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GUNNEDAH PROJECT – JORC RESOURCE

Table 1 - Checklist of Assessment and Reporting Criteria (The JORC Code, 2012 Edition)

The following table provides a summary of important assessment and reporting criteria used for the Gunnedah 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.

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Section 1	Sampling Techniques and Data
Criteria	Explanation
<i>Sampling Techniques</i>	Wireline and conventional drill cores (from 305 holes). The coal seams are sampled roof to floor. All interseam stone bands are included. Intercept lengths and linear recovery are confirmed by wireline logging, where available.
<i>Drilling techniques</i>	4C core (100mm diameter). HQ Triple Tube core (61mm diameter). NQ Triple Tube core (45mm diameter). Percussion and rotary open hole methods.
<i>Drill sample recovery</i>	Linear core recoveries are estimated with reference to wireline logs and results of seam samples with less than 90% recovery were excluded from the model. Volumetric recoveries estimated by the analysis laboratory are also used to assess core recoveries. Chip samples were not used to assess coal quality. 4C and triple tube wireline coring is used to maximise sample recovery. There is no known relationship between coal quality and sample recovery.
<i>Logging</i>	Core and chip samples were logged by geologists experienced in coal resource investigation and evaluation. The standard and level of detail is considered appropriate for mineral resource estimation. All holes since 1975 were wireline logged if possible (ie not blocked). The minimum suite of logs is gamma, density, and calliper. All core was photographed digitally since 2006. Total aggregate length of cored holes in the geological model is 30,000m, in 305 drillholes. Total aggregate length of non-cored holes is 22,000m, in 301 drillholes.
<i>Sub-sampling techniques and preparation</i>	Full cores were used for coal quality testing. Chip samples were not used to assess coal quality. HQ, & 4C coring used to ensure sample is representative, and that sufficient material is available for sub-samples. Sample preparation, sub-sampling and quality control procedures were ensured by using labs following Australian Standards for coal testing. Since 1980 sample preparation, sub-sampling and quality control procedures ensured by using NATA accredited commercial labs employing recognised QA procedures and following Australian Standards for coal testing. HQ & 4C coring used to ensure that sufficient mass and particle numbers are available for representative sub-samples. Linear and volumetric core recoveries are recorded and results of seam samples with less than 90% recovery were excluded from the model.
<i>Quality of assay data and laboratory tests</i>	Sample preparation, sub-sampling and quality control procedures ensured by following Australian Standards for coal testing. Samples were split and reserves retained where sufficient mass remained after testing. Coal quality was not estimated from geophysical measurements. Standards, blanks, duplicates, external laboratory checks have not been used by WHC or previous operators. Acceptable levels of accuracy and precision are maintained by using commercial labs that are regularly benchmarked by external auditors against ISO 17025. These labs employ regular internal and external blind proficiency programs to provide a demonstration that results are controlled (may not have occurred for historic testing).
<i>Verification of sampling and assaying</i>	Coal intersections used in the geological model were verified by geophysical measurements obtained by wireline logging, carried out by an independent contractor, and more recently by digital photographs.

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	Coal intersection depths and seam correlations have been validated by independent reviewers/auditors and/or alternative company personnel (Database Geologist). Twinned holes are not used. Data acquisition and verification protocols are as per Whitehaven Coal procedures. Drillhole collar, lithology and basic raw coal quality data is stored in a LogCheck database and exported to Ventyx Minescape for modelling. Source field records, lab reports, core photographs, survey data etc are stored in electronic form on the Whitehaven Coal network, and hard copy in borehole folders at the company's Gunnedah office. The moisture basis of coal quality data may have been adjusted to an air-dried basis. Values stored in the digital database are on an air dried basis.
<i>Location of data points</i>	Borehole collars were surveyed by a Registered Surveyor, using triangulation or dGPS RTK methods. Surveyor's Reports are not available for some boreholes, however every effort was made to verify borehole locations from old reports etc. Some older boreholes were located using distance and bearing from cadastral markers. The grid system used is the Map Grid of Australia 1994 (MGA94) based on the Geocentric Datum of Australia 1994 (GDA94) values. Older survey data may have been converted from ISG. Topographic control is a combination of NSW Department of Lands gridded data and aerial photogrammetric surveys. A 25m digital terrain model was patched together using these datasets.
<i>Data spacing and distribution</i>	Many boreholes intersect only part of the sequence ie were spudded stratigraphically below one or more seams, or were not drilled deep enough to intersect lower seams. Borehole spacing therefore needs to be considered on a seam-by-seam basis. Cored holes (coal quality data points) are spaced at widely varying distances but generally <500m in the shallow areas and more than 1000m in deeper areas. The data spacing and distribution is considered by the Competent Person to be sufficient to establish the degree of geological and grade continuity appropriate for the Mineral Resource and Ore Reserve estimation procedure(s). Where coal intersections have been sampled in multiple sections per seam, compositing of samples, on a length x RD basis, has been applied.
<i>Orientation of data in relation to geological structure</i>	Industry standard vertical drilling has been used to sample stratiform coal seams. The orientation of data in relation to geological structure is not believed to have introduced any sampling bias.
<i>Sample security</i>	Core samples were either delivered to the lab by the field geologist or collected by lab personnel.
<i>Audits or reviews</i>	The borehole database was independently audited in 2014, prior to preparation of this resource estimate. An entirely new drillhole database (LogCheck) was created and validated by the WHC Database Geologist, assisted by external geological personnel.

Section 2	Reporting of Exploration Results
Criteria	Explanation
<i>Mineral tenement and land tenure status</i>	Consolidated Coal Lease 701 (the former Gunnedah colliery) was originally granted on 16 March 1989, as an amalgamation of a number of previous titles granted under prior legislation. CCL701 was last renewed on 6 May 2009, and expires on 19 February 2022. Mining Lease 1624 (the Sunnyside mine) was granted on 5 November 2008 for a term of 21 years. Mining Lease 1680 (Brickworks) was granted in 2012 for the purposes of coal

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	<p>washery reject emplacement. Currently there is no mining taking place on either mining lease. Mining on CCL701 ceased in 2000, and on ML1624 in 2012. Approvals for washery reject disposal are in place for CCL701. There is a current Project Approval and Mining Operations Plan (MOP) for ML1624. A new MOP for care and maintenance activities is in preparation. EL5183 (Rosmar project) was granted on 23 December 1996, and is current until 22 December 2015. Land in the Sunnyside and Rosmar areas is owned by Whitehaven Coal or its subsidiaries. The remainder of the area is crown land or freehold land owned privately or by pastoral companies. There is a native title claim by the Gomeroi people over most of central northern NSW. This only affects travelling stock routes and unutilised crown land.</p>
<i>Exploration done by other parties</i>	<p>Gollin/Joint Coal Board undertook early corehole exploration starting in the late 1960s. Newcastle Wallsend carried out drilling and geophysical programs from 1976 to 1981. Australian Mining Investments Limited became operators in 1985 and continued exploration drilling in the Melville Open Cut. Namoi Mining Pty Ltd precursors Gunnedah Coal Company acquired the mine in 1997 and carried out exploration in EL5183 in 1997, in “Block 7” in 1997 – 1998 and in the Brickworks open cut in the late 1990’s.</p>
<i>Geology</i>	<p>The coal is contained within the Black Jack Group in the Gunnedah Basin. Multiple coal seams dipping gently from subcrop at near-surface weathering horizon. The strata are commonly intruded by igneous material, which has had a variable effect on the coal ranging from slight devolatilisation to cindering, to displacement and replacement.</p>
<i>Drill hole information</i>	<p>There are 1031 drillholes in the Gunnedah Project database. Of which, 606 drillholes were used for geological modelling and 212 used as coal quality points of observation. A number of historical holes have been excluded from the evaluation as their exact location could not be verified. The competent person does not believe that exclusion would detract from the understanding of this coal deposit.</p>
<i>Data aggregation methods</i>	<p>Coal intersections may have been sampled in multiple sections per seam, so compositing of samples, on a length x RD basis, may have been applied. Where quoted coal quality was for the full seam, or the underground working section at the base of the Hoskissons Coal. Grade cutoffs have not been applied to exploration results in the database. Generally, carbonaceous material in excess of 40 – 50% ash is recognised in the field and sampled separately. Where available, analyses in excess of the resource cutoff may be included in modelled data.</p>
<i>Relationship between mineralisation widths and intercept depths</i>	<p>All drillholes were (nominally) vertical. Coal thicknesses are for downhole intercept lengths, which may have been exaggerated slightly by seam dips. Coal resource modelling and estimation takes this effect into account.</p>
<i>Diagrams</i>	<p>Maps are included at the end of this table.</p>
<i>Balanced reporting</i>	<p>There is no preferential reporting of results.</p>
<i>Other substantive exploration data</i>	<p>Geotechnical, groundwater and geophysical studies have been completed and reported elsewhere.</p>
<i>Further Work</i>	<p>Additional cored holes will be required to increase confidence in grade continuity for some areas. Additional loxline drilling will be required in some areas.</p>

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Section 3	Estimation and Reporting of Mineral Resources
Criteria	Explanation
<i>Database integrity</i>	Borehole collar locations and RL's were checked against surveyors' reports, field records, record tracings (distance & bearings) and the DTM. Lithological logs and coal intersection depths were reconciled with wireline logs where available. Coal quality data were cross-checked against lab reports and sample depths were correlated with the lithological database. Validation and entry of data is per WHC Procedures. All survey, lithological and basic raw coal quality data are compiled in a Logcheck CoalLOG database.
<i>Site visits</i>	The Competent Person's most recent visit was on 3 August 2014.
<i>Geological interpretation</i>	The geological interpretation is based on reports from the mine, surface mapping of outcrop, and borehole data. The drillhole database is extensive and an alternative interpretation is unlikely. The main factors affecting coal seam continuity are the interplay of seam dip, depth of weathering and surface topography which determines seam subcrop, and igneous intrusions. Seams show good continuity of grade. Seam specific influences include the consistent, predictable thickening of the lowermost stone ply within the Hoskissons Coal and associated thinning of the underground working section. Locally developed stone lenses are mainly responsible for the bullseyes in the raw ash.
<i>Dimensions</i>	The dimensions of the total project area are 15km x 12km, and the maximum depth to the Hoskissons Coal is approximately 300m on the southern boundary of CCL701, and to the Melville Coal about 360m.
<i>Estimation and modelling techniques</i>	The geological model was developed by the Competent Person, using Ventyx Minescape software. A full description of the modelling process and parameters is included in the main body of the Report. The current estimate supersedes previous Reports dated 2009 and 2010. There is a documented history of resource reports for the Gunnedah Project dating back to 1983. There are no known deleterious elements of economic significance. Full coal thickness roof to floor is modelled for all seams. Selective mining of the Hoskissons Coal base underground is contemplated subject to metallurgical coal export market conditions. The deposit is sufficiently characterised by drilling to allow the chosen modelling parameters to operate freely without interpreted geological controls such as dummy boreholes or extrapolated survey data. The resource model is cut by either the base of weathering grid or the mined surface. Acquisition, validation and entry of data is per WHC Procedures. The geological model is validated by generating and inspecting reports, tables, cross sections, contour plans and comparisons with posted drillhole values.
<i>Moisture</i>	In situ moisture has been estimated at 9% and coal density used for resource estimation has been adjusted accordingly using the Preston & Sanders methodology. In situ moisture (Mis) was estimated for each seam using the "Meyers" model based on non-linear multivariable analysis (Meyers et al 2003). Air dried moisture averages 3.5% for coal seams in the Gunnedah area. The basis of the tonnage estimate is Mis. Run-of Mine total moistures for the Sunnyside Mine were 9%.

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<i>Cut-off parameters</i>	Coal tenement boundaries, Coal extraction boundaries as at 30 June 2014, Subcrop against base of weathering, Minimum coal thickness for open cut coal is 0.2m. Minimum coal thickness for underground coal is 1.8m, Maximum overburden ratio for opencut coal was determined and used to identify the boundary between opencut and underground resources.
<i>Mining factors or assumptions</i>	An Opencut and Underground mining scoping study completed for the Project by Encompass Mining Consultants is of a conceptual nature only.
<i>Metallurgical factors or assumptions</i>	Only raw coal variables are modelled for this resource report. Laboratory float/sink data for all seams are available. There is also contemporary (in the present Gunnedah CHPP) and historical experience of washing the Hoskissons Coal, and historical experience of washing the Melville seam. Both seams contain a proportion of near-gravity material.
<i>Environmental factors or assumptions</i>	Project Approval and the necessary environmental licences are in place for ML1624 only. No other environmental factors or assumptions have been considered.
<i>Bulk density</i>	In situ density estimated using the Preston & Sanders formula and an estimated in situ moisture of 9%.
<i>Classification</i>	The basis for classification of resources are the maximum distances from a coal quality point of observation recommended in the Australian Guidelines For Estimating And Reporting Of Inventory Coal, Coal Resources And Coal Reserves (2003). The use of these distances is moderated by factors such as geological continuity. The result reflects the Competent Person's view of the deposit.
<i>Audits or reviews</i>	Mr Benjamin Thompson has reviewed the resource estimate.
<i>Discussion of relative accuracy/confidence</i>	An informed but qualitative judgement of the accuracy of the global resource estimate, is that it is generally within +/-25% confidence limits.

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