

Tarrawonga Coal Mine Modification

ENVIRONMENTAL ASSESSMENT

April 2010



ResourceStrategies

TABLE OF CONTENTS

<u>Section</u>	<u>Page</u>
EXECUTIVE SUMMARY	ES-1
1 INTRODUCTION	1-1
1.1 PROJECT OVERVIEW	1-1
1.1.1 Purpose of this Report	1-1
1.1.2 Background	1-1
1.1.3 Project Summary	1-1
1.1.4 Project Snapshot	1-5
1.1.5 Land Use, Tenure and Zoning	1-7
1.1.6 Proponent	1-7
1.2 STRUCTURE OF THIS DOCUMENT	1-7
1.3 CONSULTATION	1-11
2 PROJECT DESCRIPTION	2-1
2.1 DESCRIPTION OF THE APPROVED TARRAWONGA COAL MINE	2-1
2.1.1 Coal Resource and Mining Method	2-1
2.1.2 On-site Coal Crushing, Screening and Stockpiling	2-2
2.1.3 Off-site Transport of Coal	2-4
2.1.4 Water Management and Water Supply System	2-4
2.1.5 Waste Management	2-6
2.1.6 Other Mine Infrastructure and Service Facilities	2-6
2.1.7 Workforce	2-7
2.1.8 Environmental Management and Monitoring	2-7
2.1.9 Rehabilitation	2-10
2.1.10 Complaints Record	2-11
2.2 DESCRIPTION OF THE PROPOSED MODIFICATION	2-11
2.2.1 Additional Coal Resource and Open Cut Extension	2-11
2.2.2 Project General Arrangement	2-11
2.2.3 Overburden Emplacements and Topsoil Management	2-11
2.2.4 Mining Equipment	2-15
2.2.5 Additional Hardstand/Infrastructure Areas	2-16
2.2.6 Coal Processing Hours	2-16
2.2.7 Water Management System	2-16
3 PLANNING FRAMEWORK AND PROJECT JUSTIFICATION	3-1
3.1 EXISTING TARRAWONGA COAL MINE APPROVALS	3-1
3.2 ENVIRONMENTAL PLANNING AND ASSESSMENT ACT, 1979	3-1
3.2.1 Existing Development Consent	3-1
3.3 OTHER APPLICABLE PLANNING INSTRUMENTS AND STATUTORY APPROVALS	3-3
3.3.1 Other Planning Instruments	3-3
3.3.2 State Environmental Polices	3-4
3.3.3 Other Statutory Approvals	3-8
3.4 PROJECT JUSTIFICATION	3-9
3.4.1 Consideration of Project Alternatives	3-9
3.4.2 Ecologically Sustainable Development Considerations	3-10
3.4.3 Consideration of the Project Against the Objects of the EP&A Act	3-11
4 ENVIRONMENTAL ASSESSMENT	4-1
4.1 CLIMATE	4-1
4.2 LAND RESOURCES	4-4
4.2.1 Existing Environment	4-4

TABLE OF CONTENTS (Continued)

	4.2.2	Potential Impacts	4-12
	4.2.3	Mitigation Measures and Management	4-14
4.3		VISUAL CHARACTER	4-15
	4.3.1	Existing Environment	4-15
	4.3.2	Potential Impacts	4-16
	4.3.3	Mitigation Measures and Management	4-21
4.4		NOISE AND BLASTING	4-22
	4.4.1	Existing Environment	4-22
	4.4.2	Potential Impacts	4-26
	4.4.3	Mitigation Measures, Management and Monitoring	4-31
4.5		AIR QUALITY	4-32
	4.5.1	Existing Environment	4-33
	4.5.2	Potential Impacts	4-36
	4.5.3	Mitigation Measures, Management and Monitoring	4-37
4.6		GREENHOUSE GAS GENERATION	4-37
	4.6.1	Modified Tarrawonga Coal Mine Greenhouse Gas Emissions	4-37
	4.6.2	Mitigation Measures, Management and Monitoring	4-39
4.7		ABORIGINAL HERITAGE	4-39
	4.7.1	Existing Environment	4-39
	4.7.2	Potential Impacts	4-43
	4.7.3	Mitigation Measures and Management	4-44
4.8		EUROPEAN HERITAGE	4-45
4.9		SURFACE WATER	4-45
	4.9.1	Existing Environment	4-46
	4.9.2	Potential Impacts	4-47
	4.9.3	Mitigation Measures, Management and Monitoring	4-48
4.10		GROUNDWATER	4-51
	4.10.1	Existing Environment	4-52
	4.10.2	Potential Impacts	4-56
	4.10.3	Mitigation Measures, Management and Monitoring	4-57
4.11		BIODIVERSITY	4-57
	4.11.1	Existing Environment	4-57
	4.11.2	Potential Impacts	4-63
	4.11.3	Measures to Avoid or Mitigate Impacts	4-65
	4.11.4	Offsets	4-67
4.12		HAZARD AND RISK	4-73
	4.12.1	Existing Measures	4-73
	4.12.2	Hazard Identification and Risk Assessment	4-75
	4.12.3	Hazard Prevention and Mitigation Measures	4-75
4.13		TRANSPORT	4-75
	4.13.1	Existing Environment	4-75
	4.13.2	Potential Impacts	4-76
	4.13.3	Mitigation Measures, Management and Monitoring	4-76
4.14		SOCIAL AND ECONOMIC ASPECTS	4-76
5		REHABILITATION	5-1
	5.1	REHABILITATION OBJECTIVES	5-1
	5.2	FINAL LANDFORM	5-2
	5.3	DECOMMISSIONING ACTIVITIES	5-3
	5.4	FINAL LAND USE	5-4
	5.5	GENERAL REHABILITATION PROCEDURES	5-5
	5.5.1	Vegetation Clearing	5-5
	5.5.2	Soil Management	5-5
	5.5.3	Overburden Placement and Shaping	5-5
	5.5.4	Drainage Installation	5-5
	5.5.5	Revegetation	5-6

TABLE OF CONTENTS (Continued)

	5.6	REHABILITATION MONITORING	5-6
6		CONCLUSION	6-1
7		REFERENCES	7-1

LIST OF TABLES

Table 1-1	Comparison of the Approved Tarrawonga Coal Mine and the Modified Tarrawonga Coal Mine
Table 2-1	2008/2009 Tarrawonga Open Cut Mining Fleet
Table 2-2	Summary of the Tarrawonga Coal Mine Environmental Management and Monitoring Regime
Table 2-3	Mining Equipment for use at the Modified Tarrawonga Coal Mine
Table 3-1	Existing Tarrawonga Coal Mine Tenements, Licences and Approvals
Table 4-1	Historical Meteorological Data Summary
Table 4-2	Summary of Soil Mapping Units within ML 1579 and the Northern Section of the Coal Haulage Route
Table 4-3	Summary Description of Land Capability Classes within ML 1579
Table 4-4	Summary Description of Agricultural Suitability Classes within ML 1579
Table 4-5	Visual Impact Matrix
Table 4-6	Noise and Blasting Monitoring Compliance Summary
Table 4-7	Complaints Summary 2006 to 2010
Table 4-8	INP Project-specific Intrusive and Recommended Acceptable Amenity Assessment Criteria (dBA)
Table 4-9	Project Noise Impact Assessment Methodology
Table 4-10	Summary of Potential Exceedances under Adverse Meteorological Conditions
Table 4-11	Air Quality Assessment Criteria for Suspended Particulate Matter Concentrations
Table 4-12	Annual Average Dust Deposition Rates (g/m ² /month)
Table 4-13	Known Aboriginal Heritage Sites within ML 1579
Table 4-14	Summary of Proposed Modification Aboriginal Heritage Consultation/Survey Programme
Table 4-15	Water Collected in the Open Cut via In-Pit Sumps
Table 4-16	Observed Groundwater Levels in Monitoring Bores
Table 4-17	Groundwater Quality Benchmarks and Trigger Levels
Table 4-18	Threatened Fauna Species Recorded within ML 1579
Table 4-19	Migratory Species Recorded within ML 1579
Table 4-20	Vegetation Types within the Proposed Modification Area
Table 4-21	Profiles of Credits Required
Table 4-22	Approved and Modified Offset Strategy

TABLE OF CONTENTS (Continued)

LIST OF FIGURES

Figure 1-1	Regional Location
Figure 1-2	Originally Proposed Project Layout as Provided in the 2005 EIS
Figure 1-3	Proposed Modification to the Tarrawonga Coal Mine
Figure 1-4	Mining Tenements
Figure 1-5a	Land Ownership
Figure 1-5b	Relevant Land Ownership List
Figure 2-1	Existing Tarrawonga Coal Mine Layout and Water Management System
Figure 2-2	Environmental Monitoring Locations – Groundwater and Surface Water
Figure 2-3	Environmental Monitoring Locations – Air, Noise, Blasting and Meteorological
Figure 2-4	General Arrangement 2009-2010 – Monitoring Locations and Water Management System
Figure 2-5	General Arrangement 2010-2011 – Monitoring Locations and Water Management System
Figure 2-6	General Arrangement 2011-2012 – Monitoring Locations and Water Management System
Figure 4-1	Regional Topography
Figure 4-2	Local Geology
Figure 4-3	Land Geology – Typical Cross-sections
Figure 4-4	Existing View and Visual Simulations – “Jeralong” Property Boundary
Figure 4-5	Existing View and Visual Simulations – “Tarrawonga” Property Entrance
Figure 4-6	Existing View and Visual Simulations – “Blair Athol School House” Property Entrance
Figure 4-7	Predicted L_{Aeq} (15 minute) Night-Time Noise Contours
Figure 4-8	Predicted Air Quality Emissions from the Modified Tarrawonga Coal Mine
Figure 4-9	Previous Archaeological Survey Coverage and Aboriginal Cultural Heritage Sites within ML 1579
Figure 4-10	Archaeological Survey Coverage and Aboriginal Cultural Heritage Sites within ML 1579
Figure 4-11	Current and Project Water Management Schematic
Figure 4-12	Predicted Groundwater Drawdown from the 2005 EIS
Figure 4-13	Vegetation Types
Figure 4-14	Approved Final Land Use and Biodiversity Offsets
Figure 4-15	Proposed Final Land Use and Biodiversity Offsets

LIST OF APPENDICES

Appendix A	Geochemistry Assessment
Appendix B	Noise and Blasting Impact Assessment
Appendix C	Air Quality Impact Assessment
Appendix D	Surface Water Assessment

TABLE OF CONTENTS (Continued)

LIST OF APPENDICES (Continued)

Appendix E	Cultural Heritage Assessment
Appendix F	Biodiversity Assessment

EXECUTIVE SUMMARY

Background

The Tarrawonga Coal Mine is located within Mining Lease (ML) 1579 approximately 15 kilometres (km) north-east of Boggabri and 42 km north-northwest of Gunnedah in New South Wales (NSW). The Mine is owned and operated by Tarrawonga Coal Pty Ltd (TCPL), which is a joint venture between Whitehaven Coal Mining Pty Ltd (Whitehaven) (70%) and Idemitsu Boggabri Coal Limited (IBC) (30%).

The Tarrawonga Coal Mine was approved by the NSW Minister for Planning in November 2005 under Part 4 of the NSW *Environmental Planning and Assessment Act, 1979* (EP&A Act). The Development Consent allows for the construction and operation of an open cut coal mine, in-pit and out-of-pit overburden placement, coal crushing and screening on-site, and transportation of the crushed coal via road to Whitehaven's Coal Handling and Preparation Plant (CHPP) on the outskirts of Gunnedah. At the CHPP the coal is crushed and screened further, washed and then loaded onto trains for dispatch and sale to customers as a low ash, thermal and/or semi-soft coking coal.

Overview of the Proposed Modification

Improved market conditions since the Tarrawonga Coal Mine was approved have made mining of higher strip ratio coal economically viable. As a result, TCPL is seeking approval under Section 75W of the EP&A Act to modify the approved Tarrawonga Coal Mine Development Consent. The proposed changes to the Tarrawonga Coal Mine are described below.

- Extension of the open cut boundary to the east by up to approximately 600 metres (m), involving additional disturbance to an area of approximately 38 hectares (ha) within ML 1579.
- Increase in the total coal production from approximately 12.4 to 16.4 million tonnes (Mt).
- Increase in the total waste rock production from approximately 88.5 to 123.3 million bank cubic metres.
- Increase in the height of the Northern Emplacement from approximately 330 to 370 m Australian Height Datum.
- Extension of the Southern Emplacement by approximately 100 to 300 m to the south, into areas previously approved for topsoil stockpiles.
- Construction and use of a new soil stockpile area, involving additional disturbance to an area of approximately 21.2 ha.
- Construction and use of two small hardstand/infrastructure areas (i.e. 1.3 ha in total).
- Adjustments to the site water management structures and water storages.
- Adjustments to the hours of operation so that coal processing hours are the same as the approved open cut mining hours.

The proposal does not involve changes to the mining method, maximum production rate (up to 2 Mt per annum), mine workforce, or the life of the mine (i.e. 8 to 10 years). The proposed increase in coal production of approximately 4 Mt would generate additional economic benefits to the region and additional royalties to the State of NSW.

Environmental Assessment

The environmental factors relevant to the proposed Modification were identified based on TCPL's operational experience at the Tarrawonga Coal Mine and in the Gunnedah Basin, the results of environmental studies and monitoring in the region, the findings of previous environmental impact assessments, and consultation with regulatory authorities and other stakeholders. Comprehensive studies that have been conducted to assess the potential environmental impacts of the modified Tarrawonga Coal Mine include: visual, water, noise, air quality, biodiversity, geochemistry, and Aboriginal heritage.

The Environmental Assessment (EA) that accompanies the application under Section 75W of the EP&A Act (i.e. this document) describes and assesses the potential environmental impacts that could result from the modified Tarrawonga Coal Mine. The main identified impacts and how they relate to the components of the proposed Modification are summarised below.

- The proposed Modification would result in some changes to the final landforms at mine closure (i.e. the height of the Northern Emplacement would be increased by 30 m and the Southern Emplacement would extend a further 100 to 300 m to the south). From a visual amenity impact perspective, no significant impacts on nearby privately owned residences are predicted to occur either during operations or post-closure. The overall effect of the design changes on the local and regional landscape is not considered to be significant as the final slopes of the emplacements, their integration with the natural topography, and the size and location of the final void would remain the same as the approved operation.
- Geochemical testwork conducted in 2010 has confirmed that the overburden from the area between the eastern edge of the approved open cut and the eastern boundary of ML 1579 is geochemically consistent with overburden from the current open cut, which is non-acid forming. The overburden is not likely to contain any significantly enriched or soluble elements of potential environmental concern. TCPL would continue to manage overburden disposal in accordance with existing procedures.
- The existing operational water management system would be expanded to incorporate the additional disturbance areas associated with the proposed Modification. The new surface water management infrastructure would include additional sediment basins and storage dams, mine water dams, and associated diversion bunds and channels. The new infrastructure would be sized in accordance with the design criteria outlined in the Site Water Management Plan (SWMP). Design details, operational and monitoring requirements of the expanded water management system would be documented in an updated version of the SWMP. The potential impact of the modified Tarrawonga Coal Mine on flows in local creeks was assessed as being negligible.
- The approved Tarrawonga Coal Mine intersects low to very low yielding groundwater aquifers. A recently conducted independent review of groundwater monitoring concluded that the regional groundwater level drawdown in private bores and pit dewatering was within the range predicted in the 2005 Environmental Impact Statement and had not exceeded trigger levels nominated in the approved Groundwater Contingency Plan. Due to the relatively small extension to the open cut, the proposed Modification would not result in any additional significant impacts on groundwater resources during operations or post-closure. TCPL would continue to monitor groundwater levels and quality in accordance with the Groundwater Monitoring Program, and would identify and manage impacts in accordance with the Groundwater Contingency Plan.

- Noise modelling has been conducted for the modified Tarrawonga Coal Mine. Modelling included several iterations designed to determine feasible and reasonable noise mitigation measures. The final noise modelling results included a range of noise mitigation and management measures, for example:
 - installation of a 6 m high bund on the southern side of selected portions of the haul roads (generally where the haul roads run east-west);
 - installation of a real-time noise monitor at a nearby reference location and implementation of a trigger-level management system;
 - cessation of emplacement activities on the Southern Emplacement during evening and night-time periods, where required by real-time noise monitoring triggers; and
 - modification of the fleet during the evening and night-time periods.

During calm meteorological conditions, the predicted noise levels were predicted to comply with the relevant criteria, except for a minor (1 A-weighted decibel [dBA]) exceedance at one privately-owned receiver.

Noise levels were also predicted under adverse meteorological conditions, including various wind speeds and directions and temperature inversions. Predicted noise levels under adverse meteorological conditions are anticipated to exceed the criteria as follows:

- Marginal (1 to 2 dBA) exceedances at four privately-owned receivers (Noise Management Zone).
- Moderate (3 to 5 dBA) exceedances at four privately-owned receivers (Noise Management Zone).
- Appreciable (>5 dBA) exceedances at two privately-owned receivers (Noise Affection Zone).

For privately-owned receivers in the Noise Management Zone, TCPL would implement feasible and reasonable acoustical mitigation at receivers (which may include measures such as enhanced glazing, insulation and/or air-conditioning), in consultation with the relevant landowner, where noise monitoring shows noise levels which are 3 to 5 dBA above project-specific noise criteria.

For privately-owned receivers in the Noise Affection Zone, TCPL would implement feasible and reasonable acoustical mitigation at receivers and would negotiate agreements with landowners, where required. These negotiations have commenced with the relevant landowners.

The potential cumulative noise impacts associated with the proposed Modification and the Boggabri Coal Mine, located to the immediate north of the Tarrawonga Coal Mine, are predicted not to exceed the relevant criteria at any privately-owned receiver.

The blasting predictions indicate that vibration and air blast emissions would comply with the relevant human comfort and structural damage criteria at nearby privately-owned receivers. One Project-related receiver is predicted to exceed the building damage criteria for vibration.

- Air quality modelling has been conducted for the modified Tarrawonga Coal Mine. Annual average dust deposition due to the proposed Modification plus the assumed background level is predicted to not exceed the applicable criterion. Cumulative annual average particulate matter less than 10 microns in size (PM₁₀) and annual average total suspended particulate concentrations are also predicted to not exceed the relevant criteria. Predicted incremental 24-hour PM₁₀ concentrations (i.e. modified Tarrawonga Coal Mine only) are not predicted to be above the relevant criterion at any privately-owned receivers. Cumulative incremental 24-hour PM₁₀ concentrations (i.e. modified Tarrawonga Coal Mine plus background) are predicted to be below the relevant criteria for the majority of surrounding dwellings, but are predicted to exceed the criteria at one private residence. However, these exceedances are considered to be background-driven rather than mine-related. TCPL would continue to use on-site dust control measures to minimise impacts on air quality associated with the modified Tarrawonga Coal Mine.
- A Biobanking assessment has been prepared for this EA and has identified that the native vegetation that would be cleared by the proposed open cut extension consists of 36.8 ha of re-growth White Cypress Pine – Narrow-leaved Ironbark Shrub/Grass Open Forest of the Western Nandewar Bioregion. The area that would be disturbed by the proposed soil stockpile is derived grassland devoid of trees and has a history of grazing and cultivation. Notwithstanding, it and one of the new infrastructure areas, occupy a total of 22.3 ha and have been classified as White Box Grassy Woodland of the Nandewar and Brigalow Belt South Bioregion.

All of the White Box Grassy Woodland meets the criteria for the NSW *Threatened Species Conservation Act, 1995* Box-Gum Woodland Endangered Ecological Community, and 0.8 ha meets the criteria for the Commonwealth *Environment Protection and Biodiversity Conservation Act, 1999* Box-Gum Woodlands and Derived Grasslands Critically Endangered Ecological Community.

The Biobanking assessment calculated the number of credits (3,051) required to account for the proposed impacts. These are available within Whitehaven's Regional Biobank Site adjacent to the Kelvin State Forest, which is located approximately 15 km to the south-east of the proposed Modification. TCPL intends to enter into a Biobanking Agreement for the proposal.

No significant impacts on NSW or Commonwealth-listed threatened flora or fauna species are predicted to occur as a result of the proposed Modification.

TCPL would continue to implement existing management measures to minimise the potential impacts of the modified Tarrawonga Coal Mine on flora and fauna (e.g. pre-clearance surveys, salvage and use of cleared vegetation in rehabilitation, bushfire management, weed and feral animal control).

- Mine landforms would continue to be progressively rehabilitated and undisturbed areas within and adjoining ML 1579 would be fenced and regenerated in order to improve continuity and connectivity with native vegetation remnants. The post-closure land use objectives would remain unchanged, with the exception of 61 ha of rehabilitated Northern Emplacement and in-filled open cut that was originally proposed to be returned to agricultural land. The main reasons for this change are:
 - with the proposed change to the Northern Emplacement design it is unlikely to be feasible to return the land to class 3 land capability and land suitability;
 - the originally proposed area of agricultural land was to be surrounded by native vegetation and fauna habitat areas on all sides which would make it difficult to access the area for agricultural activities; and
 - rehabilitation to native vegetation and fauna habitat would allow better integration with the native vegetation in the Leard State Forest to the north of ML 1579.

The Mining Operations Plan would be reviewed and updated, and a Mine Closure Strategy would be prepared in accordance with Condition 57 of the Development Consent to incorporate the final land use objectives, rehabilitation concepts and activities for the modified Tarrawonga Coal Mine. TCPL would continue to report on the progress of rehabilitation activities in the Annual Environmental Management Report.

- A Cultural Heritage Assessment was conducted for the proposal in accordance with relevant guidelines and in consultation with Aboriginal stakeholders. The study identified one Aboriginal cultural heritage site (an isolated find of two stone artefacts) within the proposed Modification disturbance area. This site is considered to have low Aboriginal, scientific and educational significance. TCPL would lodge application(s) for Aboriginal Heritage Impact Permit(s) under the NSW *National Parks and Wildlife Act, 1974*, as required. The existing Aboriginal Cultural Heritage Management Plan would be reviewed and revised to incorporate the findings of the Cultural Heritage Assessment.
- The modified Tarrawonga Coal Mine would not introduce new hazardous materials or change the storage or transport arrangements of hazardous materials of the approved Tarrawonga Coal Mine. Further, the proposed Modification would not change the potential impact mechanisms to the environment, the public, and public property, and their associated consequences and likelihoods, to the extent that risk levels would change from those previously assessed for the Preliminary Hazard Analysis.
- The modified Tarrawonga Coal Mine would not change traffic movements to and from the approved Tarrawonga Coal Mine (i.e. no new traffic movements). Therefore, no additional impacts on the local road network would be expected as a result of the proposed Modification.
- The modified Tarrawonga Coal Mine would not change the approved life of the Tarrawonga Coal Mine (i.e. 8 to 10 years), however it would provide additional economic benefits to the region through the additional 4 Mt of coal to be mined. This additional coal would lead to additional royalty payments to the State of NSW.
- TCPL makes numerous contributions to local and regional community initiatives through financial sponsorship and in-kind support. This would continue throughout the life of the modified Tarrawonga Coal Mine.
- The mechanisms for reporting and consulting with stakeholders would remain unchanged. TCPL's procedures for receiving, investigating, responding to and reporting complaints received from the community, would also continue to operate, providing the local community with a method to register issues or complaints with respect to mining activities at the modified Tarrawonga Coal Mine.