MOOLARBEN COAL PROJECT

Response to Submissions

APPENDIX AI2

Planning Report for Noise in Ulan Vallage

Planning Report for Noise Limit in Ulan Village

TABLE OF CONTENTS

1 Introduction

This report considers the setting of project specific noise goals under the Industrial Noise Policy (INP) in the context of setting a noise goal for the operation of the Moolarben Coal Project at the Village of Ulan particularly during the operation of Open Cut 1.

1.1 The Issue

Ulan Village has and is currently experiencing noise levels in excess of the rural INP amenity criteria. Noise levels have been measured at between 42 and 54 dB(A)$_{Leq\ 15\ min}$. The principal source of this noise is from the operations of the adjoining Ulan Coal Mine, as documented within the Preferred Project Report Appendix A11. Ulan Coal Mines have been granted a Development Consent that requires a noise reduction program to be implemented over a period of time to reduce levels in the order of 37-39dBA within the Ulan village. It is unclear when the noise reduction program will be implemented and how successful it will be.

The Department of Environment and Conservation in their response to the project have suggested to the Department of Planning that the project should not exceed the INP rural night time criteria which would be 35 dB(A)$_{Leq\ 15\ min}$. The Project cannot achieve the INP rural night time criteria within the Ulan Village during the construction phase of the Moolarben Coal Project nor during the first three 3 years of operation of Open Cut 1. After 3 years the Open Cut 1 operations move progressively to the north-east away from Ulan Village.

The economic benefits of the Moolarben Coal Project cannot be achieved unless the consent authority establishes an achievable noise goal of 38dB(A)$_{Leq\ 15\ min}$ for the nighttime operations.

2 The Industrial Noise Policy

The overall aim of the Industrial Noise Policy (INP) is to allow the need for development (of various kinds) and activity to occur having regard for the desire to be "quiet" in the community.

2.1 Policy Objectives

The specific policy objectives of the INP are:

- *"to establish noise criteria that would protect the community from excessive intrusive noise and preserve amenity for specific land uses – these are set out in Section 2 of the INP;*
- *to use the criteria as the basis for deriving project specific noise levels;*
- *to promote uniform methods to estimate and measure noise impacts, including a procedure for evaluating meteorological effects – these are set out in Sections 3 to 6 of the INP.*

- *to outline a range of mitigation measures that could be used to minimise noise impacts – these are set out in Section 7 of the INP.*

- *to provide a formal process to guide the determination of feasible and reasonable noise limits for consents or licences that reconcile noise impacts with the economic, social and environmental considerations of industrial development – this is covered in Section 8 of the INP; and*

- *to carry out functions relating to the prevention, minimisation and control of noise from premises scheduled under the Act."*

2.2 Responsibility of Application

The responsibility of applying the INP lies with:

- *"the land-use planner (such as a local council and the (sic) Department of Planning – DoP), through taking account of likely impacts at an early stage in the planning process so that incompatible developments are appropriately located; also, in recognising the importance of maintaining separation distances between industry and residents. In locating potentially noisy developments, it is essential to recognise that mitigation of the effects of noisy activities once these are established will be limited by cost and design factors;*

- *The land-use managers and regulators (such as local government, (sic) DoP and the EPA), who act as determining authorities and as regulators of land-use activities. Their role is in providing adequate regulation of noise to preserve amenity and in ensuring compliance with noise conditions; and*

- *The noise-source proponent and manager through consideration of noise issues at the planning stage of a project and through direct control of the noise impacts by the appropriate combination of noise management tools and engineering design of the source."*

2.3 Applying the INP

> *"The assessment of noise impact is complex and subjective, and is rarely (if ever) able to be considered in isolation from other social and economic aspects of a development or activity. The policy outlines processes to help strike a feasible and reasonable balance between the establishment and operation of industrial activities and the protection of the community from noise levels that are intrusive or unpleasant."*

2.4 Underpinning Principles

Principles underpinning the noise criteria are as follows:

> *"The industrial noise criteria set down in Section 2 are best regarded as planning tools. They are not mandatory, and an application for a noise-producing development is not determined purely on the basis of compliance or otherwise with the noise criteria. Numerous other factors need to be taken into account in the determination. These factors include economic consequences, other environmental effects and the social worth of the development."*

2.5 Negotiating Noise Impacts

Negotiating the noise impacts involves:

> *"If, after all feasible and reasonable mitigation measures are applied, the resultant noise emissions exceed the project-specific noise levels, then the residual level of impact needs to be balanced against any social and economic benefits derived from the source of the noise. Negotiation between the regulatory/consent authority, the community and the proponent to establish achievable noise limits is described in Section 8."*

2.6 Setting Noise Limits in Consent and Licence

Setting noise limits in consent and licence conditions involves:

> "*In setting noise limits the regulatory/consent authorities need to consider the technical practicalities of mitigation, the amount of noise reduction provided, community views, benefits arising from the development and cost of achieving the project – specific noise levels recommended here, along*

with the environmental consequences of exceeding the project-specific noise levels. It is important that the project-specific noise levels are not automatically interpreted as conditions for consent, without consideration of the other factors. In many instances, it may be appropriate to set noise limits for a development above the project-specific noise levels recommended in this document" (*Section 9*).

2.7 Land Acquisition

Resolving noise problems through land acquisition is viewed as an option of last resort. Where land acquisition is applied, this is done via the development consent process, which is administered by the relevant planning authority. The development consent may contain conditions related to land acquisition.

"The principal trade-off would probably be additional noise impact in return for a package of benefits. Additional noise could be defined in terms of extended times of operation, higher noise levels, and a defined time period for annoying noise characteristics to operate and for more noise to occur in the less sensitive parts of the day. Benefits could include less noise at sensitive times, treatment of residences, contributions to improve community facilities and infrastructure or acquisition of residences. The NSW Industrial Noise Policy could act as a framework for negotiations regarding a set of acceptable noise conditions."

"Where proposed mitigation measures will not reduce noise levels in the project-specific noise levels, the proponent should seek to negotiate with the regulatory/consent authority to demonstrate that all feasible and reasonable mitigation measures have been applied. The regulatory/consent authority can choose to accept the level of impact proposed, or negotiate for a better level of control where this is considered achievable."

"Where in the final analysis, the level of impact would still exceed the project-specific noise levels, the economic and social benefits flowing from the proposed development to the community should be evaluated against the undesirable noise impacts."

"Where it can be demonstrated by the proponent that the development offers net benefits, a regulatory/consent authority may consider these as grounds for applying the achievable noise levels, rather than the project-specific noise levels, as the statutory compliance limit.'

"It is important that, as far as possible, the noise assessment quantifies any remaining or residual impacts that exceed the project-specific noise levels, after applying feasible and reasonable mitigation strategies."

"The acceptability of the residual noise impacts should be evaluated by taking into consideration factors such as (as set out at Chapter 8, Clause 8.2, Pages 43 & 44)."

"The proponent may not be able to reduce noise further. In these circumstances, other benefits might be negotiated unrelated to better management of the noise source but related to material benefits for the community."

2.8 The INP and the Moolarben Coal Project

The INP provides scope for any unacceptable impact from a development proposal that is likely to persist after noise-mitigation action has been taken, can be dealt with through negotiation – either by improved mitigation or by trade-off with benefits.

Where the proposed mitigation measures will not reduce noise strictly in accordance with the methodology contained in Chapters 2 to 7 within the INP – consent authority can choose to accept the level of impact proposed having regard to the economic and social benefits flowing from the development to the community."

In this regard the MCP achievable noise goal within the village of Ulan is 38dBA. The mitigation measures for the MCP are feasible and reasonable. Additionally, MCM have made a commitment to purchase any land impacted by MCP operations above the 38dBA achievable noise goal.

2.9 BATEA

Schools/Church mitigation. Proejct Commitments. Land Purchase.

3 Socio-Economic Benefits

The economic benefits of the project are contained in the Environmental Assessment Report and are reproduced below:

5.1.1.1 "Economic Benefits - Construction

- *A total expenditure of $150 million will be spent by the proponent during the construction period, which is estimated to take up to 18 months. This expenditure is expected to stimulate additional production in the region valued at $73 million and additional consumption worth $44 million – an induced benefit of $117 million, providing a total benefit to the region of approximately $267 million;*
- *The total expenditure of $150 million is expected to generate approximately 220 full-time equivalent jobs during construction. The induced production (108 jobs) and consumption (108 jobs) in the region will generate a further 216 jobs, providing a total employment benefit to the region of 438 jobs; and*
- *Over the construction period it is estimated that taxation revenue will be approximately $19 million to the federal government and $3 million to the state government, resulting in a public sector benefit of $22 million.*

5.1.1.2 Economic Benefits – Operations

The MCP will produce the following operational economic benefits based on 3 shifts per day, 365 days per annum, these being:-

- *"When production revenue is maximised at $356 million per annum in the fourth year of operation, the coal mining activities will stimulate further output in the region valued at approximately $308 million: $162 million of which will result from additional production and $146 million of which will be generated from additional consumption. The total annual output impact from Year 4 inclusive is expected to be valued at more than $664 million;*
- *Employment at the MCP is expected to be maximised from Year 11 inclusive, with direct annual employment at the mining operations equivalent to around 317 full-time positions. Additional production and consumption in the region will generate a further 280 and 313 jobs respectively, providing an induced employment benefit of 593 jobs. In total, approximately 910 full-time equivalent positions will be created in the region in each financial year of operation; and*
- *When production revenue is maximised in Year 4, Federal Government taxation receipts are estimated to total approximately $59 million: $37 million from income tax, $13 million from indirect taxes, and $9 million from company tax. Payroll taxation revenue to the State Government is estimated at more than $10 million, yielding a total public sector benefit of more than $69 million in each financial year of operation. It is estimated that a total of $341 million will be paid in production royalties to the State Government over the life of the project.*

5.1.2 Workforce Impacts and Mitigation Measures

During the construction and operational phases of the MCP the Mudgee and Gulgong townships, and to a lesser extent Rylstone and Kandos townships, are anticipated to experience an increase in population as a result of experienced mine workers and their

respective families taking up residency in the local government area. FRL encourages women to become part of the MCP workforce – similar to other operating mine sites operated and managed by FRL.

FRL, through its experience of operating three coal mining operations in New South Wales and Queensland, estimates that a number of construction workers will temporarily reside in the local government area, whilst up to 160 workers during operations will take up residency.

The following assessment focuses on the major impacts during construction and operations of the MCP.

5.1.2.1 Construction

The MCP will closely follow the construction phase associated with the approved and under construction Wilpinjong Coal Project. Similar to this project, it is believed that a significant proportion of the MCP construction workforce will be sourced from the local region. Approximately 50 workers from outside the region may be employed on the MCP and would be housed in motels, hotels, tourist accommodation, caravan parks and units and other dwellings. Accommodation within the townships of Mudgee, Gulgong, Rylstone and Kandos will record higher than average occupancy rates.

Subject to discussions, scope may also exist to house some of the workers at the construction camp facility developed for the Wilpinjong Coal Mine Project.

5.1.2.2 Operations

It is estimated that 160 experienced mine workers (male and female) and their families will relocate to the Mid-Western Regional Council local government area during the first year of operation. The remainder of the workers will be drawn from the local workforce draw area.

Initially the experienced workers will be needed for the smooth functioning of operations. The experienced workers will provide training to any local trainee workers.

The major impact associated with the operational aspect of the MCP is the housing of the 160 workers and their families relocating to the district. Assuming that each worker has 2 dependents, the population would increase by some 480 persons. A mix of housing types will be needed to accommodate these people. It is anticipated that the majority of the people will seek to reside in the Mudgee or Gulgong townships, given the community infrastructure which exists. The housing construction industry will benefit from the MCP.

The additional people residing in the Mid-Western Regional Council local government area will result in additional demand being placed on existing services, especially those of commercial, education, health care and recreation.

MCM will be seeking to enter into a formal Planning Agreement with the Mid-Western Regional Council and contribute potentially "works in kind" or monetary contributions to off-set the MCP socio-economic impacts. The Minister for Planning would determine the level of contributions if agreement is not achieved between the proponent and the Mid-Western Regional Council."

4 Conclusion

The adoption of the 38dBA achievable noise goal for the MCP has the following benefits:

- The social and economic benefits outlined in the Environmental Assessment Report will accrue to the local, regional, state and federal economies;
- The impact from the Moolarben Coal Project on Ulan Village is for a limited duration (3 years of operation);
- The predicted impact from the Moolarben Coal Project is negligible in comparison to the existing acoustical environment in the Ulan Village; and
- The proponent is committed to purchasing properties where noise impacts exceed the achievable noise criteria in Ulan Village;

The Moolarben Coal Project will deliver considerable economic and social benefits to the local, state and national economies based on an achievable noise goal within the Ulan Village of 38dB(A)$_{Leq\ 15\ min}$ for night time operations. Moolarben in designing the project and in the preparation of management plans have and will continue to have regard to the application of "*best management practices*" and "*best available technology economically achievable*". Moolarben are prepared to undertake noise mitigation works at Ulan Public School to ameliorate any noise impacts.

The Moolarben Coal Project is consistent with the objects of the Environmental Planning and Assessment Act, 1979 and the Minister for Planning is respectfully requested to establish an achievable noise goal regard to the unique circumstances that apply in respect to the Ulan Village.

MOOLARBEN COAL PROJECT

Response to Submissions

APPENDIX AI3

Archaeology Response

RESPONSE TO ISSUES RAISED

in respect of the

MOOLARBEN COAL PROJECT

ABORIGINAL CULTURAL HERITAGE ASSESSMENT REPORT

On behalf of

Moolarben Coal Mines Pty Limited,

by Giles Hamm
Cultural Heritage Consultant

Archaeological Risk Assessment Services Pty Ltd
30th November 2006

TABLE OF CONTENTS

1. INTRODUCTION

This report assesses the changes to the Moolarben Coal Project (MCP) in the context of Aboriginal Heritage.

The MCP was the subject of an Environmental Assessment (EA) which contained a report on Aboriginal Cultural Heritage at Appendix 12.

The EA was placed on public exhibition and various submissions were made. Responses to those submissions are contained in an Appendix to the PPR of which this PPR report forms part.

Between 7 and 9 November the MCP was the subject of an Independent Hearing and Assessment Panel at Mudgee convened by the Minister for Planning on the issues of Subsidence, Groundwater and Noise. Various submissions were also made to the IHAP.

During the public notification and IHAP process issues were raised with regard to the subsidence and the effect of subsidence on Aboriginal Cultural Heritage.

This report considers the effects of subsidence from the preferred mine plan on Aboriginal Cultural Heritage and reports on the appropriate response to the potential for protection from damage to and recording of Aboriginal Cultural Heritage for the preferred mine plan for the underground component of the MCP.

This report also recommends specific management and mitigative actions concerning Aboriginal Cultural Heritage sites within the MCP's Stage 1 Approvals area in response to predicted subsidence impacts.

2. ISSUES RAISED BY THE IHAP ASSESSMENT AND REVIEW PROCESS AS OF NOVEMBER 17TH 2006

The issue of subsidence and its impact on Aboriginal sites and Objects within the MCP Stage 1 area has been raised by the IHAP process.

Aboriginal Sites and Objects Likely to be Effected by Subsidence Impacts

Following an on-site inspection carried out on Monday the 6th of November 2006, a number of issues have been raised by IHAP members specifically concerning subsidence impacts to Aboriginal Sites and Objects located within Underground No. 4 area of the Stage 1 MCP impact area. Using MCP's original Underground No 4 Mine Plan layout, it had been assessed that a number of sites (see Table 1 Appendix 2 & Figure 1) were likely to have been effected by subsidence impacts (see Strata Engineering 2006).

Revised Underground No 4 Mine Plan Layout and subsidence impacts. Preferred Project Plan.

However, following the IHAP process and in consultation with the NSW Department of Planning, the MCM has agreed to modify its Underground No 4 Mine Plan layout. This modification (or Preferred Project Plan) will mean a real reduction in the level of subsidence impacts to Aboriginal sites of significance.

Specifically, Aboriginal sites that were assessed as having a high risk from expected subsidence impacts and were assessed to be either of scientifically High (i.e. sites S1MC 280 and S1MC 264) or Medium (i.e. site S1MC 287) significance are no longer under any threat from significant subsidence impact (See Strata Engineering Preferred Project Report: Subsidence Ditton 2006 revised assessment). Only one site S1MC 256 is now likely to be significantly effected by subsidence impacts . This site has been assessed to be of low scientific significance (See Table 1 Appendix 2).

- **The NSW Department of Environment & Conservation Response(DEC)**

In their review of MCP Stage 1 Aboriginal Cultural Heritage Assessment, the DEC has raised two issues of concern. These are:

- **Cumulative Impacts; and**

- **Impacts on The Drip and the need for a cultural assessment.**

Cumulative Impacts

The MCP comprises the project described in the EA. It is indicated that there may be a further Stage 2 of the Moolarben mine but no application for its approval has been made and no assessment has been made or is appropriate until there is an application for development of that area.

These mining areas while reasonably large when compared to European property ownership are not large (even in aggregation/when related to the region and areas that locally-based Aborigines would have travelled prior to European settlement.

The mine areas are, relatively, a small area of the relevant region. To assess cumulative impact one would have to assess the total heritage in the relevant area and relate that to the mining areas. This has not been done and is not practicable or required when the large undisturbed areas in the locality are taken into account.

There are Aboriginal sites located in the (only presently contemplated) Stage 2 area that are of higher scientific value (i.e. within the Murragamba Valley). Assessment of these sites and any impact on them will have to be assessed when (and if) an application is made to develop in that area).

The assessment of cumulative impact on Aboriginal heritage resources is not a straightforward matter. It is unclear what areas or regions would have to be compared to arrive at scientifically valid statement of cumulative impact. To just compare Aboriginal heritage lost in adjacent mine sites such as Wilpingjong and Ulan would only demonstrate the impacts of mining.

Cumulative Impact Assessment is not an issue that is set out in the DEC Guidelines for Aboriginal Cultural Assessment. This issue was also not raised as part of the Director General's requirements for the MCP.

The Drip and the need for cultural assessment in Stage 1 area issue

The DEC has raised the issue of a lack of cultural assessment (assessment of cultural, social or contemporary Aboriginal value sets) for The Drip site. On several occasions, both in written[1] and verbal form, MCP has asked each of the Aboriginal cultural groups about sites of cultural significance within the MCP mine lease or adjacent to it. No response was received from any of the Aboriginal stakeholder groups.

MCP asked if any of the groups would like to participate in a cultural assessment. This was done as early as June 2005. Only David Maynard, representing Murong Gialinga Aboriginal Torres Strait Islander Corporation, has provided MCP Stage 1 assessment with written feedback about the significance of The Drip. None of the other groups have ever provided the Stage 1 assessment with any information concerning the cultural significance of The Drip or any other sites within the Stage 1 area.

In addition MCP has sent copies of the Stage 1 assessment report to three identified Native Title claimants (i.e. Bill Allen, Martin De Launey and Lyn Syme) asking them specifically if they knew of any sites of significance within the Stage 1 assessment area. No response has been received from them either.

Due to the fact that The Drip will not be impacted by any Underground mining activities, it is argued that a retrospective assessment of the cultural values of The Drip would be unwarranted.

3. ISSUES RAISED THROUGH THE PUBLIC SUBMISSIONS PROCESS

A total of four main issues were raised through public submissions concerning Aboriginal Cultural Heritage Impact Assessment in MCP Stage 1 area. These are as follows:

1. Cumulative Impacts on Aboriginal Cultural Heritage, especially on sites of cultural significance such as The Drip.

   This issue has already been addressed in section 2.3.1 & 2.3.2 of this report.

2. Consultation process for Aboriginal community involvement was too narrow and some people missed out on being directly involved in the project assessment.

   Table 2 below sets out the Aboriginal consultation process applied by the MCP and this has been endorsed by a recent DEC review.

Project Task	Action taken	Aboriginal community response/outcomes
Expressions of Interest for Aboriginal community involvement in MCM using DEC Guidelines	Advertisement placed in the Mudgee Chronicle 6th of May 2005	Three Aboriginal community groups responded in writing.

[1] See letters sent to Aboriginal groups on the 18 November 2005 (Appendix 1).

Project Task	Action taken	Aboriginal community response/outcomes
First Aboriginal community consultation meeting held 14th June 2005 in Mudgee	Meeting to brief all Aboriginal groups and individuals present about the project and its scope. Input requested from Aboriginal people about how the Aboriginal Cultural Heritage Assessment would be carried out. Aboriginal community members invited to take part in both Archaeological Assessment and Cultural Assessment. Giles Hamm, Alan Wells & Ian Callow.	(See Minutes of Meeting) No response on questions of sites of cultural significance except for *Hands on Rock* Art Site and *The Drip*. No response on the issue of wishing to be involved with Aboriginal Cultural Assessment was received. MCM urged attendees to go away and think about it and respond either verbally on in writing.
A further meeting to discuss the study area, survey methodology and drill site assessment was held on the 26th of July 2005 in Mudgee	Giles Hamm and Ian Callow discussed the survey method and the need for additional assessment of some drill sites.	Issues such as survey coverage and drill site impacts were discussed but no mention was made about sites of cultural significance within the Stage 1 Study area.
A letter (18th November 2005) inviting Aboriginal groups to participate in a cultural assessment was sent to each of the groups. Following a period of notification, no formal response was received from any of the groups to be involved in such an assessment (see attachments)	Giles Hamm representing MCM project asked if any Aboriginal community member or members wanted to participate in an assessment of cultural values for the MCM lease area.	No response was received within 20 days of MCM's official notification from any of the Aboriginal groups involved with the project.
Archaeological Survey	This survey was carried out with members of three local Mudgee Aboriginal groups, between June 2005 & January 2006.	None of the groups participating in the ***Archaeological Survey*** identified or reported sites of cultural significance within the Stage 1 study area, other than The Drip area which was outside the Stage 1 study area.

Project Task	Action taken	Aboriginal community response/outcomes
A third Aboriginal consultation meeting was held on the evening of the 7th of March 2006 in Mudgee in which all three Aboriginal groups were represented	The impact of the proposed *Part 3A changes of the Environmental Planning and Assessment Act 1979.* These changes were explained by Mike Young of the NSW Department of Planning; Current mine plan: Ian Callow Moolarben Coal Project Manager White Mining; Results of the Archaeological Survey Assessment: Giles Hamm ARAS Pty Ltd; and Likely subsidence impacts on Aboriginal Heritage: Steve Ditton Strata Engineering.	It was agreed at the above meeting that Giles Hamm would prepare a draft report for comment to each Aboriginal group. It was also agreed that any comments or cultural knowledge concerning Aboriginal Sites or Objects of significance within the Stage 1 Project area should be forwarded to Giles Hamm within two weeks of this meeting date. No sites of cultural significance were identified or
On the 10th & 11th of April 2006, onsite meetings at Moolarben Coal Stage 1 Project Approval area. All relevant Aboriginal community stakeholders were represented at the meetings.	The meetings were held to discuss specific management issues relating to likely mining impacts on Aboriginal Sites and Objects. Aboriginal community groups were represented by the following people: Mudgee LALC, Larry Flick; Murong Gialinga, David Maynard; and Wendy Lewis representing Warrabinga Native Title Claimants Aboriginal Corporation. Also present at these onsite meetings were Giles Hamm, ARAS Pty Ltd; Alan Wells, Wells Environmental Services Pty Ltd; and Steve Ditton Subsidence expert, Strata Engineering Pty Ltd.	A series of management recommendations were made for each site or group of sites that may be impacted by the MCM project. No sites were identified within the Stage 1 Approval area that was considered culturally significant.
Final Aboriginal Cultural Heritage Assessment Report Issued as a draft. 20th of April 2006	On the 20th of April 2006 ARAS Pty Ltd on behalf of MCM, sent a final draft report to each of the three participating Aboriginal community groups for specific comments and feedback.	Only one response was received from Mr David Maynard representing Murong Gialinga Aboriginal Corporation.

3. Assessment of impacts on The Drip area

This issue has already been addressed in section 2.3.2 of this report.

4. A lack of assessment of cultural landscape values

The MCM invited the assessment of Aboriginal cultural landscape values within the Stage 1 assessment process, but unfortunately no response to this request was taken up by any of the Aboriginal stakeholder groups. Identification of three cultural landscapes was made and these were:

- ***Bora Creek alluvial flats;***
- ***Goulburn River; and***
- ***The Drip.***

4. MANAGEMENT RESPONSE AND RECOMMENDATIONS.

As part of its statement of commitments to minimizing or offsetting impacts on identified Aboriginal Sites and Objects within its Stage 1 Approvals area the MCP agrees to implement the following management actions.

4.1 Subsidence Impacts on Sites within Underground No. 4 (see Table 1 & Figure 1)

Revised Underground No 4 Mine Plan: Preferred Project Plan.

Following recommendations made through the Independent Hearing and Assessment Panel and the NSW Department of Planning, the MCM has agreed to modify its original Underground No 4 mine plan layout. This modification will mean two things:

- Significant reduction in any predicted subsidence impacts to all archaeological sites previously identified as having a high or moderate subsidence impact risk in the Underground No4 area; and

- Protection of a higher number of significant archaeological sites within the MCP Stage 1 Approvals area.

The above impact review advice has been confirmed by Strata Engineering expert Steve Ditton (pers comm. 2006).

Site S1MC 264: Grinding Groove Site

To avoid subsidence impacts on this site, MCP has agreed to modify its mine plan by adjusting its long wall panel design by 50 metres. To safeguard any unlikely indirect subsidence impacts MCP has agreed to undertake an intensive archaeological recording of the site before underground mining is likely to become a threat.

Site S1MC 280 (36-3-0042)

To avoid subsidence impacts on this site, MCP has agreed to modify its mine plan by ensuring a chain pillar is positioned under this site. This mitigation measure will significantly reduce any likely subsidence impacts. As a precautionary measure, MCP has agreed to undertake an intensive archaeological recording of the site (i.e. surface features only). This work would have to take place before underground mining commenced in the local area. The site is also to be part of a detailed subsidence monitoring programme.

Site S1MC 283

Although this site is not under any direct threat of impact from subsidence due to its high scientific significance rating, as a precautionary measure, MCP has agreed to undertake an intensive archaeological recording of the site's surface features. This work would have to take place before underground mining commenced in the local area. The site is also to be part of a detailed subsidence monitoring programme.

Site S1MC 287

To offset likely subsidence impacts to this site, MCP has agreed to undertake an intensive archaeological recording of the site which would also include subsurface testing to recover any buried archaeological materials. This work would have to take place before underground mining commenced in the local area. The site is also to be part of a detailed subsidence monitoring programme.

Sites S1MC 256, 261,271, 281, 282, 284, 285, 288-297.

MCP has agreed to monitor these sites in accordance with a detailed subsidence management plan and as part of the implementation of its Aboriginal Cultural Heritage Management Plan. Monitoring is to be done in consultation with the relevant Aboriginal Stakeholder groups.

4.2 Implementation of Aboriginal Cultural Heritage Management Plan

In consultation with relevant Aboriginal Stakeholder group the MCP has agreed to implement an Aboriginal Cultural Heritage Plan. This plan will include consent conditions set down by the DEC and DoP.

5. Bibliography

NSW Department of Environment & Conservation 2005 *Guidelines for Aboriginal Cultural Heritage Impact Assessment and Community Consultation*

Strata Engineering 2006 *Moolarben Coal Project: Mine Subsidence Impact Assessment for the proposed No 4 Underground Area Moolarben Coal Project Report. No 04-001-WHT/1*

Strata Engineering 2006 *Preferred Project Report: Moolarben Coal Project: Mine Subsidence Impact Assessment for the proposed No 4 Underground Area.*

6. Appendices

- **Appendix 1 – Copies of Letters sent to Aboriginal Stakeholders**

archaeological risk assessment services

PO Box 67, Katoomba NSW 2780
Telephone: 61 2 4782 2733, Mobile: 0423 046 208 Facsimile: 61 2 4782 2933
Email: A.R.A.S@bigpond.com ABN: 71 106 520 290

18 November 2005

Mrs Veroncia Martin
Chairperson
Murong Gialinga Aboriginal and Torres Strait Islander Corporation

C/o PO BOX 1097

MUDGEE NSW 2850

Dear Veroncia,

Re: Moolarben Coal Mine Project Aboriginal Cultural Assessment

As part of the Moolarben Coal Mine Project Aboriginal Cultural Assessment, Archaeological Risk Assessment Services Pty Ltd is requesting your assistance in participating in a cultural assessment as per the NSW Department of Environment & Conservation(DEC) requirements for the Interim Community Consultation Requirements for Applicants under Part 6 Approvals. This cultural assessment is designed to provide the following information to DEC:

- assessment of cultural knowledge about the Moolarben Coal Mine Lease area within the Wiradjuri Aboriginal community;
- identification of sites of cultural significance within the Moolarben Coal Mine Lease area; and
- evaluation of Aboriginal community values that relate to development impacts and Aboriginal sites within the Moolarben Coal Mine Lease area.

The proposed methodology to carry out the cultural assessment is:

1. oral history interviews, either by tape and/or written questionnaire; and
2. mapping of cultural landscapes of significance.

This process assumes that your organisation appropriately represents people who may have this knowledge and/or information and therefore we invite you to respond to this request within 10 days of the receipt of this letter.

If you require any further information about this letter or its contents please feel free to call Giles Hamm on (02) 4782 2733 or (0423) 046 208.

Yours sincerely,

Giles Hamm
Archaeological Risk Assessment Services

archaeological risk assessment services

PO Box 67, Katoomba NSW 2780
Telephone: 61 2 4782 2733, Mobile: 0423 046 208 Facsimile: 61 2 4782 2933
Email: A.R.A.S@bigpond.com ABN: 71 106 520 290

18 November 2005

Mr Larry Flick
Chairperson
Mudgee Local Aboriginal Land Council

C/o PO BOX 1098

MUDGEE NSW 2850

Dear Larry,

Re: Moolarben Coal Mine Project Aboriginal Cultural Assessment

As part of the Moolarben Coal Mine Project Aboriginal Cultural Assessment, Archaeological Risk Assessment Services Pty Ltd is requesting your assistance in participating in a cultural assessment as per the NSW Department of Environment & Conservation(DEC) requirements for the Interim Community Consultation Requirements for Applicants under Part 6 Approvals. This cultural assessment is designed to provide the following information to DEC:

- assessment of cultural knowledge about the Moolarben Coal Mine Lease area within the Wiradjuri Aboriginal community;
- identification of sites of cultural significance within the Moolarben Coal Mine Lease area; and
- evaluation of Aboriginal community values that relate to development impacts and Aboriginal sites within the Moolarben Coal Mine Lease area.

The proposed methodology to carry out the cultural assessment is:

1. oral history interviews, either by tape and/or written questionnaire; and
2. mapping of cultural landscapes of significance.

This process assumes that your organisation appropriately represents people who may have this knowledge and/or information and therefore we invite you to respond to this request within 10 days of the receipt of this letter.

If you require any further information about this letter or its contents please feel free to call Giles Hamm on (02) 4782 2733 or (0423) 046 208.

Yours sincerely,

Giles Hamm
Archaeological Risk Assessment Services

archaeological risk assessment services

PO Box 67, Katoomba NSW 2780
Telephone: 61 2 4782 2733, Mobile: 0423 046 208 Facsimile: 61 2 4782 2933
Email: A.R.A.S@bigpond.com ABN: 71 106 520 290

20th April 2006

Mrs Wendy Lewis
Secretary
Warrabinga Native Title Claimants Aboriginal Corporation

525 Pheasants Nest Road

PHEASANTS NEST NSW 2574

Attention: Mrs Wendy Lewis

Dear Wendy,

Re: Final Draft Report Moolarben Coal Mine Project Aboriginal Cultural Assessment: Stage 1 Approval Area.

Please find enclosed the following items:

- Hard copy of the above final draft assessment report;and
- CD Rom with report and relevant maps, appendix 1 and figures;

If you or members of your organisation, could provide any comments on the report or its recommendations so that we can include it in our final EIS document, that would be greatly appreciated.

If you require any further information about this letter or its contents please feel free to call Giles Hamm on (02) 4782 2733 or (0423) 046 208.

Yours sincerely,

Giles Hamm
Archaeological Risk Assessment Services

- **Appendix 2 – Revised Table showing significance ratings & subsidence impacts**

Table 1: Aboriginal sites and new subsidence impact risk ratings for the Preferred Project Plan in Underground No. 4 area (see Figure 1)

Site Name	Site Location	Site Description	Scientific Significance	Revised Subsidence Risk Rating
S1MC 254 UG No. 4 T1	Ridge Crest Munghorn Plateau	Artefact Scatter consisting of two artefacts lying on a vehicle track surface. Artefacts are not in situ. Artefacts cover an area of 8.2m x 2m. The site is in poor condition.	Low	Moderate
S1MC 256 UG No 4 T5	Gully feature Munghorn Plateau	Small rock shelter lying within broad gully. Facing west. Dimensions: 2.1mH x 7.6mW x 2.5mD. Shallow sandy deposit. The site is in poor condition. A scatter of 23 artefacts lies outside the shelter's drip-line. No cultural deposits observed on shelter's floor.	Low	High
S1MC 261 UG No4 T5	Gully Feature Munghorn Plateau	Small rock shelter lying within broad gully. Facing west. Dimensions: 1.6mH x 10mW x 4.4mD. Shallow sandy deposit. The site is in poor condition. A scatter of 2 artefacts lies outside the shelter's drip-line	Low	Moderate
S1MC 264 UG No. 4 T5	Drainage channel Munghorn Plateau	Small sandstone boulder 13m x 13.5m lying within tributary channel of Goulburn River covered with 78 grinding grooves. Grooves measure on average 22.4cm x 6.6cm x 1.4cm. The site is in good condition. Grooves are assumed to have been made as a result of stone axe grinding activities. Site is located at the head of a gully feature near a series of small sandstone rock pools.	High	Low
S1MC 265 UG No 4 T5	Gully Feature Munghorn Plateau	Artefact Scatter made of 3 artefacts covering an area of 13m x 13.5m. No insitu deposits or other features, Fair condition	Low	Low

Site Name	Site Location	Site Description	Scientific Significance	Revised Subsidence Risk Rating
S1MC 267 UG No. 4: T7	Ridge Crest Munghorn Plateau	Small rock shelter facing west. Dimensions: 2.2mH x 4.6mW x 2.4D with shallow gravel deposit 10cm depth. A scatter of 10 artefacts are lying in front of the shelter's drip-line. Good condition. No cultural material observed on the shelter's floor.	Low	Low
S1MC 271 UG No 4: T8	Ridge Slope Munghorn Plateau	Small rock shelter located on edge of ridge. Facing south. Dimensions: 2.2mH x 11.5mW x 4.2mD. Shallow sandy deposit. The site is in poor condition. A scatter of 8 artefacts lies outside the shelter's drip-line	Low	Low
S1MC 280 36-3-0042 UG No4:T11	Ridge Crest Munghorn Plateau	Medium size rock shelter facing north-west. Dimensions: 2.4H x 13.3W x 5.7mD. Deposits of >60cm in places. Single faded red hand stencil located on eastern wall. Small cluster of 8 grinding grooves and grinding patch located on boulder on eastern side of shelter. Extensive European graffiti on sections of shelter's back wall. Rabbit burrows located in several places within shelter floor. Fair condition, however stencil art almost faded. A scatter of 45 artefacts located just outside shelter's drip-line.	High	Moderate
S1MC 281 UG No 4 T12	Forest Creek Flats	Open artefact scatter comprising of 11 artefacts distributed over a 30m x 60m area. This site is located within an eroding area near a vehicle track above an existing ephemeral creek, near the Goulburn River. There are no sub-surface deposits associated with this site. The site is in poor condition.	Low	Low
S1MC 282 UG No 4 T12	Forest Creek Flats	Open artefact scatter comprising of 71 artefacts distributed over a 15m x 160m area. This site is located along a vehicle track above an existing ephemeral creek, near the Goulburn River. There are no sub-surface deposits associated with this site. The site is in poor condition.	High	Low

Site Name	Site Location	Site Description	Scientific Significance	Revised Subsidence Risk Rating
S1MC 283 UG No 4 T12	Ridge Crest Munghorn Plateau	Medium sized rockshelter facing east. Dimensions: 5mH x 14.8mW x 4.4mD. Rock floor. Good condition. Scatter of 6 artefacts located in front of shelter's drip-line. No cultural material observed on shelter's floor. This site contains rock art depicting hand stencils made in red (10) and (2) white ochre and a goanna figure drawn in white ochre. A large sandstone slab is lying within the shelter and contains European graffiti engraved on its surface. There could be more hand stencils located within shelter's roof or walls. More intensive recording is required.	High	Low
S1MC 284 UG No 4 T12	Ridge Crest Munghorn Plateau	Small sized rockshelter facing west. Dimensions: 2.3mH x 6.7mW x 3.8mD. Shallow deposit is 15cm in depth. Poor condition. Eight artefacts were found just outside the shelter's drip-line.	Low	Low
S1MC 285 UG No 4 T12	Ridge Crest Munghorn Plateau	Small sized rockshelter facing west. Dimensions: 1,8mH x 7.8mW x 3.9mD. Shallow deposit is 15cm in depth. Poor condition. Three artefacts were found within the shelter floor.	Low	Moderate
S1Mc 286 UG No 4 T12	Ridge Crest Munghorn Plateau	Small sized rockshelter facing west. Dimensions: 2.3mH x 8.7mW x 3.0mD. Shallow deposit is 15cm in depth. Poor condition. 28 artefacts were found just outside the shelter's floor.	High	Low
S1MC 287 UG No. 4 T4	Ridge crest Munghorn Plateau	Medium sized rockshelter facing west. Dimensions: 5.5mH x 31mW x 6.6mD. Shallow deposit 15cm in depth. Good condition. Scatter of 28 artefacts located in front of shelter's drip-line. No cultural material was observed on the shelter's floor.	Medium	Low

Site Name	Site Location	Site Description	Scientific Significance	Revised Subsidence Risk Rating
S1MC 288 UG No. 4 T4	Ridge crest Munghorn Plateau	Large rockshelter facing north-west. Dimensions: 6mH x 40mW x 4.2D. One artefact is lying within the site's drip-line. The site is in good condition. No cultural material was observed on the shelter's floor. Shallow sandy deposit approximately 25cm in depth.	Low	Low
S1MC 289 UG No4 T4	Ridge crest Munghorn Plateau	Medium sized rockshelter facing south. Dimensions: 4mH x 13.5mW x 2.8mD. Deposit is 50cm in depth. Good condition. Scatter of 9 artefacts located in front of shelter's drip-line over an area of 16.4m x 3m. No cultural material was observed on the shelter's floor.	Low	Low
S1MC 290 UG No4 T4	Ridge crest Munghorn Plateau	Medium sized rockshelter facing south-west. Dimensions: 0.9mmH x 5.1mW x 1.6mD. Shallow deposit is 20cm in depth. Poor condition. Scatter of 5 artefacts located in front of shelter's drip-line over an area of 2.8m x 1.6m. No cultural material was observed on the shelter's floor.	Low	Low
S1MC 291 UG No4 T4	Ridge crest Munghorn Plateau	Medium sized rockshelter facing south. Dimensions: 5mH x 13mW x 3mD. Shallow deposit is 20cm in depth. Poor condition. Isolated Find located in front of shelter's drip-line over an area of 1m x 1m. No cultural material was observed on the shelter's floor.	Low	Low
S1MC 292 UG No4 T4	Ridge crest Munghorn Plateau	Medium sized rockshelter facing south. Dimensions: 3.5mH x 22W x 3.9mD. Shallow deposit is 10cm in depth. Poor condition. Isolated Find located in front of shelter's drip-line over an area of 1m x 1m. No cultural material was observed on the shelter's floor.	Low	Low
S1MC 293 UG No4 T4	Ridge crest Munghorn Plateau	Small sized rockshelter facing north-west. Dimensions: 3mH x 7.8mW x 1.1mD. Shallow deposit is 10cm in depth. Poor condition. Isolated Find located in front of shelter's drip-line over an area of 1m x 1m. No cultural material was observed on the shelter's floor.	Low	Low

Site Name	Site Location	Site Description	Scientific Significance	Revised Subsidence Risk Rating
S1MC 294 UG No4 T4	Ridge crest Munghorn Plateau	Small sized rockshelter facing south. Dimensions: 3mH x 8.5mW x 2.6mD. Shallow deposit is 10cm in depth. Poor condition. Scatter of two artefacts are located in front of shelter's drip-line over an area of 4.8m x 3.7m. No cultural material was observed on the shelter's floor.	Low	Low
S1MC 295 UG No4 T4	Ridge crest Munghorn Plateau	Medium sized rockshelter facing south-west. Dimensions: 5mH x 17mW x 9mD. No deposit. Poor condition. Isolated Find located in front of shelter's drip-line over an area of 1m x 1m. No cultural material was observed on the shelter's floor.	Low	Low
S1MC 296 UG No4 T4	Ridge crest Munghorn Plateau	Medium sized rockshelter facing south. Dimensions: 3mH x 17W x 4.2mD. Deposit is 75cm in depth. Poor condition. A scatter of 10 artefacts are located in front of shelter's drip-line over an area of 5.2mx 3.7m. No cultural material was observed on the shelter's floor.	Low	Low
S1MC 297 UG No4 T4	Ridge crest Munghorn Plateau	Medium sized rockshelter facing south. Dimensions: 3mH x 17W x 4.2mD. Deposit is 50cm in depth. Poor condition. A scatter of 5 artefacts are located in front of shelter's drip-line over an area of 14m x 3.5m. No cultural material was observed on the shelter's floor.	Low	Low

MOOLARBEN COAL PROJECT

Response to Submissions

APPENDIX A I 4

Greenhouse Gas Emissions

PROPOSED MOOLARBEN COAL MINE
PREFERRED PROJECT REPORT

GREENHOUSE GAS EMISSION

15 December 2006

Prepared for
Moolarben Coal Project

by

Holmes Air Sciences
Suite 2B, 14 Glen Street
Eastwood NSW
ACN 003 741 035
ABN 79 003 741 035

Phone (02) 9874 8644
Fax (02) 9874 8904
Email Nigel.Holmes@holmair.com.au

CONTENTS

1 INTRODUCTION

This report has been prepared by Holmes Air Sciences[1] on behalf of the Moolarben Coal Project (MCP) at Mudgee. The report supplements our previous report, which is Appendix 3 of the Environmental Assessment (EA). Appendix 3 reports on Scope 1 and Scope 2 Green House Gas (GHG) emissions.

The report is to form part of a Preferred Project Report for the MCP. It responds to submissions made in relation to GHG emissions following the public exhibition of the EA. The report is a further consideration of the Scope 1 and Scope 2 GHG emissions of the MCP and a consideration of the Scope 3 GHG emissions from the MCP. It also takes into account the judgement of Her Honour Pain J in the matter of *Gray v The Minister for Planning and ors NSWLEC 720* in the context of the principles of *ecologically sustainable development (ESD).*

The report provides, in respect of the MCP:

- a revised assessment of Scope 1 and Scope 2 GHG emission (using site specific data that has become available since the EA was submitted);
- a consideration of Scope 3 GHG emissions; and
- an analysis of the MCP and its compliance with ESD principles in the context of global warming and climate change.

For the purposes of this report, the ESD principles have been taken to be those defined by the Department of Planning (**DUAP, 2000**), which are as follows:

1. the precautionary principle – namely, that if there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation;
2. inter-generational equity – namely, that the present generation should ensure that the health, diversity and productivity of the environment is maintained or enhanced for the benefit of future generations;
3. conservation of biological diversity and ecological integrity; and
4. improved valuation and pricing of environmental resources.

The submission revisits the estimated emissions of GHG associated with the MCP and examines the scientific principles that relate GHG gases to the global warming effect and shows that even when all categories (that is Scopes 1, 2 and 3) of GHG emissions from the MCP are taken into account the project will comply with the principals of ESD.

It is argued that global warming that is attributable to the increases in the concentrations of GHGs is an effect due to the cumulative emissions of all sources of GHGs. The effective management of the anthropogenic global warming effect will need measures that ensure that reductions of emissions of GHG in one location are not replaced by emissions from other sources.

[1] Holmes Air Sciences, Suite 2B, 14 Glen Street Eastwood NSW 2122, email Nigel.Holmes@holmair.com.au.

2 SUBMISSIONS RECEIVED FOLLOWING EXHIBITION OF THE EA

The submissions made to the public exhibition of the EA for the MCP, that are relevant to this report, relate generally to impacts from GHG emissions due to the actual operation of the MCP (Scope 1 and Scope 2 emissions) and emissions that would result from the off-site transport and burning of the coal produced by the MCP (Scope 3 emissions). The GHG issues raised by these submissions are categorised under the general descriptors of:

- "climate change";
- "greenhouse gas effects"; and
- "global warming" and other similar headings.

The examples of the submissions that raise these issues are discussed below.

The most extensive of these submission and the most representative examples of these submissions are those by Mr G Pettett and others with the same surname.

Generally, the objecting submissions on these issues referred to global effects and the contribution that the project would make to these and the consequent 'global warming' and resulting 'climate change'. In particular, the submissions raise the issue that the assessment did not include the effects of the burning of the coal that will be produced by the MCP (Scope 3 emissions).

In particular, it is claimed (Geoff Pettett, 2006, his Point No 1 and 23) that:

1. "With the exporting and burning of 12 million tonnes of coal per annum from Anvil Hill mine will generate about 32 million tonne of carbon dioxide. From the extraction, transport and end user burning of the product. This will accelerate climate change and bring about imminent and colossal threat to Australia and the world. ..."
2. Approving the project "is paramount to genocide of many species on this planet"
3. The coal mine is like the tobacco and asbestos industries
4. The contribution of the mine and the fossil fuels used in extracting the coal and moving it to its intended destination must be accounted for in the approval process
5. Concern that removing native vegetation will cause climate change
6. Concern that the removal of vegetation will affect oxygen and carbon dioxide levels.

It is also claimed (Wendy White, 2006) that:

1. The mine will release 330 million tonne of greenhouse gas emissions per year
2. The emissions will add to the already dangerous amount of carbon dioxide present, which is causing extreme weather events, melting glaciers and rising sea.

Other submissions express concerns (Nicholas and Caroline Adler, 2006) that Moolarben will contribute to climate change with the production of 12 Mtpa which will produce 32 Mt of greenhouse pollution per year and that climate change is currently affecting the area.

The submission by Daniel Endicott expresses similar concerns that the assessment of greenhouse gases fails to look at the emissions that arise when the coal is burnt.

The Pettett submissions also referred to ozone depletion ("The hole over the Antarctic…"). While this is a global environmental issue, its cause is understood to be largely due to the effect of chloro-fluoro-carbons (CFCs), which are used mostly in refrigeration systems, and previously as propellants in spray cans and in fire safety systems.

The use of these chemicals is now being controlled via international agreements (to which Australia is a signatory). While some CFC gases are strong greenhouse gases they are not released during the mining of coal. The problem of ozone depletion is not relevant to the coal industry nor the MCP.

3 SCIENCE OF GLOBAL WARMING

Arguably, the most authoritative and comprehensive documents dealing with the science of global warming are the scientific assessment reports (SARs) produced approximately every five years by the Intergovernmental Panel on Climate Change (IPCC). To date, the IPCC has published three SARs, the most recent being in 2001 (**IPCC, 2001**). These documents are essentially the scientific community's consensus view on climate change. The SARs also provide a useful database that is necessary to understand the significance of various human activities in the context of climate change. In summary, the IPPC reports provide well written information critical to understanding the science of global warming. They include quantitative information on the production and fate of greenhouse gases and estimates of the expected increases in global temperatures for a range of scenarios intended to cover a range of possible futures. These scenarios are chosen to illustrate the range of uncertainty in the predictions of temperature increases.

The temperature of the earth's atmosphere is determined almost entirely[2] by the balance in radiation received from the sun and that re-radiated to outer space (see for example **IPCC, 2001**).

The parts of the radiation spectrum through which the earth can re-radiate and loose energy to outer space depends on the composition of the atmosphere. Certain gases including water vapour, carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O) and a range of other gases absorb electromagnetic energy in the infrared. Solar radiation from the sun contains most of its energy in the infrared, visible and ultraviolet parts of the spectrum. Sunlight passes through the atmosphere and warms both the atmosphere and the earth's surface.

Clouds and the earth's surface directly reflect some of the sun's radiation back to space, but much of the sun's radiation is absorbed by the earth's surface and some by the atmosphere, which are warmed. The warmed earth and its atmosphere then reradiate this energy back to space. For the average global temperature to remain

[2] The words "almost entirely" are used because the residual heat from the earth's formation and from the decay of radioactive elements in the earth have some effect on the earth's temperature.

constant the incoming radiation from the sun must be balanced by the outgoing energy radiated from the earth and atmosphere.

Global warming (and the associated climate change) occurs because of the changing composition of the atmosphere, namely the increasing concentrations of so-called GHGs, in particular CO_2, CH_4 and N_2O. These gases reduce the parts of the electromagnetic spectrum through which energy can be re-radiated from the earth. In response, the earth's temperature must increase to allow the rate of energy loss from the earth to increase and thereby allow the incoming and outgoing radiation to be brought back into balance.

In summary, GHGs absorb electromagnetic energy and change the radiation balance of the earth causing the temperature to increase so that the radiation balance is restored.

Without the presence of any greenhouse gases, the earth's average temperature would be extremely cold (-18 ^oC) (**Seinfeld and Pandis, 1998**) and most of the planet would be uninhabitable. However, the effect of increasing greenhouse gases is to change existing climates and this will place stresses on current ecological systems that have adapted to current climate regimes.

Increasing concentrations of CO_2, CH_4 and other greenhouse gases will cause the temperature of the atmosphere to increase, but because the earth transports heat from the equator towards the poles in a complicated way via ocean currents and winds, the precise effect of increasing concentrations is difficult to estimate for any particular location.

The cause of the increasing concentrations of CO_2 and CH_4 is largely attributable to the increase in the worldwide use of fossil fuels to provide energy for increasing populations, which also have increasing per capita consumptions of energy. However, land clearing on a global scale is also an important cause in the change in the concentrations of CO_2.

4 QUANTIFYING GREENHOUSE EFFECTS

Scientific publications refer to the quantity of carbon stored in the atmosphere or to the equivalent quantity of carbon dioxide. In this context, 1.0 t of carbon is equivalent to 3.67 t of CO_2. Most of the analysis in this report will refer to CO_2 rather than carbon, as this appears to be the most common approach used in Australia.

The estimated quantity of carbon stored in the atmosphere now is approximately 750 Gt, which is equivalent to 2,750 Gt of carbon dioxide (**Seinfeld and Pandis, 1998**). The International Energy Agency (**IEA, 2006**), estimates that in the 2004, the global emissions of CO_2 from burning fossil fuels was 26,583.3 Mt of CO_2 per year and Australia's emissions of CO_2 from burning fossil fuels was 354.4 Mt CO_2-equivalent (i.e. 1.4% of the global due to total fossil fuel use).

Because the relationship between global warming and greenhouse gas concentrations is not linear[3] there is no accepted method to determine the contribution that a given emission of greenhouse gases might make to global warming.

To understand this point it is useful to consider the following discussion from Section 1.3.1 of the Second Assessment Report prepared by the IPCC (**IPCC, 1995**).

> *"The amount of carbon dioxide in the atmosphere has increased by more than 25% in the past century and since the beginning of the industrial revolution, an increase which is known to be in large part due to the combustion of fossil fuels and the removal of forests (Chapter 2 [*of the report*]). In the absence of controls, projections are that the future rate of increase in carbon dioxide amount may accelerate and concentrations could double from pre-industrial values within the next 50 to 100 years (**IPCC, 1994**).*
>
> *The increased amount of carbon dioxide is leading to climate change and will produce, on average, a global warming of the Earth's surface because of its enhanced greenhouse effect – although the magnitude and significance of the effects are not yet fully resolved, If, for instance, the amount of carbon dioxide in the atmosphere were suddenly doubled, but with other things remaining the same, the outgoing long-wave radiation would be reduced by about 4 Wm^{-2}. To restore the radiative balance, the atmosphere must warm up and, in the absence of other changes, the warming at the surface and throughout the troposphere would be about 1.2 ^{o}C. However, many other factors will change, and various feedbacks come into play (see Section 1.4.1* [of the report]*), so the best estimate of the average global warming for doubled carbon dioxide is 2.5 ^{o}C (**IPCC, 1990**). Such a change is very large by historical standards and would be associated with major climate changes around the world.*
>
> *Note if carbon dioxide were removed from the atmosphere altogether, the change in out going radiation would be about 30 Wm^{-2} – 7 to 8 times as big as the change for doubling – and the magnitude of the temperature change would be similarly enhanced. The reason is that the carbon dioxide absorption is saturated over part of the spectral region where it absorbs, so the amount of absorption changes at a much smaller rate than the concentration of the gas (Chapter 2* [of the report]*). If the concentrations of carbon dioxide are more than doubled, then the relationship between radiative forcing and concentration is such that each further doubling provides a further radiative forcing of about 4 Wm^{-2}."*

5 GREENHOUSE GAS INVENTORIES

Greenhouse gas inventories are calculated according to a number of different methods. The procedures specified under the Kyoto Protocol United Nations Framework Convention on Climate Change are the most common.

[3] The warming effect of a given quantity of greenhouse gases to the atmosphere is less and less as the concentration become higher and higher.

The protocol nominates the following as greenhouse gases:

- Carbon dioxide (CO_2)
- Methane (CH_4)
- Nitrous oxide (N_2O)
- Hydrofluorocarbons (HFCs)
- Perfluorocarbons (PFCs)

From the point of view of the MCP, only CO_2, CH_4 and N_2O are relevant.

CO_2 and N_2O are formed and released during the combustion of gaseous, liquid and solid fuels. These are the most significant gases for the MCP. They are liberated when fuels are burnt in diesel powered equipment and in the generation of the electrical energy that will be used by the project. In addition, there will be emissions of CH_4 and CO_2 which will be liberated as the coal seam is broken up during mining. These gases will be liberated directly from the exposed coal in the open cut mine and from the exposed coal via the underground mine ventilation system and while the coal is stockpiled on the surface. The liberation of trapped gases can take a few days. The coal seams to be mined at Moolarben are not particularly gassy (see later).

Inventories of greenhouse gas emissions[4] can be calculated using published emission factors. Different gases have different greenhouse warming effects (referred to as warming potentials) and emission factors take into account the global warming potentials of the gases created during combustion.

The global warming potentials assumed in the Australian Greenhouse Office (**AGO, 2005**) emission factors are as follows:

- CO_2 – 1;
- CH_4 – 21;
- N_2O – 310; and
- NO_2 – not included.

When the global warming potentials are applied to the estimated emissions then the resulting estimate is referred to in terms of CO_2-equivalent emissions.

5.1 Conventions for estimating and classifying GHG emissions

A number of conventions on the determination, assessment and the reporting of GHG from development and human activity on the planet have been developed. These are discussed in AGO Factors and Methods Workbook (**AGO, 2005**). The Workbook adopts the reporting approach known as the *Greenhouse Gas Protocol: A Corporate Accounting and Reporting Standard* which will be referred to as *The GHG Protocol.* This divides emissions into three categories or Scopes referred to as Scopes 1, 2 and 3.

The GHG Protocol defines the three scopes of emission as follows:

[4] Note the estimates of emissions quoted in this report are quoted to an implied accuracy of 1 kg in some cases. This is not intended to be the accuracy of the estimate and is done to assist in checking the arithmetic of calculations.

Scope 1 covers direct emissions from sources within the boundary of an organisation such as fuel combustion and manufacturing processes.

Scope 2 covers indirect emissions from the consumption of purchased electricity, steam or heat produced by another organisation. Scope 2 emissions result from the combustion of fuel to generate the electricity, steam or heat and do not include emissions associated with the production of fuel. Scopes 1 and 2 are carefully defined to ensure that two or more organisations do not report the same emissions in the same scope.

Scope 3 includes all other indirect emissions that are a consequence of an organisation's activities but are not from sources owned or controlled by the organisation.

Information on Scope 1 and Scope 2 GHG emissions was provided in the EA for the MCP.

Emissions associated with the burning of the coal by customers would be included in and classed as Scope 3 emissions, as would the emissions associated with the transport of the coal from the location where it is mined to the location where it is burnt to produce the energy. The emissions associated with Scope 3 emissions include (see **AGO (2005)**):

- disposal of waste generated (e.g. if the waste is transported outside the organisation and disposed of);
- **use of products manufactured and sold;**
- disposal (end of life) of products sold;
- employee business travel (in vehicles or aircraft not owned or owned by the reporting organisation);
- employees commuting to and from work;
- extraction, production and transport of purchased fuels consumed;
- extraction, production and transport of other purchased materials or goods;
- purchase of electricity that is sold to an end user (reported by electricity retailer);
- generation of electricity that is consumed in a Transmission & Distribution system (reported by end user);
- out-sourced activities; and
- **transportation of products, materials and waste.**

Note the bold text indicates the emission not included in the EA, which are now included see calculations in **Section 5.4**. Note some relatively minor emission for example employee travel is not included.

The assessment presented in the Environmental Assessment focussed on providing estimates of greenhouse gas emissions associated with the mining and processing of coal within the boundary of the site including the use of electrical energy that was estimated to be required by the project. It thus included Scope 1 and 2 emissions.

The reporting of Scope 3 emissions is generally not required in most reporting programs for the simply reason that it will be reported by the user, for example by the power generator in Japan when the Japanese GHG inventory is reported. In the

case of the MCP, the reporting of Scope 3 emissions is complicated because the end customer is not known and the way in which the coal might be used is not known. However, as will be seen later, some reasonable assumptions can be made and an indication as to the magnitude of the emission can be made.

5.2 Emission factors

In the EA for the MCP, the estimated emissions were not categorised into Scope 1, 2 or 3 emissions. Estimates were simply made of the GHG emissions associated with the mining and preparation of the coal for export. Appropriate emission factors were used to fully disclose all the emissions likely to occur as a result of these activities. This included some Scope 3 emissions when appropriate (see the emission factor for burning diesel).

The objectors have not objected specifically to Scope 3 emission being excluded from the assessment; they have objected to the fact that the effect of emissions from the burning of the coal by customers was not assessed. The fact that the emissions from the burning of the coal falls into the category of Scope 3 emissions has led to the observation that Scope 3 emissions were not considered in the assessment. It is in fact more appropriate to use the objector's language and to note that emissions from the burning of the coal was not assessed.

The emission factors published by the Australian Greenhouse Office (**AGO, 2005**) have been used to convert fuel usage and electricity consumption into CO_2-equivalent emissions. The relevant emission factors are:

- 3.0 kg CO_2-equivalent/litre for diesel usage – based on full fuel cycle analysis (see Table 3 of the AGO Workbook **AGO (2005)**)
- 0.985 kg CO_2-equivalent/kWh of electrical energy used in NSW (see Table 29 of Appendix 6 of the AGO Workbook **AGO (2005)**).

Note the 3.0 kg CO_2-equivalent/litre for diesel usage includes Scope 1 (associated with burning the fuel on the MCP site) and Scope 3 emissions (associated with producing the diesel emissions).

Note the 0.985 kg CO_2-equivalent/kWh of electrical energy is an emission factor that includes Scope 2 emissions (i.e. those associated with generating the electricity) and Scope 3 emissions (those associated with producing the fuel for the power station and the distribution losses involved in delivering electricity to the mine).

5.3 MCP's Emissions

5.3.1 Emissions from mining

The project will liberate greenhouse gases as a result of the combustion of diesel to power earthmoving equipment and for blasting and the use of electrical energy. Information on fuel and electricity consumption available for this study includes the following:

- Consumption of 12 ML/year of diesel; and
- 74,000 MWh of electrical energy over a year.

The average annual greenhouse gas emissions from the consumption of energy for mining at MCP will then be 108,890,000 kg of CO_2-equivalent per year [12,000,000 L x 3.0 kg/L +74,000 MWh x 985 kg/MWh].

5.3.2 Emissions from coal during extraction

The **AGO (2005)** Workbook (Table 6 in the Workbook) suggests that for open cut mines in NSW the CO_2-equivalent emission factor is 45.5 kg/t of ROM coal and for underground operations the emission factor for less gassy mines is 11.3 kg/t of ROM coal. The EA report was based on the **AGO (2005)** Workbook.

Since the preparation of the EA, site specific emissions data for the Moolarben coal seams have become available from tests on drill samples of coal. Four samples have been tested to date. These indicate that the coal to be mined by the MCP will liberate 0.23 kg CO_2-equivalent/t (on a raw coal basis). This is substantially less than the default figures suggested by the AGO data.

The low value is consistent with values measured at Wilpinjong and is likely to be a result of the low depth at which the coal is buried, which has allowed the gases to be lost over geological time. The figure of 0.23 kg/t is much lower than the default figure of 45.5 and 11.3 kg/t assumed in the EIS, which were the default AGO figures.

The site-specific tests apply to the open cut and underground coal. Assuming that the open cut produces 8 Mtpa and the underground operations 4 Mtpa the average annual greenhouse gas emissions from CO_2 and CH_4 liberated as the coal is mined will be 2,760,000 kg of CO_2-equivalent per year [4,000,000 Mtpa x 0.23 kg/t + 8,000,000 Mtpa x 0.23 kg/t].

Adding the emissions from **Section 5.3.1** to these emissions gives and estimate of 0.112 Mtpa [108,890,000 kg/y + 2,760,000 kg/y].

5.3.3 Emissions from other processes

If the coal were to spontaneously combust there would be further emission of CO_2. However, the mine would obviously be operated in such a way as to minimise these types of emissions and these emissions are likely to be very small compared with the 0.112 Mt/year estimated above. In any event, this emission will be picked up in the estimated emission of GHGs when the coal is burnt by the customer. Any emission that occurs from the spontaneous combustion of the coal on the mine site or during transport will be an emission that cannot occur when the customer burns the coal because coal burnt by spontaneous combustion on-site or in transit will never reach

the customer. Thus, this emission is completely accounted for by assuming that the customers receive all the product coal that is produced by the mine and exported to them.

The MCP does not propose, nor does its application for approval, seek approval to burn any of the coal produced.

5.3.4 Sum of all on-site GHG emissions

Total annual emission of CO_2-equivalent from mining coal at Moolarben will therefore be 111,650,000 kg/year (0.112 Mt/year) [2,760,000 kg/year from CO_2 and CH_4 from fractured coal + 108,890,000 kg/year from diesel and electricity used]. This is 0.112 Mt/year.

The figure can be compared with the other benchmark figures listed in **Section 4**. For example, the emission is 0.03% of the estimated emission from fuel burning in Australia in 2004, or 0.0004% of the estimated world's emissions from combustion of fossil fuels in 2004.

5.4 Export and burning of the coal

The coal will need to be transported to the Port of Newcastle or to a customer outside the project area. For the purpose of this analysis, it will be assumed that all coal is carried by rail to Newcastle a distance of approximately 280 km (one way). According to a study commissioned by **QR Network Access (2002)** the Australian average CO_2-e emission rate for rail transport is 12.3 g/net tonne-km. From this it can be inferred that transporting 10,000,000 t of product coal from Moolarben to Newcastle to would result in the emission of 34,440 t of CO_2-e [12.3 g/t-km x 10,000,000 t x 280 km].

MCP's customers will make use of the coal, and there will inevitably be GHG emissions associated with the end use. The emissions on burning the coal will of course be much larger than those associated with the mining of the coal. The adopted convention is that these emissions are attributed to the user of the coal not the producer, however to address the recent the judgement of her Honour Pain J in the matter of *Gray v The Minister for Planning* estimates of the GHG emissions associated with the burning of the coal have been made.

The convention of not including these emissions avoids double counting of the emissions. Leaving the accounting of the emissions from the use of the coal to the end user is also desirable as emissions due to the end use depend on the method by which the coal is used to produce energy and any control measures that might be in place. Various methods of burning will be used by different customers. As coal from the MCP is to (generally) be exported, any assessment of greenhouse emissions by its use in those other jurisdictions will be speculative and potentially unreliable.

If it is assumed that the coal is burnt in a power station, there will be emissions of CO_2 and N_2O. The quantity of CO_2 emitted can be estimated with a reasonable degree of reliability if the carbon content of the coal is known. It is reasonable to assume that all the carbon will be converted to CO_2 and that minor emissions of CO will be converted to CO_2 reasonable rapidly (in 1 to 4 months) (**Seinfeld and Pandis, 1998**). There will however be some uncertainty as to the production of N_2O, which depends

not only on the nitrogen content in the fuel but the temperature of the combustion process. Some small quantity of carbon will also be retained in the ash.

Two ways to estimate emissions are available. One is to assume that all the carbon in the coal is converted to CO_2 and that the N_2O emission is negligible. (Note this also assumes that the customers do not employ any carbon capture and sequestration technology. While this is probably a reasonable assumption at this time, it may not be the case in the future).

Tests results (Qualsheetr5R.xls) on the Moolarben coal have been provided to Holmes Air Sciences for estimating the carbon content of the material that will be burnt by Moolarben's customers. The ultimate analysis of the open cut washed coal shows that it contains 81% fixed carbon on a dry ash-free basis. Taking account of the moisture content of the coal, the yield on washing, the ash content of the washed coal, the quantity of carbon in 8 Mtpa of ROM coal is estimated to be 4.171 Mtpa.

Similar calculations on the underground coal indicate that the quantity of carbon in the 4 Mtpa of ROM coal will be 2.447 Mtpa.

Thus of the 10 Mtpa of product coal exported, the total carbon content would be 6.618 Mtpa. The CO_2 produced when this is burnt would be approximately 24 Mtpa.

An alternative approach is to assume that the coal is used in a power station and that the power station has similar emissions to a power station in NSW burning black coal. The emission can then be estimated using the AGO (Table 1 Scope 1) emission factor of 89.8 kg CO_2-equivalent/GJ. Assuming that the ratio of product coal to ROM coal is 0.81 and 0.88 for the open cut and underground mines respectively, the quantity of product coal from 12 Mtpa (8 Mtpa open cut plus 4 Mtpa underground) would be 10 Mtpa.

If the 10 Mtpa of washed coal is all exported and burnt in a power station similar to one in NSW, and the specific energy of the coal is 27.6 GJ/t, then the CO_2-equivalent emission would be 24.785 Mtpa [10^7 t/year x 27.6 GJ/t x 89.8 kg/GJ]. This is close to the 24 Mtpa estimated from the carbon content of the coal see previous paragraph.

Thus, the total annual emission of CO_2-equivalent assuming 12 Mtpa ROM is mined to produce 10 Mtpa of product which is then exported and burnt in a power station is approximately 24.938 Mtpa [0.119 Mtpa (from mining) + 24.785 Mtpa (from burning in a power station) + 0.034 Mtpa from transport of coal from Moolarben to Newcastle + a small but unknown emission from delivery of coal by sea to customers].

(Since the locations of the customers is not know it is not possible to provide a realistic estimate of the emissions associated with the delivery of the coal by sea, but a small additional emission will be associated with this activity.)

6 IMPORTANT ADDITIONAL CONSIDERATIONS

While it is possible to assess the significance of these emissions by comparing them with other sources of greenhouse gases it is also important to note that the efficiency

with which the coal is used also very important. All other things being equal[5] global CO_2-equivalent emissions could be halved if power station efficiencies were doubled, or halved if the efficiency by which end users' consumed electricity was doubled or waste was reduced and so on.

Different customers will use the coal in power plants of different thermal efficiencies. The Australian Coal Association provides some typical statistics for power station efficiencies on their web site (**ACA, 2006**).

The web site notes the following:

> "*Industry has continuously* striven to *increase efficiencies of conventional plant; for example, the average thermal efficiency of US power stations has increased from 5% in 1900, to around 35% currently. In China, most power plants are relatively small, average efficiency is about 28% compared to an OECD average of 38%. New conventional* [pulverised fuel] *PF power plants achieve above 40% efficiency.*
>
> *Advanced modern plants use specially developed high strength alloy steels, which enable the use of supercritical and ultra-supercritical steam (pressures >248 bar and temperatures >566°C) and can achieve, depending on location, close to 45% efficiency.*
>
> *Application of new advanced materials to PF power plant should enable efficiencies of 55% to be achieved in the future. This results in corresponding reductions in CO_2 emissions as less fuel is used per unit of electricity generated.*

7 CONTRIBUTION TO GLOBAL WARMING AND CONCLUSIONS

Finally, it is useful to consider the contribution that (1) emissions from mining, (2) emissions from burning MCP coal and (3) the combined emissions from both mining and burning MCP coal might make to global warming.

Because the relationship between global warming and greenhouse gas concentrations is not linear[6] there is no accepted method to determine the contribution that a given emission of greenhouse gases might make to global warming.

To understand this point it is useful to consider the discussion from Section 1.3.1 of the Second Assessment Report prepared by the IPCC (**IPCC, 1995**), which was provided earlier in **Section 4** of this submission.

At any point in time, it would be reasonable simply to compare the estimated emission of CO_2-equivalent from the various activities with the estimated equivalent global emission from fuel burning of 26,583.3 Mtpa (**IEA, 2006**). On this basis, the emissions from the mining and burning coal from Moolarben is estimated to be 0.09%

[5] Population remaining fixed and the per capita consumption of energy being fixed.
[6] The warming effect of a given quantity of greenhouse gases to the atmosphere is less and less as the concentration become higher and higher (see **Section 4**).

of global CO_2-equivalent annual emissions for fuel burning. Thus, the Moolarben Project could be considered to contribute 0.09% to the increase in global temperatures caused by the increase in greenhouse gas emissions as they are currently. This invites the question as to what temperature rise might be attributed to the GHG emissions from the MCP.

Based on the IPPC estimate, that a doubling of the CO_2-equivalent concentration in the atmosphere would lead to a 2.5 ^oC increase in global average temperature (see **Section 4**), and that the current global CO_2 load is 2,750 Gt, we can estimate that the emissions from the MCP (including mining, transporting the coal to Newcastle and burning the coal) would lead to an increase in global temperature of 0.000023 ^oC [(24.938 x 10^6/2,750 x 10^9) x 2.5 ^oC]. If the equivalent calculation is done for the CO_2-equivalent liberated due to the mining of the coal the increase in global temperature that could be attributed to the MCP would be 0.000000102 ^oC [112 x 10^3 /2,750 x 10^9 x 2.5 ^oC]. Both of these calculations assume that all the CO_2 liberated in a year stays in the atmosphere.

There will clearly be no measurable environmental effect due to the emissions of greenhouse gases from the MCP even when the customer's use of the coal is taken into account. Any environmental assessment would conclude that the effects of the emissions from the MCP are unmeasurable. Given this it is clear that the MCP would comply with the principles of ESD.

In practice, of course, the effects of global warming and associated climate change are the cumulative effect of many thousands of such sources and it is the cumulative effects that pose a threat to ESD principles.

This analysis highlights the problem of dealing with climate change on a mine-by-mine, or project-by-project basis. Indeed if this approach is adopted it is likely to be ineffective since the coal will simply be sourced from some other place.

Ultimately, the control of greenhouse gas emissions is likely to occur via economic instruments such as carbon taxes set as suggested in the recently released Stern Review and elsewhere (**Stern, 2006**). These taxes, set a appropriate levels, would encourage increases in efficiencies in the way that carbon-based fuels (including coal) are used, encourage the development of carbon capture and sequestration and encourage the development of renewable forms of energy generation, and improve the efficiency with which electricity is used.

8 REFERENCES

ACA (2006)
http://www.australiancoal.com.au/cleantech.htm

Australian Greenhouse Office (2005)
"AGO Factors and Methods Workbook" December, 2005, Published by Department of Environment and Heritage, GPO Box 787, Canberra, ACT 2601. (Available from http:/www.greenhouse.gov.au/workbook).

DUAP (2000)

"Coal mines and associated infrastructure – EIS guideline" Department of Urban Affairs and Planning (now Department of Planning), 23-33 Bridge Street (GPO Box 39) Sydney NSW 2001.

IEA (2006)
"CO_2 Emissions from Fuel Consumption 1971 – 2004 (2006 Edition)" International Energy Agency ISBN 92-64-10891-2. Available from http://www.iea.org/w/bookshop/add.aspx?id=36

IPCC (1990)
"Climate Change 1990 - The Science of Climate Change: - The IPCC Scientific Assessment" Edited by Houghton, J T, Jenkins J J, Ephraums J J, Cambridge University Press, UK 365 pp

IPCC (1994)
"Climate Change 1994 – Radiative Forcing of Climate Change and an Evaluation of IPCC IS92 Emissions Scenarios " Edited by Houghton, J T, Meira Filho L G, Bruce J, Lee, H, Callender B A, Haites E,\ Harris N and Maskell K, Cambridge University Press, UK 339 pp

IPCC (1996)
"Climate Change 1995 - The Science of Climate Change - Contribution of Working Group 1 to the Second Assessment Report of the Intergovernmental Panel on Climate Change" Edited by Lakeman J A, Published by Cambridge University Press, ISBN 0 521 56436 0.

IPCC (2001)
"Climate Change 2001: The Scientific Basis". Contribution of Working Group I to the Third Assessment Report of the Intergovernmental Panel on Climate Change [Houghton, J.T.,Y. Ding, D.J. Griggs, M. Noguer, P.J. van der Linden, X.

QR Network Access (2002)
"Comparison of Greenhouse Gas Emissions by Australian Intermodal Rail and Road Transport" QR Network Access, 127 Creek Street, Brisbane, Queensland 4000.

Seinfeld J H and Pandis S N (1998)
"Atmospheric Chemistry and Physics" Published by John Wiley & Sons Inc.

Stern (2006)
"The Economics of Climate Change" available http://www.hm-treasury.gov.uk/independent_reviews/stern_review_economics_climate_change/stern_review_report.cfm

MOOLARBEN COAL PROJECT

Response to Submissions

APPENDIX A I 5

Rail Capacity

Mr Ian Callow
Project Manager
Moolarben Coal Project.

7th November 2006.

Dear Ian

Thank you for your letter of inquiry dated 2 November 2006.

ARTC has for the past 2 years undertaken extensive investigation of the rail corridor and an integral part of that assessment has been to fully understand what potential developments were being proposed by coal producers on the corridor between Muswellbrook and Ulan.

Our understanding is that with the Moolarben development projected to commence in the latter part of 2008 export and domestic coal haulage is forecast to rise from the current tonnage of around 5.5mtpa to in excess of 30mtpa from the extremity of the Ulan line.

In developing our approach to dealing with the throughput task we have separated the inner load points from the outer as they pose quite different challenges which will be explained in the latter part of this response.

As a first step to providing additional capacity on the route ARTC has proposed and is in the delivery stage of three (3) crucial projects.

The first project scheduled for completion June 2007 is the redesign of Muswellbrook Yard which will provide a direct route for services running to and from the Ulan line.

The second project scheduled for delivery July 2007 is the introduction of a new safe working system known as Centralised Train Control. This system is expected to deliver significantly reduced running times for services operating on the route.

Coupled with these projects we are building two (2) additional passing loops on the route, one of these is to be at Wollar which is approximately 26klm from Ulan and the second will be located at some 16klm west of Muswellbrook near where the Anvill Hill mine will connect when approved. These loops are scheduled for completion during quarter 4, 2007.

Our current timetable on the Muswellbrook to Ulan corridor has a total of 7 full return coal paths which are used to service the Ulan mine with trains of varying length ranging from 42 to 91 wagons.

With the capacity enhancements ARTC will deliver during the next 12 months our modelling has shown we will be able to offer eleven (11) return paths to service the three (3) mines Ulan, Wilpinjong and Moolarben.

Assuming the rail operators service these load point with trains that carry net volume cargoes ranging between 7,200 tonnes and 8,600 tonnes per train this would equate to an annualised capacity of 25.3mtpa on an 80% availability and utilisation basis.

As you would be aware ARTC has recognised in the latest version of the Hunter Valley Corridor Improvement Strategy there is a need to complete the duplication of the single line between Antiene and Muswellbrook. This is a two stage project scheduled for completion June 2008.

As a result of that duplication ARTC has modelled and expects to revise timetables to increase the numbers of paths on the Ulan line from Muswellbrook to sixteen (16) per day. This increase will occur by not having to manage the delay that currently occurs to trains running to and from the Ulan line through the single line section amongst all other traffic using the route.

Using the same methodology of train sizes and utilisation of the available daily paths it is expected the capacity to service mines on the Ulan line will increase to 36.9mtpa.

It is considered the expected developments at Anvill Hill, Mt Pleasant and the existing load point at Bengalla are able to be serviced as additional to the paths shown in both enhanced modelling, this is because of the close proximity to Muswellbrook and as the new system of Safe working between Muswellbrook and Sandy Hollow will be designed with follow on signals and this will allow more than one train to operate in each section and therefore capacity in that section of the route will in fact be greater than the eleven (11) and sixteen (16) paths shown above.

As part of our strategy for the route between Muswellbrook and Ulan we have assessed the potential to install an additional four (4) passing loops at other strategic locations on the route should it be necessary. I am not in a position at this time to advise what additional capacity their installation will result in but can advise and confirm the commitment that ARTC has always provided coal producers in the Hunter Valley that delivery of rail track capacity ahead of demand will be met.

I trust this letter satisfies your concern however should you require any further detail or clarity on the issue I am available to discuss them further should you wish.

Yours truly,

Dale Macklinshaw
Hunter Valley Operations Manager
ARTC.

MOOLARBEN COAL PROJECT

Response to Submissions

APPENDIX A16

Moolarben Response to UCML Submission

Moolarben Coal Mines Pty Limited
ABN 82 108 601 672

Level 14
213 Miller Street
North Sydney NSW 2060
Australia

Telephone (02) 9922 3777
International (61 2)+
Facsimile (02) 9923 2427
PO Box 1320
North Sydney NSW 2059
wml-nsw@whitemining.com.au

9 November 2006

Department of Planning
GPO Box 39
SYDNEY NSW 2001

Attention: Michael Moore
For consideration by the Moolarben IHAP

Dear Sir

MOOLARBEN COAL MINE PTY LIMITED ("MCM")
MOOLARBEN COAL PROJECT ("MCP") – APPLICATION 05.0117
SUBMISSION BY ULAN COAL MINES LIMITED ("UCM")

This is a response by MCM to the submission of UCM to the IHAP in respect of the MCP.

1. PRODUCTION

It is believed that approval for the production of 10 Mtpa from the UCML expires in 2007. It is assumed that a new approval would then be required to authorise the continued operation of the mine of the Ulan Coal Mine "*for a further 15 years under the current mine plan*".

2. LANDOWNER & INFRASTRUCTURE IMPACTS

2.1 Mining Lease

Before any project approval for the MCP can be exercised a mining lease will be required by MCM under the *Mining Act, 1992*. Two mining lease applications ("MLA") were lodged in 2005 and one in October 2006. Notice of each application was served on UCML as a landholder. No objections have been made to either of the MLA's made in 2005 and time for the making of objections in respect of them has expired allowing the Minister to grant each application without restriction.

The Minister for Mineral Resources, under the Mining Act, may grant a mining lease to MCM in relation to the October 2006 MLA without

the consent of UCML other than in respect of land found to be either "*agricultural land*" or protected under s62 of the Mining Act. Whether such constraints apply in respect of the area of the 2006 MLA will depend upon a determination process in respect of any objection made by UCML provided for in the Mining Act which, generally, is a decision made by the Minister following the recommendation of the Mining Warden following an enquiry by him.

A mining lease would authorise MCM to conduct the MCP under any project approval that may be issued.

2.2 Consultation

UCML is aware of the MCP. Numerous meetings and communications have occurred between MCP and UCML and details can be provided.

Attempts have been made, which will continue, to reach co-operative arrangements between MCM and UCML with regard to mining activities within UCML land (and in the event of failure such an issue will be determined by the Mining Warden) and with regard to all other aspects of interaction between MCM and UCML.

Attention is drawn to the attached letter dated 21 July 2006 from Felix Resources Limited to Xstrata Coal Australia regarding the purchase of lands. MCM also wrote to Xstrata Coal in November 2005 raising a number of issues.

2.3 UCM Knowledge

It is understood that UCML commenced operations in 1982 and has "*detailed knowledge of the environmental, social and operation constraints of the region*". MCM sought this environmental information from UCML which was denied, resulting in MCM making FOI applications to the relevant agencies with very limited results due to objection by UCML to provision of that information on the basis of "*commercial-in-confidence*". This was despite the fact that the information was required to be provided to the agencies by UCML under approvals given under legislation of the State of New South Wales.

3. ASSESSMENTS

The existence of the Moolarben dam, UCML's air strip, communication tower, two lined potable water dams and reverse osmosis plant are known to MCM. The Environmental Assessment results in the conclusion that the use and enjoyment by UCML of those facilities will be unimpeded, and unaffected, by any operation of the MCP. MCM acknowledges its obligations to ensure that this will be the case.

4. MCM – EPL – SALINITY OFFSET AREA

MCM accepts its obligations to replace appropriate areas in respect of any area presently allocated under the EPL and which may be unavailable to UCML for

the salinity offset requirements of the UCML EPL. The surface of MCP underground areas may well be still available to UCML.

5. WATER MANAGEMENT

As observed above, MCM sought the benefit of the information held by UCML in respect of groundwater systems and water management proposals which were, as noted, declined by UCML.

The assertions made by UCML with regard to the MCP groundwater and water management assessment are generalised and without foundation. The adequacy or otherwise of the MCP assessments is not a matter for UCML and is a matter for the approval authorities. If UCML will provide specifics these can be addressed and if it will provide details of its experience with groundwater and water management these can be taken into account if necessary. Reference is made to the Company's attached letters to Xstrata Coal dated 21 July 2006 and 22 November 2005.

6. NOISE AND BLASTING

The setting of noise goals for the MCP is a matter for the Minister for Planning as the approval authority. The noise exceedances at the Ulan Village allegedly due to the operation of UCML are a matter of concern to MCM, of concern to the residents of Ulan and is relevant to the setting of noise goals which will, if approval is to be granted, be imposed by the approval authority.

It is noted that UCML observes that the MCP environmental assessment incorrectly assumes "*that UCM will achieve 34 dBa noise level as a result of the noise reduction plan required by DA 103-5-2005*". It is noted that the basis for this is that UCML considers that it has no obligation to reduce noise levels at the Ulan Village under another approval held by UCML for its open cut mining operation for the "*various other noise emissions from the remainder of the mine*" and that the noise reduction order "*will not result in UCM achieving an overall noise level of 34 dBa*". MCM asks that UCML advise MCM, and the IHAP, what noise level it proposes to achieve at the Ulan Village.

7. LAND ACQUISITION

MCM accepts that any Project Approval will contain the condition requiring MCM to acquire "*if so requested by the landholder (other than a mining company)*" any land which is affected by noise (or dust) beyond levels relevantly determined by the approval authority.

MCM has written to UCML in July 2006 regarding purchase of lands owned by UCML affected by the mining operations (refer attached). We note no response has been received from UCML.

8. AIR QUALITY

The response to the representations made by UCML with regard to air quality is contained within a report prepared by Holmes Air Sciences.

9. RAIL ISSUES

ARTC has advised that appropriate rail capacity is available to transport MCP's coal.

10. ULTRA CLEAN COAL PLANT

No application has been made for an ultra clean coal plant and the issue is therefore not relevant under the Environmental Planning and Assessment Act.

Felix Resources Limited is one of the ten companies that is doing an enormous amount of work on this clean coal technology.

Yours faithfully

Ian Callow

c.c. Mike Young
Major Projects Assessments
Department of Planning

FELIX RESOURCES

BF COPY

F-2007-019

Friday 21st July 2006

Mr. Glenn Robinson
Xstrata Coal Australia
PMB 8
Singleton, NSW, 2330

Dear Glenn,

RE: Land at Ulan for Felix's Moolarben Project

As agreed at our meeting at Bulga, I am writing to you to formally advise that it is our desire to purchase land off Xstrata, which is required for development of our Moolarben Coal mine at Ulan.

I have previously sent our preliminary requirements but since our meeting we have further checked the ownership etc and now submit our estimated requirement.

As you suggested we have attempted to follow boundaries of individual lots, except of course, we have excluded the airstrip land.

I am also attaching copy of a letter Ian Callow sent to you in November 2005 which refers to use of surplus water (item 9) and we would like to have further discussion with you on this matter.

I would like to reach agreement on these points as soon as possible and would appreciate your advice as to when we can do so.

Yours Faithfully,

Brian Flannery
Managing Director

CC: Mick Buffier
Val Istomin

Felix Resources Limited ABN 75 000 754 174
Postal: PO BOX 10470 Brisbane Adelaide Street QLD 4000 Delivery: 316 Adelaide Street Brisbane QLD 4000 Australia
T (61-7) 3248 7900 F (61-7) 3211 7328 E admin@felixresources.com.au W www.felixresources.com.au

Moolarben Coal Mines Pty Limited
ABN 82 108 601 672

Level 14
213 Miller Street
North Sydney NSW 2060
Australia

Telephone (02) 9922 3777
International (61 2)+
Facsimile (02) 9923 2427
PO Box 1320
North Sydney NSW 2059
wml-nsw@whitemining.com.au

22 November 2005

Xstrata Coal Australia
PMB 8
Singleton NSW 2330

RE: DETAILED INFORMATION SOUGHT FOR MOOLARBEN COAL PROJECT

Dear Glenn,

We refer to our recent meeting in your offices 3/11/05 regarding access to various reports, information as well as access to Ulan's groundwater consultants. As discussed Moolarben would prepare a detailed list of such information for your response.

The following are those detailed requirements:

1. Initially we would like copies of the various reports shown in the following listing. We note these reports were provided to the government agencies in response to Ulan's various approvals.

a. Environmental Management Strategy (relevant to ground and surface waters) prepared in 2000.

b. Annual Environmental Monitoring Reports (AEMR's) for years 2000 to 2005

c. Site Water Management Plans prepared in 2000

d. Details of the construction and location of surface and groundwater monitoring positions and the associated monitoring plan developed and implemented in 2000.

e. Water quality data for ground and surface water monitoring in the mine lease area, local creeks and river systems.

f. Site Water Balance and annual budgets for years 2000 to 2005

2. Permission to talk to Ulan's ground and surface water consultants for the purposes of understanding what each party is doing regarding the development of the regional model as required by the government agencies.

3. Locations of piezometers within and around the vicinity of Ulan mine (if possible up to a radius of 10kms). Information sought includes collar RL's, geological logs and construction details.

4. Historical water level, water quality data and any hydraulic testing results from each piezometer from 2000 to date.

5. Details of Ulan's water supply borefield located alongside the Ulan Road. Information sought includes location of each bore, depth, casing diameter, casing and screen intervals, geological logs and pumping rates. Copies of all historical data would also be useful.

6. Ulan's dewatering data from the mine operations. The information sought would include volumes pumped, specific geological formations being pumped in each location, groundwater quality data, historical pumping rates and drawdown responses.

7. EIS reports relating to both groundwater and surface waters. The information sought would include consultant reports dealing with each of these issues.

Please note the purpose for seeking the information described above is to ensure that any model is accurate with respect to the UCML operations. For the Moolarben Coal Project's Environmental Assessment Report we are required to model and assess the cumulative impacts of the Moolarben project on the others in the vicinity (i.e. both Ulan and Wilpinjong mines).

8. Roads needs studies for the Ulan/ Cassilis Road. The information sought relates to any safety audits or risk assessments carried out on the route from Mudgee to UCML. The council will be seeking a joint cumulative impact study covering UCML, Wilpinjong and Moolarben.

9. Use of surplus UCML mine waters in the Moolarben operations. We would propose an agreement where surplus UCML mine waters are used as the first point of call. We would envisage Moolarben could take up to the following proposed quantities:

- 2006 - Construction phase, 500Ml
- 2007 - 1st operating year, 1,500Ml
- 2008 and beyond, 2,000Ml

The quality and suitability of the water would need to be assessed against the different purposes around site. Quality data, if available, would be appreciated.

We look forward to receiving your advice regarding the availability of this information. We believe most of the data would be readily available and could be the focus of our requested permission to talk to your water consultants. Should you require any further clarification please don't hesitate to contact me at your earliest convenience.

Yours sincerely

Ian Callow
Project Manager

MOOLARBEN COAL PROJECT

Response to Submissions

APPENDIX AI7

Leachate Studies

28 November, 2006

Alan Wells
Wells Environmental Services
PO Box 205 East Maitland NSW 2323

Re: Acid Rock Drainage Potential of Moolarben Project Mine Materials and Requirements for Further Investigations

Dear Sir,

This letter is intended to clarify recommendations made in EGi Document No. 2350/710, regarding further acid rock drainage (ARD) investigations for the Moolarben Project[1].

Geochemical testing was carried out on one hole from each of the three proposed open pits, and one hole from the proposed underground development. Investigations carried out indicated that over 90% of overburden material from the open cut and waste rock from underground operations would likely be non acid forming (NAF). The remainder was expected to be potentially acid forming low capacity (PAF-LC) but with a low ARD potential. No potentially acid forming (PAF) materials were identified for floor samples from the open cut, which suggested that final pit floors would not be a source of ARD. The roof and floor materials from the underground project and coal were classified as PAF-LC, and the coal reject samples had the highest ARD potential and were classified PAF.

Although there were not sufficient samples to accurately represent the entire mine stratigraphic sequence, the lack of any PAF materials in the overburden and floor materials strongly suggests that overall the site is likely to have a low risk of developing ARD, with the exceptions of rejects and coal stockpiles.

Future investigations should focus on confirming these preliminary conclusions, and most of these can be carried out during operations, when more representative samples will become available. The main uncertainties in regard to acid potential that require resolution are:

- Confirmation that operational blending will be sufficient to control ARD from PAF-LC overburden;

[1] Environmental Geochemistry International Pty Ltd, April 2006, Document No. 2350/710, *Geochemical Assessment of the Moolarben Coal Project.*

- Confirmation of the apparent lack of pyritic overburden and floor materials in the mine stratigraphic sequence; and
- Limited testing of coal and washery wastes indicated that these may be acid producing, but testing of more representative samples would be required to determine the ARD potential and variation of these materials.

Column leach testing of PAF-LC overburden samples is recommended to confirm that operational blending is a valid approach for managing PAF-LC overburden materials. Column testing would take at least 6 months before producing sufficient results for assessment, with the main purpose of demonstrating that no special overburden materials handling is likely to be required. Given the lead-time, column tests should be carried out as soon as possible using drill hole materials currently available, so that results are available in time to allow revision of management strategies if required. However, the column test results will not be needed before starting operations, as long as during operations a system of water quality monitoring, and dump surface sampling and ARD testing is carried out to provide early warning of any ARD generation. This monitoring would provide field scale comparisons to the column testing, and confirm that PAF-LC materials make up only a small proportion of the overburden.

Further testing of overburden and floor materials is required to confirm the expected lack of pyritic horizons but, given the expected low ARD risk, this can be carried out during operations as long as the monitoring system described above is in place. Resource holes sampled at 1m intervals allow detailed geological control on samples, and testing of these holes in all three pits is recommended to infill existing information on ARD potential of the mine stratigraphy. Testing of blast hole samples ahead of mining is also recommended to determine the overall ARD potential of mining benches, and as a check of the expected ARD potential indicated from the resource drilling results.

Only one intercept of coal samples from the underground operations was available at the time of testing, and the ARD potential and variation of these materials was not adequately represented. Preliminary results suggest that the coal may be PAF-LC. Further ARD testing of the coal is required, but this is only necessary once more representative sample become available, such as from bulk samples or during operations. In the interim it should be assumed that the coal is potentially acid leaching, and appropriate provisions should be made to ensure control of any resulting ARD, including:

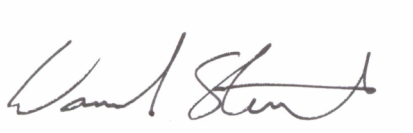
- Run off and leachate from coal stockpiles and underground operations should be contained and monitored to check water quality for indications of ARD.
- Provision for acid treatment of run off and leachate should be made, which could include use of a mobile lime dosing plant to treat acid waters and broadcast application of agricultural lime.

There were only 2 samples of small scale laboratory generated washery rejects available at the time of testing, and again the ARD potential and variation of these materials was not adequately represented. Based on results for the two samples tested, rejects appear to have

a higher ARD risk than other mine materials, and are likely to require specific management to control ARD. Possible approaches include underwater disposal, lime treatment, isolation from infiltration, or a combination of these. Finalisation of the most appropriate management strategies will depend on the ARD potential of these materials, which is unlikely to be confidently known until mining and coal processing starts. The following provisions should be made to ensure control of any resulting ARD during operations:

- A programme of routine sampling and ARD testing of coarse and fine rejects from the wash plant should be implemented to determine the ARD potential and variation of these materials.
- Rejects should be stored in such a way that they may either be managed in-situ or rehandled.
- Run off and leachate from rejects should be contained and monitored for indications of ARD.
- Provision for acid treatment should be made to neutralise any acid water produced from rejects.

Regards,



Warwick Stewart