonaceous bands throughout, sandstone lenses throughout, mudstone bands towards top of unit, medium to dark grey
28.19	34.93	SILTSTONE minor carbonaceous bands throughout, occasional sideritic bands, occasional sandstone lenses, medium to dark grey
34.93	35.00	COAL stoney dull, common calcite veining along bedding planes (dip 10degrees)
35.00	35.52	COAL 10-40% Bright bands, calcite in cleats.

35.52	35.57	CLAYSTONE tuffaceous, medium cream brown
35.57	35.63	COAL 10-40% Bright bands
35.63	35.65	CLAYSTONE tuffaceous, medium cream brown
35.65	35.70	COAL <10% Bright bands
35.70	35.75	PYRITE concretion / band
35.75	36.10	COAL 10-40% Bright bands
36.10	36.17	CLAYSTONE tuffaceous, medium cream brown
36.17	36.26	COAL <10% Bright bands
36.26	36.28	CLAYSTONE tuffaceous, medium cream brown
36.28	36.34	COAL 10-40% Bright bands, calcite veins towards bottom of unit
36.34	36.47	CLAYSTONE tuffaceous, medium cream brown
36.47	36.59	COAL 10-40% Bright bands
36.59	36.63	PYRITE concretion / band
36.63	36.80	COAL 10-40% Bright bands
36.80	36.97	COAL 40-60% Bright bands
36.97	37.13	CARBONACEOUS MUDSTONE coaly lenses throughout minor pyrite on bedding planes, dark blackish grey
37.13	37.23	SILTSTONE carbonaceous towards top of unit, light to medium to dark grey. (dip 8 degrees)
37.23	39.70	SILTSTONE slightly sandy towards base of unit, medium grey. (dip 10 degrees)
		<b>End of Core</b>
39.70	42.50	SILTSTONE medium grey.
42.50	44.00	SILTSTONE (30%) medium grey CLAYSTONE (70%) Tuffaceous, light whitish grey
44.00	44.40	SILTSTONE carbonaceous, medium to dark grey
44.40	46.10	COAL with tuffaceous claystone bands
46.10	47.58	TUFF? slightly clayey, light whitish grey
47.58	48.10	COAL (50%) SILTSTONE (50%) medium to dark grey
48.10	53.50	SILTSTONE medium to dark grey.
53.50	54.98	SANDSTONE fine grained, lithic, light grey
54.98	56.02	COAL with tuffaceous claystone bands
56.02	58.00	SILTSTONE medium grey
58.00	63.00	SANDSTONE very fine grained, minor siltstone bands, light grey
63.00	84.30	SANDSTONE fine to very fine grained, minor siltstone bands, light grey
84.30	87.16	COAL with abundant tuffaceous claystone bands towards top of unit
87.16	90.10	SANDSTONE fine grained, carbonaceous wisps towards top of unit, light grey
90.10	94.57	COAL with abundant tuffaceous claystone bands throughout
94.57	96.50	SANDSTONE very fine grained, carbonaceous wisps throughout, minor coal lenses and siltstone bands, light grey
96.50	96.91	COAL (interpreted from geophysics)

96.91	99.50	SANDSTONE very fine grained, carbonaceous wisps throughout, minor coal lenses and siltstone bands, light grey
99.50	103.00	SANDSTONE fine to medium grained, light grey
103.00	113.50	SANDSTONE fine to medium grained, sideritic in part, slightly silty in part, light grey
112.92	116.06	COAL with minor tuffaceous claystone and carbonaceous bands
116.05	118.00	SILTSTONE light grey
118.00	124.00	SANDSTONE medium to coarse grained, lithic with occasional carbonaceous fragments, fining upward, light grey
		<b>EOH</b>

SAMPLE DATA							
Sample ID	From Drilled Depth	To Drilled Depth	From Correct – ed Depth	To Correct – ed Depth	Lith - ology	Sample Type	Comments
GT01	22.44	22.72	22.36	22.64	ST	Geotech	
GT02	30.35	30.56	30.27	30.48	ST	Geotech	
GT03	34.81	35.01	34.73	34.93	ST	Geotech	Roof
Target Seam	35.09	36.97	35.01	36.97	COAL + Partings	CQ	See RDH01C Borehole Sample Sheet
GT04	37.55	37.72	37.47	37.64	ST	Geotech	Floor

COMMENTS
Seam depth ~ 10m deeper than predicted
Driller estimated water flow rate of 1 – 1.5l/s. @ ~80m



### Drill Hole Summary

			<b>Hole Name</b>	RDH01Ca
<b>Site No.</b>	Site 1 – DH1	<b>Start – End Date</b>	10/07/11 – 10/07/2011	
<b>Easting</b>	698053 GPS	<b>Northing</b>	7410510 GPS	
<b>Elevation</b>	147 GPS	<b>Datum</b>	GDA	
<b>Tenure</b>	EPC1827	<b>Map Zone</b>	55	
<b>Tenure Holder</b>	Area Coal	<b>Company Rep / Geo</b>	John Stegler	
<b>Hole Objective</b>	Core target seam for Recyoal analysis			

<b>HOLE DATA As Drilled</b>					
Interval	HOLE SIZE	DEPTH (mGL)	BIT TYPE	CEMENT	DRILLED / INSTALLED
Pre-collar	7 7/8"	16.5	PCD	Nil	10/07/11
Casing	6"	16.5 (17)	n/a	Nil	10/07/11
Open hole to core depth	5 3/4"	33.00	PCD	Nil	10/07/11
Core	140mm	37.52	4C medium	Nil	10/07/11
Open hole to TD	99mm	43.52	PCD	Nil	10/07/11

<b>DRILLING DATA</b>					
<b>Drilling Contractor</b>	Depco Drilling	<b>Drilling system</b>	Top Head Drive	<b>Rotary hole</b>	Air core
<b>Rig</b>	Gardener Denver	<b>Fluid</b>	Water injection	<b>Additives</b>	none

<b>CORE RUN DATA As Drilled</b>							
Run number	From	To	Drilled	Recovered	loss / gain	Cumulative loss	Adjusted Depth
1	33.02	37.52	4.50	4.47	- 0.03	- 0.03	37.49

<b>STRATIGRAPHY Corrected</b>					
Horizon/Seam Name	From	To	Thickness	Interburden	Data Source
Base of Tertiary	0.00	6.00	6.00	0.00	Chips

Bas of Weathering	0.00	15.00	15.00	0.00	Chips
Leo Seam	34.69	36.80	2.11	0.00	Core/Geophysics

LITHOLOGICAL Corrected		
		<b>Chipped Interval</b>
0	1.00	SOIL, sandy. Medium brown
1.00	4.50	SAND, medium grain size, clayey. Light to medium brown
4.50	6.00	CLAY, sandy, medium orange brown, highly weathered. <b><u>Base of Tertiary</u></b>
6.00	8.00	SILTSTONE (80%) medium to dark grey, limonite staining, weathered SANDSTONE (20%) fine to medium grained, limonite staining throughout, mottled grey purple.
8.00	11.00	SANDSTONE (70%) fine to medium grained, abundant ferruginous staining throughout, mottled grey purple. SILTSTONE (30%) abundant ferruginous staining, medium to dark grey brown, highly weathered, mottled grey purple.
11.00	13.00	SANDSTONE fine to medium grained, abundant ferruginous staining, minor siltstone bands towards the base of unit, highly weathered, mottled purple grey
13.00	15.00	SANDSTONE fine to medium grained, minor limonite staining, minor siltstone bands, weakly weathered, light to medium grey <b><u>Base of Weathering</u></b>
15.00	18.00	SANDSTONE medium grained, lithic, light grey, fresh
18.00	20.50	SANDSTONE fine to medium grained, lithic, medium to dark grey
20.50	23.00	MUDSTONE minor sandstone lenses, dark grey
23.00	25.00	SANDSTONE fine to medium grained, lithic, medium to dark grey
25.00	26.00	SILTSTONE minor mudstone lenses, medium to dark grey
26.00	32.00	SILTSTONE occasional sandstone lenses, occasional mudstone lenses, medium to dark grey
32.00	32.89	MUDSTONE slightly silty in part, dark grey
		<b>Start of Core</b>
32.89	34.37	SILTSTONE mudstone lenses throughout, occasional sideritic? bands, medium to dark grey.
34.50	34.69	CARBONACEOUS MUDSTONE calcite veining towards base of unit, silty towards top of unit, dark grey black
34.69	34.72	COAL <10% Bright bands
34.72	35.05	COAL 10-40% Bright bands
35.05	35.07	PYRITE concretion / band
35.07	35.23	COAL 10-40% Bright bands, calcite in cleats
35.23	35.28	CLAYSTONE tuffaceous, medium cream brown
35.28	35.34	COAL <10% Bright bands
35.34	35.35	CLAYSTONE tuffaceous, medium cream brown
35.35	35.43	COAL <10% Bright bands (dip 3 degrees)
35.43	35.46	PYRITE concretion / band

35.46	35.81	COAL 10-40% Bright bands
35.81	35.88	CLAYSTONE tuffaceous, medium cream brown
35.88	35.98	COAL 10-40% Bright bands
35.98	36.00	CLAYSTONE tuffaceous, medium cream brown
36.00	36.06	COAL 10-40% Bright bands, calcite veins
36.06	36.17	CLAYSTONE tuffaceous, medium cream brown
36.17	36.62	COAL 10-40% Bright bands (dip 6 degrees)
36.62	36.66	MUDSTONE carbonaceous band towards middle of unit, medium to dark grey black
36.66	36.72	COAL <10% Bright bands
36.72	36.77	COAL 40-60% Bright bands
36.72	36.80	COAL <10% Bright bands
36.80	36.85	CARBONACEOUS MUDSTONE slightly silty in part, dark grey black
36.85	36.92	CARBONACEOUS SILTSTONE dark grey
36.92	37.36	SILTSTONE occasional carbonaceous lenses, medium to dark grey (dip 5-6 degrees)
37.36	37.39	CORE LOSS
		<b>End of Core</b>
37.39	40.00	SILTSTONE abundant carbonaceous mudstone throughout, dark grey black.
40.00	43.00	SILTSTONE minor mudstone bands towards top of unit, medium to dark grey.
		<b>EOH</b>

**SAMPLE DATA**

Sample ID	From Drilled Depth	To Drilled Depth	From Correct – ed Depth	To Correct – ed Depth	Lith - ology	Sample Type	Comments
GT01	34.14	34.50	34.01	34.37	ST	Geotech roof	
GT02	37.17	37.39	37.04	37.26	ST	Geotech floor	
RDH01 Ca	34.82	36.93	34.69	36.80	Coal and Partings	Recycoal	Samples in 2 bags, dispatched 21-7-2011.

**COMMENTS**

Seam sampled from 34.69 – 36.80 (corrected depth) for Recycoal analysis.



### Drill Hole Summary

			<b>Hole Name</b>	RDH02
<b>Site No.</b>	Site 2 – DH2	<b>Start – End Date</b>	10/07/11 – 11/07/2011	
<b>Easting</b>	698513 GPS	<b>Northing</b>	7409644 GPS	
<b>Elevation</b>	147 GPS	<b>Datum</b>	GDA	
<b>Tenure</b>	EPC1827	<b>Map Zone</b>	55	
<b>Tenure Holder</b>	Area Coal	<b>Company Rep / Geo</b>	John Stegler	
<b>Hole Objective</b>	Drill pilot hole - identify target seam depth and chip on to 120m			

<b>HOLE DETAILS As Drilled</b>					
Interval	HOLE SIZE	DEPTH (mGL)	BIT TYPE	CEMENT	DRILLED / INSTALLED
Pre-collar	6 ½ ”	16	Hammer	Nil	10/07/11
Casing	5”	16 (16.5)	n/a	Nil	11/07/11
Open hole to core depth	N/A				
Core	N/A				
Open hole to TD	99mm	120	PCD	Nil	11/07/11

<b>DRILLING DATA</b>					
<b>Drilling Contractor</b>	Depco Drilling	<b>Drilling system</b>	Top Head Drive	<b>Rotary hole</b>	Air core
<b>Rig</b>	Gardener Denver	<b>Fluid</b>	Water injection	<b>Additives</b>	none

<b>CORE RUN DATA As Drilled</b>							
Run number	From	To	Drilled	Recovered	loss / gain	Cumulative loss	Adjusted Depth
N/A							

<b>STRATIGRAPHY Corrected</b>					
<b>Horizon/Seam Name</b>	<b>From</b>	<b>To</b>	<b>Thickness</b>	<b>Interburden</b>	<b>Data Source</b>
Base of Tertiary	0.00	6.00	6.00	0.00	Chips
Bas of Weathering	0.00	20.75	20.75	0.00	Chips/Geophysics
Aquarius Seam	17.90	22.27	4.37	0.00	Chips/Geophysics
Seam	39.05	39.30	0.25	16.78	Chips/Geophysics
Seam	65.30	69.65	4.35	26.00	Chips/Geophysics
Seam	99.95	100.14	0.19	30.30	Chips/Geophysics

<b>LITHOLOGICAL Corrected</b>		
		<b>Chipped Interval</b>
0	1.50	SOIL, sandy. Medium brown
1.50	4.00	SAND, medium grain size, slightly clayey. Light to medium orange brown
4.50	6.00	CLAY, silty. Medium Orange Brown. Highly weathered. <b><u>Base of Tertiary</u></b>
6.00	9.00	SILTSTONE limonite staining throughout, mottled orange brown, highly weathered
9.00	10.00	CLAYSTONE ferruginous staining bleached clay, mottled grey brown, highly weathered.
10.00	16.00	SILTSTONE. limonite staining throughout, light to medium greenish grey and orange brown, moderately weathered.
16.00	17.00	SILTSTONE limonite staining, medium grey brown, weakly weathered.
17.00	17.90	SILTSTONE medium grey, weakly weathered
17.90	20.15	COAL with tuffaceous claystone bands throughout, slightly weathered
20.15	20.75	TUFF ? clayey light white cream <b><u>Base of Weathering?</u></b>
20.75	22.27	COAL with minor tuffaceous claystone bands, fresh ?
22.27	26.00	SILTSTONE slightly sandy in part, light to medium grey
26.00	39.50	SANDSTONE fine grained, occasional siltstone bands, light grey
39.05	39.30	COAL
39.30	44.00	SANDSTONE fine grained, occasional siltstone bands, light grey.
44.00	45.00	SILTSTONE light to medium grey.
45.00	52.00	SANDSTONE fine to medium grained, occasional siltstone bands, light grey.
52.00	56.50	SANDSTONE fine to medium grained, light grey blue.
56.00	62.50	SANDSTONE fine to medium grained, occasional sideritic bands, light grey brown.
62.50	65.00	SILTSTONE light to medium grey.
65.00	65.30	MUDSTONE carbonaceous towards base of unit, minor coaly fragments, minor sideritic bands, medium to dark grey black
65.30	69.65	COAL with tuffaceous claystone bands throughout
69.65	72.30	SANDSTONE fine to medium grained, light whitish grey

72.30	72.80	CARBONACEOUS SILTSTONE slightly sandy in part, dark grey
72.80	76.00	CARBONACEOUS SILTSTONE (70%) dark grey black minor coaly fragments SANDSTONE (30%) fine to medium grained, light whitish grey
76.00	79.00	CARBONACEOUS SANDSTONE fine grained, dark grey black
79.00	80.00	SANDSTONE fine grained, lithic, light grey
80.00	82.00	CARBONACEOUS SANDSTONE fine grained, minor pyritic fragments, silty in parts, dark grey black
82.00	85.50	SANDSTONE fine grained, carbonaceous wisps towards top of unit, occasional silty bands, medium grey
85.50	93.00	SANDSTONE medium grained, lithic, occasional carbonaceous siltstone bands throughout, light grey
93.00	95.50	SILTSTONE occasional sandy lenses, light to medium grey
95.50	97.00	SANDSTONE medium grained, lithic, light grey
97.00	99.00	CARBONACEOUS occasional sandstone and siltstone bands throughout, medium to dark grey
99.95	100.14	COAL? carbonaceous siltstone throughout
100.50	106.00	SANDSTONE fine to medium grained, lithic, fining upwards, light to medium grey
106.00	111.00	SANDSTONE fine grained, carbonaceous, medium grey
111.00	120.00	SANDSTONE fine to medium grained, lithic coarsening upward, light to medium grey
		<b>EOH</b>

<b>SAMPLE DATA</b>							
Sample ID	From	To	From Correct - ed	To Correct - ed	Lith - ology	Sample Type	Comments
N/A							

<b>COMMENTS</b>

## Drill Hole Summary

			<b>Hole Name</b>	RDH02C
<b>Site No.</b>	Site 2 - DH2	<b>Start – End Date</b>	11/07/11 – 12/07/2011	
<b>Easting</b>	698515 GPS	<b>Northing</b>	7409641 GPS	
<b>Elevation</b>	147 GPS	<b>Datum</b>	GDA	
<b>Tenure</b>	EPC1827	<b>Map Zone</b>	55	
<b>Tenure Holder</b>	Area Coal	<b>Company Rep / Geo</b>	John Stegler	
<b>Hole Objective</b>	Core target seam for coal quality analysis			

<b>HOLE DETAILS</b> As drilled					
Interval	HOLE SIZE	DEPTH (mGL)	BIT TYPE	CEMENT	DRILLED / INSTALLED
Pre-collar	7 7/8"	16.5	PCD	Nil	11/07/11
Casing	6"	16.5 (17)	n/a	Nil	11/07/11
Open hole to core depth					
Core	140mm	24.37	4C fine/medium	Nil	12/07/11
Open hole to TD	99mm	30.37	PCD	Nil	12/07/11

<b>DRILLING DATA</b>					
<b>Drilling Contractor</b>	Depco Drilling	<b>Drilling system</b>	Top Head Drive	<b>Rotary hole</b>	Air core
<b>Rig</b>	Gardener Denver	<b>Fluid</b>	Water injection	<b>Additives</b>	none

<b>CORE RUN DATA</b> As Drilled							
Run number	From	To	Drilled	Recovered	loss / gain	Cumulative loss	Adjusted Depth
1	16.53	18.99	2.46	2.36	- 0.10	- 0.10	18.89
2	18.99	19.28	0.29	0.16	- 0.13	- 0.23	19.22
3	19.28	23.37	4.09	4.15	+ 0.06	-0.17	23.37
4	23.37	24.37	1.00	1.00	0	-0.17	24.37

<b>STRATIGRAPHY Corrected</b>					
<b>Horizon/Seam Name</b>	<b>From</b>	<b>To</b>	<b>Thickness</b>	<b>Interburden</b>	<b>Data Source</b>
Base of Tertiary	0.00	5.00	6.00	0.00	Chips
Bas of Weathering	0.00	17.84	17.84	0.00	Core
Aquarius Seam	17.68	22.58	4.90	0.00	Core/Geophysics

<b>LITHOLOGICAL Corrected</b>		
		<b>Chipped Interval</b>
0	0.50	SOIL, slightly sandy, medium brown
0.50	4.00	SAND, medium grain size, slightly clayey, medium brown
4.00	5.00	SAND, medium grain size, slightly clayey, medium orange brown <b><u>Base of Tertiary</u></b>
5.00	7.00	CLAY, sandy with limonite staining, mottled orange brown, highly weathered.
7.00	12.00	CLAY, silty with ferruginous nodules throughout and limonite staining, mottled purple white yellow brown, highly weathered.
12.00	16.76	SILTSTONE clayey, limonite staining throughout, mottled greenish grey minor yellow, highly weathered
		<b>Start of Core</b>
16.76	17.13	SILTSTONE clayey, limonite stained bands throughout, light to medium greenish grey yellow, highly weathered
17.13	17.68	SILTSTONE clayey, minor limonite staining throughout, light to medium greenish grey minor yellow, highly broken core highly weathered (dip 8 degrees)
17.68	17.84	COAL <10% Bright bands?, weathered (sooty) <b><u>Possible Base of Weathering</u></b>
17.84	18.00	COAL <10% Bright bands, weakly weathered ?
18.00	18.20	CLAY, reworked, spin-marked, puggy light medium grey
18.20	18.32	SILTSTONE clayey, carbonaceous bands towards base of unit
18.32	18.58	COAL <10% Bright bands (?) broken core
18.58	18.84	CLAYSTONE slightly sandy towards base of unit, light cream brown
18.84	18.87	COAL <10% Bright bands
18.87	18.91	CLAYSTONE tuffaceous, medium brown cream
18.91	18.99	COAL 10-40% Bright bands
18.99	19.01	CLAYSTONE tuffaceous and carbonaceous, medium to dark brown black
19.01	19.13	COAL <10% Bright bands, carbonaceous mudstone bands throughout, highly broken core
19.13	19.24	COAL <10% Bright bands, carbonaceous mudstone bands throughout, highly broken core
19.24	19.27	COAL 60-90% Bright bands
19.27	19.31	COAL 10-40% Bright bands
19.31	19.32	CLAYSTONE tuffaceous, medium brown cream
19.32	19.44	COAL 10-40% Bright bands, broken core

19.44	19.66	CLAYSTONE silty, abundant fracture planes towards base of unit, light grey brown
19.66	19.78	COAL 40-60% Bright bands
19.78	19.85	COAL 10-40% Bright bands
19.85	19.96	CLAYSTONE tuffaceous?, minor carbonaceous wisps, light cream grey
19.96	20.23	COAL 10-40% Bright bands, minor tuffaceous claystone bands
20.23	20.25	CLAYSTONE tuffaceous , minor carbonaceous wisps, light to medium brown cream
20.25	20.49	COAL <10% Bright bands
20.49	21.02	CLAYSTONE tuffaceous , minor carbonaceous wisps, light grey
21.02	21.09	COAL dull <1% Bright bands
21.09	21.18	COAL <10% Bright bands
21.18	21.20	CLAYSTONE tuffaceous, minor carbonaceous wisps, medium dark brown
21.20	21.26	COAL dull <1% Bright bands
21.26	21.28	CLAYSTONE tuffaceous, minor carbonaceous wisps, medium dark brown
21.28	21.32	COAL <10% Bright bands
21.32	21.48	COAL 40-60% Bright bands
21.48	21.63	COAL >90% Bright bands
21.63	21.74	CLAYSTONE tuffaceous?, minor carbonaceous wisps, medium grey brown
21.74	21.99	COAL 10-40% Bright bands
21.99	22.30	COAL 60-90% Bright bands
22.30	22.42	CLAYSTONE slightly silty, minor carbonaceous fragments and wisps, light to medium grey
22.42	22.58	COAL 10-40% Bright bands
22.58	22.69	CARBONACEOUS MUDSTONE coaly lenses throughout, dark blackish grey
22.69	22.79	CLAYSTONE slightly silty, carbonaceous wisps, tuffaceous? medium to dark grey (slight brown)
22.79	22.95	CLAYSTONE slightly silty, occasional carbonaceous wisps, light to medium to dark grey (slight brown)
22.95	22.97	CARBONACEOUS MUDSTONE coaly lenses throughout, dark blackish grey
22.97	23.18	MUDSTONE carbonaceous wisps throughout, light to medium grey black
		<b>End of Core</b>
23.18	24.18	SILTSTONE occasional carbonaceous wisps and lenses throughout, slightly sandy towards base of unit, light to medium grey.
24.18	30.18	SANDSTONE fine grained, fining upwards, light to medium grey
		<b>EOH</b>

**SAMPLE DATA**

Sample ID	From Drilled Depth	To Drilled Depth	From Correct – ed Depth	To Correct – ed Depth	Lith - ology	Sample Type	Comments
Target Seam	17.45	22.77	17.84	22.58	COAL + Partings	CQ	See RDH02C Borehole Sample Sheet
GT02	23.72	23.99	23.53	23.80	ST	Geotech floor	GT01 Sample too fragmented - not taken

**COMMENTS**

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### Drill Hole Summary

			<b>Hole Name</b>	RDH02Ca
<b>Site No.</b>	Site 2 - DH2	<b>Start – End Date</b>	12/07/11 – 12/07/2011	
<b>Easting</b>	698516 GPS	<b>Northing</b>	7409634 GPS	
<b>Elevation</b>	147 GPS	<b>Datum</b>	GDA	
<b>Tenure</b>	EPC1827	<b>Map Zone</b>	55	
<b>Tenure Holder</b>	Area Coal	<b>Company Rep / Geo</b>	John Stegler	
<b>Hole Objective</b>	Core target seam for Recyoal analysis			

<b>HOLE DETAILS As Drilled</b>					
Interval	HOLE SIZE	DEPTH (mGL)	BIT TYPE	CEMENT	DRILLED / INSTALLED
Pre-collar	7 7/8"	16.54	PCD	Nil	12/07/11
Casing	6"	16.5 (17)	n/a	Nil	12/07/11
Open hole to core depth	N/A				
Core	140mm	24.13	4C medium	Nil	12/07/11
Open hole to TD	99mm	30.13	PCD	Nil	12/07/11

<b>DRILLING DATA</b>					
<b>Drilling Contractor</b>	Depco Drilling	<b>Drilling system</b>	Top Head Drive	<b>Rotary hole</b>	Air core
<b>Rig</b>	Gardener Denver	<b>Fluid</b>	Water injection	<b>Additives</b>	none

<b>CORE RUN DATA As Drilled</b>							
Run number	From	To	Drilled	Recovered	loss / gain	Cumulative loss	Adjusted Depth
1	16.54	19.36	2.82	2.74	- 0.08	- 0.08	19.28
2	19.36	22.63	3.27	3.27	0	- 0.08	22.63
3	22.63	24.13	1.50	1.50	0	-0.08	24.13

<b>STRATIGRAPHY Corrected</b>					
<b>Horizon/Seam Name</b>	<b>From</b>	<b>To</b>	<b>Thickness</b>	<b>Interburden</b>	<b>Data Source</b>
Base of Tertiary	0.00	7.00	7.00	0.00	Chips
Bas of Weathering	0.00	18.32	18.32	0.00	Core
Aquarius Seam	18.01	22.96	4.95	0.00	Core/Geophysics

<b>LITHOLOGICAL Corrected</b>		
		<b>Chipped Interval</b>
0	0.50	SOIL, sandy, medium brown
0.50	4.00	SAND, medium grain, slightly clayey medium brown, highly weathered
4.00	6.00	SAND, medium grain, slightly clayey, medium orange brown, highly weathered
6.00	7.00	CLAY, sandy, limonite staining, mottled purple orange white, highly weathered. <b><u>Base of Tertiary</u></b>
7.00	12.00	CLAY, silty, ferruginous nodules towards top of unit, limonite staining throughout, mottled purple white yellow brown, highly weathered
12.00	16.41	SILTSTONE clayey, limonite staining throughout, medium greenish grey yellow brown, highly weathered.
		<b>Start of Core</b>
16.41	17.30	SILTSTONE ferruginous staining throughout, light to medium whitish yellow brown, very broken core, highly weathered.
17.30	17.83	CLAYSTONE minor limonitic staining, medium blue grey, moderately weathered
17.83	18.01	CLAYSTONE medium grey, moderately weathered
18.01	18.32	COAL 10- 40% Bright bands?, weathered <b><u>Possible Base of Weathering</u></b>
18.32	18.60	COAL <10% Bright bands, weakly weathered ?
18.60	18.64	COAL <10% Bright bands?, very broken core
18.64	18.69	CLAYSTONE tuffaceous?, light to medium cream brown
18.69	18.73	COAL <1% Bright bands
18.73	18.75	CLAYSTONE tuffaceous?, light to medium cream brown
18.75	18.80	COAL <1% Bright bands
18.80	18.85	CLAYSTONE tuffaceous?, light to medium cream brown
18.85	18.94	COAL <1% Bright bands
18.94	18.96	CLAYSTONE tuffaceous and carbonaceous, medium brown cream
18.96	19.00	COAL <10% Bright bands
19.00	19.01	CLAYSTONE tuffaceous minor carbonaceous wisps, medium brown cream
19.01	19.08	COAL <1% Bright bands
19.08	19.15	COAL <10% Bright bands
19.15	19.51	COAL <10% Bright bands, broken core
19.51	19.86	CLAYSTONE tuffaceous, light cream brown

19.86	20.12	COAL 10- 40% Bright bands
20.12	20.22	CLAYSTONE tuffaceous, light cream brown
20.22	20.47	COAL <1% Bright bands, minor claystone lenses and bands throughout
20.47	20.53	CLAYSTONE tuffaceous, light cream brown
20.53	20.68	COAL <10% Bright bands
20.68	20.74	COAL <1% Bright bands
20.74	21.20	CLAYSTONE silty towards middle of unit, light cream brown
21.20	21.37	COAL <10% Bright bands, claystone lenses and bands throughout
21.37	21.44	COAL <1% Bright bands
21.44	21.48	CLAYSTONE tuffaceous? minor carbonaceous wisps, medium cream brown
21.48	21.50	COAL <10% Bright bands
21.50	21.51	CLAYSTONE tuffaceous? medium cream brown
21.51	21.58	COAL 10- 40% Bright bands
21.58	21.59	CLAYSTONE tuffaceous? medium cream brown
21.59	21.90	COAL 10- 40% Bright bands
21.90	22.01	CLAYSTONE tuffaceous? medium cream brown
22.01	22.11	COAL <10% Bright bands
22.11	22.12	CLAYSTONE pyritic lens towards top of unit, medium to dark brown black
22.12	22.27	COAL 10- 40% Bright bands
22.27	22.51	COAL 40- 60% Bright bands
22.51	22.63	COAL 10- 40% Bright bands, very broken core
22.63	22.72	CLAYSTONE carbonaceous, dark grey black
22.72	22.93	COAL <10% Bright bands
22.93	22.94	CLAYSTONE carbonaceous, medium brown cream
22.94	22.96	COAL <10% Bright bands
22.96	23.07	CARBONACEOUS MUDSTONE medium to dark grey
23.07	24.00	SANDSTONE fine to medium grained, carbonaceous bands towards top of unit and carbonaceous wisps throughout, coarsening upwards, light to medium grey black
		<b>End of Core</b>
24.00	30.00	SANDSTONE fine to medium grained, occasional carbonaceous wisps throughout, light to medium grey
		<b>EOH</b>

**SAMPLE DATA**

Sample ID	From Drilled Depth	To Drilled Depth	From Correct – ed Depth	To Correct – ed Depth	Lith - ology	Sample Type	Comments
RDH02 Ca	18.14	23.09	18.01	22.96	Coal and Partings	Recycoal	Samples in 4 bags, dispatched 21-7-2011.

**COMMENTS**

Seam sampled from 18.01 – 22.96 (corrected depth for Recycoal analysis.)



### Drill Hole Summary

			<b>Hole Name</b>	RDH03
<b>Site No.</b>	Site 3 - DH3	<b>Start – End Date</b>	13/07/11 – 15/07/2011	
<b>Easting</b>	698803 GPS	<b>Northing</b>	7408948 GPS	
<b>Elevation</b>	147 GPS	<b>Datum</b>	GDA	
<b>Tenure</b>	EPC1827	<b>Map Zone</b>	55	
<b>Tenure Holder</b>	Area Coal	<b>Company Rep / Geo</b>	John Stegler	
<b>Hole Objective</b>	Drill pilot hole - identify target seam depth and chip on to 120m			

<b>HOLE DETAILS As Drilled</b>					
Interval	HOLE SIZE	DEPTH (mGL)	BIT TYPE	CEMENT	DRILLED / INSTALLED
Pre-collar	6 3/4"	21.50	PCD	Nil	13/07/11
Reaming	6 1/2"	42	Hammer		13/07/11
Open hole to Casing Depth	6 1/2"	48	Hammer		13/07/11
Casing	5"	48(49)	n/a	Nil	13/07/11
Open hole to core depth	N/A				
Core	N/A				
Open hole to TD	99mm	108	PCD	Nil	15/07/11

<b>DRILLING DATA</b>					
<b>Drilling Contractor</b>	Depco Drilling	<b>Drilling system</b>	Top Head Drive	<b>Rotary hole</b>	Air core
<b>Rig</b>	Gardener Denver	<b>Fluid</b>	Water injection	<b>Additives</b>	none

<b>CORE RUN DATA As Drilled</b>							
Run number	From	To	Drilled	Recovered	loss / gain	Cumulative loss	Adjusted Depth
N/A							

<b>STRATIGRAPHY Corrected</b>					
<b>Horizon/Seam Name</b>	<b>From</b>	<b>To</b>	<b>Thickness</b>	<b>Interburden</b>	<b>Data Source</b>
Base of Tertiary	0.00	1.00	1.00	0.00	Chips
Bas of Weathering	0.00	20.00	20.00	0.00	Chips
Aquarius Seam	31.50	35.05	3.55	0.00	Chips/Geophysics
Seam	72.00	73.45	1.45	36.95	Chips/Geophysics
Seam	77.90	79.20	1.30	4.45	Chips/Geophysics

<b>LITHOLOGICAL Corrected</b>		
		<b>Chipped Interval</b>
0	1.00	SOIL medium grained sand, dark brown <u><b>Base of Tertiary (Qa)</b></u>
1.00	2.00	SILTSTONE ferruginous staining throughout, light to medium yellow brown, highly weathered
2.00	3.50	SANDSTONE fine grained, ferruginous staining throughout, mottled purple grey, highly weathered
3.50	4.00	SILTSTONE ferruginous staining throughout, light to medium yellow brown, highly weathered
4.00	11.00	MUDSTONE slightly silty towards base of unit, ferruginous staining throughout, mottled purple yellow grey, moderately weathered.
11.00	17.00	SANDSTONE fine grained, lithic, minor ferruginous staining, mottled brown grey, weakly weathered
17.00	20.00	SANDSTONE fine grained, lithic, ferruginous staining (chips appear laminated), light grey, weakly weathered <u><b>Base of Weathering</b></u>
20.00	23.50	SANDSTONE fine grained, lithic, light grey, fresh
23.50	25.50	SANDSTONE (60%) fine grained, lithic, light grey SILTSTONE (40%) siliceous (some fragments appear crystalline- possible igneous), very hard, medium to dark grey
25.50	27.00	SANDSTONE fine grained, lithic, carbonaceous wisps, light grey
27.00	30.00	SANDSTONE (60%) fine grained, lithic, light grey SILTSTONE (40%) minor fractures with Fe oxide (possible contamination), medium grey
30.00	31.50	SILTSTONE minor sandstone bands, medium grey
31.50	35.05	COAL tuffaceous claystone bands throughout
35.00	48.00	SANDSTONE fine to medium grained, lithic, carbonaceous wisps throughout, fractured with minor pyrite and calcite on fracture surfaces, light grey
48.00	53.00	SANDSTONE fine to medium grained, lithic, occasional carbonaceous wisps, rare siltstone bands, light grey
53.00	54.00	SANDSTONE medium grained, lithic, light to medium grey
54.00	57.50	SANDSTONE fine grained, lithic, light grey
57.50	60.00	SILTSTONE slightly sandy, light to medium grey
60.00	62.00	SANDSTONE fine grained, lithic, silty in parts, possible sideritic bands, light to medium

		brown grey
62.00	71.00	SILTSTONE (60%) medium grey SANDSTONE (40%) fine grained, lithic, light grey
71.00	72.00	SILTSTONE minor coaly lenses, medium grey
72.00	73.45	COAL minor claystone bands throughout
73.45	77.10	SANDSTONE fine to medium grained, lithic, light grey
77.10	79.20	COAL claystone bands throughout
79.00	82.50	SANDSTONE fine to medium grained, lithic, light grey
82.50	84.00	SANDSTONE very fine grained, lithic, silty, light grey
84.00	89.50	SANDSTONE fine to medium grained, lithic, light whitish grey
89.50	100.00	SANDSTONE fine to medium grained, lithic, abundant carbonaceous wisps throughout, light grey
100.00	101.00	SANDSTONE fine to medium grained, lithic, abundant carbonaceous wisps throughout and minor coaly fragments, light grey
101.00	108.00	SANDSTONE (90%) fine to medium grained, occasional carbonaceous wisps, light grey SILTSTONE (10%) medium grey
		<b>EOH</b>

**SAMPLE DATA**

Sample ID	From	To	From Correct - ed	To Correct - ed	Lith - ology	Sample Type	Comments
N/A							

**COMMENTS**

High groundwater flow rate ~7 l/s (driller estimate)

Hole reamed from 20 to 48m and re-cased to 48m.

Hole continued to make water after deepening the cased interval (~1/3 of initial flow) and was abandoned at 108m when pits reached capacity.

**Drill Hole Summary**

			<b>Hole Name</b>	RDH03C
<b>Site No.</b>	Site 3 – DH3	<b>Start – End Date</b>	14/07/11 – 15/07/2011	
<b>Easting</b>	698803 GPS	<b>Northing</b>	7408945 GPS	
<b>Elevation</b>	147 GPS	<b>Datum</b>	GDA	
<b>Tenure</b>	EPC1827	<b>Map Zone</b>	55	
<b>Tenure Holder</b>	Area Coal	<b>Company Rep / Geo</b>	John Stegler	
<b>Hole Objective</b>	Core target seam for coal quality analysis			

<b>HOLE DETAILS As Drilled</b>					
Interval	HOLE SIZE	DEPTH (mGL)	BIT TYPE	CEMENT	DRILLED / INSTALLED
Pre-collar	7 7/8"	14	PCD	Nil	14/07/11
Casing	6"	14 (14.5)	n/a	Nil	14/07/11
Open hole to core depth	5 5/8"	30.54	Hammer	Nil	14/07/11
Core	140mm"	36.54	4C medium	Nil	15/07/11
Open hole to TD	99mm	42.54	PCD	Nil	15/07/11

<b>DRILLING DATA</b>					
<b>Drilling Contractor</b>	Depco Drilling	<b>Drilling system</b>	Top Head Drive	<b>Rotary hole</b>	Air core
<b>Rig</b>	Gardener Denver	<b>Fluid</b>	Water injection	<b>Additives</b>	none

<b>CORE RUN DATA As Drilled</b>							
Run number	From	To	Drilled	Recovered	loss / gain	Cumulative loss	Adjusted Depth
1	30.54	35.04	4.50	4.47	- 0.03	- 0.03	35.01
2	35.04	36.54	1.50	1.53	+ 0.03	0.00	36.54

STRATIGRAPHY					
Horizon/Seam Name	From	To	Thickness	Interburden	Data Source
Base of Tertiary	0.00	3.00	3.00	0.00	Chips
Bas of Weathering	0.00	19.00	19.00	0.00	Chips
Aquarius Seam	31.43	34.92	3.49	0.00	Core/Geophysics

LITHOLOGICAL Corrected		
		<b>Chipped Interval</b>
0	1.00	SOIL sandy, medium brown
1.00	3.00	SAND medium grain size, slightly clayey. Light to medium orange brown <b><u>Base of Tertiary</u></b>
3.00	4.50	SILTSTONE haematite staining throughout, mottled purple grey, highly weathered
4.50	10.50	MUDSTONE abundant haematite staining throughout, mottled purple yellow grey, moderately weathered.
10.50	13.00	SANDSTONE fine grained, lithic, haematitic staining, mottled purple grey, moderately weathered
13.00	19.00	SANDSTONE fine grained, lithic, minor ferruginous staining, light grey, weakly weathered <b><u>Base of Weathering</u></b>
19.00	24.00	SANDSTONE fine to medium grained, lithic, light grey , fresh
24.00	25.00	SANDSTONE fine grained, lithic, minor basalt? fragments, light to medium grey
25.00	28.00	SANDSTONE fine grained, lithic, minor carbonaceous wisps, light grey
28.00	30.45	SILTSTONE (40%) light to medium grey SANDSTONE (60%) fine grained, lithic, light grey
		<b>Start of Core</b>
30.45	31.43	SILTSTONE occasional sandstone bands, minor carbonaceous wisps towards base of unit, minor tuffaceous claystone bands, light to medium grey
31.43	31.49	COAL 10-40% bright bands
31.49	31.54	COAL 10% bright bands
31.54	31.56	COAL 60-90% bright bands
31.56	31.73	COAL 10% bright bands. occasional tuffaceous claystone lenses
31.73	31.93	CLAYSTONE tuffaceous, minor carbonaceous wisps, slightly sandy, light cream brown
31.93	31.97	COAL dull, stoney
31.97	32.03	CLAYSTONE tuffaceous, coaly band towards base of unit, slightly sandy, light cream brown
32.03	32.10	COAL <10% bright bands
32.10	32.13	CLAYSTONE tuffaceous, carbonaceous wisps, slightly sandy, light cream brown
32.13	32.24	COAL <1% bright bands, tuffaceous claystone bands throughout
32.24	32.33	COAL 40-60% bright bands
32.24	32.57	COAL 10-40% bright bands, rare tuffaceous claystone lenses
32.57	32.79	CLAYSTONE tuffaceous, slightly sandy, light cream brown

32.79	32.96	COAL <10% bright bands
32.96	33.13	CLAYSTONE tuffaceous, slightly sandy, light cream brown
33.13	33.30	COAL 10-40% bright bands
33.30	33.42	COAL <10% bright bands
33.42	33.58	CLAYSTONE tuffaceous, silty towards base of unit, coal lenses towards base of unit, minor pyrite on fracture planes, light to medium cream brown
33.58	33.68	COAL 10-40% bright bands
33.68	33.70	CLAYSTONE carbonaceous lenses, medium brown
33.70	33.78	COAL 10-40% bright bands
33.78	33.82	COAL <10% bright bands, tuffaceous claystone lenses
33.82	33.85	COAL >90% bright bands, calcite in cleats
33.85	33.90	COAL 10% bright bands, occasional tuffaceous claystone lenses
33.90	34.01	COAL <10% bright bands
34.01	34.18	COAL 40-60% bright bands
34.18	34.26	CLAYSTONE tuffaceous, silty, carbonaceous wisps, light cream brown
34.26	34.30	COAL 40-60% bright bands
34.30	34.36	COAL <10% bright bands
34.36	34.37	COAL >90% bright bands
34.37	34.53	COAL 10-40% bright bands
34.53	34.62	COAL 40-60% bright bands
34.62	34.70	COAL <10% bright bands
34.70	34.80	COAL 40-60% bright bands
34.80	34.82	CARBONACEOUS MUDSTONE dark grey black
34.82	34.92	COAL 10-40% bright bands, broken core
34.92	34.56	SILTSTONE, sandy in parts, occasional carbonaceous wisps towards top of unit, fining upwards, light to medium grey
34.56	36.45	SANDSTONE fine grained, lithic, siltstone bands throughout, light grey
		<b>End of Core</b>
36.45	40.00	SILTSTONE, minor sandstone bands throughout, light to medium grey
40.00	42.45	SANDSTONE fine grained, lithic, siltstone bands towards base of unit, light grey
		<b>EOH</b>

SAMPLE DATA							
Sample ID	From Drilled Depth	To Drilled Depth	From Correct – ed Depth	To Correct – ed Depth	Lith - ology	Sample Type	Comments
GT01	30.94	31.17	30.85	31.08	ST	Geotech Roof	
Target Seam	31.52	35.01	31.43	34.92	COAL + Partings	CQ	See RDH03C Borehole Sample Sheet

GT02	35.01	35.29	34.92	35.20	ST	Geotech Floor	
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<b>COMMENTS</b>	
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### Drill Hole Summary

			<b>Hole Name</b>	RDH03Ca
<b>Site No.</b>	Site 3 – DH3	<b>Start – End Date</b>	15/07/11 – 16/07/2011	
<b>Easting</b>	698803 GPS	<b>Northing</b>	7408942 GPS	
<b>Elevation</b>	147 GPS	<b>Datum</b>	GDA	
<b>Tenure</b>	EPC1827	<b>Map Zone</b>	55	
<b>Tenure Holder</b>	Area Coal	<b>Company Rep / Geo</b>	John Stegler	
<b>Hole Objective</b>	Core target seam for Recycoal analysis			

<b>HOLE DETAILS As Drilled</b>					
Interval	HOLE SIZE	DEPTH (mGL)	BIT TYPE	CEMENT	DRILLED / INSTALLED
Pre-collar	7 7/8"	15	PCD	Nil	15/07/11
Casing	6"	15 (15.5)	n/a	Nil	15/07/11
Open hole to core depth	5 3/4"	31.01	PCD	Nil	15/07/11
Core	140mm"	35.92	4C medium	Nil	16/07/11
Open hole to TD	99mm	41.92	PCD	Nil	16/07/11

<b>DRILLING DATA</b>					
<b>Drilling Contractor</b>	Depco Drilling	<b>Drilling system</b>	Top Head Drive	<b>Rotary hole</b>	Air core
<b>Rig</b>	Gardener Denver	<b>Fluid</b>	Water injection	<b>Additives</b>	none

<b>CORE RUN DATA As Drilled</b>							
Run number	From	To	Drilled	Recovered	loss / gain	Cumulative loss	Adjusted Depth
1	31.01	34.92	3.91	3.88	- 0.03	- 0.03	34.99
2	34.92	35.92	1.00	1.00	+ 0.03	0.00	35.92

<b>STRATIGRAPHY Corrected</b>					
<b>Horizon/Seam Name</b>	<b>From</b>	<b>To</b>	<b>Thickness</b>	<b>Interburden</b>	<b>Data Source</b>
Base of Tertiary	0.00	1.00	1.00	0.00	Chips
Bas of Weathering	0.00	20.00	20.00	0.00	Chips
Aquarius Seam	31.46	34.84	4.95	3.38	Core/Geophysics

<b>LITHOLOGICAL Corrected</b>		
		<b>Chipped Interval</b>
0	1.00	SOIL sandy, dark brown <b><u>Base of Tertiary (Qa)</u></b>
1.00	2.00	SILTSTONE clayey, limonite staining throughout, light to medium yellow brown , highly weathered
2.00	3.50	SANDSTONE fine to medium grain size, clayey , limonite staining, light to medium yellow brown
3.50	4.50	SILTSTONE haematite and limonite staining throughout, mottled purple grey, highly weathered
4.50	11.00	MUDSTONE abundant haematite staining throughout, slightly clayey, silty bands throughout, mottled purple yellow grey, highly weathered.
11.00	17.00	SANDSTONE fine grained, abundant ferruginous staining, mottled purple grey, moderately weathered
17.00	20.00	SANDSTONE fine grained, lithic, minor ferruginous staining, mottled grey brown, weakly weathered <b><u>Base of Weathering</u></b>
20.00	24.50	SANDSTONE fine grained, lithic, light grey , fresh
24.50	28.00	SANDSTONE (40%) fine grained, lithic, light grey SILTSTONE (60%) medium grey
28.00	30.96	SILTSTONE (40%) light to medium grey SANDSTONE (60%) fine grained, lithic, light grey
		<b>Start of Core</b>
30.96	31.43	SILTSTONE occasional sandstone bands, minor carbonaceous wisps towards base of unit, light to medium grey
31.43	31.46	MUDSTONE, carbonaceous wisps, medium grey (dip 8 degrees)
31.46	31.57	COAL 10-40% bright bands
31.57	31.65	COAL 10-40% bright bands, claystone lenses throughout
31.65	31.74	COAL <10% bright bands. occasional tuffaceous claystone lenses
31.74	31.75	CLAYSTONE tuffaceous, light cream brown
31.74	31.76	COAL dull, stoney
31.76	31.93	CLAYSTONE tuffaceous, minor carbonaceous lenses towards base of unit, light cream brown (dip 12 degrees)
31.93	31.99	COAL <1% bright bands
31.99	32.02	CLAYSTONE carbonaceous bands, light to medium cream brown
32.02	32.09	COAL 40-60% bright bands

32.09	32.13	CLAYSTONE tuffaceous, minor carbonaceous wisps, medium cream brown
32.13	32.16	COAL 10-40% bright bands
32.16	32.17	CLAYSTONE tuffaceous, minor carbonaceous wisps, medium cream brown
32.17	32.23	COAL 10-40% bright bands, claystone bands throughout
32.23	32.30	COAL 10-40% bright bands
32.30	32.38	COAL <10% bright bands
32.38	32.41	COAL 40-60% bright bands
32.41	32.45	COAL <10% bright bands
32.45	32.47	COAL 40-60% bright bands
32.47	32.52	COAL <10% bright bands
32.52	32.71	CLAYSTONE tuffaceous, minor carbonaceous wisps, light cream brown
32.71	32.91	COAL 10-40% bright bands
32.91	33.09	CLAYSTONE tuffaceous, minor carbonaceous wisps, coaly band at base of unit, light cream brown
33.09	33.11	COAL <1% bright bands
33.11	33.13	COAL 60-90% bright bands
33.13	33.28	COAL 10-40% bright bands
33.28	33.33	COAL 40-60% bright bands (dip 6 degrees)
33.33	33.36	COAL <10% bright bands
33.36	33.53	CLAYSTONE tuffaceous, coaly bands and wisps, light cream brown
33.53	33.67	COAL <10% bright bands
33.67	33.69	CLAYSTONE tuffaceous, minor carbonaceous wisps, light to medium cream brown
33.69	33.81	COAL 10-40% bright bands, occasional tuffaceous claystone bands
33.81	34.01	COAL 10-40% bright bands
34.01	34.21	CLAYSTONE tuffaceous, light cream brown
34.21	34.50	COAL 10-40% bright bands
34.50	34.51	CLAYSTONE dark brown
34.51	34.59	COAL 10-40% bright bands
34.59	34.63	COAL <10% bright bands
34.63	34.69	CARBONACEOUS MUDSTONE coaly lenses towards middle of unit, dark grey black
34.69	34.76	COAL 10-40% bright bands
34.76	34.84	COAL 40-60% bright bands, broken core
34.84	34.85	CARBONACEOUS dark grey black
34.85	35.87	SANDSTONE very fine to fine grained, lithic, rare carbonaceous wisps, silty, light grey
		<b>End of Core</b>
35.87	41.87	SANDSTONE fine to medium grained, lithic, occasional siltstone bands, light grey
		<b>EOH</b>

**SAMPLE DATA**

Sample ID	From Drilled Depth	To Drilled Depth	From Correct – ed Depth	To Correct – ed Depth	Lith - ology	Sample Type	Comments
RDH03 Ca	31.51	34.89	31.46	34.84	COAL + CY Partings	Coal seam for Recycoal analysis	Samples in 4 bags dispatched 21-7-2011

**COMMENTS**

Seam sampled from 31.46 – 34.84 (corrected depth) for Recycoal analysis

**Drill Hole Summary**

			<b>Hole Name</b>	RDH04
<b>Site No.</b>	Site 4 - DH4	<b>Start – End Date</b>	13/07/11 – 14/07/2011	
<b>Easting</b>	698243 GPS	<b>Northing</b>	7409000 GPS	
<b>Elevation</b>	147 GPS	<b>Datum</b>	GDA	
<b>Tenure</b>	EPC1827	<b>Map Zone</b>	55	
<b>Tenure Holder</b>	Area Coal	<b>Company Rep / Geo</b>	John Stegler	
<b>Hole Objective</b>	Drill pilot hole - identify target seam depth and chip on to 120m or Rewan Fm			

<b>HOLE DATA As Drilled</b>					
Interval	HOLE SIZE	DEPTH (mGL)	BIT TYPE	CEMENT	DRILLED / INSTALLED
Pre-collar	6 3/4"	29.50	Blades	Nil	13/07/11
Casing	5"	29.5 (30)	n/a	Nil	14/07/11
Open hole to core depth	N/A				
Core	N/A				
Open hole to TD	99mm	96	PCD	Nil	14/07/11

<b>DRILLING DATA</b>					
<b>Drilling Contractor</b>	Depco Drilling	<b>Drilling system</b>	Top Head Drive	<b>Rotary hole</b>	Air core
<b>Rig</b>	Gardener Denver	<b>Fluid</b>	Water injection	<b>Additives</b>	None

<b>CORE RUN DATA As Drilled</b>							
Run number	From	To	Drilled	Recovered	loss / gain	Cumulative loss	Adjusted Depth
N/A							

<b>STRATIGRAPHY Corrected</b>					
<b>Horizon/Seam Name</b>	<b>From</b>	<b>To</b>	<b>Thickness</b>	<b>Interburden</b>	<b>Data Source</b>
Base of Tertiary	0.00	10.00	10.00	0.00	Chips
Bas of Weathering	0.00	29.00	29.00	0.00	Chips
Rewan Formation	89.00	96.00+	7.00+	0.00	Chips/Geophysics

<b>LITHOLOGICAL Corrected</b>		
		<b>Chipped Interval</b>
0	2.00	SOIL, clayey, medium yellow brown
2.00	4.00	CLAY, slightly sandy, limonitic staining throughout, stiff, light to medium yellow brown
4.00	5.50	CLAY, haematitic staining, mottled whitish grey purple, stiff, highly weathered
5.50	10.00	CLAY, haematitic staining, mottled whitish grey purple, stiff, highly weathered. <b><u>Base of Tertiary?</u></b>
10.00	13.00	CLAYSTONE limonitic staining, mottled whitish grey yellow, stiff, highly weathered.
13.00	17.00	CLAYSTONE ferruginous staining, clayey, medium grey brown, highly weathered.
17.00	23.00	MUDSTONE possible siltstone in parts, limonite staining throughout, clayey, medium grey brown, highly weathered.
23.00	25.00	SILTSTONE carbonaceous mudstone lenses throughout, slightly clayey, medium grey brown, moderately weathered.
25.00	27.00	SANDSTONE carbonaceous wisps throughout, slightly clayey, medium grey black, weakly weathered
27.00	29.00	SILTSTONE carbonaceous in parts, slightly clayey, medium grey black. Weakly weathered <b><u>Base of Weathering</u></b>
29.00	32.00	SANDSTONE finegrained, lithic, minor carbonaceous fragments and siltstone bands throughout, light grey, fresh
32.00	37.00	CARBONACEOUS MUDSTONE silty lenses throughout, medium to dark grey black
37.00	40.00	SILTSTONE mudstone bands towards top of unit, medium grey
40.00	42.00	SANDSTONE very fine to fine grained, fractured with calcite on fracture surfaces, occasional siltstone bands, light grey
42.00	64.50	CARBONACEOUS SILTSTONE fractured? Occasional calcite fragments throughout, dark blackish grey
64.50	67.00	CARBONACEOUS SANDSTONE (70%) fine to medium grained, fractured? occasional calcite fragments throughout, medium to dark grey black. CARBONACEOUS SILTSTONE (30%), dark blackish grey
67.00	89.00	SILTSTONE sandstone bands throughout, altered, rusty brown (possible RED BEDS or influenced by fault zone)
89.00	93.00	SANDSTONE fine grained, lithic, medium to dark greenish grey. (REWAN FM)
93.00	95.00	SILTSTONE sandstone bands throughout, altered, rusty brown (possible RED BEDS or influenced by fault)
95.00	96.00	SANDSTONE fine grained, lithic, greenish grey.
		<b>EOH</b>

**SAMPLE DATA**

Sample ID	From	To	From Correct - ed	To Correct - ed	Lith - ology	Sample Type	Comments
N/A							

**COMMENTS**

Hole was abandoned in Rewan Fm.

Low sample variability in the 67 – 89m interval may indicate drilling along subvertical strata within the fault zone.

Minor coaly fragments were intersected shallow in the hole but with no indication of a significant seam.

## **Appendix 3**

### Coal Quality Analysis Results



## Testing and Analysis Report

Hole: RDH01C

Geological information:

Sample No:	PL01C_000023 - 24	PL01C_000025	PL02C_000031	PL04C_000037 - 38	
Seam:	n/a	n/a	n/a	n/a	
Depth To:	35.01	35.32	35.75	36.63	(m)
Depth From:	35.32	35.52	36.10	36.97	(m)
Thickness:	0.31	0.20	0.35	0.34	(m)
Recieved Mass:	4242.0	2708.2	4953.9	4565.5	(g)
Dry Mass:	4191.7	2694.9	4933.4	4480.2	(g)
Free Moisture:	1.2	0.5	0.4	1.9	(% ar)

Stage 1 Raw Coal Analysis:

Proximate Analysis:

Inherent Moisture:	1.4	2.1	1.1	1.1	(% ad)
Ash:	42.6	43.2	49.3	54.1	(% ad)
Volatile Matter:	13.8	10.9	9.8	8.7	(% ad)
Fixed Carbon:	42.2	43.8	39.8	36.1	(% ad)

Other Analysis:

Total Sulfur:	0.21	0.40	0.39	0.50	(% ad)
Calorific Value:	N/R	N/R	N/R	N/R	(MJ/kg ad)
Relative Density:	1.78	1.70	1.80	1.86	(g/cc ad)

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## Testing and Analysis Report

**Hole: RDH01C**

Stage 2 Washability 12 + 0mm:

Sample No: PL01C\_000023 - 24

Relative Density		Fractional		Cumulative	
Sinks	Floats	Mass%	Ash (%ad)	Mass%	Ash (%ad)
	F1.35	5.0	3.0	5.0	3.0
S1.35	F1.40	0.8	13.0	5.8	4.4
S1.40	F1.45	1.2	15.6	7.0	6.3
S1.45	F1.50	2.6	22.9	9.6	10.8
S1.50	F1.55	6.9	28.5	16.5	18.2
S1.55		83.5	45.6	100.0	41.1
<b>Total:</b>		<b>100.0</b>	<b>41.1</b>		

Sample No: PL01C\_000025

Relative Density		Fractional		Cumulative	
Sinks	Floats	Mass%	Ash (%ad)	Mass%	Ash (%ad)
	F1.35	2.9	4.2	2.9	4.2
S1.35	F1.40	1.3	13.1	4.2	7.0
S1.40	F1.45	1.5	18.3	5.7	9.9
S1.45	F1.50	3.3	23.1	9.0	14.8
S1.50	F1.55	7.1	29.3	16.1	21.2
S1.55		83.9	47.4	100.0	43.2
<b>Total:</b>		<b>100.0</b>	<b>43.2</b>		

Sample No: PL02C\_000031

Relative Density		Fractional		Cumulative	
Sinks	Floats	Mass%	Ash (%ad)	Mass%	Ash (%ad)
	F1.35	4.8	3.3	4.8	3.3
S1.35	F1.40	1.0	10.0	5.8	4.5
S1.40	F1.45	0.8	17.3	6.6	6.0
S1.45	F1.50	1.7	22.2	8.3	9.3
S1.50	F1.55	3.4	29.8	11.7	15.3
S1.55		88.3	53.5	100.0	49.0
<b>Total:</b>		<b>100.0</b>	<b>49.0</b>		

Sample No: PL04C\_000037 - 38

Relative Density		Fractional		Cumulative	
Sinks	Floats	Mass%	Ash (%ad)	Mass%	Ash (%ad)
	F1.35	6.3	3.0	6.3	3.0
S1.35	F1.40	1.1	12.4	7.4	4.4
S1.40	F1.45	1.3	16.7	8.7	6.2
S1.45	F1.50	2.6	22.9	11.3	10.1
S1.50	F1.55	5.1	29.6	16.4	16.1
S1.55		83.6	62.3	100.0	54.7
<b>Total:</b>		<b>100.0</b>	<b>54.7</b>		

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## Testing and Analysis Report

Hole: RDH01C

### Stage 3 Product Analysis:

Sample No: PL04C\_000037 - 38  
Seam: n/a

### Proximate Analysis:

Inherent Moisture: 0.8 (% ad)  
Ash: 10.2 (% ad)  
Volatile Matter: 13.7 (% ad)  
Fixed Carbon: 75.3 (% ad)

### Other Analysis:

CSN: 8 (ad)  
Total Sulfur: 0.73 (% ad)  
Calorific Value: 33.48 (MJ/kg ad)  
Phosphorous in Coal: 0.005 (% ad)

### Gieseler Plastometer Analysis:

Initial Softening Temperature: 0 (Deg.C)  
Max Fluidity Temperature: 0 (Deg.C)  
Solidification Temperature: 0 (Deg.C)  
Plastic Range: 0 (Deg.C)  
Max Fluidity: 0 (dd/min)  
Max Fluidity: 0.00 (Log 10)  
Date of Analysis: 06.09.11

### Dilatation Analysis:

Initial Contraction Temperature: 440 (Deg.C)  
Max Contraction Temperature: 470 (Deg.C)  
Max Dilatation Temperature: 470 (Deg.C)  
Max Contraction: 9 (%)  
Max Dilatation: -9 (%)  
Date of Analysis: 06.09.11

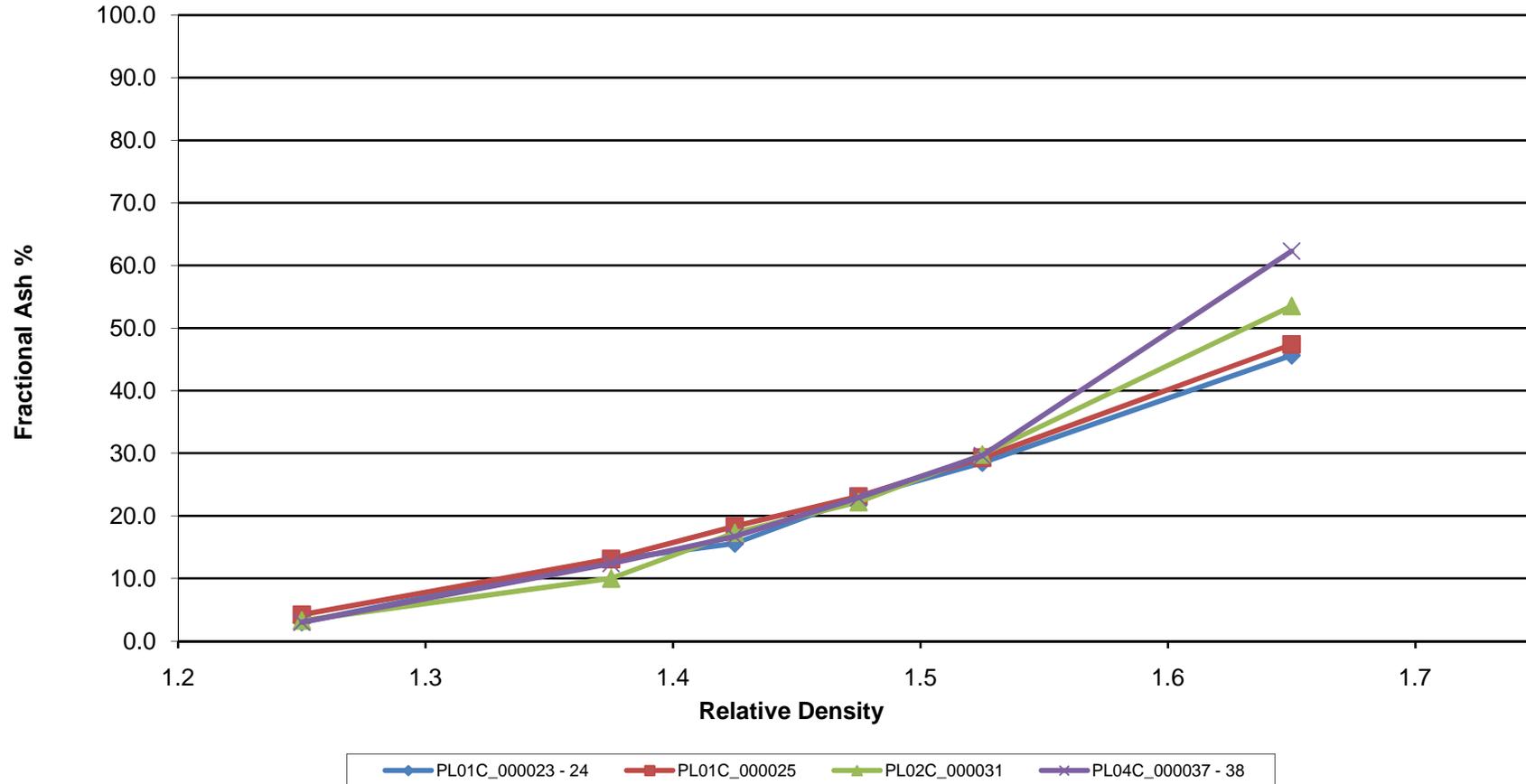
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### Testing and Analysis Report

Hole: RDH01C

### Density V's Fractional Ash % RDH01C



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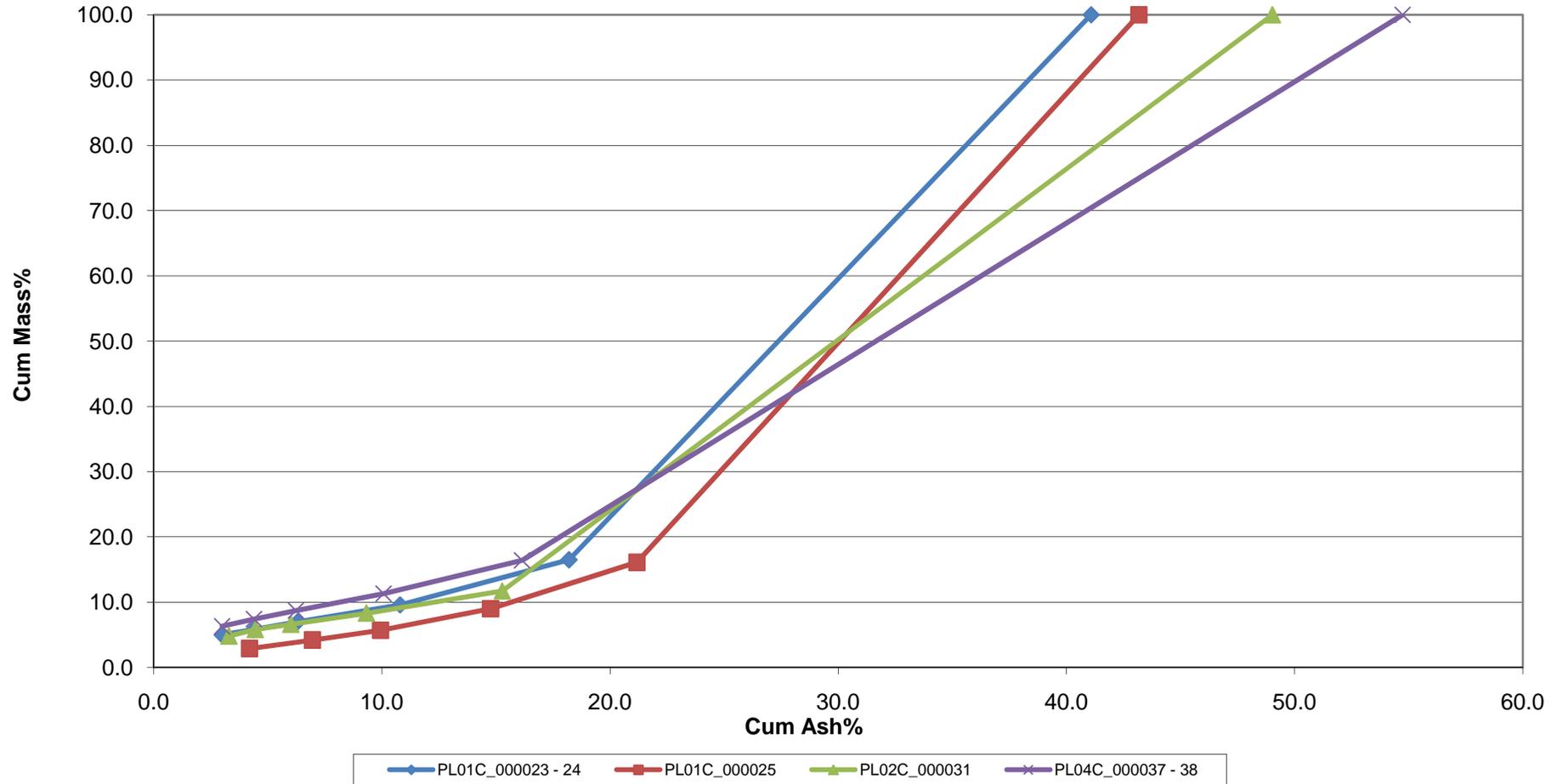
9 Beckinsale Street, Gladstone, QLD 4680  
P.O. Box 230 Gladstone QLD 4680  
Telephone (07) 49724288 Facsimile (07) 49722205



### Testing and Analysis Report

Hole: RDH01C

#### Cum Ash V's Cum Mass % RDH01C



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## Testing and Analysis Report

Hole: RDH03C

### Geological information:

Sample No:	PL01C_000001	PL02C_000008 -9	PL04C_000013 - 14	PL05C_000017	PL06C_000019	
Seam:	n/a	n/a	n/a	n/a	n/a	
Depth To:	31.43	32.21	33.13	33.90	34.26	(m)
Depth From:	31.73	32.57	33.42	34.18	34.62	(m)
Thickness:	0.30	0.36	0.29	0.28	0.36	(m)
Received Mass:	4130.7	4676.7	4120.0	3542.0	4356.8	(g)
Dry Mass:	4090.7	4641.7	4072.9	3487.4	4304.4	(g)
Free Moisture:	1.0	0.7	1.1	1.5	1.2	(% ar)

### Stage 1 Raw Coal Analysis:

#### Proximate Analysis:

Inherent Moisture:	0.7	0.6	0.5	0.8	1.0	(% ad)
Ash:	65.0	56.6	57.8	45.3	38.5	(% ad)
Volatile Matter:	6.6	9.1	7.6	9.3	10.6	(% ad)
Fixed Carbon:	27.7	33.7	34.1	44.6	49.9	(% ad)

#### Other Analysis:

Total Sulfur:	0.22	0.38	0.41	0.34	0.44	(% ad)
Calorific Value:	N/R	N/R	N/R	N/R	N/R	(MJ/kg ad)
Relative Density:	2.02	1.92	1.94	1.76	1.63	(g/cc ad)

**COMMITTED TO CUSTOMER SERVICE**

9 Beckinsale Street, Gladstone, QLD 4680  
P.O. Box 230 Gladstone QLD 4680  
Telephone (07) 49724288 Facsimile (07) 49722205

**Testing and Analysis Report**

Hole: RDH03C

Stage 2 Washability 12 + 0mm:

Sample No: PL01C\_000001

Relative Density		Fractional		Cumulative	
Sinks	Floats	Mass%	Ash (%ad)	Mass%	Ash (%ad)
	F1.35	4.1	3.5	4.1	3.5
S1.35	F1.40	0.7	10.2	4.8	4.5
S1.40	F1.45	0.7	13.9	5.5	5.7
S1.45	F1.50	0.8	20.0	6.3	7.5
S1.50	F1.55	1.6	34.0	7.9	12.9
S1.55		92.1	69.1	100.0	64.7
Total:		100.0	64.7		

Sample No: PL02C\_000008 -9

Relative Density		Fractional		Cumulative	
Sinks	Floats	Mass%	Ash (%ad)	Mass%	Ash (%ad)
	F1.35	7.6	3.0	7.6	3.0
S1.35	F1.40	1.4	9.5	9.0	4.0
S1.40	F1.45	1.0	13.7	10.0	5.0
S1.45	F1.50	1.1	17.5	11.1	6.2
S1.50	F1.55	1.3	26.6	12.4	8.4
S1.55		87.6	62.7	100.0	56.0
Total:		100.0	56.0		

Sample No: PL04C\_000013 - 14

Relative Density		Fractional		Cumulative	
Sinks	Floats	Mass%	Ash (%ad)	Mass%	Ash (%ad)
	F1.35	7.5	2.8	7.5	2.8
S1.35	F1.40	1.4	10.7	8.9	4.0
S1.40	F1.45	1.1	17.2	10.0	5.5
S1.45	F1.50	1.3	20.6	11.3	7.2
S1.50	F1.55	1.8	28.3	13.1	10.1
S1.55		86.9	63.0	100.0	56.1
Total:		100.0	56.1		

Sample No: PL05C\_000017

Relative Density		Fractional		Cumulative	
Sinks	Floats	Mass%	Ash (%ad)	Mass%	Ash (%ad)
	F1.35	7.2	2.6	7.2	2.6
S1.35	F1.40	1.6	9.9	8.8	3.9
S1.40	F1.45	2.5	18.5	11.3	7.2
S1.45	F1.50	4.8	23.8	16.1	12.1
S1.50	F1.55	10.5	29.7	26.6	19.1
S1.55		73.4	53.5	100.0	44.3
Total:		100.0	44.3		

Sample No: PL06C\_000019

Relative Density		Fractional		Cumulative	
Sinks	Floats	Mass%	Ash (%ad)	Mass%	Ash (%ad)
	F1.35	11.0	3.3	11.0	3.3
S1.35	F1.40	3.9	10.5	14.9	5.2
S1.40	F1.45	3.4	17.3	18.3	7.4
S1.45	F1.50	7.2	23.4	25.5	11.9
S1.50	F1.55	8.9	28.7	34.4	16.3
S1.55		65.6	50.6	100.0	38.8
Total:		100.0	38.8		

## Testing and Analysis Report

Hole: RDH03C

### Stage 3 Product Analysis:

Sample No: PL06C\_000019  
Seam: n/a

### Proximate Analysis:

Inherent Moisture: 1.0 (% ad)  
Ash: 11.8 (% ad)  
Volatile Matter: 13.0 (% ad)  
Fixed Carbon: 74.2 (% ad)

### Other Analysis:

CSN: 3.5 (ad)  
Total Sulfur: 0.60 (% ad)  
Calorific Value: 32.05 (MJ/kg ad)  
Phosphorous in Coal: 0.001 (% ad)

### Gieseler Plastometer Analysis:

Initial Softening Temperature: 0 (Deg.C)  
Max Fluidity Temperature: 0 (Deg.C)  
Solidification Temperature: 0 (Deg.C)  
Plastic Range: 0 (Deg.C)  
Max Fluidity: 0 (dd/min)  
Max Fluidity: 0.00 (Log 10)  
Date of Analysis: 07.09.11

### Dilatation Analysis:

Initial Contraction Temperature: 450 (Deg.C)  
Max Contraction Temperature: 500 (Deg.C)  
Max Dilatation Temperature: 500 (Deg.C)  
Max Contraction: 9 (%)  
Max Dilatation: -9 (%)  
Date of Analysis: 07.09.11

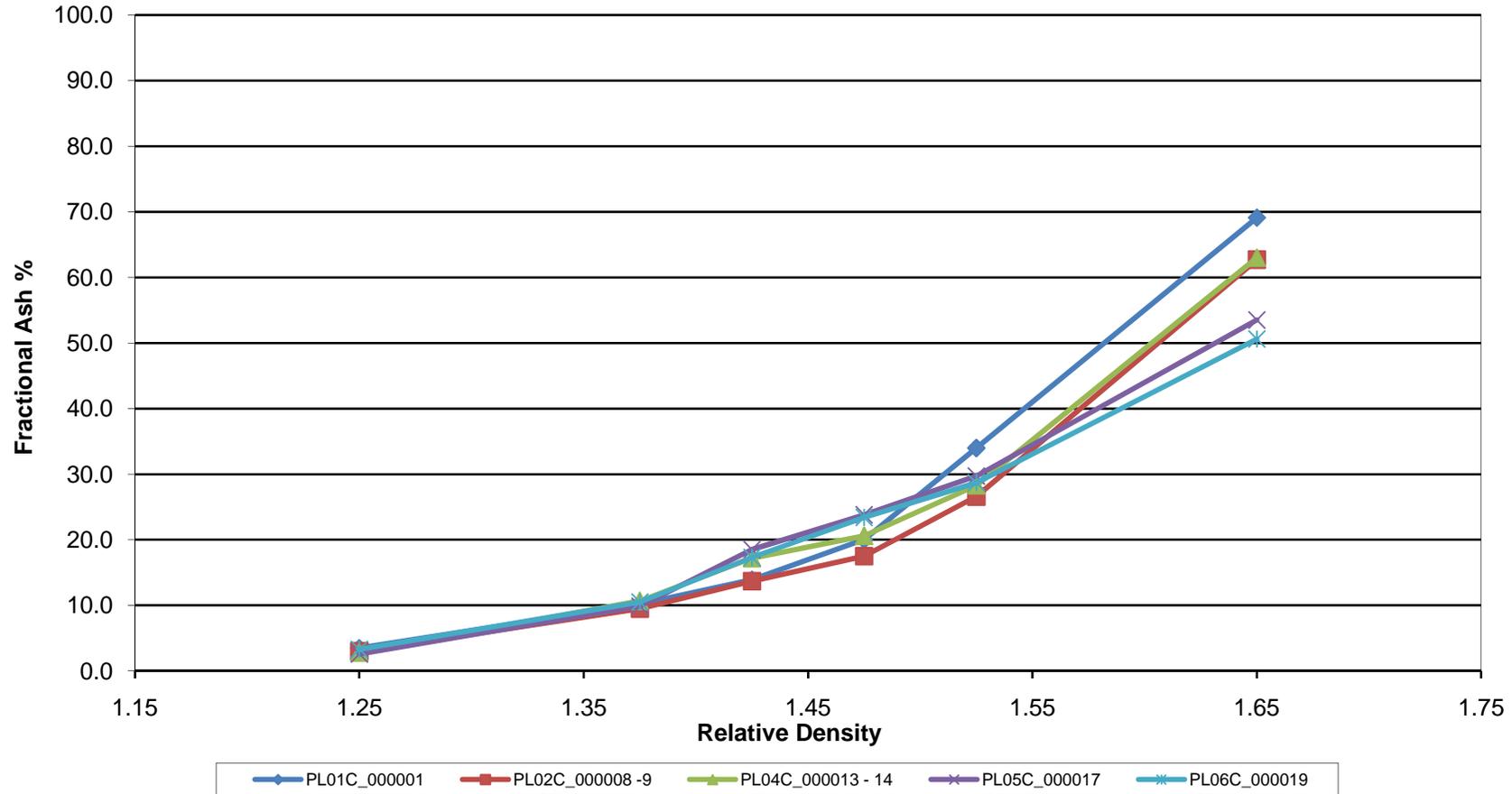
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### Testing and Analysis Report

Hole: RDH03C

#### Density V's Fractional Ash % RDH03C



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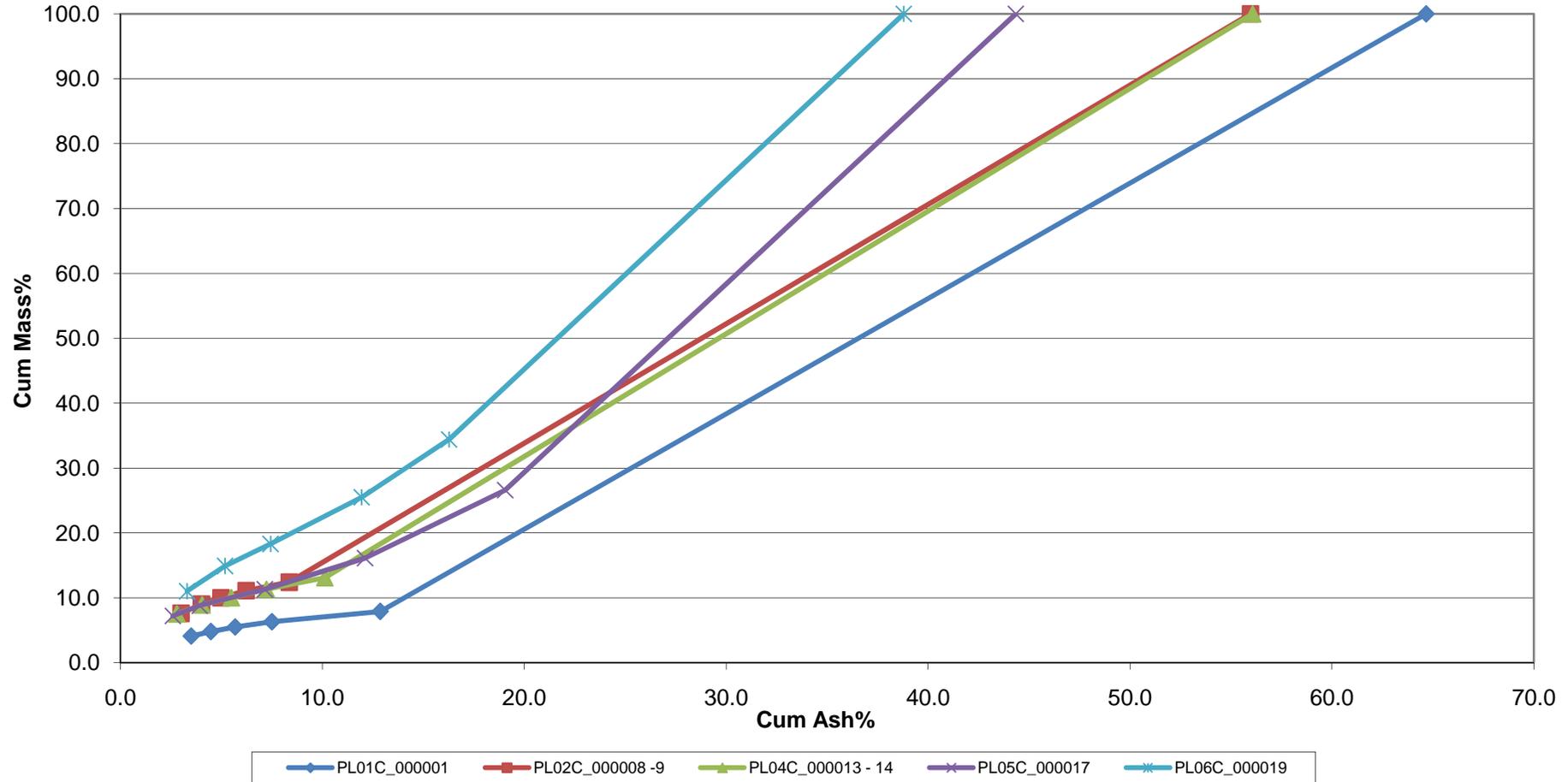
9 Beckinsale Street, Gladstone, QLD 4680  
P.O. Box 230 Gladstone QLD 4680  
Telephone (07) 49724288 Facsimile (07) 49722205



### Testing and Analysis Report

Hole: RDH03C

#### Cum Ash V's Cum Mass% RDH03C



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Telephone (07) 49724288 Facsimile (07) 49722205

**Methods****List of Accredited Tests**

<b><u>Test Name</u></b>	<b><u>Abbreviation</u></b>	<b><u>Standard Reference</u></b>
Ash	A	AS1038.3
Ash Fusibility	AFT	AS1038.15
Crucible Swelling Number	CSN	AS1038.12.1
Dilatometer	DIL	ISO8264
Float/Sink Analysis	F/S	AS4156.1
Gieseler	GIES	AS1038.12.4.1
Hardgrove Grindability Index	HGI	AS1038.20
Moisture - Inherent	IM	AS1038.3
Relative Density	RD	AS1038.21.1.2
Size Analysis	SIZING	AS3881
Gross Calorific Value	CV	AS1038.5
Sampling		AS4264.1
Sample Preparation		AS4264.1
Total Moisture	TM	AS1038.1
Total Sulfur	TS	AS1038.6.3.3
Volatile Matter	VM	AS1038.3

**List of Non Accredited Tests**

<b><u>Test Name</u></b>	<b><u>Abbreviation</u></b>	<b><u>Standard Reference</u></b>
Bulk Density		AS3899
Drop Shatter		AS4156.8
Durham Cone		AS1038.25
Dust Index of Coal		ASTM D547-41 Defunct
Gray King Coke Type	GKCT	AS1038.12.2
Rapid Ash	RA	(In-house) T035
Wet Tumble		AS4156.1

Any Result in Bold is Performed in Single at Client's Request and NATA Accreditation Does Not Apply  
Results Reported to an Air Dried Basis Unless Otherwise Stated.  
The Reported Results Relate Only to the Samples Tested.  
Sample(s) supplied by Client.  
This report replaces and confirms all previous preliminary reports.  
This report may not be reproduced except in full.

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## **Appendix 4**

### RecyCoal Analysis Results



RecyCoal Analysis Results

Size mm	RD H01 ca Bag 1								+0.5	-0.5
Weight %									99.5	0.5
Density Floats & Sinks	Floats 1.30	Floats 1.30-1.40	Floats 1.40-1.50	Floats 1.50-1.60	Floats 1.60-1.65	Sinks 1.65	Total Flts 1.60	Total Flts 1.65	Raw +0.5	
Floats (%yield)	1.6	1.5	3.6	15.0	10.2	68.1	<b>21.7</b>	31.9	<b>100</b>	
Total Moisture %	9.3	9.9	9.6	9.5	9.7		<b>9.5</b>	9.6		
Anaysis Moisture %	1.4	2.1	1.7	1.6	1.8	1.9	<b>1.6</b>	1.7	<b>1.8</b>	
Ash % (d/b)						65.4				
Ash %	11.1	6.3	18.2	29.3	33.4		<b>24.5</b>	27.4		
Volatile Matter %	13.7	16.7	12.9	11.6	11.5		<b>12.3</b>	12.1		
Sulphur %	0.67	0.76	0.58	0.48	0.41		<b>0.53</b>	0.5		
Gross C.V. Value kj/kg	28,958	30,288	25,842	21,613	19,715		<b>23,456</b>	22,260		
Gross C.V. Value kcals/kg	6,916	7,234	6,172	5,162	4,709		<b>5,602</b>	5,317		
Net C.V. Value kj/kg	27,973	29,232	24,913	20,769	18,901		<b>22,573</b>	21,399		
Net C.V. Value kcals/kg	6,681	6,982	5,950	4,961	4,514		<b>5,391</b>	5,111		
DAF C.V. Value kj/kg	36,380	36,140	35,790	35,320	34,650		<b>35,533</b>	35,251		
DAF C.V. Value kcals/kg	8,689	8,632	8,548	8,436	8,276		<b>8,487</b>	8,419		
DAF Volatile Matter (%)	17.2	19.9	17.9	19.0	20.2		<b>18.7</b>	19.2		
B.S. Swelling Number	7.0	4.5	4.0	1.5	1.0		<b>2.5</b>	2.0		4.1868
Size mm	RD H01 ca Bag 2								+0.5	-0.5
Weight %									99.0	1.0
Floats (%yield)	0.9	0.8	1.9	15.4	14.9	66.1	<b>19.0</b>	33.9	<b>100</b>	
Total Moisture %	9.7	10.1	9.5	9.1	8.9		<b>9.2</b>	9.1		
Anaysis Moisture %	1.8	2.3	1.6	1.2	1.0	1.0	<b>1.3</b>	1.2	<b>1.1</b>	
Ash % (d/b)						76.9				
Ash %	2.7	8.6	19.0	28.8	34.8		<b>25.7</b>	29.7		
Volatile Matter %	17.1	16.9	12.8	11.1	11.2		<b>11.8</b>	11.5		
Sulphur %	0.72	0.75	0.63	0.53	0.86		<b>0.56</b>	0.69		
Gross C.V. Value kj/kg	31,780	29,132	25,724	21,925	19,803		<b>23,075</b>	21,637		
Gross C.V. Value kcals/kg	7,591	6,958	6,144	5,237	4,730		<b>5,511</b>	5,168		
Net C.V. Value kj/kg	30,701	28,091	24,797	21,092	19,003		<b>22,212</b>	20,802		
Net C.V. Value kcals/kg	7,333	6,709	5,923	5,038	4,539		<b>5,305</b>	4,968		
DAF C.V. Value kj/kg	36,280	35,830	35,980	35,310	35,170		<b>35,445</b>	35,324		
DAF C.V. Value kcals/kg	8,665	8,558	8,594	8,434	8,400		<b>8,466</b>	8,437		
DAF Volatile Matter (%)	19.5	20.8	17.9	17.9	19.9		<b>18.1</b>	18.9		
B.S. Swelling Number	5.0	3.5	4.5	3.5	1.0		<b>3.7</b>	2.5		

Size mm	RD H02 ca Bag 1								+0.5	-0.5
Weight %									95.3	4.7
Density Floats & Sinks	Floats 1.30	Floats 1.30- 1.40	Floats 1.40- 1.50	Floats 1.50- 1.60	Floats 1.60- 1.65	Sinks 1.65	Total Flts 1.60	Total Flts 1.65	Raw +0.5	
Floats (%yield)	0.7	0.6	0.6	0.3	0.6	97.2	<b>2.2</b>	2.8	<b>100</b>	
Total Moisture %	10.5	10.9	12.0	10.0	9.6		<b>11.0</b>	10.7		
Anaysis Moisture %	2.7	3.2	4.3	2.2	1.7	3.4	<b>3.2</b>	2.9	<b>3.4</b>	
Ash % (d/b)						83.1				
Ash %	1.9	4.2	8.0	28.6	33.0		<b>7.8</b>	13.2		
Volatile Matter %	20.4	20.3	19.7	11.3	10.6		<b>18.9</b>	17.2		
Sulphur %	0.76	0.92	1.00	0.62	0.59		<b>0.85</b>	0.8		
Gross C.V. Value kj/kg	31,403	29,961	27,568	21,607	19,984		<b>28,628</b>	26,776		
Gross C.V. Value kcals/kg	7,500	7,156	6,585	5,161	4,773		<b>6,838</b>	6,395		
Net C.V. Value kj/kg	30,273	28,854	26,492	20,747	19,180		<b>27,556</b>	25,761		
Net C.V. Value kcals/kg	7,231	6,892	6,328	4,955	4,581		<b>6,582</b>	6,153		
DAF C.V. Value kj/kg	35,850	35,290	34,460	35,190	34,820		<b>35,228</b>	35,141		
DAF C.V. Value kcals/kg	8,563	8,429	8,231	8,405	8,317		<b>8,414</b>	8,393		
DAF Volatile Matter (%)	23.3	23.9	24.6	18.4	18.5		<b>23.2</b>	22.2		
B.S. Swelling Number	2.5	1.5	2.0	1.5	1.0		<b>2.0</b>	1.8	4.1868	
Size mm	RD H02 ca Bag 2								+0.5	-0.5
Weight %									96.8	3.2
Floats (%yield)	0.7	1.0	0.7	1.1	1.3	95.2	<b>3.5</b>	4.8	<b>100</b>	
Total Moisture %	10.6	11.3	11.2	10.2	9.7		<b>10.8</b>	10.5		
Anaysis Moisture %	2.8	3.6	3.5	2.4	1.8	2.7	<b>3.0</b>	2.7	<b>2.7</b>	
Ash % (d/b)						77.2	<b>0.0</b>	0.0		

Ash %	1.9	4.8	9.2	23.9	34.9		<b>11.1</b>	17.5			
Volatile Matter %	20.9	23.7	20.9	12.7	10.6		<b>19.1</b>	16.8			
Sulphur %	0.81	0.98	0.88	0.60	0.45		<b>0.81</b>	0.71			
Gross C.V. Value kj/kg	31,400	29,582	27,882	23,407	19,329		<b>27,665</b>	25,407			
Gross C.V. Value kcals/kg	7,500	7,066	6,660	5,591	4,617		<b>6,608</b>	6,068			
Net C.V. Value kj/kg	30,261	28,425	26,793	22,504	18,530		<b>26,605</b>	24,418			
Net C.V. Value kcals/kg	7,228	6,789	6,399	5,375	4,426		<b>6,354</b>	5,832			
DAF C.V. Value kj/kg	35,890	35,260	35,030	35,520	34,890		<b>35,422</b>	35,278			
DAF C.V. Value kcals/kg	8,572	8,422	8,367	8,484	8,333		<b>8,460</b>	8,426			
DAF Volatile Matter (%)	23.9	28.2	26.3	19.3	19.1		<b>24.2</b>	22.8			
B.S. Swelling Number	2.5	1.5	1.0	1.0	1.0		<b>1.4</b>	1.3			
Size mm	RD H02 ca Bag 3							+0.5	-0.5		
Weight %								98.2	1.8		
Floats (%yield)	0.4	0.5	0.8	1.6	1.0	95.7	<b>3.3</b>	4.3	<b>100</b>		
Total Moisture %	9.7	10.0	10.0	9.3	9.1		<b>9.6</b>	9.5			
Anaysis Moisture %	1.9	2.2	2.2	1.4	1.2	1.8	<b>1.8</b>	1.6	<b>1.8</b>		
Ash % (d/b)						78.9	<b>0.0</b>	0.0			
Ash %	7.5	6.7	17.3	30.4	34.7		<b>20.9</b>	24.1			
Volatile Matter %	15.6	16.5	15.6	10.0	9.8		<b>13.0</b>	12.3			
Sulphur %	0.73	0.80	0.73	0.52	0.48		<b>0.6</b>	0.6			
Gross C.V. Value kj/kg	29,796	30,000	25,868	21,636	20,048		<b>24,918</b>	23,786			
Gross C.V. Value kcals/kg	7,117	7,165	6,178	5,168	4,788		<b>5,952</b>	5,681			
Net C.V. Value kj/kg	28,769	28,951	24,897	20,811	19,254		<b>23,999</b>	22,896			
Net C.V. Value kcals/kg	6,871	6,915	5,947	4,971	4,599		<b>5,732</b>	5,469			
DAF C.V. Value kj/kg	35,990	36,010	35,580	35,880	35,670		<b>35,840</b>	35,801			
DAF C.V. Value kcals/kg	8,596	8,601	8,498	8,570	8,520		<b>8,560</b>	8,551			
DAF Volatile Matter (%)	18.8	19.9	21.5	16.6	17.4		<b>18.6</b>	18.3			
B.S. Swelling Number	2.0	2.0	1.0	1.5	1.5		<b>1.5</b>	1.5			

Size mm	RD H02 ca Bag 4								+0.5	-0.5
Weight %									92.2	7.8
<b>Floats (%yield)</b>	0.5	1.1	2.1	3.7	2.1	90.5	<b>7.4</b>	9.5	<b>100</b>	
<b>Total Moisture %</b>	10.0	10.2	9.3	9.3	9.1		<b>9.5</b>	9.4		
<b>Anaysis Moisture %</b>	2.2	2.4	1.4	1.4	1.2	1.1	<b>1.6</b>	1.5	<b>1.1</b>	
<b>Ash % (d/b)</b>						63.5	<b>0.0</b>	0.0		
<b>Ash %</b>	2.8	7.4	21.0	29.8	35.0		<b>22.1</b>	25.0		
<b>Volatile Matter %</b>	18.8	18.3	13.3	10.2	9.8		<b>12.9</b>	12.2		
<b>Sulphur %</b>	0.77	0.81	0.62	0.51	0.48		<b>0.60</b>	0.58		
<b>Gross C.V. Value kj/kg</b>	31,316	29,544	24,818	21,856	19,790		<b>24,479</b>	23,442		
<b>Gross C.V. Value kcals/kg</b>	7,480	7,056	5,928	5,220	4,727		<b>5,847</b>	5,599		
<b>Net C.V. Value kj/kg</b>	30,219	28,476	23,908	21,024	19,004		<b>23,571</b>	22,562		
<b>Net C.V. Value kcals/kg</b>	7,218	6,801	5,710	5,021	4,539		<b>5,630</b>	5,389		
<b>DAF C.V. Value kj/kg</b>	35,910	35,850	35,610	35,890	35,400		<b>35,806</b>	35,716		
<b>DAF C.V. Value kcals/kg</b>	8,577	8,563	8,505	8,572	8,455		<b>8,552</b>	8,531		
<b>DAF Volatile Matter (%)</b>	21.6	22.2	19.1	16.7	17.5		<b>18.5</b>	18.3		
<b>B.S. Swelling Number</b>	2.5	1.5	2.0	1.0	1.0		<b>1.5</b>	1.4		

Size mm	RD H03 ca Bag 1								+0.5	-0.5
Weight %									98.9	1.1
Density Floats & Sinks	Floats 1.30	Floats 1.30-	Floats 1.40-	Floats 1.50-	Floats 1.60-	Sinks 1.65	Total Flts	Total Flts	Raw +0.5	
Floats (%yield)	0.9	0.4	0.8	1.2	2.2	94.5	3.3	5.5	100	
Total Moisture %	9.4	9.7	11.1	9.1	9.1		9.7	9.5		
Anaysis Moisture %	1.5	1.8	3.4	1.2	1.2	2.1	1.9	1.6	2.1	
Ash % (d/b)						72.1				
Ash %	1.7	6.9	10.6	30.5	36.1		15.0	23.4		
Volatile Matter %	15.3	14.8	18.2	9.8	9.1		13.9	12.0		
Sulphur %	0.63	0.68	0.75	0.43	0.37		0.59	0.5		
Gross C.V. Value kj/kg	32,460	30,216	27,839	21,833	19,726		27,203	24,212		
Gross C.V. Value kcals/kg	7,753	7,217	6,649	5,215	4,711		6,497	5,783		
Net C.V. Value kj/kg	31,398	30,216	27,839	21,833	19,726		26,914	24,039		
Net C.V. Value kcals/kg	7,499	7,217	6,649	5,215	4,711		6,428	5,742		
DAF C.V. Value kj/kg	36,510	29,191	26,781	21,009	18,941		27,628	24,153		
DAF C.V. Value kcals/kg	8,720	6,972	6,397	5,018	4,524		6,599	5,769		
DAF Volatile Matter (%)	17.2	-	-	-	-		-	-		
B.S. Swelling Number	5.5	5.0	1.0	1.5	1.5		2.9	2.3	4.1868	
Size mm	RD H03 ca Bag 2								+0.5	-0.5
Weight %									98.6	1.4
Floats (%yield)	0.7	0.7	0.8	1.7	1.4	94.7	3.9	5.3	100	
Total Moisture %	9.2	9.3	9.9	9.0	9.1		9.3	9.2		
Anaysis Moisture %	1.3	1.4	2.1	1.1	1.2	2.4	1.4	1.3	2.3	
Ash % (d/b)						78.3				
Ash %	2.2	6.5	12.1	30.0	34.5		17.1	21.7		
Volatile Matter %	14.7	13.3	14.9	9.7	8.7		12.3	11.4		
Sulphur %	0.66	0.66	0.66	0.44	0.40		0.56	0.52		
Gross C.V. Value kj/kg	32,465	30,706	28,033	22,285	20,462		26,803	25,128		

<b>Gross C.V. Value kcals/kg</b>	7,754	7,334	6,696	5,323	4,887		<b>6,402</b>	6,002		
<b>Net C.V. Value kj/kg</b>	31,413	29,700	27,037	21,452	19,670		<b>25,866</b>	24,229		
<b>Net C.V. Value kcals/kg</b>	7,503	7,094	6,458	5,124	4,698		<b>6,178</b>	5,787		
<b>DAF C.V. Value kj/kg</b>	36,640	36,470	35,940	26,530	36,280		<b>32,059</b>	33,174		
<b>DAF C.V. Value kcals/kg</b>	8,751	8,711	8,584	6,337	8,665		<b>7,657</b>	7,923		
<b>DAF Volatile Matter (%)</b>	16.6	15.8	19.1	15.9	15.4		<b>16.7</b>	16.3		
<b>B.S. Swelling Number</b>	5.0	6.0	2.5	1.5	1.0		<b>3.1</b>	2.6		
<b>RD H03 ca Bag 3</b>										
<b>Size mm</b>									<b>+0.5</b>	<b>-0.5</b>
<b>Weight %</b>									95.0	5.0
<b>Floats (%yield)</b>	1.1	0.8	1.2	3.8	3.2	89.9	<b>6.9</b>	10.1	<b>100</b>	
<b>Total Moisture %</b>	9.8	9.4	9.8	9.3	9.5		<b>9.5</b>	9.5		
<b>Anaysis Moisture %</b>	2.0	1.5	2.0	1.4	1.6	2.1	<b>1.6</b>	1.6	<b>2.1</b>	
<b>Ash % (d/b)</b>										
<b>Ash %</b>	1.8	8.0	15.3	27.7	35.0	75.1	<b>19.1</b>	24.2		
<b>Volatile Matter %</b>	17.1	13.9	13.6	9.8	8.9		<b>12.1</b>	11.1		
<b>Sulphur %</b>	0.70	0.67	0.63	0.47	0.43		<b>0.56</b>	0.52		
<b>Gross C.V. Value kj/kg</b>	32,159	30,077	27,005	22,822	20,022		<b>25,879</b>	24,023		
<b>Gross C.V. Value kcals/kg</b>	7,681	7,184	6,450	5,451	4,782		<b>6,181</b>	5,738		
<b>Net C.V. Value kj/kg</b>	31,070	29,069	26,042	21,979	19,226		<b>24,957</b>	23,141		
<b>Net C.V. Value kcals/kg</b>	7,421	6,943	6,220	5,250	4,592		<b>5,961</b>	5,527		
<b>DAF C.V. Value kj/kg</b>	36,380	36,410	36,060	36,220	36,080		<b>36,240</b>	36,189		
<b>DAF C.V. Value kcals/kg</b>	8,689	8,696	8,613	8,651	8,618		<b>8,656</b>	8,644		
<b>DAF Volatile Matter (%)</b>	19.3	16.8	18.2	15.6	16.0		<b>16.8</b>	16.5		
<b>B.S. Swelling Number</b>	4.0	4.5	1.5	1.5	1.0		<b>2.2</b>	1.9		
<b>RD H03 ca Bag 4</b>										
<b>Size mm</b>									<b>+0.5</b>	<b>-0.5</b>
<b>Weight %</b>									98.8	1.2
<b>Floats (%yield)</b>	1.7	1.6	2.9	12.1	11.1	70.6	<b>18.3</b>	29.4	<b>100</b>	
<b>Total Moisture %</b>	10.2	9.3	9.7	9.1	9.1		<b>9.3</b>	9.2		



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<b>Anaysis Moisture %</b>	2.4	1.4	1.9	1.2	1.2	1.1	<b>1.4</b>	1.3	<b>1.2</b>	
<b>Ash % (d/b)</b>										
<b>Ash %</b>	1.7	8.5	19.1	30.3	36.4	66.1	<b>24.0</b>	28.7		
<b>Volatile Matter %</b>	18.1	12.8	12.5	9.5	8.5		<b>11.1</b>	10.1		
<b>Sulphur %</b>	0.71	0.62	0.57	0.45	0.40		<b>0.51</b>	0.47		
<b>Gross C.V. Value kj/kg</b>	31,945	30,052	25,774	21,980	19,652		<b>24,213</b>	22,491		
<b>Gross C.V. Value kcals/kg</b>	7,630	7,178	6,156	5,250	4,694		<b>5,783</b>	5,372		
<b>Net C.V. Value kj/kg</b>	30,838	29,060	24,842	21,156	18,877		<b>23,331</b>	21,649		
<b>Net C.V. Value kcals/kg</b>	7,366	6,941	5,933	5,053	4,509		<b>5,572</b>	5,171		
<b>DAF C.V. Value kj/kg</b>	36,260	36,560	36,200	36,270	36,060		<b>36,283</b>	36,199		
<b>DAF C.V. Value kcals/kg</b>	8,661	8,732	8,646	8,663	8,613		<b>8,666</b>	8,646		
<b>DAF Volatile Matter (%)</b>	20.5	15.6	17.6	15.7	15.6		<b>16.4</b>	16.1		
<b>B.S. Swelling Number</b>	3.5	4.0	1.5	1.0	1.0		<b>1.6</b>	1.4		