Narrabri Coal Mine
Stage 2 Longwall Project
Non-Indigenous Heritage Assessment

Prepared by:
Archaeological Surveys & Reports Pty Ltd

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Level 1, 12 Dangar Road
PO Box 239
BROOKLYN NSW 2083
Tel: (02) 9985 8511
Fax: (02) 9985 8208
Email: brooklyn@rw corkery.com

On behalf of:  Narrabri Coal Operations Pty Ltd
Level 9, 1 York Street
PO Box R1113
SYDNEY NSW 1225
Tel: (02) 8507 9700
Fax: (02) 8507 9701
Email: thaggarty@whitehaven.net.au

Prepared by:  John Appleton
Archaeological Surveys & Reports Pty Ltd
16 Curtis Avenue
ARMIDALE NSW 2350
Tel: 02 6772 6512
Fax: 02 6772 4567
Mobile: 0428 651 789
Email: japples@northnet.com.au
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EXECUTIVE SUMMARY

This assessment was performed for R.W. Corkery & Co. Pty Limited (RWC) on behalf of Narrabri Coal Operations Pty Ltd (NCOPL). NCOPL has contracted R.W. Corkery & Co. Pty Limited (RWC) to prepare an Environmental Assessment to support its application for project approval for Narrabri Coal Mine Stage 2 Longwall Project (the “Longwall Project”) as a Major Project under Part 3A “Major Projects” of the Environmental Planning & Assessment Act 1979 (EP& A Act). NCOPL is a joint venture between Narrabri Coal Pty Ltd, Upper Horn Investments (Australia) Pty Ltd, J-Power, EDF Trading and a Korean consortium consisting of Daewoo and Kores. Narrabri Coal Pty Ltd is a 100% subsidiary Company of Whitehaven Coal Limited, which is a publicly listed Company.

The Narrabri Coal Mine is approximately 30km south-southeast of Narrabri and 10km north-northwest of Baan Baa, on the north-western slopes of the Northern Tablelands in New South Wales. Approval for the Narrabri Coal Mine (Stage 1) (Project Approval (PA) 05_0102) was granted by the Minister for Planning on 13 November 2008 following a previous archaeological investigation of the Mine Site Pit Top Area by Australian Archaeological Survey Consultants Pty Ltd (AASC, 2007), prepared to support an Environmental Assessment and project application for the Narrabri Coal Mine.

In this report, the Mine Site corresponds with ML 1609 and the Mining Area corresponds with the total area overlying and corresponding with the proposed 26 longwall panels to be mined over the projected life of 27 years of the mine.

RWC engaged Archaeological Surveys & Reports Pty Ltd (ASR) to undertake an assessment of the non-Indigenous (“European”) structures and relics within the Mine Site and a pipeline corridor to the Mine Site to identify sites and/or places of heritage significance and to provide recommendations, to manage all archaeological sites identified.
INTRODUCTION

This investigation was performed for R.W. Corkery & Co. Pty Limited (RWC) on behalf of Narrabri Coal Operations Pty Ltd (NCOPL). NCOPL has contracted R.W. Corkery & Co. Pty Limited (RWC) to prepare an Environmental Assessment to support its application for project approval to increase production at the Narrabri Coal Mine through the introduction of longwall mining (the “Longwall Project”) under Part 3A of the Environmental Planning and Assessment Act 1979 (EP&A Act). NCOPL is a joint venture between Narrabri Coal Pty Ltd (70%), Upper Horn Investments (Australia) Pty Ltd (7.5%), J-Power (7.5%), EDF Trading (7.5%), a Korean consortium consisting of Daewoo (5%) and Kores (2.5%). Narrabri Coal Pty Ltd is a 100% subsidiary Company of Whitehaven Coal Limited, which is a publicly listed Company. The Narrabri Coal Mine is approximately 30km south-southeast of Narrabri and 10km north-northwest of Baan Baa, on the north-western slopes of the Northern Tablelands in New South Wales (see Figure 1).

Approval for the Narrabri Coal Mine (Stage 1) (Project Approval (PA) 05_0102) was granted by the Minister for Planning on 13 November 2008 following a previous archaeological investigation of the Mine Site Pit Top Area by Australian Archaeological Survey Consultants Pty Ltd (AASC, 2007), prepared to support an Environmental Assessment and project application for the Narrabri Coal Mine. PA 05_0102 approves the mining (by continuous miner) and rail transport of up to 2.5 million tonnes of ROM coal per year for a period of 21 years from the granting of a mining lease. The Pit Top Area (of 757ha) encompasses all surface infrastructure except for the disturbance associated with mine ventilation and gas drainage. The Pit Top Area includes the site access road, the rail loop, the ROM and product coal pads, coal handling and preparation facilities (including a coal preparation plant), initial ventilation shaft area, reject emplacement area, brine storage ponds, box cut and drift portals, and all surface building and service infrastructure.

Background and Scope

NCOPL proposes to convert the approved Stage 1 Narrabri Coal Mine from a continuous miner operation (with an approved annual production rate of 2.5Mtpa) to a longwall mining operation with a maximum annual production rate of 8Mtpa. Figures 2 and 3 identifies the critical surface and underground components of the proposed longwall mining operation, differentiating between those activities or infrastructure already approved for the Stage 1 operations and those proposed for the Stage 2, longwall operations.

Figure 2 displays the location of the area to be mined by longwall mining methods, referred throughout this report as the “Mining Area”. The Mining Area has been divided into 26 panels referred to as Longwall Panels 1 to 26. Detailed assessment of heritage (both Indigenous and Non Indigenous) initially focussed on the first seven longwall panels (Longwall Panels 1 to 7) with further survey subsequently undertaken over the remaining panels (Longwall Panels 8 to 26).

The Mine Site corresponds with Mining Lease (ML) 1609 and covers an area of 5,210ha. It is noted that with the exception of the brine storage ponds, all of the additional Pit Top Area disturbance identified on Figure 3, along with the initial Ventilation Shaft Area, occurs within an area surveyed and assessed by AASC (2007).
Figure 3
PIT TOP AREA LONGWALL
PROJECT COMPONENTS

REFERENCE
Mine Site Boundary
Pit Top Area Boundary
Contour (m AHD)(Interval = 2m)
Creek / Drainage Line
Sealed Road
Unsealed Road / Track
Approved Disturbance within the Pit Top Area
Area of Proposed Longwall Project Surface Disturbance
Initial Brine Storage Pond
Power Line
Water Pipeline Route

Notes:
1. Modified from Stage 1 Boundary
2. Initial 3 Brine Storage Ponds (42ha) provide for sufficient Brine Storage for base case (most likely) groundwater in-flow (and therefore brine generation) predictions.

SCALE 1:25 000

Note: A colour version of this figure is available on the Project CD
The Longwall Project requires additional surface disturbance beyond the areas surveyed by AASC (2007). These areas, which are identified on Figure 2, include the following.

- **Ventilation Shaft Areas.** Sites for the construction and operation of ventilation fans. The current mine design has provided for up to four intake or exhaust fan sites above the West Mains of the underground mine and rear of panel exhaust sites every three to four longwall panels. Each Ventilation Shaft Area would cover an area of up to approximately 5ha.

- **Gas Pre-drainage Sites.** Sites from where medium radius drill holes are bored from surface into and along the coal seam and intersected by a gas pumping well to drain the gas contained within the coal seam prior to mining. The combined area of disturbance associated with each pre-drainage site would be approximately 3.5ha and there would be either two or three pre-drainage sites over each longwall panel (depending on the length of the panel).

- **Goaf Gas Drainage Sites.** Gas concentrating in the goaf of the underground workings would be removed via a vacuum pump attached to the top of a cased 250mm internal diameter borehole. The boreholes would be drilled from surface, at roughly 200m intervals and would therefore require the creation of a drill pad of approximately 50m x 50m dimensions.

- **Access Roads and Service Corridors.** A road and service corridor of approximately 10m in width would be constructed along the tailgate side of each longwall panel along the alignment of the goaf gas drainage sites.

- **Power Line Corridor.** A corridor of approximately 30m wide would be required for the construction of powerlines to service the ventilation fans.

Following a review of the dewatering requirements of the Longwall Project, NCOPL advised that a Brine Storage Area of up to 160ha in area could be required to store the waste water (brine) produced by the reverse osmosis treatment of this water (see Figure 3). In addition, a pipeline would be required to transfer and discharge the surplus fresh water (raffinate) produced by the reverse osmosis treatment of this water (see Figure 4). The scope of the archaeological investigations was subsequently extended to include a detailed archaeological investigation of the designated Brine Storage Area and proposed water pipeline route between the mine and the Namoi River.

### 1.2 Scope, Objectives and Report Format

#### 1.2.1 Scope

The scope of works was for ASR to undertake an investigation of the Mining Area, the additional disturbance areas of the Pit Top Area and the proposed water pipeline route between the Mine Site and the Namoi River to identify any sites and relics of non-indigenous heritage significance that might be present within the Survey Areas. The results of the investigation were to be presented in a report, which was to include an assessment of the significance of any cultural relics or places identified, an appraisal of the options and opportunities arising from the discoveries, and clear recommendations for the management of those cultural resources.

#### 1.2.2 Report Objectives

The objectives of this report are to describe the investigation of the various survey areas and to record the archaeological relics and sites that were identified. Further, the report documents the recommendations as to the future management of the site identified during the investigation. Finally, the report includes a statement as to the recommendations for the future development of Narrabri Coal Mine.
1.2.3 Report Format

The report is presented in the following format:

i  Executive summary
ii  Contents
1.  Introduction
2.  The Environmental Context
3.  The Searches
4.  The Surveys
5.  The Results
6.  Assessing Heritage Significance
7.  Statement of Heritage Significance
8.  Recommendations.

1.3 THE MINE SITE, MINING AREA AND SURVEY AREAS

The Narrabri Coal Mine is located approximately 30km south-southeast of Narrabri and 10km north-northwest of Baan Baa, on the north-western slopes of the Northern Tablelands in New South Wales. In this report the Mine Site corresponds with ML 1609, the Mining Area corresponds with the total area overlying and corresponding with the proposed 26 longwall panels to be mined over the projected 27 year life of the mine.

The Mining Area occurs over a number of properties, the majority of which are owned by NCOPL. As noted previously, survey was initially undertaken concurrently with an Indigenous heritage survey over Longwall Panels 1 to 7 and surrounds. Subsequently, the remainder of the Mining Area was surveyed, along with the proposed areas of disturbance associated with the Brine Storage Area and water pipeline route (also concurrently with the Indigenous heritage survey). Figure 5 identifies the survey areas (with the Longwall Panel 8 to 26 survey area sub-divided further on the basis of landform and vegetation type).

1.4 POTENTIAL IMPACTS OF THE LONGWALL PROJECT

Two sources of potential impact to the archaeological and cultural record have been identified as being associated with the proposed Longwall Project, namely:

- clearing associated with drilling and operation of ventilation, pre-drainage and goaf gas drainage sites (and associated access and power line corridor construction); and
- surface subsidence resultant from the longwall mining method.

Both effects are complex and technical but for the purposes of this review they have been reduced to simple issues.
Construction and Operation of Gas Drainage Sites and Ventilation Shaft Areas

Tests conducted by GeoGas Pty Ltd established that gas composition within the mine varies considerably (RWC, 2009). As a consequence, it will be necessary to install a comprehensive mine ventilation system to manage seam gas generated within the mine and to provide a safe working environment for the mine’s workforce. To achieve this outcome, gas within the coal seam will have to be pre-drained, gas accumulating within the collapsed goaf of each completed longwall panel removed and the mine ventilated.

Gas pre-drainage would require a number of medium radius drilling Surface to In-seam (SIS) boreholes to be drilled (across the width of each longwall panel) into and then along the length of the coal seam. An area of approximately 80m x 80m would be required for each SIS Borehole Drill Site (0.64ha), however, as with other surface drilling sites, mature trees and other vegetation would be retained where practicable within each site. At the extremity of each set of SIS boreholes, a vertical pump well would be constructed to intersect each SIS borehole. The current pre-drainage arrangement provides for seven pump wells at each Gas Production Site, requiring an area of approximately 2.9ha. On the basis that three Pre-Drainage Sites would be required for Longwall Panels (LW) 3 to 24, and two would be required for LW1, LW2, LW25 and LW26, the total area of disturbance would be up to 259ha (66.5ha of which would be incurred within the Panels 1 to 7 Survey Area).

A conceptual goaf drainage design has 250mm internal diameter cased boreholes located about 30m off the tailgate corner of the active goaf at approximately 200m intervals. To provide access for the drilling rigs and vehicles, as well as pipelines and other services, a corridor of 10m would be required between each goaf gas drainage hole. Up to 400 goaf gas drainage sites would be required over the Mining Area, requiring surface disturbance of up to 100ha.

Ventilation shafts of up to 6m in diameter would be constructed to provide for air intake to or ventilation from the underground workings. The preferred construction technique is as blind bores, i.e. bored from the surface into the underground workings to depths of between approximately 170m and 320m below surface. The technique involves the drilling of the shaft to the coal seam prior to the development of the roadways in the coal with these roadways intersection the shafts after their final completion. The construction area for each Ventilation Shaft Area would be of maximum dimensions 200m x 250m (5.0ha). The location and number of surface ventilation locations is based on a conservative assessment of ventilation requirements and is therefore likely to provide for more ventilation capacity than may be required, i.e. the number of surface ventilation points, and therefore area of surface disturbance is unlikely to exceed that illustrated on Figure 2. Figure 2 provides for ventilation from the West Mains from Maingates 2, 7 and 8, and rear of panels LW2, LW5, LW9, LW12, LW14, LW19 and LW21. Therefore, on the basis that each of the West Mains ventilation shaft area would disturb up to 5.0ha, and the rear of panel ventilation up to 0.25ha, up to 17.0ha of the Mine Site would be disturbed to accommodate the ventilation requirements of the Longwall Project over the life of the mine.

It is worthy of note that the estimated areas of disturbance provided for represents a maximum area of disturbance. NCOPL would reduce, or consolidate areas of disturbance associated with other activities (eg. access roads).

There is a potential for any archaeological contexts occurring within the footprint of any of the impacts described above, to be severely impacted upon.