

Australian Pacific Coal

ASX RELEASE 24 May 2016

AUSTRALIAN PACIFIC COAL COMMISSIONED COAL RESOURCE ESTIMATE AT DARTBROOK OF 1.2 BILLION TONNES

HIGHLIGHTS:

- Report commissioned by Australian Pacific Coal Ltd ahead of completion of the acquisition identifies a total Coal Resource Estimate of 1.2 billion tonnes at Dartbrook (100% Project ownership basis).
- Comprising 466 million tonnes Measured, 449 million tonnes Indicated and 294 million tonnes Inferred Resources to a maximum depth of 350m.
- Comprehensive coal quality demonstrates ability to produce a range of thermal coal products between 10 to 18% ash (air dried basis).
- Potential to produce an 8% ash (air dried basis) pulverised coal injection ("PCI") product from the Kayuga and Piercefield seams.
- Subject to relevant approvals, potential for long mine life, low stripping ratio (5:1 Vertical Coal tonnes to waste BCM) open cut mining operation.

Australian Pacific Coal Limited ("AQC" or "Company") is pleased to announce the findings of an independent assessment undertaken by geological consultants JB Mining Services Pty Ltd ("JB Mining") on behalf of the Company estimating a 1.2 billion tonne Coal Resource Estimate ("CRE") for the Dartbook Project (100% Project ownership basis) located in the renowned coal region of the Hunter Valley, NSW.

On a 100% Project basis, the CRE comprises 466 million tonnes (Mt) and 449Mt in the Measured and Indicated categories respectively, a total of 915Mt, based on area that avoids the Hunter River alluvium and Kayuga village to a maximum depth of 350m.

Coal quality analysis demonstrates the ability to produce a range of thermal coal products between 10% to 18% ash on an air dried basis ("adb") and there is also potential to produce an 8% ash adb PCI product from the Kayuga and Piercefield seams.

The Company has entered into a binding agreement to acquire an 83.33% interest in the Dartbrook Joint Venture ("Dartbrook" or "the Project") from Anglo American Plc ("Anglo") and shall acquire an additional 16.67% owned by Marubeni Coal Pty Ltd ("Marubeni") following Marubeni's decision to exercise its tagalong right under the Joint Venture Agreement. The acquisition of Marubeni's interest is subject to, amongst other things, AQC's agreement with Anglo becoming unconditional. The parties are in the process of finalising formal documentation for the tag-along sale from Marubeni and it is expected that a final agreement will be reached in the coming weeks. It is envisaged that the sale of both Anglo and Marubeni's interest in the Dartbrook JV, totalling 100%, will complete simultaneously. Completion of the Project acquisition has not yet occurred and is subject to satisfaction or waiver of the remaining conditions precedent. If these conditions precedent are not satisfied or waived AQC will not be able to complete its acquisition of Dartbrook and will have no interest in the Project.

Table 1 - Dartbrook Project – Coal Resource Estimate (100% Project basis)						
	CRE Tonnage (Mt)					
Measured	Indicated	Inferred	Total			
466	449	915	294	1,209		

Table 2 - Dartbrook Project – Coal Resource Estimate (83.33% Project basis)								
	CRE Tonnage (Mt)							
Measured	Measured Indicated Total Measured Inferred Total							
& Indicated								
388	374	762	245	1,007				

AQC's Chief Executive Officer, Mr John Robinson Jnr, said "This CRE confirms Dartbook as one of the largest under developed coal operations in the Hunter Valley. It reaffirms our long-held belief that Dartbrook is a tier one mining asset that has the potential to create a significant number of job opportunities for the local community. The high quality of Dartbrook's coal will also help meet global demand for low ash Australian premium thermal coal, which will continue to play a critical role in meeting future energy needs."

The CRE was estimated by JB Mining. JB Mining is a leading provider of geological services to the coal mining and resources industries specialising in modelling, resource estimation and reporting to JORC standards using Vulcan and Minescape geological software systems. JB Mining was established in 1995 and has developed a substantial collective knowledge due to the experience of working with some of the most recognised companies, contractors and consultants in the coal industry over a long period of time. The CRE was prepared by JB Mining in accordance with the JORC Code (2012 Edition).

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Acquisition

As announced on 29 December 2015, the Company's Dartbrook acquisition from Anglo consists of:

- 83.33% interest in the Dartbrook JV;
- 100% interest in Anglo Coal (Dartbrook Management) Pty Ltd, manager of the Dartbrook JV; and
- 83.33% interest in Dartbrook Coal (Sales) Pty Ltd, marketing agent of the Dartbrook JV (together, "the Anglo Acquisition")

The consideration for the Acquisition includes:

- a A\$25 million cash payment (of which a deposit of A\$500,000 has been paid and the balance of A\$24.5 million is held in escrow pending completion of the Acquisition); and
- a royalty over AQC's share of coal from the Dartbrook joint venture at a rate of A\$2.50 per tonne of coal sold or otherwise disposed of and A\$0.25 per tonne of any third party coal processed through the Dartbrook infrastructure, but capped at A\$25 million (subject to escalation in accordance with CPI).

The Company's proposed acquisition from Marubeni consists of a 16.67% interest in the Dartbrook JV and a 16.67% interest in Dartbrook Coal (Sales) Pty Ltd, the marketing agent of the Dartbrook JV (together, "the Marubeni Acquisition").

The consideration for the Marubeni Acquisition will include:

- a A\$5 million cash payment (of which a deposit of A\$100,000 is payable on execution of the formal documentation); and
- a royalty of A\$0.50 per tonne of total coal sold or otherwise disposed of from the Project and A\$0.05 per tonne of any third party coal processed through Project infrastructure, but capped at A\$5 million (subject to escalation in accordance with CPI).

Completion of the acquisition of Anglo and Marubeni's interests in the Dartbrook JV remains subject to certain conditions precedent, including:

- Marubeni releasing Anglo from any further liability in respect of the Dartbrook JV, which it has agreed to do on completion of the sale of its interest;
- receipt of NSW government approval to the tenement change of control and to the tenement transfers from Marubeni;
- AQC providing reasonable evidence to Anglo and Marubeni of AQC's ability to replace the financial assurances of approximately A\$9.2 million; and
- in respect of the Marubeni Acquisition, Foreign Investment Review Board approval, if applicable.

AQC and Anglo will also need to formally agree to waive the condition precedent relating to Marubeni not exercising its pre-emptive or tag-along rights under the JV Agreement. It is expected that this will occur at the same time as execution of the formal documentation for the Marubeni tag-along acquisition.

Dartbrook Project

<u>Overview</u>

The Project is located in the renowned coal region of the Hunter Valley, NSW, approximately 4km west of Aberdeen and 10km north-west of Muswellbrook. The location ideally places Dartbrook near world-class infrastructure, workforce and support industries used by major mining companies in the region to serve key customers in Asia.

Access to the Project is via sealed road directly off the New England Highway, with the mine connected to the existing Hunter Valley Rail Network for the transportation of coal to the port of Newcastle for export, approximately 147km to the south-east.

Coal at Dartbrook can be classed as high volatile bituminous coal. It is able to produce a range of thermal coal products between 10 to 18% ash on an air dried basis ("adb"). There is also potential to produce an 8% ash adb PCI product from the Kayuga and Piercefield seams.

The area has a low stripping ratio even to depths of up to 500m and hence a large potential resource exists. The CRE focuses on open-cut resources within a nominal pit area that avoids the Hunter River alluvium and village of Kayuga. The CRE is limited to a 350m depth.

Table	Table 3 - Dartbrook Project – Coal Resource Estimate by Depth							
	CRE Tonnage (Mt)							
Depth	Depth Measured Indicated Inferred Total							
0-100m	88	71	41	200				
100-200m	152	128	65	345				
200-250m	83	71	55	209				
250-300m	83	86	54	224				
300-350m	300-350m 59 93 80 232							
Total	466	449	294	1,209				

The Dartbrook CRE is located on the western side of the Muswellbrook Anticline, 2.5kms west of the Hunter River. Strata of the Permian Wittingham Coal Measures outcrop in the area and dip 3 to 5 degrees to the west. Structural geology is simple with relatively minor faulting. Underground mining has been carried out in this area and this has provided direct evidence of the coal continuity in the mined seams and confirmation of the interpretations based on drilling data.

Two thick dykes and one plug have been well defined by magnetic surveys supplemented by follow up drilling. Small dykes have been found in underground workings. The impact of the dykes and plugs on coal quality is minimal.



Figure 1: Project Location

Resources are estimated in accordance with the "Australian Guidelines for Estimation and Classification of Inventory Coal Resources" (2014), and are reported in compliance with the "Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves – The JORC Code 2012 Edition"

Location, Access and Topography

Mining operations in the immediate area surrounding the Project include Mangoola (Glencore, 13.5 mtpa approval), the Bengalla JV (New Hope and Wesfarmers, 12 mtpa approval), Mount Arthur (BHP Billiton, 36 mtpa approval) and the adjacent project Mount Pleasant (Rio Tinto).



Figure 2: Aerial view of adjacent open cut operations

The Hunter River is located to the east of the Dartbrook lease areas, running north-south. Sandy Creek runs through the northern and eastern areas of Dartbrook, joining up with the Hunter River to the southeast. The Dart Brook is another minor tributary of the Hunter River, located to the east of the project area. The north-eastern parts of the Dartbrook leases are located on the Hunter River flats, at an elevation of approximately 170m (AHD). The topography rises towards the south-west, where it reaches an elevation of 330m (AHD). Overall the topography undulates gently, with areas of flat ground near the Hunter River.

Land Holding and Tenure Summary

Dartbrook has a large, freehold land package of over 3,400 hectares covering the majority of the potential open cut mining area. Dartbrook's mining leases (ML) and coal leases (CL) cover a total of 3,268 hectares, whilst the exploration leases (EL) and authorisation permits (AUTH or A) cover 3,800 hectares (which includes areas also within the area of the ML's and CL).

ML1497 currently excludes mining from surface to 20m above the roof of Mount Arthur seam. The overlying EL4575 and EL5525 allow access from surface to 20m above roof of Mount Arthur seam. The CRE assumes that all coal to 350m depth is assessable to open cut mining in ML1497 through the EL access rights.



Figure 3: Dartbrook Land Holding and Tenure

Existing infrastructure and conducive operating environment

Key mining and processing infrastructures have been maintained in good condition since Dartbrook was placed on a care and maintenance basis in 2006. Surface infrastructure, including power, waste and office facilities as well as the CHPP and TLO, remain ready for recommencement of operations with minimal capital outlay.

The Project's existing on-site TLO and rail loop connect it to the Hunter Valley Coal Rail Network for transportation of coal to the port of Newcastle, which contains two world-class coal handling terminals. One of these is the Port Waratah Coal Services, the largest coal export terminal in the world, owned and operated by Hunter Valley coal producers and customers. The Hunter Valley network has undergone

considerable capital investments and throughput improvements in the last 10 years, making it the largest coal export operation in the world.

Furthermore, a long history of mining in the Hunter Valley has created a large pool of highly skilled workers and lasting partnerships with suppliers as well as stakeholders.



Figure 4: Dartbrook CHPP



Figure 5: Dartbrook Mine Infrastructure Area

Summary of Resource Estimate and Reporting Criteria

Geology and Geological Interpretation

Dartbrook is located in a relatively structurally benign zone of flat-lying to gently folded strata on the western side of the Muswellbrook Anticline.

Strata of the Permian Wittingham Coal Measures crop out in the area and dip gently to the west. Underlying marine sediments of the Maitland Group sub-crop on the eastern side of the Aberdeen Thrust. Further to the east lies the basin-bounding fault, the Hunter-Mooki Thrust. The Greta Coal Measures (which are exploited at the nearby Drayton and Muswellbrook Collieries) occur below the Maitland Group, but at depths in excess of 1,000m below surface.

Dips in the area are gentle, ranging from 3°-5° to the west or north-west. Local variations of up to 15° have been identified, and are generally considered to be due to clastic wedging, seam splitting and differential compaction.



Figure 6: Coal Seam Stratigraphy

The deposit contains 15 main seam groups subdivided into approximately 110 different plies. Seam splitting is common particularly in the Mt Thorley and Burnamwood Formations. Despite the amount of seam splitting the coal plies show lateral consistency in both thickness and raw ash providing confidence in resource classification.



Figure 7: Typical East West Section across the deposit

Interburden is dominated by interbedded fine to coarse grained sandstone, siltstone and mudstone of various carbonaceous content, with minor amounts of claystone, tuffaceous claystone, and occasional coarse grained sandstone and conglomerate. The base of weathering depth ranges from 5m to 45m, with an average depth of 17m.

Two major dykes have been interpreted at Dartbrook from various aeromagnetic surveys, magnetometer surveys and surface trenching. These dykes traverse the area in a north-east to south-west direction and have been well defined in both extent and impact.

Faults trend north-west south-east, however most have only small displacement and historically did not materially impact on mining. A north north-west trending, sub-vertical fault system with a maximum throw of 5m has been identified which past underground mine activities successfully navigated, without impediment in the Kayuga seam.

The Project is well suited to open cut operations, with the historical underground mining providing significant knowledge and understanding of mining conditions, coal quality, proposed approach and risk mitigation.

Dartbrook benefits from being a relatively dry mine environment, with water associated with the Hunter River alluvium and groundwater in the Permian strata being unconnected and of different quality and transmissivity.

Drilling and Sampling Techniques

Exploration at Dartbrook has been through a series of drilling campaigns incorporating slim cores, large diameter cores and non-core holes. Downhole geophysics was run in both cored and non-cored holes. Quality and geotechnical testing was conducted on cored holes. Drilling is generally on a 250m grid pattern with a combination of cored and non-cored holes.



Figure 8: Drillhole location plan

Diamond drill bits have been used for slim cored holes and tungsten bits used for non-cored holes. Large diameter cored holes using polycrystalline diamond (PCD) drill bits have been used to provide bulk samples for detailed washability analyses.

Table 4 – Drill Hole Statistics						
Number	Details					
1230	Total Number of Holes in Database excluding barren holes					
774	Holes in used in Structural Model					
352	Holes in used in Quality Model					

Sample Analysis Method

Full cores were used for sample testing. Core sampling was completed at the drill site or core shed.

Samples have been crushed and sub-sampled in NATA registered laboratories using appropriate Australian Standards for coal testing. All samples are weighed, air dried then re-weighed before being crushed to -11.2mm. One eighth of the sample is then divided off to test for Raw Coal Proximates RD and TS. The complement is washability tested. Plies with a core recovery of < 95% were re-drilled.

The following table provide details of sampling and subsequent analyses.

Table 5 – Sampling and Analysis					
Seam	All Seams				
Sampling Detail	Ply samples generally <1m				
Raw Coal Analyses	352 holes				
Washability Analyses	343 Holes				

Resource Estimation Methodology

The CRE has been reported based on the guidelines recommended in The JORC Code (2012 Edition).

Confidence classification involves evaluation of both structural definition as well as grade definition. A quality point of observation for each ply is defined as a cored hole with coal recovery of >90 % and having raw ash data. Almost all raw ash data points have associated Float sink (F/S) ash yield data. Because of a strong correlation between raw ash and float yield and ash, any absent F/S data can be back calculated from raw ash.

A quantity point of observation for each ply is defined as a ply drill hole intercept with downhole geophysics or fully cored section. The vast majority of structural holes have geophysics. Supporting data for coal continuity are holes with downhole geophysics and 2D seismic surveys over the area. The area has been previously mined by underground methods, thus providing direct evidence of the coal continuity in the mined seams. The structural geology is simple and the igneous geology is well understood.

Ply thickness contours indicate strong continuity and consistency with local trending. Significant effort has been put into detailed ply correlations across the deposit. The correlation is aided by good stratigraphic markers and facilitated by downhole geophysics and detailed core logging.

A characteristic of the seams in the Wittingham Coal Measures is the large degree of seam splitting leading to significant variation in seam thickness. In contrast, the component plies show high consistency in thickness with local trending. Raw coal ash, whilst not as consistent as the ply thickness is still reasonably consistent with low coefficient of variation.

The consistency of raw coal ash is a feature of this area and provides additional confidence in the resource classification. The following table details the drill hole spacing used for resource classification.

Table 6 – Drill Hole Spacing for Resource Classification							
Classification	Distance Apart (m)						
Measured	250	500					
Indicated	500	1000					
Inferred	1000	2000					

Geological modelling and resource estimation has been carried out by JB Mining using Version 9 of Maptek's VULCAN 3-D geological modelling software. The model is of the coal plies only. Ply structure modelling (20x20m grid) is based on triangulation of the structure roof and floor intercepts corrected for drill hole deviation. Seam thickness is derived by structure roof minus floor models. Coal quality models (100x100m grid) are generated using the Inverse Distance Algorithm. Resources were calculated using Vulcan's Rsvute module. Checks are performed by calculating resources in a completely different reserving module within VULCAN.

Average raw coal quality parameters (adb) calculated per block are RD, Ash, Inherent Moisture, Volatile Matter, Total Sulphur and CSN. Average washed coal parameters calculated per block Ash and Yield at both F1.50 and F1.60.

Relative Density and In-situ Moisture

True RD is modelled directly from Laboratory RD data. In situ RD is calculated via the Preston & Sanders formula using the True RD model, Inherent Moisture model and a calculated in-situ moisture. The inherent moisture is in the order of 2% to 8% averaging 4.3%. In situ Moisture is calculated using the ACARP Report C10041 formula as follows:

In situ moisture = $1.1431 \times Moisture Holding Capacity + 0.348$. For an MHC of 8.0 the calculated average in-situ moisture is 9.5%.

Resource Constraints

- The western up-dip limit is the nominal pit boundary or the ply lox line
- The northern limit is set as the nominal pit boundary
- The down-dip limit is set by lease boundaries
- The southern limit is set by lease boundaries
- Maximum depth is 350m from surface.
- Mined out plies are excluded.
- A minimum ply thickness constraint of 0.3m was applied where the overlying ply is more than 0.3m distant.
- A maximum raw ash constraint of 45% was applied.
- Coal in the Kayuga plug and two major dykes areas is excluded.
- The lowest ply is EDB3 is excluded due to poor incremental strip ratio

The nominal pit boundary is west of the limit of alluvium and west of the Kayuga village.



Figure 9: Resource Area

Mining and Metallurgical Methods and Parameters

Open cut resources have been defined in a nominal pit west of the limit of alluvium associated with the Hunter River flats and west of the Kayuga village

A feature of the Wittingham Coal Measures is that the cumulative vertical waste to coal tonnage ratio does not significantly change with increase in depth as more seams are added as the sequence deepens.

The thickest, most attractive seam for open cut mining is the Wynn seam. The vertical ratio to the Wynn Upper seam is as low as 3:1 but generally between 4:1 and 5:1 (vertical waste BCM/ tonne In situ). The Wynn seam depth ranges from approximately 200m in the east to 500m in the west.

Dartbrook's past export product was low in ash (9-10%) and sulphur (~0.30%) on an as received basis, with a relatively high calorific value (6,200-6,300) Kcal/kg GAR), comparing favourably with adjacent thermal coal operations and the Newcastle benchmark. The low sulphur content also enhances the marketability of the product through blending with higher sulphur Hunter Valley coals.

Dartbrook's primary coal product is expected to be priced competitively in line with the Newcastle Thermal Coal benchmark. Such high quality coal is expected to become an increasing rarity given the projected fall in the energy content of thermal coal production globally, driven predominantly by the low quality thermal coal product being exported from Indonesia. Outlined in the table below is the calculated air dried basis energy at various ash product levels using an Ash/Energy regression based on the average of all seams for indicative quality purposes.

Table 7 – Indicative Coal Quality							
Ash (%) SE MJ/kg kcal/kg							
8	29.20	6,975					
10	28.46	6,795					
12	27.72	6,620					
15	26.61	6,355					

Coal quality demonstrates the ability to produce a range of thermal coal products between 10 to 18% ash on an air dried basis ("adb"). There is also potential to produce an 8% ash adb PCI product from the Kayuga and Piercefield seams.

Table 8 - Ply Weighted Average Qualities within the Measured and Indicated ResourceCategories (Air dry unless noted otherwise)										
Seam Group	Insitu RD	Inherent Moisture %	Raw Ash %	Raw CSN	Raw Total Sulphur %	Raw Volatile Matter %	F1.50 Yield %	F1.50 Ash %	F1.60 Yield %	F1.60 Ash %
Blakefield	1.39	6.4	16.2	-	0.34	29.0	-	-	-	-
Glen Munro	1.52	7.1	33.8	-	0.26	24.4	50.5	13.1	62.1	16.5
Woodlands Hill	1.47	7.0	25.5	-	0.31	27.9	67.4	10.4	74.7	12.4
Arrowfield	1.37	7.1	12.8	1.3	0.35	31.9	84.8	5.8	88.1	6.5
Bowfield	1.49	6.3	26.7	0.8	0.34	27.5	63.1	10.2	69.8	12.4
Warkworth	1.43	5.9	20.5	1.7	0.41	30.2	71.9	9.6	78.8	11.6
Mt Arthur	1.43	5.6	19.4	1.1	0.31	28.7	77.2	10.5	83.6	12.0
Kayuga	1.40	5.5	17.9	2.1	0.29	31.4	76.1	8.6	82.1	10.3
Piercefield	1.39	5.0	15.5	2.0	0.41	31.7	80.6	7.8	84.7	8.9
Vaux	1.46	4.8	23.6	1.8	0.36	28.2	67.5	10.0	74.8	11.9
Broonie	1.43	4.0	20.8	1.6	0.44	29.7	71.4	10.1	77.6	11.9
Bayswater A	1.41	3.9	17.5	1.0	0.38	29.2	77.8	10.7	85.2	12.0
Bayswater B	1.52	3.5	24.8	0.6	0.27	24.2	51.9	13.5	69.2	16.1
Wynn Upper	1.43	3.6	21.1	1.7	0.37	29.6	73.0	10.2	78.1	11.2
Wynn Lower	1.50	4.2	27.5	1.4	0.47	28.1	63.7	13.0	72.2	15.2
Edderton	1.52	3.8	29.8	1.9	0.41	28.5	57.1	13.1	67.4	15.8

Note that the above qualities do not include the partings between plies that might be incorporated into a mining working section. As a result, working section qualities may have higher ash and lower yield.

Competent Persons Statement

The information in this announcement that relates to Exploration Results and Coal Resources is based on, and fairly represents, information compiled or reviewed by Mr Mal Blaik, a Competent Person who is a Member of the Australasian Institute of Mining and Metallurgy (No 112631) and a qualified geologist (BSc App Geol (Hons) University of Queensland, 1979) with over 30 years' experience in coal geology and over 20 years' experience in resource evaluation. Mr Blaik is a Principal Consultant of JB Mining Services Pty Ltd and has sufficient experience that is relevant to the style of mineralisation and type of deposit under consideration and to the activity being undertaken to quality as a Competent Person as defined in the 'Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves–*The JORC Code 2012 Edition*'. Mr Blaik consents to the inclusion in the report of the matters based on the information in the form and context in which it appears.

Appendix 1 – JORC Table 1 Checklist of Assessment and Reporting Criteria

The following table provides a summary of important assessment and reporting criteria used for the Dartbrook Project in accordance with the Table 1 checklist in The Australasian Code for the Reporting of Exploration Results, Mineral Resources and Ore Reserves (The JORC Code, 2012 Edition). Criteria in each section apply to all preceding and succeeding sections.

Section 1	Sampling Techniques and Data									
Criteria		Ex	planation							
Sampling Techniques	Core holes were fully or partly cored. Drilling rigs comprised both conventional and top head drive units providing core samples of 100mm, 63mm and 61mm diameter core. Openhole rotary drilling provided chip samples where seams were not cored. All holes were attempted to be drilled vertical. Most holes were geophysically logged. The following table provide details of sampling and subsequent analyses.									
	0 1 5 5 00	Seam All Seams								
		Sampling detail	Ply samples generally <1m							
		Raw Coal analyses	352 holes							
		Washability Analyses	343 Holes							
Drilling techniques	Wireline and conve or hammer bit.	ntional core drilling. Rotary drilli	ng using downhole blades, poly crystalli	ine diamond (PCD)						
Drill sample recovery	Core sample drilled weights to aid deter Anglo's standards conditions.	and recovery noted by supervision rmination of sample recovery. D require a redrill where core reco	ng geologist. Sample weights are compa ensity logs used to check sample recov veries are <95%, except when due to	ared with estimated ery. adverse geological						
Logging	Drill cuttings and co that the lithological intercepts were cor Where possible, wi of logs - calliper, g considered to be at	bres were lithologically logged in logs were encoded directly in trected to downhole geophysics. reline logging of all drill holes has amma and density. Deviation hoppopriate for coal resource defin	the field. As almost all the drilling was p the field on industry standard coding s Cores were photographed in the more s been routinely undertaken for the indu ogs have been on run some holes. Th ition.	boost 1983 it is likely heets. Coal seam recent cores. Istry standard suite he level of detail is						
Sub- sampling techniques and preparation	Full cores were use Core samples were reasonable and kep registered laborato dried then re-weigh for Raw Coal Proxit	ed for sample testing. Core sam e wrapped in plastic (or bagged ot in cold storage prior to analyse ries using appropriate Australian hed before being crushed to -11. mates RD and TS. The complem	pling was completed at the drill site or c d) to reduce oxidation, transported to t s. Samples have been crushed and sub o Standards for coal testing. All sample 2mm. One eighth of the sample is the pent is washability tested	ore shed. he lab as soon as p-sampled in NATA es are weighed, air n divided off to test						
Quality of assay data and laboratory tests	NATA registered laboratories have been used for all coal testing. Nata laboratories have quality assurance/quality control schemes.									
Verification of sampling and assaying	On arrival at the la recovery and thick consistency and ch accordingly.	boratory, sample mass is comp ness loss/inconsistencies. Sam eck for core loss. If lithological lo	ared with theoretical mass for that cor ples are compared with geophysics to gs are adjusted to geophysics, sample o	e size to check for confirm to ensure lepths are adjusted						
Location of data points	All survey data is in the Australian Heig	n MGA94 Zone 56 co-ordinates ht Datum.	which are based on GDA94 datum. T	he Height datum is						
	Drill hole collars are	e surveyed by registered surveyo	ors post drilling.							
	An aerial survey wa data (contours).	as flown and a DTM compiled in	2007. The topography model is based	on the 2007 DTM						
	Drillhole collars hav	ve been checked against the DTI	M and found to be consistent.							

Data spacing and distribution	A total of 1,230 holes are in the lithological database of which approximately 774 are used for structure modelling. Drillholes are spaced generally 250m apart over the majority of the area. The majority of holes were drilled to the Wynn seam. A large number of drill sites are cored so the core spacing is similar to the total drill hole spacing in the east but core spacing is sparser in the west. Approximately 373 holes are used for coal quality modelling.
Orientation of data in relation to geological structure	Drilling has been attempted to maintain hole verticality. As the strata is gently dipping, hole deviation is generally not significant despite the depth of the holes. Downhole deviation logs (where available) are used to calculate seam roof and floor positions in space. Seam structure modelling is based on triangulation of the structure roof and floor intercepts. Seam thickness is derived by structure roof minus floor models.
Sample security	Core samples were bagged and labelled with a unique field sample ID. In addition the field sample No. was placed on a tag and bagged with the sample material. Field sample despatch records were compiled detailing the sample depths, general composition (coal/parting) and intended analyses instructions. On arrival at the laboratory field samples were re-weighed and confirmed against sample despatch advice data.
Audits or reviews	A formal audit of the Anglo 2010 model was undertaken by ASEAMCO. Several internal company reviews have been undertaken. Comparison of JBMS calculated and Anglo total coal seam tonnages in the leases indicate a similar total when the same limitations are applied. Comparison of quoted resources JORC are vastly different due to different limitations being applied.

Section	2		Repo	orting of Exploration Results						
Criteria				Explanation						
Mineral										
tenement and land tenure	Authority	Expiry	Surface	Comments						
	CL 386	19.12.33	Subsurface	Some minor surface areas						
status				PART – excludes surface and 20 m below						
				PART – surface to unlimited depth						
				PART – surface to 20 m below						
	ML 1497	5.12.22	Subsurface and surface							
				PART – surface to 20 m below Dartbrook JVs						
				PART – excludes surface and 20 m below						
				PART – excludes surface and below to 20 m above roof						
				PART – surface to unlimited depth (no restriction)						
	A 256	2515	Surface	PART surface to 20 m below						
	A 250	Linder	Sunace	PART – surface to depth of 900 m below						
		renewal		Australian Height Datum (AHD)						
	EL 5525	21.9.16	Surface	PART – surface to 20 m above roof of Mt Arthur seam						
				PART – between 40m below the surface and 20 m above						
				roof of Mt Annur seam						
	EL 4574	7.4.15	Surface	PART – surface to 20 m below						
		Under		PART – surface to unlimited depth						
		renewal								
	EL 4575	23.5.16	Surface	PART – surface to 20 m above roof of Mt Arthur						
				PART – not specified						
	ML 1456	26.09.20	Surface	Surface to 20 m below						



Exploration done by other parties Initial coal exploration of the Dartbrook area was carried out in the early 1970's by Peabody Coal. The Department of Mineral Resources undertook further drilling in the late 1970's.

Exploration data just outside the leases to the west (supplied by the Muswellbrook Coal Company) includes: 17 cored holes and 49 rotary holes. Of these, 5 boreholes have raw quality data supplied. Most of these holes are very shallow, only intersecting the Blakefield seam. In 2000 Anglo American Coal Purchased Shell Coal's Australian assets including Dartbrook. For the purposes of this report, Anglo American Coal is referred to as Anglo.

From 1980 onwards exploration has been carried out by companies associated with Anglo (Bellambi Coal Co., Shell etc.) and Anglo. A huge amount of high quality drilling and coal quality work has been carried out during

this period providing a good understanding of the coal seams, structure, coal quality and other geological features. The deposit has been mined by underground methods providing direct evidence of seam continuity and simple structure. The last JORC Resource report for Dartbrook (2010) was thorough and well documented. It is acknowledged that a large portion of the technical material in that report has been used in this report (either adapted or reproduced) as it is difficult to improve on.

Geology Regional Geology

The Dartbrook coal resources are located on the western side of the Muswellbrook Anticline. Strata of the Permian Wittingham Coal Measures outcrop in the area and dip gently to the west. Underlying marine sediments of the Maitland Group outcrop approximately three kilometres to the east, on the eastern side of the Aberdeen Thrust. Further to the east lies the basin-bounding fault, the Hunter- Mooki Thrust. The Greta Coal Measures occur below the Maitland Group. These seams are exploited at the nearby Muswellbrook Colliery, but occur at depths in excess of 1000 m below the surface at Dartbrook. The Wittingham Coal Measures contain the coal-bearing Jerrys Plains Subgroup and the Vane Subgroup in the Dartbrook area. Elsewhere in the basin these subgroups are separated by the Archerfield Sandstone, a massive, well sorted sandstone unit. However, at Dartbrook, the Bayswater seam at the base of the Jerrys Plains Subgroup has coalesced with the Wynn seam, the top of the Vane Subgroup.

The Jerrys Plains Subgroup is divisible into five main coal-bearing formations of which the basal four, the Malabar, Mt Ogilvie, Mt Thorley and Burnamwood Formations, occur at Dartbrook. Seams of the subgroup show a high degree of splitting, particularly towards the east, and major seams are generally represented by several plies / splits. Interburdens in the Jerrys Plains Subgroup are generally coarse-grained in the upper sequence, above the Vaux Seam, and become progressively finer with depth to the Bayswater Seam. Non-coal units in the Vane Subgroup are generally fine to medium grained sandstones. A typical stratigraphic column is shown in the schematic below.

Tertiary basalts and dolerites intrude the Permian Coal Measures and are present as lava flows in the Liverpool Ranges to the northwest of Dartbrook.

Local Geology

Quaternary

Recent sediments from the Hunter River occur in the narrow Hunter River flood plain zone. The edge of alluvium has been defined by 500-700 spaced backhoe costeans in a 2007 study by Australasian Groundwater & Environmental Consultants. Previously it was defined by the edge of the flood plain.

Weathering

Visual base of weathering was determined from 713 boreholes, both cored and non-cored. The base of weathering depth ranges from 5 to 45 m, with an average depth of 18m in the resource area. There is no discernible spatial correlation between the change in weathering depth, coal seam subcrops or surface features.

Igneous Intrusions

Igneous features within the Dartbrook area include major dykes, plugs and other minor intrusions.

Two major dykes have been interpreted at Dartbrook from various magnetometer surveys, surface trenching, in-seam drilling and in-seam intersections. These dykes traverse the area in a north-east to south-west direction and are named the 'Roman Road' dyke and 'The Great Wall of China' dyke.

The Roman Road dyke is a zone up to 15 m thick, comprising several dykes in a swarm some having UCS values up to 200 MPa. The Great Wall of China dyke zone is up to 25 m thick and although not directly tested, is also assumed to be very hard due to its strong magnetic trace. A plot of the dykes and plugs is appended to this table.

Coal Seams

General

Within the Dartbrook tenements, the 15 coal seams have been subdivided into a 110 individual coal plies that can be widely correlated across the area (Figure 5.2.1). Named coal seams comprise individual plies or combinations of plies with associated non-coal partings. As is typical of the Wittingham coal measures, seam splitting and coalescence are commonplace, and frequently develop rapidly, although splitting and coalescence trends are consistent between boreholes.

It should be noted that seam thickness is far more variable than the individual component ply thickness variation. The plies exhibit high consistency in thickness- often with local trends.

Coal seam stratigraphy and ply/split configuration and nomenclature are shown in the table below, which also shows the regional correlatives of the Dartbrook seam nomenclatures.

Typical seam splitting can be seen in the cross sections included in Figures 14-16. The seams generally dip gently to the north-west, ranging from three to six degrees. Local variation of up to 15 degrees have been

identified, and are generally interpreted as being due to clastic wedging, seam splitting and differential compaction. The uppermost seam, the Whynot, sub crops in the extreme west of EL4574 and EL5525 with the lower seams sub cropping progressively to the east.













Structure

The Dartbrook coal resources are located on the western side of the Muswellbrook Anticline. The NW trending Aberdeen Thrust is located approximately 3km to the east of the area. The area could be described as structurally benign with gentle dips and few significant faults. Dips range from 3 to 6 degrees. Steeper dips are due to differential compaction around clastic wedges.

Fault trends are NW and ENE. The few faults in the area are detailed as follows:

The Kayuga Fault Zone and its North-Western Branch have been indicated by seismic surveying and drilling as well as having been recorded in workings and should therefore be considered to be of high confidence, at least as far north as the Roman Road Dyke.

The WNW Fault Zone, passing just north of the Kayuga Plug, has been recorded in workings and should therefore be considered to be of high confidence.

The two NW-SE trending faults interpreted between the Roman Road Dyke and the Great Wall of China Dyke appear to have been interpreted from drilling and should therefore be considered to be of low to medium confidence. Note that dykes appear to favour the NE trending faults. Apart from the 2 large dykes several thin NE trending dykes have been intercepted in underground workings and appear to intrude along small faults. A structure contour plot of the floor of the WUC1 ply is appended to this table.

Coal Quality

Coals at Dartbrook can be classed as high volatile bituminous coal. It is slightly lower in rank than the coals to the south in the Hunter Valley. The raw coal inherent moisture ranges from 2.0% to 8.0% averaging 4.3%.

The coal will require beneficiation for export markets. It is able to produce a range of Thermal coal products between 10 to 18% Ash adb. There is potential to produce an 8% ash adb PCI product from the Kayuga and Piercefield seams.

The following table presents the weight averaged raw and washed coal qualities for Measured and Indicated Resources.

Seam Group	Insitu RD	Inheren t Moistur e %	Raw Ash %	Raw Total Sulphu r %	Raw Volatile Matter %	F1.60 Yield %	F1.6 0 Ash %	F1.60 Kcals/Kg
Blakefield	1.39	6.4	16.2	0.34	29.0	-	-	-
Glen Munro	1.52	7.1	33.8	0.26	24.4	62.1	16.5	6,228
Woodlands Hill	1.47	7.0	25.5	0.31	27.9	74.7	12.4	6,584
Arrowfield	1.37	7.1	12.8	0.35	31.9	88.1	6.5	7,104
Bowfield	1.49	6.3	26.7	0.34	27.5	69.8	12.4	6,584
Warkworth	1.43	5.9	20.5	0.41	30.2	78.8	11.6	6,661
Mt Arthur	1.43	5.6	19.4	0.31	28.7	83.6	12.0	6,621
Kayuga	1.40	5.5	17.9	0.29	31.4	82.1	10.3	6,773
Piercefield	1.39	5.0	15.5	0.41	31.7	84.7	8.9	6,895
Vaux	1.46	4.8	23.6	0.36	28.2	74.8	11.9	6,631
Broonie	1.43	4.0	20.8	0.44	29.7	77.6	11.9	6,633
Bayswater A	1.41	3.9	17.5	0.38	29.2	85.2	12.0	6,620
Bayswater B	1.52	3.5	24.8	0.27	24.2	69.2	16.1	6,261
Wynn Upper	1.43	3.6	21.1	0.37	29.6	78.1	11.2	6,692
Wynn Lower	1.50	4.2	27.5	0.47	28.1	72.2	15.2	6,336
Edderton	1.52	3.8	29.8	0.41	28.5	67.4	15.8	6,286

Ply Weighted Average Qualities within the Measured and Indicated Resource Categories (Air dried basis)

Note that these qualities do not include the partings between plies that might be incorporated into a mining working section. As a result working section qualities will have higher ash and lower yield.

Drill hole information

Given the large amount of data as detailed in the following table- tabulation of all the drill hole locations and seam intercepts would overload this document with information of limited value. Instead, plots of the holes used for structural and quality modelling demonstrate the location and density of the drilling data.

Number	Details
1230	Total Number of Holes in Database excluding barren holes
774	Holes in used in Structural Model
352	Holes in used in Quality Model



Data aggregation methods

Relationship between mineralisatio n widths and intercept depths A number of contiguous coal seam samples have been composited on an industry standard length by density basis for Raw coal quality and length by density by yield basis for clean coal quality. Reported coal quality is for the ply only.

Tabulated coal thickness are downhole thicknesses. Coal resource modelling and estimation methods adjust for seam thickness versus the apparent thickness. Downhole deviation logs are used to calculate seam roof and floor positions in space. Seam structure modelling is based on triangulation of the structure roof and floor intercepts. Seam thickness is derived by structure roof minus floor models.

Diagrams	Most figures are embedded in the text of this table. Resource outline plots are appended to the end of this document. Due to the large number of plies (110) only one ply from each seam group is attached. No quality plots are presented - again due to the large number of plies. Instead the coal quality table above detailing the weighted average qualities on a ply basis provides a summary of the data.
Balanced	All data and geological information is reported on. Where data has not been used an explanation is provided
reportina	as to why the data has been excluded from the modelling and resource definition. Coal resources are reported
	by seam, confidence level (Measured, Indicated and Inferred) and in depth categories.
Other	2D seismic surveys as well as UG mine surveys supplement drilling to provide substantive definition of the
substantive	structure of the area. Magnetic surveys are used to delineate dykes and plugs. Gas, Geotechnical and
data	
Further	This resource is at the feasibility study stage. Further coal quality work may be required.
Work	

Section 3	Estimation and Reporting of Mineral Resources				
Criteria	Explanation				
Database integrity	Lithological logs, wireline geophysical logs, assay results and coal intersection depths have been reconciled in previous modelling and resource estimations. Spot checks of ply intercepts against geophysics indicate no systematic issues.				
Site visits	The competent person has not visited the site, however he has had previous experience with the Joint Coal Board in Singleton and performed the Order 27 (geological audit) on Dartbrook. The competent person has assessed and modelled other deposits in the Hunter Valley.				
Geological interpretation	The geological interpretation for this resource estimate is based in the integration of all drillhole and coal quality data. There is sufficient drilling data to allow an unambiguous interpretation of the area. The interpretation is consistent with previous work on the deposit.				
Dimensions	The dimensions of the Dartbrook resource are approximately 6.4 km along strike by 5 km downdip. The resource dips to the northwest and the lowest seam is ~520m deep in the west. The maximum depth to which resources are reported is 350m. Approximately 80% of these resources are shallower than 300m.				
Estimation and modelling techniques	Geological modelling and resource estimation has been carried out by the Competent Person using Version 9 of Maptek's VULCAN 3-D geological modelling software. The model is of the coal plies only (not working sections) and with waste modelled as a default. Ply structure modelling (20x20m grid) is based on triangulation of the structure roof and floor intercepts corrected for drill hole deviation. Seam				
	thickness is derived by structure roof minus floor models. Coal quality models (100x100m grid) are generated using the Inverse Distance Algorithm (Power =1, points =5).				
Moisture	Air dry Relative Density and Inherent Moisture are modelled from directly from analytical data for each ply. In situ Moisture is calculated using the seam average Moisture Holding Capacity in the In situ Moisture is calculated using the ACARP Report C10041 formula as follows:				
	In situ Moisture = 1.1431 x Moisture Holding Capacity (MHC) +0.348.				
	For an MHC of 8.0% the calculated average In situ Moisture is 9.5%.				
Cut-off parameters	The resources are viewed as amenable to open-cut mining techniques due to the low vertical strip ratio (<6:1 BCM waste to In situ Tonnes). Mining studies indicate that the seams are economic to mine within the next 10 years.				
	The western up-dip limit is the nominal pit boundary or the ply lox line.				
	The northern limit is set is the nominal pit boundary.				
	The down-dip limit is set by lease boundaries.				
	The southern limit is set by lease boundaries.				
	The nominal pit boundary is west of the limit of Alluvium and west of the Kyuga village. A plot showing the nominal pit area is appended to this table.				
	A minimum ply thickness of 0.3m has been applied where the ply is > 0.3m distant from the overlying ply.				
	A maximum raw ash of 45% has been applied.				

Mining factors or assumptions	A prefeasibility open-cut mining study on the deposit was carried out in August 2015 indicating the deposit is viable to open cut mining even at depths >300m. The assumed open cut mining method is overburden and coal removal by dragline, shovel and trucks.						
Metallurgical factors or assumptions	This coal resource estimation is based on the assumption that the coal will require beneficiation prior to export. It is expected that the coal will require the local standard plant configurations to allow export grade products to be produced.						
Environmenta I factors or assumptions	Resources are excluded from sensitive areas such as the Hunter River floodplain, Kayuga village and the northern most Exploration lease area.						
Bulk density	<i>In-situ</i> density is estimated using the Preston & Sanders formula. Air dry Relative Density and, Inherent Moisture are modelled directly from analytical data for each seam. In situ Moisture calculated from MHC as detailed previously.						
Classification	 Resource classification is based on the density of Coal quality Points of Observation (POB) and Structural POB. In this deposit the Coal quality POB have a lower density than the structure POB and thus are the principal delimiter of the resource classification. Quality variability is slightly greater than structural variability in this deposit. Both seam thickness and Raw ash have low coefficients' of variation generally in the order of 0.5. High confidence is placed on structural definition due to the benign structure. A quality point of observation for each ply is defined as a cored hole with coal recovery of >90 % and having raw ash data. Almost all raw ash data points have associated Float sink (F/S) ash yield data. Because of a strong correlation between raw ash and float yield and ash, any absent F/S data can be back calculated from raw ash. 						
	A quantit or fully co	y point of ob	servation for each ply is defined as a ply drill hole intercept with downhole ge The vast majority of structural holes have geophysics.	eophysics			
	Supporting data for coal continuity are holes with downhole geophysics and 2D seismic surveys over the The area has been underground mined providing direct evidence of the coal continuity in the mined se The structural geology is simple and the igneous geology is well understood.						
	Ply thickness contours indicate strong continuity and consistency with local trending. Significant effort has been put into detailed ply correlations across the deposit. The correlation is aided by good stratigraphic markers and facilitated by downhole geophysics and detailed core logging.						
	A characteristic of the seams in the Wittingham Coal Measures is the large degree of seam splitting leading to significant variation in seam thickness. In contrast, the component plies show high consistency in thickness with local trending. Ply thickness has a low coefficient of variation (indicating good consistency) as shown in the chart below.						
			Ply Thickness Coefficient of Variation				
			in descending stratigraphic order				
		3.50					
		0.50 3.00					
		of Varg					
		1.50					
		0.50 Coefficiency	asingthe langer of the				
	1 6 111 116 116 21 21 216 21 216 21 217 21 2101 2101 1101						
			Ply Sequence No top down				

Raw coal ash, whilst not as consistent as the ply thickness is still reasonably consistent with low coefficient of variation.



































