4 April 2012 Proposal No. P17621005_002_Rev2

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AVOCA AND GIPPS CREEK COAL EXPLORATION PROGRAMMES, TASMANIA

Dear Cherie:

Indicoal Mining Australia Pty Ltd (Indicoal) has requested Golder Associated Pty Ltd (Golder) to prepare a proposal for exploration of the Avoca EL 27/2008 and Gipps Creek EL 23/2010 exploration licences in northeast Tasmania. This letter summarises the mining and exploration history of the licences and recommends areas for further investigation.

The information presented in this report is based on results of the recent exploration conducted by Spitfire Resources Limited (Spitfire), field observations made by Marston International Pty Ltd (Marston), results of earlier exploration programmes, Mineral Resources Tasmania (MRT) records and other publicly available sources.

Coal measures are present in the Avoca and Fingal areas towards the top of a lacustrine Permo-Triassic sequence. Five seams have been recorded in the Avoca area. Thick Jurassic dolerite covers much of the coal bearing region. The geology is discussed in more detail in Attachment A.

EL 27/2008 Avoca

EL 27/2008 was granted to Black Rock Energy Pty Ltd (Black Rock) on 12 October 2008 and covers an area of 85 km^2 northwest of Avoca. The licence was acquired by Spitfire in November 2008 and was subsequently acquired by Indicoal in August 2011. The location of the licence is shown in Figure 1. Access to the area is via the Storeys Creek Road and Stanhope Road for 9.5 km northwest of Avoca.

Coal in the licence occurs in a Triassic age lithic sandstone facies that is up to 30 m thick with five seams recorded. The majority of the coal occurrences within the licence and the areas of the previous mining are confined to the valley between Greenstone Hill and Mt. Christie where seams outcrop near the base of thick dolerite flows. Gipps Creek is deeply incised through the valley and has eroded the coal measures along much of its course. Remnants of the lithic sandstone facies that contain the coal measures are interpreted to be preserved along Buffalo Creek and Marsh Creek, and to the northwest and southeast of the historic workings along Gipps Creek. See Figure 1. A summary of previous mining and exploration history is provided in Attachment A.

Background

An analysis of previous exploration and mining activity indicated that further exploration potential in the Gipps Creek area and the adjacent areas of known coal occurrence is limited due to rugged topography, variable seam thickness and quality, and frequent faulting. Drilling through any significant thickness of

dolerite in the Gipps Creek area has proven difficult and access to drill sites on the dolerite slopes and ridges is not practical.

Two exploration holes, AV12 and AV13, drilled by Shell Company of Australia in 1980 within the current licence area intersected 158.73 m and 307.46 m of dolerite respectively before locating the Triassic lithic sandstone sequence. No significant coal intercepts were located. The location of the holes is shown in Figure 1.

Western Mining Corporation drilled nine holes around Bonneys Plains, Buffalo Brook and Marsh Creek in 1977. Holes TAR 1, TAR 2, TAR 3 and TAR 8 encountered coal measures which contained thin coal seams interbedded with carbonaceous shale around the margins of the dolerite. See Figure 1. Drilling along Buffalo Creek and Marsh Creek failed to locate the interpreted lithic sandstone facies sediments with coal measures. The target unit has been completely eroded along the creek courses.

Exploration by Spitfire Resources in 2010 concentrated around the Gipps Creek area looking for extensions of the previous mines below the dolerite. Eighteen open holes and two cored holes were drilled. See Figure 1. DDH_011 on Gipps Creek and DDH_016 on Stynes Creek showed that the lithic sandstone facies had been eroded along the creek courses.

Holes RDH_006 and RDH_010 intersected northern extensions of the B Seam exposed in the Stanhope open cut but the seam was found to have split and a 0.5 m stone band is present. Holes RDH_004 and RDH_005 tested further extensions of this seam and showed that it had deteriorated to high ash coal/carbonaceous shale with stone bands.

Holes RDH_007 and DDH_002 tested the southern extension of the B Seam on the south side of the Stanhope open cut and showed that it had deteriorated to high ash stony coal and carbonaceous shale.

Holes RDH_011 and DDH_001 tested the western and northern extensions of the New Stanhope mine. RDH_011 intersected high ash coal/carbonaceous shale and DDH_001 intersected a 2.4 m of moderate ash coal (23.68%, ad) to the north of the New Stanhope mine.

Holes RDH_001, RDH_002 and RDH_012 tested the northern extension of the lithic sandstone facies and located high ash/coal/carbonaceous shale.

Recommendation

Golder concluded that further exploration of the lithic sandstone facies in areas where the dolerite is not present, mainly along creeks and surrounding flat areas, is not justified as the unit appears to have been removed by erosion. Further exploration around the New Stanhope mine is also not warranted due to the presence of thick overlying dolerite, the close proximity to the Castle Carey Fault and deteriorated coal quality in nearby drill holes.

The only area recognised by Golder that has not been fully explored is the Bonneys Plains area approximately 3.5 km south of the New Stanhope Open cut. It is 3 - 4 km distant from the Castle Carey Fault. Hills (1922) reported coal measures in the workings at the Bonneys Palins comprising thin coal and carbonaceous shale over 2 m thick. The reported quality of samples collected and analysed by Hills indicated moderate to high ash (28.7%, adb). Hills interpreted the workings to correlate with the Delta (D) Seam in the Mt. Christie area. Hole TAR1 drilled by Western Mining intersected coal measures 3.5 m thick to the east of the workings. Golder interprets the drill hole intercept and seam exposures in the Bonneys Plains workings to represent the basal section of the coal measures and that the upper part of the sequence remains untested. It is proposed to test for the complete sequence by locating drill holes up sequence from these locations. This would however require drilling through 50 – 70 m of dolerite cover to intersect the coal measures and test for the presence of the thicker better quality B Seam. Previous experience indicates there is some risk with successfully drilling through the dolerite. It is likely that any resource identified could only be exploited by underground means. The locations of the four proposed open holes, BP001 – BP004, are shown in Figure 2.

The locations and the proposed depths of the drill holes are shown in Table 1.

Table 1, Proposed Drill Holes Bonneys Plains

Hole No	Northing	Easting	Proposed Depth (m)
BP1	554025	5376735	120
BP2	554950	5376850	120
BP3	555350	5377304	120
BP4	554230	5378170	120
Total	**-**	**-**	**480**

Coordinates GDA 1994 MGA Zone 55

Golder proposes the following programme:

- Prepare a "Proposed Exploration Work Programme", submit to the MRT for approval and notify affected landholders
- Engage drilling, logging, surveying, earth moving contractors and coal quality testing laboratory
- Prepare Safety Management Plan
- Mark out drill sites and obtain MRT clearance for access
- Supervise drill programme and data collection
- Rehabilitate drill sites
- Evaluate data and prepare report
- Prepare MRT statutory annual report

To optimise expenditure and use of manpower Golder proposes to conduct the drilling programme in conjunction with the Gipps Creek exploration programme.

Golder estimates the drill programme and related site activities will take 8 days to complete as drilling through dolerite is generally slow. A wet weather contingency has also been included. Preliminary planning and data evaluation and final reporting is estimated to take 10 days to complete.

The drilling programme would be conducted by an experienced coal exploration geologist who would be supported by a senior geologist as required. A Principal Consultant would manage the project. The drilling programme will require formal approval by Mineral Resources Tasmania prior to commencement and all affected landholders will have to be personally advised at least 14 days prior to commencement of work. All exploration work will be conducted under the Tasmanian Mineral Exploration Code of Practice.

Golder's estimate to conduct the exploration programme, evaluate results and prepare reports is A$49,160. This includes A$41,160 in fees and A$8,000 in expenses. Costs are summarised in Table 2.

Table 2, Avoca Drilling Programme Costs

Task	Hours	Fees	Expenses	Total
1) MRT Approvals and Landholder Notification	16	$3,075	$0	**$3,075**
2) Engage Contractors	40	$7,538	$0	**$7,538**
3) Safety Plan, Site Preparation & Access	32	$6,150	$0	**$6,150**
4) Supervise Drilling Programme	124	$20,600	$5,500	**$26,100**
5) Rehabilitate Sites	10	$1,850	$0	**$1,850**
6) Evaluate Data and Report	25	$4,763	$0	**$4,763**
7) MRT Statutory Reporting	15	$2,248	$0	**$2,248**
8) Wet Weather Contingency	20	$3,000	$0	**$3,000**
Total Fees & Expenses:	**281**	**$49,223**	**$5,500**	**$54,723**

The expenses include vehicle hire, travel expenses, accommodation and drilling consumables.

These costs do not include exploration contractor costs that would be determined once the drilling proposal has been approved. Contractors cost would be submitted to Indicoal for approval prior to commencing work.

EL 23/2010 Gipps Creek

EL 23/2010 was granted to Black Rock on 22 December 2010. The licence covers an area of 123 km^2 located about 18 km northwest of Avoca. It was acquired by Indicoal in August 2011 and the location is shown in Figure 2. There has been no known previous mining or exploration within the licence. Coal occurrences have been reported in creeks within the licence and are shown in Figure 2. Access to the area is from the northwest via Blessington and local forestry tracks.

As there is no specific information regarding the location of coal occurrences in the licence, it is proposed to conduct a grass roots field exploration programme that would involve the following:

- Prepare “Proposed Exploration Work Programme” and submit for MRT approval
- Notify affected landholders
- Traverse creeks and locate prospective coal measure sequence and coal outcrops
- Map and sample coal occurrences
- Evaluate local structure and geological environment
- Identify potential drill sites and access
- Prepare report and recommendations for additional exploration

Provided suitable drill targets were identified, a “Proposed Exploration Work Programme” would be prepared and submitted to the MRT for approval. Exploration drilling, geophysical logging and coal quality testing programmes would be conducted subsequently.

The grass roots field exploration programme is estimated to take two weeks to complete. Coal quality testing of any samples collected would take a further eight to ten weeks.

The field work would be conducted by experienced coal exploration geologists who would be supervised by a Principal consultant. Due to the remote location and to ensure employee safety the field work will be conducted by two Golder employees. The exploration programme will require formal approval by Mineral Resources Tasmania prior to commencement and all affected landholders will have to be personally advised at least 14 days prior to commencing work. All exploration work will be conducted under the Tasmanian Mineral Exploration Code of Practice.

Golder’s estimated cost to conduct the exploration programme, evaluate results and prepare a report is A$48,560. This includes A$40,560 in fees and A$8,000 in expenses. The costs are summarised in Table 3.

Table 3, Gipps Creek Exploration Costs

Task	Hours	Fees	Expenses	Total
1) MRT Approvals and Landowner Notification	16	$3,075	$0	**$3,075**
2) Exploration Planning and Safety Management	20	$3,815	$300	**$4,115**
3) Field Exploration Mapping and Sampling	121	$20,400	$4,500	**$24,900**
4) Geological Evaluation	24	$5,015	$2,900	**$7,915**
5) Prepare Exploration Drilling Plans and Report	47	$8,255	$300	**$8,555**
Total	**228**	**$40,560**	**$8,000**	**$48,560**

The expenses include vehicle hire, travel expenses, accommodation and an allowance for laboratory testing of field samples.

Contractual Matters

Golder proposes to charge on a time and materials basis. The budget estimate provides for a reasonable amount of time spent by consultants to perform project management and administration tasks as well as peer review, which is chargeable to the project. The budget also includes an allowance for a period of on-going questions and answers.

Disbursements including all travel, accommodation, communications and printing and will be charged at cost plus 10%.

Golder proposes that the work be carried out in accordance with our Standard Terms and Conditions for Professional Services (LEG01 RL5, Appendix A). Payment of invoices is required within 30 days of the date of the invoice.

Golder carries the appropriate insurances (Professional Indemnity, Public Liability, Motor and Workcover) and will provide proof of the currency of the insurances if requested on being awarded the contract.

Golder places a high importance on the health, safety and security of our employees. The Golder Health and Safety Protocol for Site Work, which forms part of our terms and conditions is available on request.

We look forward to again working with Indicoal and trust that the above scope and budget addresses your requirements. If you wish to proceed with the proposal, please complete the attached Client Authorisation and return to me. You can contact me on 02 - 4953 9888 with any questions

GOLDER ASSOCIATES PTY LTD

Neil Fraser
Principal Mining Consultant

NF/RY/vt

Attachments: Figure 1. Location map, Exploration Drill Holes EL 28/2008 and Coal Occurrences EL 23/2010
Figure 2. Proposed Drill Hole Locations Bonneys Plains
Attachment A. Mining and Exploration History, EL 27/2008 Avoca

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Figure 1

Location map, Exploration Drill Holes EL 28/2008 and Coal Occurrences EL 23/2010

Golder Associates Pty Ltd
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A.B.N. 64 006 107 857

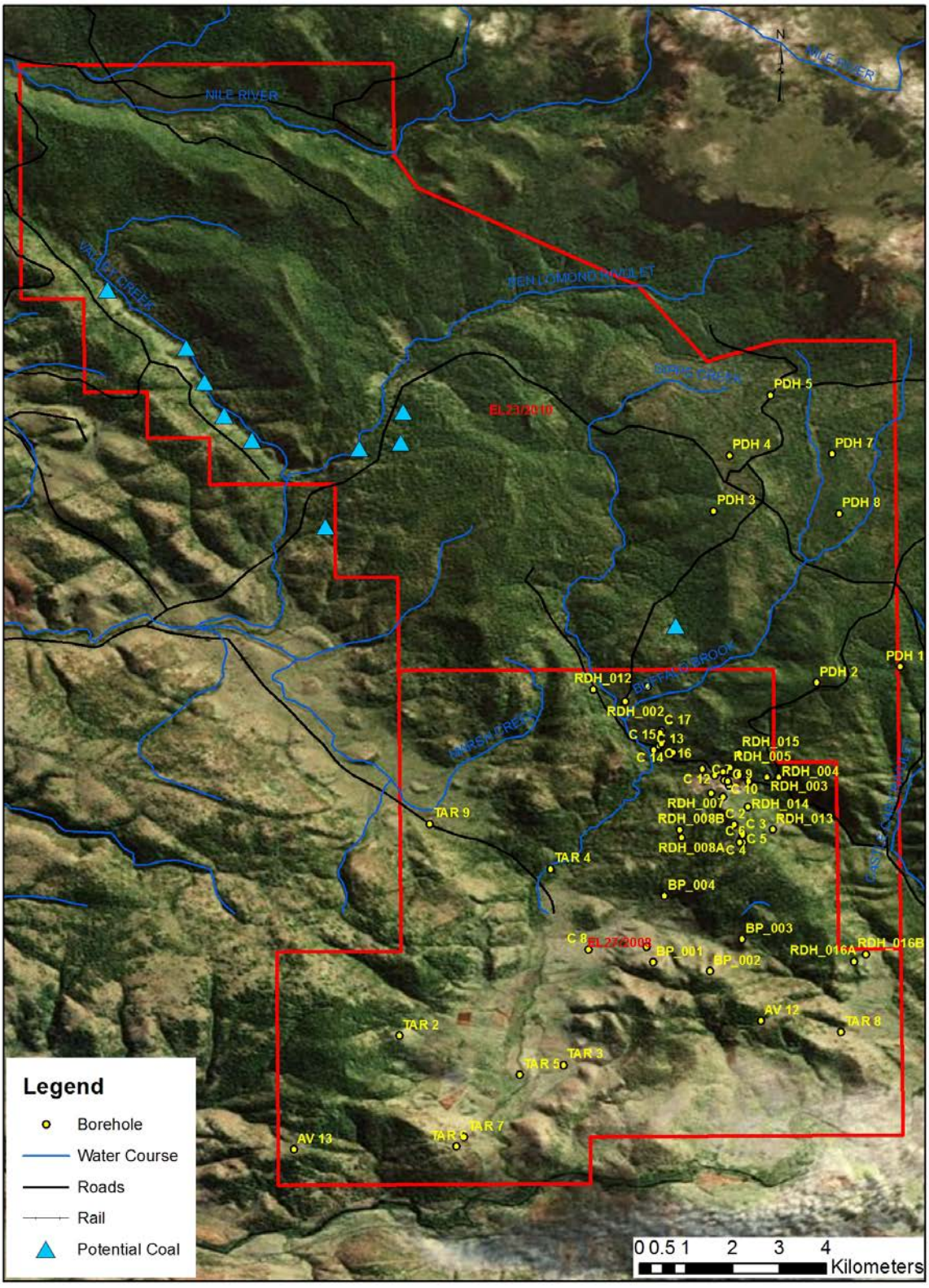

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Figure 2

Proposed Drill Hole Locations Bonneys Plains

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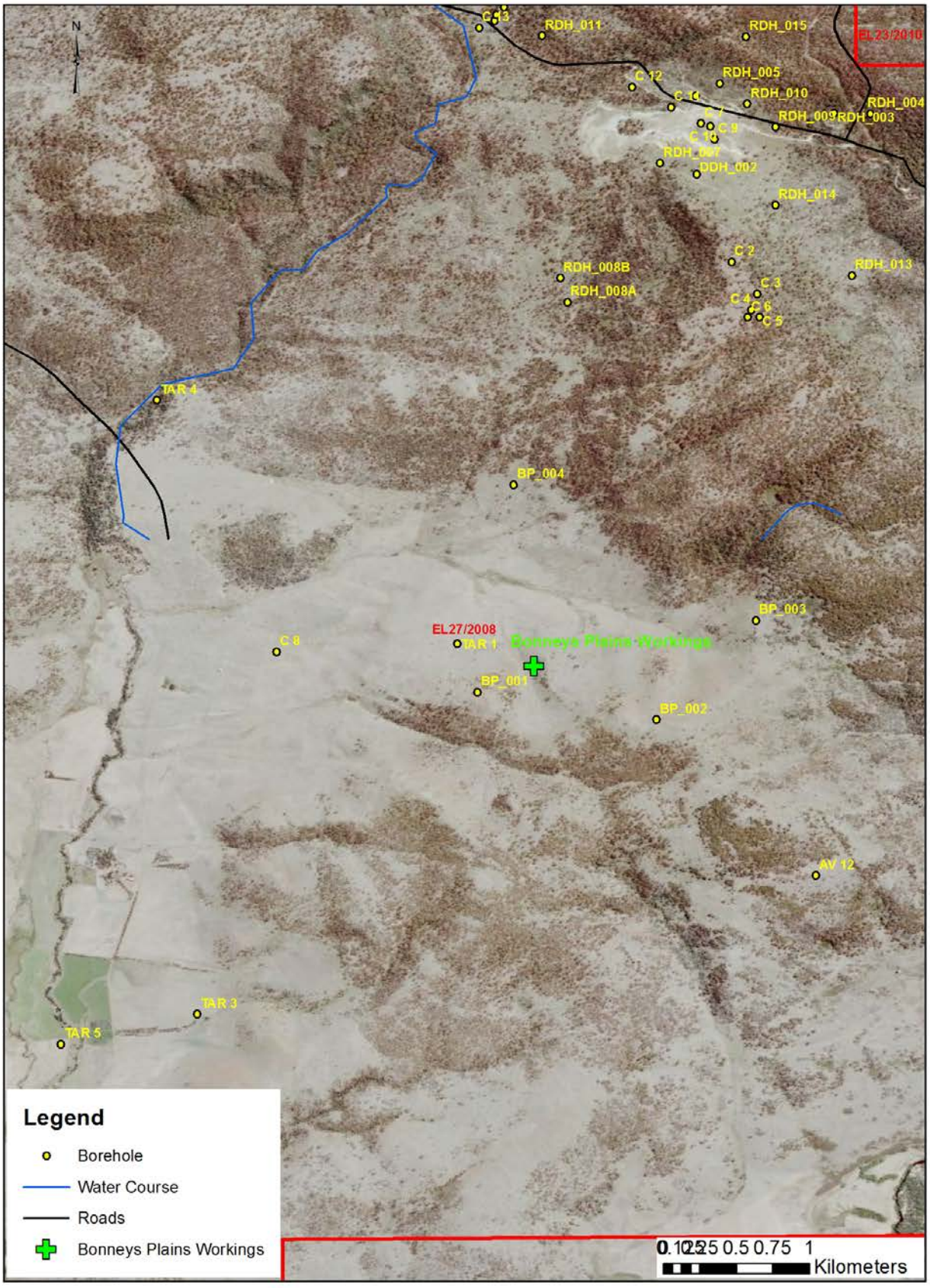

Attachment A

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Geology

The geology of the region has been described by Twelvetrees (1906), Blissett (1959), Threader (1968), Western Mining (1977a, 1977b), Ivatt and Taylor (1979), Bornman (1981) and Bornman and Murphy (1981).

The basement rocks are Siluro-Devonian Mathinna Beds which are an extensively folded micareous quartz-wacke turbedite sequences, with minor mudstone intervals. These rocks do not outcrop with the licence. The rocks were folded during the Middle Devonian Tabberabberan Orogeny and have been intruded by the Ben Lomond Granite of Devonian age, which is present to the east of the Castle Carey Fault.

The basement rocks are unconformably overlain by Permo-Triassic Parmeener Super-Group sediments. The Lower Parmeener Super-Group is dominantly a glacio-marine mudstone sequences and is at least 150 m thick. These are the lowermost units in the EL and are present in an up-thrown block west of the Castle Carey Fault. Upper Parmeener Super-Group sediments conformably overlie the lower sequence. A basal quartzose sandstone unit is overlain by a lithic sandstone unit interbedded with minor mudstone, siltstone and coal. The coal bearing sequences are limited to the top of the Upper Parmeener Super-Group.

Jurassic dolerite has extensively intruded the Parmeener Super-group sediments and caps most of the higher ground to the west of the Castle Carey Fault. The dolerite was intruded as a series of dykes and transgressive sheets, with minor faulting accompanying the intrusion. The dolerite is up to 350 m thick in the region. Steep dolerite escarpments along Gipps Creek are shown in Plate 1.

Plate 1. Jurassic dolerite escarpments along Gipps Creek overlying Permo-Triassic coal measures

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Major faults developed during the Tertiary with the largest being the northwest-southeast trending Castle Carey Fault. These faults produced horst and graben structures which form the basis of the present day topography. Quaternary dolerite talus masks most of the hill slopes west of the Castle Carey Fault and Quaternary alluvium is present in the lower lying plains areas.

Mining History

Coal was first discovered in the area on the slopes on Ben Lomond in 1864. In 1882 an adit was driven into an outcrop on Storeys Creek by R. Stevenson (Montgomery, 1892). Twelvetrees (1906) reported initial mining attempts were uneconomic due to distance to markets. Waller (1901) recorded outcrops along Gipps Creek on the south-east flank of Ben Lomond. James Stevenson found coal near Mt. Christie in 1904 and a number of small workings were subsequently developed in this area.

The coalfield geology, early exploration and mining activities in the area have been described by Hills (1922) and more recent activity has been described by Bacon (1983, 1986 and 1991). Locations of the mines are shown in Figure 1. Quality of coal samples reported by Hills (1922) is shown in Table A1.

Table A1, Coal Quality Avoca Coalfield Samples, Hills (1922)

Location	Seam	Inherent Moisture (% adb)	Ash (% adb)	Volatile Matter (% adb)	Fixed Carbon (% adb)	Calorific Value (kcal/kg, adb)	Sulphur (% db)
Mt. Christie	B	2.74	23.40	55.20	18.66	-	0.45
Mt. Christie	B	2.86	21.34	49.64	26.16	-	0.45
Mt. Christie	D	15.08	25.50	42.50	16.92	-	0.27
Mt. Christie	D	14.50	24.20	38.84	22.46	-	0.27
Mt. Christie	B	1.68	20.32	53.28	24.72	5,806	0.46
Mt. Christie	B	1.78	19.82	50.34	28.06	-	0.49
Mt. Christie	E	1.96	24.04	44.26	29.74	-	0.66
Bonney Plains	D	2.46	28.66	56.78	12.10	-	0.75
Ben Lomomd	B	2.38	20.68	46.58	30.36	-	0.45
Merrywood	B	2.66	25.10	53.88	18.36	6,052	0.44

Stanhope Mine

Twelvetrees (1906) and Hills (1922) reported a number of shafts, trenches and exploratory adits on the slopes of Mt. Christie. These workings were referred as the Buena Vista mine by Hills in 1922. When production in this area commenced in 1923 the operation was known as the Excelsior mine and was renamed the Stanhope mine in 1931. The Excelsior mine workings were operated from 1923 until 1937 and were reported to be badly faulted and banded with some seam thinning. Mining conditions were reported to be difficult. The mine was limited to the south by a fault with estimated 20 m displacement. Some shallow pillars were extracted by open cut methods between 1931 and 1939.

A new mine entrance was established in 1937 to the southeast of the earlier workings and on the southern side of the fault. The mine terminated against dolerite to the south and a fault to the southeast. Mining was by bord and pillar methods with some brief but unsuccessful attempts to use short wall and long wall techniques in 1943. A large number of small faults were encountered and mining conditions were reported to be difficult. Mining ceased in June 1957. Hills (1922) reported the Beta Seam was exploited here and this was subsequently renamed the Stanhope Seam. Hughes (1954) reported the seam as dipping at 4^{o} - 5^{o} to the southwest. Estimated production from 1932 to 1957 was 175,000 t (Bacon, 1983).

New Stanhope Mine

The mine is located 1.3 km northwest of the Stanhope mine and production began in 1957. The underground mine exploited the New Stanhope (Beta) Seam. A gravity coal beneficiation plant was installed in 1959 and was later replaced by a jig due to poor recoveries. A 2.1 m seam was mined from two adits. The No.1 adit was developed in 1957 and the No.2 adit in 1963. Development continued until 1969 when complex geological structure and poor roof conditions were encountered. Pillar extraction continued until 1973 when the mine was closed. Total production from 1957 to 1973 was about 220,000 t (Bacon, 1983).

Fenhope Mine

Mining Lease 1008P/M covering 25 ha was granted to D. Fenton in February 1980. Fenton established a new underground mine immediately to the north of the Excelsior mine workings. A 3.6 m seam named the Fenhope Seam was exploited. The seam contained a central mudstone band 450 cm thick that was extracted separately during mining. Production between 1981 and 1983 was estimated to be less than 1,000 tonnes (Bacon, 1983). Quality of coal samples reported by Bacon (1983) is shown in Table A2.

Table A2. Coal Quality Fenhope Mine Samples, Bacon (1983)

Parameter	Raw Coal	Clean Coal *
Proximate Analysis		
Inherent Moisture (% adb)	3.1	3.8
Ash (% adb)	29.4	15.2
Volatile Matter (% adb)	24.7	28.6
Fixed carbon (% adb)	42.80	52.40
Total Sulphur (% adb)	0.40	0.39
Calorific Value (kcal/kg, adb)	5,397	6,538
Ultimate Analysis (dry ash free)		
Carbon (%)	54.78	67.22
Hydrogen (%)	3.56	4.17
Nitrogen (%)	1.03	1.23
Sulphur (%)	0.53	0.27
Ash Fusion Temperature (reducing atmosphere)		
Deformation (^{o}C)	1200	1310
Spherical (^{o}C)	1490	1470
Hemispherical (^{o}C)	>1500	1500
Flow (^{o}C)	>1500	>1500
Coal Maceral Analysis		
Vitrinite (%)	28.4	-
Exinite (%)	5.1	-
Inertinite (%)	55.9	-
Mineral Matter (%)	10.5	-

* CF1.7 fraction, 71.1% apparent yield

The data indicates the coal is suitable as a thermal product and can be beneficiated with acceptable yield.

Stanhope Open Cut

The Merrywood Coal Company acquired Mining Lease 1640P/M that covered 249 ha, within EL 21/91, in 1997. A small open cut mine was established over the Stanhope mine underground workings. Coal was initially transported to the company's wash plant at the Merrywood mine south of Avoca. When the Merrywood mine closed in 1997 coal was sold to the Cornwall Coal Company at Fingal. The mine closed in December 1998. Total raw coal production was 175,524 t and washed coal product was 121,917 t at an average recovery of 69.5%.

Bonneys Plains

The Bonneys Plains working are located about 3.5 km south of Mt Christie. Three adits were developed at the Bonneys Plains workings about 3.5 km south of the Stanhope mine. It is not known when the seams were worked but the area was abandoned when inspected by Hills in 1922. Hills (1922) interpreted the seam to be the Delta Seam. Hughes (1954) inspected the area and considered the exposed coal seam to be the same as that being exploited at Stanhope (Beta Seam). The amount of production is unknown.

Coal Seams

Correlation of the coal seams between the mine areas has proved difficult even though the mines are in close proximity. This is due to a combination of faulting, seam thinning and an absence of marker horizons. Hills (1922) reports five seams present in the Mt. Christie workings; the Alpha, Beta, Gamma, Delta and Eta

Seams. Hills (1922) reported the main workings were in the Beta Seam which was also present in the Buena Vista (later Stanhope mine) workings. This seam varies from 1.8 - 3.6 m thick and appears to have been variously named the Stanhope Seam, New Stanhope Seam and Fenhope Seam after the mine in which it was exploited. The Delta Seam was exploited at the Mt. Christie workings and possibly at Bonneys Plains. Hills (1922) stated that the above five seams correlated with those worked in the Mt. Nicholas and Fingal areas further to the east. A 2.5 m thick outcrop of the Beta Seam (Seam B) from the Stanhope open cut is shown in Plate 2 which shows localised seam thinning and small scale faulting.

Remnants of the Triassic coal measures have also been preserved to the east on the slopes of Ben Lomond in uplifted fault blocks.

Plate 2. Seam B outcrop, Stanhope open cut.

Previous Exploration

Stanhope Mine

The operator of the Stanhope mine drilled 24 shallow holes around the Stanhope, New Stanhope and Mount Christie mine, and at Bonneys Plains between 1954 and 1971. Results are not reported.

Western Mining Corporation

Western Mining Corporation (WMC) acquired EL 16/76 covering 826 km^2 in July 1976. Regional and detailed mapping was conducted to identify areas of Triassic lithic sandstone and siltstone facies with coal measures that had not been previous explored. The main areas of interest identified were the Bonneys Plains and Marsh Creek areas. WMC differentiated the Upper Parmeener Triassic sequence into four facies:

- a coal and carbonaceous shale facies;
- a mudstone facies commonly associated with the coal and carbonaceous shale facies as well as the lithic sandstone facies;
- the lithic sandstone and siltstone facies which also occurs with the coal and carbonaceous shale facies and at times forms the roof of some of the coal seams in the area;

- the quartzose sandstone facies which occur towards the base of the Triassic sequence but which is also interbedded with all the other facies.

Coal samples were collected and analysed from old workings in the area and are the results are reported in Table A3.

Table A3, Coal Quality Surface Samples, WMC Ltd

Location	Total Moisture (% arb)	Inherent Moisture % (adb)	Ash (% adb)	Volatile Matter (% adb)	Fixed Carbon (% adb)	Crucible Swell Number
New Stanhope Mine	2.5	2.1	14.4	32.0	51.6	1
New Stanhope Mine	3.1	2.1	10.8	31.0	56.1	1
New Stanhope Mine	2.4	2.0	7.6	35.9	54.5	6
Stanhope Mine	6.2	3.4	7.4	33.9	55.3	0
Bonneys Plains	2.9	1.9	7.2	33.0	57.9	1
Bonneys Plains	3.1	2.2	16.1	27.9	53.8	1/2

WMC drilled nine exploration holes, TAR 1 – TAR 9, between March and May 1977 to test for the presence of non-outcropping coal measures below alluvial cover in the Bonneys Plains and Marsh Creek areas. The location of the drill holes is shown in Figure 1. The holes were generally drilled around the margins of the dolerite where the lithic sandstone facies was known to be preserved. The lithic sandstone facies was intersected in seven of the holes and four holes, TAR 1, TAR 2, TAR 3 and TAR 8 intersected coal measures with seams varying from 0.1 – 0.4 m thick. The thickest intersection of coal measures was in TAR2 with 45 m comprising thin seams and carbonaceous shale. Exploration drilling is summarised in Table A4.

Table A4, Exploration Drilling Avoca WMC Ltd

Hole No.	Hole Type	Total Depth (m)	Comments
TAR 1	Open hole & core	82.0	Coal measures approx 3.5 m
TAR 2	Open hole	84.9	Coal measures approx 45 m
TAR 3	Open hole	63.5	Dolerite to 7.0m, coal measures approx 32.5m
TAR 4	Open hole	60.0	No coal intersected
TAR 5	Open hole	78.0	No coal intersected
TAR 6	Open hole	3.8	Hole abandoned in dolerite
TAR 7	Open hole	60.0	No coal interstected
TAR 8	Open hole	80.0	Coal measures approx 5.2m
TAR 9	Open hole	78.0	No coal intersected
Total		**590.2**	

Analyses of chip samples from hole TAR 2 are shown in Table A5. WMC relinquished the EL in July 1977.

Table A5, Coal Quality Analysis Hole TAR 2, WMC Ltd

From Depth (m)	To Depth (m)	Thick (m)	Inherent Moisture (% adb)	Ash (% adb)	Volatile Matter (% adb)	Fixed Carbon (% adb)	Crucible Swell Number
10.0	10.4	0.4	2.5	36.9	19.9	40.7	1/2
11.0	11.4	0.4	2.5	29.1	25.6	43.8	1/2
14.1	14.5	0.4	2.5	52.1	19.1	26.3	1/2
38.8	39.0	0.2	2.5	29.5	32.6	35.4	1/2
47.6	48.0	0.4	2.5	71.1	11.9	14.5	-
48.0	49.0	1.0	2.5	80.3	10.3	6.9	-
49.0	49.5	0.5	2.5	86.0	8.2	3.3	-

Shell Company of Australia Limited

Exploration Licence EL 18/77 covering 1,473 km^2 was granted to the Shell Company of Australia Limited (Shell) in January 1978. Shell initially conducted a review of the area including a photographic interpretation and construction of regional geology by consultants Layton and Associates. A fracture study of the area was also produced from aerial photographs. A field mapping programme was conducted to review the work of previous explorers and inspect potentially prospective areas delineated by Department of Mines gravity survey.

An exploration programme of nine cored holes was conducted between May and September 1978 in an area mainly to the south of Avoca. Between March and July 1980, four fully cored holes were completed including holes AV12 and AV13 drilled in the south of the licence. Hole AV12 intersected 158.73 m of dolerite, 324.61 m of Upper Parmeener Super-group and 6.99 m of Lower Parmeener Super-Group. Hole AV13 intersected 307.46 m of dolerite, 52.24 m of the lower section of the Upper Pameener Super-Group sequence. No significant coal seams were present in the holes. The locations of the drill holes are shown on Figure 1. Shell relinquished the licence in July 1981.

Avoca Transport Company Pty Ltd

The Avoca Transport Company Pty Ltd (Avoca) held a number of EL's over the Greenstone Hill area between 1980 and 1987. The company conducted a review of the area with the objective of identifying areas with potential for surface mining including pillars remaining in the abandoned underground workings. Geological mapping and two drilling programmes were conducted in 1985 and 1986 with nine shallow cored holes drilled in the vicinity of the Stanhope workings and one cored hole drilled immediately south of the New Stanhope workings. The drilling located unmined blocks of Beta Seam (Seam B) resource and confirmed earlier interpretations that the coal in the Stanhope area was fault bounded to the southeast and southwest. An unmined area of Seam B resource was also located immediately south of the New Stanhope workings. Avoca concluded that there was unlikely to be sufficient resource remaining in the previously worked areas to support a mining operation and relinquished the licence in 1997.

Merrywood Coal Company

The Merrywood Coal Company acquired EL 21/91 covering 16 km^2 in 1993 and reduced this to 6 km2 in 1995. The area was referred to as Mt. Rex. An evaluation of remaining shallow underground resource was conducted by D. Nelson and Associates in 1986 who estimated a maximum of 324,000 t was present in pillars and areas adjacent to the Stanhope mine. Remaining resource in the New Stanhope mine area was assessed as not amenable to open cut mining. Two shallow open holes were drilled in the Stanhope mine area to confirm resources and one hole was drilled southeast of the New Stanhope mine to test for shallow extensions of the resource. Seam B was intersected in holes MS-1 and MS-2 while hole MS-3 was abandoned in dolerite talus.

A 1,500 t bulk sample was extracted in 1997 and was processed through the Merrywood wash plant and trial burns were successfully conducted with existing Merrywood customers. The product coal was reported to have calorific value 5,490 - 6,450 kcal/kg. A programme of 40 air track drill holes was conducted to define the depth to the top of the main seam and locate seam fault displacements accurately. The programme also identified that an upper and lower seam that had not been previously mined was present above and below the main seam.

Mining Lease 1640P/M covering 249 ha within the licence was granted to Merrywood in 1997 and a small open cut mine was established over the Stanhope underground workings. Coal was initially transported to the company's wash plant at Merrywood and subsequently was sold to the Cornwall Coal Company at Fingal. The mine closed in December 1998. Total raw coal production was 175,524 t and washed coal product was 121,917 t at an average recovery of 69.5%.

Spitfire Resources

Marston International Pty Ltd (Marston) conducted an exploration drilling programme for Spitfire Resources in April and May 2010 that comprised 16 open holes and two cored holes. Total metres drilled were 1,119.2 m. The location of the holes is shown in Figure 1.

All holes were located in the general vicinity of the Stanhope and New Stanhope mines and along Gipps Creek on the Bona Vista property. The drilling was conducted in an area of narrow, steep sided valleys in rugged hilly to mountainous terrain. The objective of the drilling programme was to test for extensions of known coal occurrences around the historical mines, identify additional resource in previously unexplored areas and test extensions of the seams beneath the dolerite cover.

To test for extensions of the known resources it was necessary to drill through the dolerite and dolerite scree overlying the Triassic coal measures. Seven open holes collared in the dolerite were abandoned due to poor ground conditions. Six open holes successfully intersected coal measures beneath dolerite cover. The remaining five holes were collared in the Permo-Triassic sequence. Four of these holes intersected coal measures with coal seams 0.5 - 3.0 m thick.

Two cored holes were designed to sample the best coal intercepts located by the open hole drilling. Hole DDH001 was drilled to the north of the New Stanhope mine and intersected 2.4 m of good quality coal, interpreted as Seam C. Hole DDH002 was drilled on the slopes of Greenstone Hill to the west of the Stanhope open cut and intersected 1.9 m and 2.9 m of high ash stony coal interpreted as Seams B and C. The drilling is summarised in Table A6 and the coal quality in shown Table A7.

Table A6, Exploration Drilling Avoca Project, Spitfire Resources

Hole No.	Hole Type	Total Depth (m)	Comments
DDH_001	Core	29.0	Coal measures.
DDH_002	Core	60.5	Dolerite to 26.5m, coal measures
RDH_001	Open hole	37.0	Abandoned in dolerite
RDH_002	Open hole	10.0	Abandoned in dolerite
RDH_003	Open hole	97.0	Coal measures
RDH_004	Open hole	85.0	Coal measures
RDH_005	Open hole	67.0	Dolerite to 7.0m, coal measures
RDH_006	Open hole	43.0	Dolerite to 7.0m, coal measures
RDH_007	Open hole	31.0	Abandoned in dolerite
RDH_008A	Open hole	13.0	Abandoned in dolerite
RDH_008B	Open hole	31.0	Abandoned in dolerite
RDH_009	Open hole	67.0	Coal measures
RDH_010	Open hole	85.0	Dolerite to 1.0m, coal measures
RDH_011	Open hole	103.0	Dolerite to 10.0m, sediments no coal measures
RDH_012	Open hole	17.7	Abandoned in dolerite
RDH_013	Open hole	79.0	Dolerite to 5.0m, coal measures
RDH_014	Open hole	85.0	Dolerite to 12.5m, coal measures
RDH_015	Open hole	87.0	Abandoned in dolerite
RDH_016A	Open hole	13.0	Abandoned in dolerite
RDH_016B	Open hole	79.0	Sediments no coal measures
Total		**1,119.2**	

Table A7, Coal Quality Analysis Avoca Project, Spitfire resources

Hole No.	Depth From (m)	Depth To (m)	Thick (m)	Seam	Inherent Moisture (% adb)	Ash (% adb)	Volatile Matter (% adb)	Fixde Carbon (% adb)	Total Sulphur (% adb)	Calorific Value (kcal/kg, adb)
DDH001	3.45	5.17	1.72	B	7.89	74.18	12.13	5.80	0.05	464
	18.46	21.04	2.40	C	2.64	23.68	27.85	45.83	0.48	5,846
	22.30	22.77	0.47	D	2.99	57.19	14.10	25.73	0.26	2,991
DDH002	26.89	27.85	0.91	A	9.61	76.75	8.01	5.63	0.07	174
	33.73	34.65	0.92	B	4.51	59.47	14.77	21.25	0.22	2,341
	54.22	56.75	2.53	C	4.16	63.86	13.83	18.15	0.16	2,119

A composited sample of Seam C from DDH001 were subject to float-sink testing that indicated that a clean coal product with 12.3% ash could be produced with 85.3% apparent yield at a float density of 1.7 gm/cc.

Marston analysed the results of the programme in relation to the results of previous exploration programmes, reports and plans of previous mining activity, and geological observations from outcrops in the area. The following conclusions were derived:

- The coal measures have been confirmed as present for approximately 4 km along the slopes of escarpments adjacent to Gipps Creek.
- An extension of the underground resource was identified to the north of the New Fenhope mine.
- The coal measures have been removed by erosion along the courses of the local streams.
- Coal measure outcrops and seam intercepts were confirmed beneath the base of the dolerite in the area explored.
- Access to drill sites designed to test coal measures beneath significant thicknesses of dolerite was extremely difficult due to the steep terrain. Only drill sites near the margin of the dolerite could be accessed.
- Seam thickness is variable, coal quality appears to deteriorate rapidly in some areas, faulting is common and seam correlation is uncertain.
- The presence of the nearby regional Castle Carey fault may have had a significant impact on structural disruption of the seams in the area.
- The steep topography dictates there is no potential to identify open cut resource in the area explored.
- The observed, reported and interpreted faulting indicates limited potential to identify extensive mineable underground resource in the area explored.
- Drilling through the dolerite to test the underlying coal measures is difficult and regional continuation of the seams has not been conclusively demonstrated to date.
- Additional exploration potential may exist further to the west where the influence of the Castle Carey fault is diminished, where dolerite cover appears thinner and topography is less rugged.

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