**Donaldson Coal Pty Limited**

# Abel Underground Mine

## Part 3A Environmental Assessment
## Response to Submissions

Application No. 05_0136

19 January 2007

# TABLE OF CONTENTS

# LIST OF FIGURES

PAGE NO.

# 1. INTRODUCTION

Donaldson Coal Pty Ltd (Donaldson) proposes to develop an underground mine - Abel Underground Mine (Project 05_1316) – to access coal reserves south of their existing Donaldson Open Cut Mine, approximately 23 kilometres north-west of Newcastle. Full details of the proposal are provided by the Environmental Assessment (EA) submitted to the Department of Planning (DOP) by Donaldson in October 2006. The Environmental Assessment was prepared under Part 3A of the *Environmental Planning and Assessment Act 1979* (**Act**).

In accordance with the requirements of the Act, the EA was placed on public exhibition for 30 days, from 6 October to 9 November 2006, during which time submissions were made to DOP by government departments, community groups, businesses and individuals.

282 submissions were received by DOP as a result of the exhibition of the EA. DOP has provided these submissions to Donaldson and has requested that a response be prepared.

Submissions received may be categorised as:

- 10 Government agency/representative submissions;
- 3 commercial interest group submissions (1 objection and 2 non-objections to the project);
- 6 community group submissions (5 objections and 1 non-objection);
- 101 copies of a Form Letter 'A', (91 not raising issues in addition to those noted on the form letter);
- 129 copies of a Form Letter 'B', (112 not raising issues in addition to those noted on the form letter); and
- 33 individual letters (all objections).

One letter did not provide name or address details and Donaldson were advised by DOP that it did not require consideration. Several submissions were received from different individuals within the one household but have been considered as separate submissions.

**Figure 1** shows the geographical spread of submissions received from individuals and community groups, with **Table 1** showing an analysis of these submissions by location. This information has assisted in the consideration of issues of concern to residents in particular geographical areas.

This figure shows that the majority of individual letters, covering a range of issues, come from residents located within the proposed underground mine area. A large number of form letters came from the Ashtonfield and East Maitland urban areas to the north. The third highest number of submissions came from areas south-east of the map, being Newcastle and Sydney urban areas.

All submissions were forwarded by DOP to Donaldson for review and response where appropriate, with submissions received by Donaldson up until 22

December taken into consideration in this report. This report also provides a response to the independent expert groundwater study review, conducted by Kalf and Associates.

DOP provided a matrix categorising submission content into various issues. This matrix (slightly modified by Donaldson to assist with number identification) has been used as the basis of Donaldson's response to the submissions and is provided as **Appendix A.** Names and addresses (except for suburbs) have not been included.

**Table 2** lists the categories of issues raised and provides more detailed information about what submissions raised in relation to each issue. Subsequent chapters provided additional information on the main concerns raised by the submissions.

This Response to Submissions is provided to DOP in accordance with the Director-General's request, made under section 75H(6)(a) of the Act, for a reply to submissions made in relation to the Abel Underground Mine project.

**Table 1 Analysis of Submissions by Location**

| | Total submissions | Total properties[1] | Individual Letters | Form Letter A | Form Letter B | Form Letters with additional Comments |
|---|---|---|---|---|---|---|
| Underground Area | 63 | 39 | 15 | 1 | 47 | 21 |
| East of mine | 22 | - | 3 | 1 | 18 | 5 |
| West of mine | 11 | - | 2 | 0 | 9 | 47 |
| North of mine | 70 | - | 2 | 59 | 9 | 47 |
| Further afield | 82 | - | 5 | 35 | 42 | 52 |
| No address/ location | 9 | | 5 | 2 | 2 | 1 |

[1.] Total properties submissions were received from (accounts for where multiple submissions were received from one residence)

North-West of map
15 - 97 km
Individual Letters = 0
Form Letter A = 5
Form Letter B = 3

North of map
7 - 160 km
Individual Letters = 0
Form Letter A = 12
Form Letter B = 14

East of map
6 - 39 km
Individual Letters = 0
Form Letter A = 2
Form Letter B = 4

West of map
10 - 35 km
Individual Letters = 0
Form Letter A = 5
Form Letter B = 8

Abel Project Application Area

Abel Underground Mine Area

South-East of map
7 - 21 km
Individual Letters = 2
Form Letter A = 10
Form Letter B = 9

South of map
10 - 120 km
Individual Letters = 3
Form Letter A = 1
Form Letter B = 4

# Abel Underground Mine Project

**KEY**

- Abel Project Application Area
- Abel Underground Area
- Submissions on map
- Submissions outside map

DONALDSON COAL

## Distribution of Public Submissions

| Drawn: AH, SR | 28/11/2006 |
|---|---|

**Table 2 ISSUE CATEGORIES AND DETAIL**

| Issue[1] | Detail of Issue |
|---|---|
| **Subsidence** | • Insufficient details provided on subsidence – particularly for non-residential structures, dams, water tanks and on-site effluent disposal systems<br>• Will not be able to use house alarm due to potential movement of land due to subsidence<br>• Concern regarding disruption to watercourses, Black Hill Road (only access to school), public infrastructure<br>• Impacts on ground and surface waters and downstream impacts on Pambalong Nature Reserve and Hexham Swamp<br>• Shallow nature of northern area of extraction – proposed Catholic land development – future school<br>• Need for privacy –ongoing subsidence inspections<br>• Boral plant – impact of subsidence<br>• Mining under gas pipeline<br>• Cracking – impact on watercourses, groundwater, general landscape and safety<br>• Cemetery impacts |
| **Greenhouse Gases** | • Release of carbon dioxide from the combustion of coal not assessed<br>• Implications of global warming on flora and fauna and water resources not assessed |
| **Surface water** | • Impact on Pambalong Nature Reserve<br>• Impact on dams (water supply concerns) and creeks above underground mining<br>• Impact on Four Mile Creek from Bloomfield discharge<br>• Monitoring of ephemeral creeks (cracking may not be noticed)<br>• Wastewater disposal details required<br>• No 'whole of catchment' analysis completed (re Pambalong/Long Gully)<br>• Long term monitoring and assessment plan required for CHPP surface and groundwater impacts to verify predictions |
| **Ground water** | • Concern with directional flows stated and salinity of groundwater,<br>• Contamination and drainage of groundwater reserves due to fracturing,<br>• Contamination of groundwater by underground injection of Bloomfield tailings. |
| **Flora and fauna** | • Rainforest importance not recognised<br>• Inadequate flora and fauna assessment<br>• Biodiversity of dams not assessed<br>• Section addressing Pambalong Nature Reserve as a whole not included |
| **Offsets** | • Need for EEC offset area to offset EEC vegetation clearing around CHPP |

| Issue[1] | Detail of Issue |
|---|---|
| **Noise**<br>**Blasting/Vibration** | • Impact of noise from coal stockpiles, preparation plant – reduction by 10dBA in background noise in future not feasible<br>• Construction noise from Bloomfield CHPP upgrade not provided<br>• Additional train movements<br>• Internal haulage by truck<br>• Ventilation fan noise<br>• Cumulative impacts of noise from 4 facilities<br>• Black Hill School and Church not adequately assessed |
| **Air/Dust** | • Dust from coal stockpiles, preparation plant, additional train movements and haulage<br>• Cumulative impacts of dust from 4 facilities<br>• Need for increased operational air quality monitoring |
| **Aboriginal heritage** | • More comprehensive consultation with knowledge holders in the local Aboriginal community and a comprehensive archaeological survey of the whole site is needed<br>• Long Gully Aboriginal artefacts |
| **Non-indigenous Heritage** | • Disused Anglican cemetery not addressed |
| **Visual** | • Size/scale of ventilation fan<br>• Visual impact to Black Hill residents<br>• Floodlighting of Bloomfield stockpiles<br>• Visual quality of Black Hill and Sugarloaf area |
| **Social** | • Social cost to the community<br>• Need to consider impact on social capital (lifestyle, community pride, social wellbeing) |
| **Traffic/Roads** | • Safety of Black Hill Road and John Renshaw Drive intersection (not assessed, cumulative impact)<br>• Need for buffer between John Renshaw Drive and surface facilities to reduce distraction to drivers on John Renshaw Drive<br>• Traffic assessment of water haulage by trucks if this occurs |
| **Health & Safety** | • Larger open cut mines use safer techniques than continuous mining bord and pillar<br>• Dewatering rates would be a potential hazard to the workforce<br>• Mining under existing old workings hazardous |

| Issue[1] | Detail of Issue |
|---|---|
| **Cumulative impacts** | • Cumulative impact of traffic on Black Hill Rd/John Renshaw Dr intersection<br>• Cumulative noise and dust from truck movements from Tasman, Donaldson and Abel |
| **Other Issues** | • Lack of community consultation/lack of information at meetings/lack of consultation in areas outside of underground mine footprint<br>• Insufficient time to review EA<br>• Inadequate EA generally<br>• Risk assessment – studies not completed so risk assessment based on incomplete information<br>• Decrease in property values/need for compensation<br>• Code of Conduct re: community<br>• Landholder compensation<br>• Renewable energy sources/Sustainable energy<br>• School safety and access, health of school community<br>• Horses - concerned about subsidence affecting horses and paddocks<br>• Enforcement of not mining under houses<br>• Waste, Stormwater, Chemical Storage<br>• Require a Mining Operations Plan<br>• Landowner Agreement<br>• Community Liaison Committee Minutes not provided<br>• Not compatible with Regional Strategies<br>• Need for more detailed plans of Bloomfield upgrade works |

1. Note: 'Issues' as per DOP spreadsheet provided to Donaldson.

# 2. COMMUNITY CONSULTATION

| Submission Issues: | Raised by:[1] |
|---|---|
| • East Maitland/ Ashtonfield, Avalon Estate, Thornton and East of Freeway communities not consulted<br>• Consultation undertaken with landowners above proposed mining area was unsatisfactory and full scope of project not revealed<br>• No consultation with the relevant community groups<br>• EA does not contain minutes of CLC meetings or detail of planning focus meetings<br>• Community were misled over project details – eg: use of trucks versus conveyor, magnitude of subsidence | CG1-2, CG4-5, G2, G5, L1, L6, L8, L18, L20, L26, L28, L30, A1-101, B1-129 |

*1. Refer Appendix A for key to submission numbers.*

A number of individual letters, one government agency letter and all form letters were concerned that inadequate consultation had been undertaken by Donaldson regarding the proposed Abel Underground Mine and its activities, in particular consultation with communities to the north and north-east regarding the proposed upgrade of the Bloomfield Coal Handling and Preparation Plant (CHPP) and rail loading facility.

Community consultation undertaken for the Abel Underground Mine project and general media awareness has included:

- Letter drop to landowners in underground area - Nov 2005;
- Advertising of project in local newspaper - 28 Dec 2005;
- Exhibition of project application at 3 Councils– Maitland, Cessnock & Newcastle – Dec 2005 onwards;
- Exhibition of project application on DoP website – Dec 2005 onwards;
- Articles relating to the project in newspapers – 29 Dec 2005, 30 Dec 2005, 12 Jan 2006, 20 Jan 2006, 9 Oct 2006, 11 Oct 2006, 15 Oct 2006, 26 Oct 2006;
- Reports on local radio – Oct 2006;
- Advertising for representatives on the Community Liaison Committee (CLC) in newspapers – Mar 2006;
- 7 Community public meetings – Mar to Oct 2006;
- 7 CLC meetings – Mar to Oct 2006;
- Advertising of EA in newspapers by DoP – 5 Oct 2006 and 11 Oct 2006;

- Display of EA on DoP website from 6 Oct 2006 (refer Table 3 for website visits);
- Exhibition of EA in Councils and DoP from Oct 2006; and
- Ongoing articles in papers and on radio.

The 7 public meetings organised by Donaldson generally ran from 7pm for about two hours. This amounts to 14 hours of intensive consultation. During these meetings, the proponent followed the advice from DoP at the Planning Focus Meeting that community consultation should concentrate on subsidence issues.

The CLC was set up to discuss aspects of the project with the local community and it was the intention that the CLC would report back to their communities. The March advertisement for CLC representatives resulted in nominations from the Black Hill area only. To ensure proper representation from areas north of the mine within Maitland LGA, Donaldson requested Maitland Council provide a representative on the CLC.

It is considered that the above consultation and media exposure was sufficient for all members of the Maitland area community to be aware of the proposal. A local community member was employed by Donaldson during the EA preparation period to be available to discuss the project at any time convenient to the community. This employee visited many homes in the Black Hill area at the request of the resident to discuss particular issues. Visits were also made to other locations such as Newcastle to speak with absentee owners who rented their properties.

The proponent's preliminary risk assessment included in the Project Application concluded that the key issues were subsidence and underground water. It found that impacts from dust, noise and visual were low risk, especially in the Ashtonfield area.

The Bloomfield CHPP and rail loop have been in existence for more than 15 years and there have been no complaints to Bloomfield or Donaldson from the Ashtonfield area for the last five years.

The detailed assessment in the EA concludes that impacts in the Ashtonfield area are within acceptable limits (indeed less than existing). This assessment has been verified by DEC's submission.

Submissions via form letters A & B criticise the proponent for not consulting widely enough, especially in the north west sector of Ashtonfield.

Authors of the form letters attended all Community meetings. One of the authors was a member of the Community Liaison Committee.

During the consultation process the Company openly sought feedback from the community. Any concern that the Ashtonfield residents had not been included could have been raised at any time from March to October 2006 in either the community meetings or the CLC meetings. Such concern was never raised. The form letter mail-out was delayed until after the last community meeting on 18 October, possibly to create grounds for

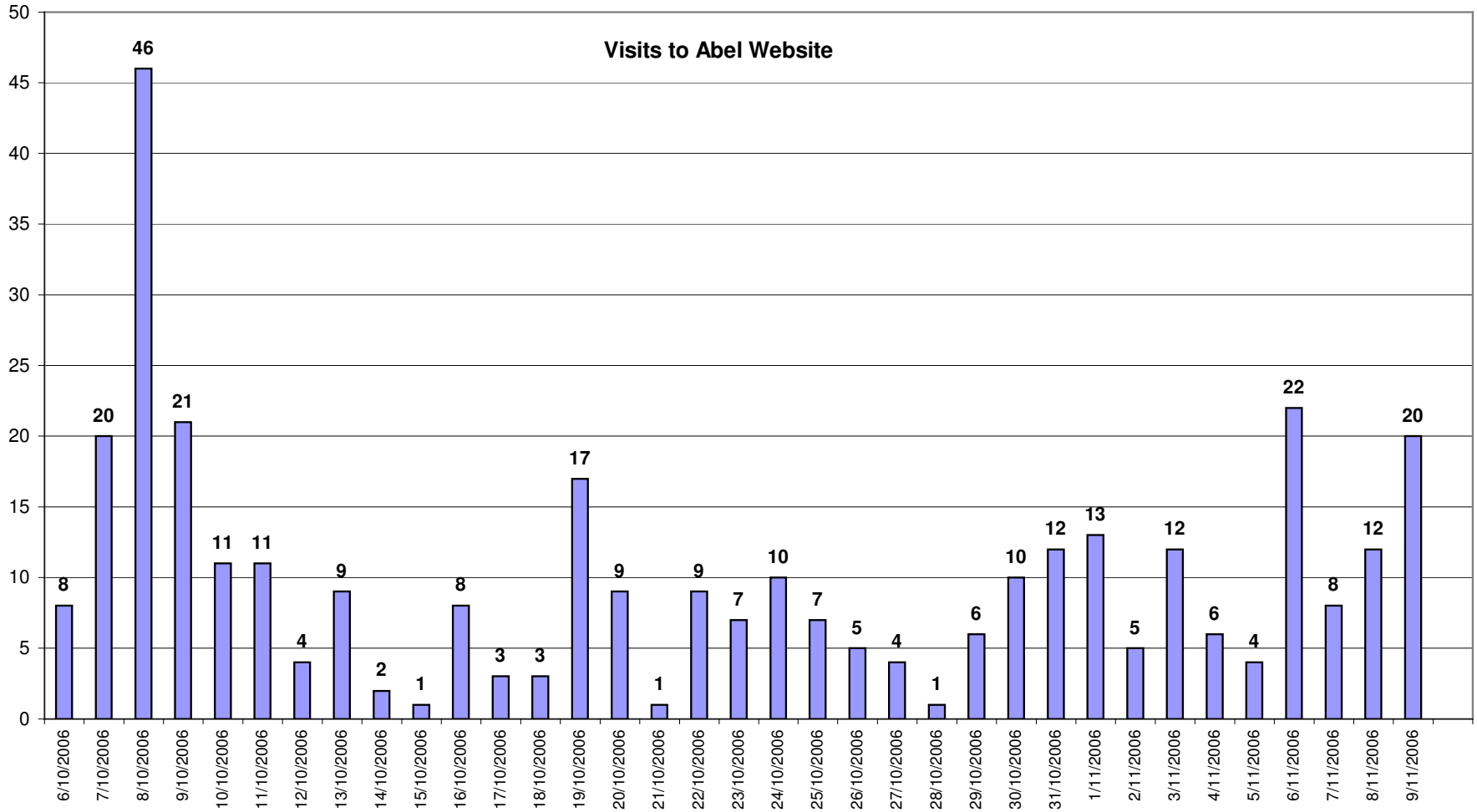
complaint. The wording of Form letter A appears to have been designed to maximize opposition to the project and the timing of Form letter A appears to have been delayed to preclude any opportunity for involvement in the consultation process.

The map of objector locations (Figure 1) indicates intensive Form letter activity in the Ashtonfield area following earlier lack of interest.

The proponent submits that it has undertaken a very complete consultation process, and rejects the suggestion that consultation has been inadequate in any way. The proponent has endeavoured to make direct contact with all affected landowners, and has endeavoured to contact other interested parties by advertisement, or through the CLC, which has a responsibility to disseminate information to the community. The proponent submits that consultation has been undertaken in accordance with the EARs.

However, if this view is not accepted, any inadequacies in the proponent's consultation process have been corrected by the Black Hill Community Group's extensive mail out that occurred during the EA exhibition period.

**Table 3 Record of Website Visits – EA Exhibition Period**



# 3. SUBSIDENCE ISSUES

| Submission Issues: | Raised by: [1] |
|---|---|
| • Detail and location of management strategies<br>• Strategies to ensure flexibility in mine planning and layout designs<br>• Insufficient details provided on subsidence – particularly for non-residential structures, dams, water tanks and on-site effluent disposal systems<br>• Will not be able to use house alarm due to potential movement of land due to subsidence<br>• Concern regarding disruption to watercourses, Black Hill Road (only access to school), public infrastructure<br>• Impacts on ground and surface waters and downstream impacts on Pambalong Nature Reserve and Hexham Swamp<br>• Shallow nature of northern area of extraction – proposed Catholic land development – future school<br>• Need for privacy –ongoing subsidence inspections<br>• Boral plant – impact of subsidence<br>• Mining under gas pipeline<br>• Surface cracking – safety, aesthetics and structures<br>• Cemetery not identified | G4, G5, G8, G10, CG1-2, CG4-5, C1-2, L1-4, L6, L8-12, L17-19, L21, L24, L27-28, L30-33, A1-101, B1-129 |

*1. Refer Appendix A for key to submission numbers.*

The proposed Abel Underground Mine aims to minimise subsidence impacts through the use of flexible bord and pillar techniques with secondary extraction. This method enables the amount of extraction to be varied so that subsidence can be controlled in particular areas.

This method allows flexible mine planning and provides the ability to adapt to changing above and below ground conditions. Given this, the EA provided an overview of the mine method and as much detail as possible of the mine plan, however, the EA is based on current underground coal mine administration by DOP and the Department of Primary industry in that it has relied on the need for the preparation of detailed Subsidence Management Plans (SMP's) prior to any mining occurring that will lead to subsidence. The SMP's will be at an appropriate scale to provide individual property level detail. These SMP's would be prepared in consultation with the property owners, Department of Primary Industries, Mine Subsidence Board, Department of Planning and other relevant agencies well ahead of any mining taking place beneath a particular property. These SMP's will address the concerns of property owners regarding the level of detail in

identifying and managing subsidence protection measures or impacts for particular property features, including all non-residential structures such as dams, fences, water tanks, etc.

The only Donaldson Mine generated traffic using Black Hill Road will be the occasional survey vehicle or personnel visiting properties to undertake monitoring or inspections. Black Hill Road will not be closed by the proposed mining. As per the Statement of Commitments, Principal Residences will not be undermined and electronic systems such as house alarms, smoke detectors, etc will not be affected by the proposal.

With regard to mining in the northern area of the proposed underground lease, where shallower depths may lead to increased subsidence impacts, Donaldson are in regular contact with the Catholic Diocese of Maitland and Newcastle regarding their proposed school plans and any mine works on or below the land allocated for this future development would be planned in consultation with representatives of the Diocese. The Boral plant and equipment will be protected as per a Principal Residence and all planning and monitoring procedures will be the same as for these structures, as described by the EA and the Statement of Commitments.

Concerns were raised regarding the impact of subsidence on various items such as creeks and dams, structures, vegetation communities, cliffs, etc. It is considered that the Mine Subsidence Impact Assessment provided by Volume 3 of the EA provided a comprehensive assessment of potential subsidence, and that the various technical reports (Appendices F to M) provided adequate information on the potential impacts of subsidence on the items raised by the submissions. As noted by the Mine Subsidence Board submission (G8), *"The Board's experience indicates surface impacts on structures can be successfully managed by a suitably designed mine layout or through design or preventative works."* Additionally the Mine Subsidence Impact Assessment concluded that all surface impacts could be successfully managed.

One submission (L28) was concerned that a disused Anglican cemetery off John Renshaw Drive had not been identified and would be subsided. This cemetery was identified (refer Item 14 of Table 3 Volume 1 of the EA) and will be protected in the same manner outlined in the Statement of Commitments for the cemetery adjacent to the Black Hill Church.

Concern was raised that inspection and monitoring activities by Donaldson on private properties would invade residents' privacy. Donaldson Coal will develop a policy in consultation with the relevant landowners to ensure that any communications and on ground works such as inspections, monitoring, remediation works or other required visits, are undertaken at times suitable to the landowner and that particular requests, such as telephone contact prior to visits or entry only at certain times, are documented and followed. These communication protocols will form part of the Individual Property Subsidence Management Plans.

# 4. GREENHOUSE GAS EMISSIONS

| Submission Issues: | Raised by: [1] |
|---|---|
| • Impact from the off site combustion of coal not assessed<br>• Alternative energy sources should be considered instead of coal | G9, CG2-5, L1-3, L5, L7, L9-11, L14-17, L20-24, L27-28, L31, A25, A50-52, A54-55, A60, A68-69, A77, A80, A82-101, B1-129 |

*1. Refer Appendix A for key to submission numbers.*

A large number of submissions were concerned that the combustion of coal from the proposed Abel Underground Mine, after export, would increase the amount of carbon dioxide in the global atmosphere. Carbon dioxide is a greenhouse gas considered to be contributing to an acceleration in global warming.

A calculation of the amount of greenhouse gases released by the mining process, including fuels used by equipment and methane released from underground coal seams, was provided by Section 6.6.7 of Volume 1 of the EA. In view of the large number of submissions concerned with the potential impact of the combustion of the coal a further assessment has been made, which is provided as Appendix B of this Response to Submissions.

Appendix B provides estimates for Scope 3 greenhouse gas emissions and an analysis of compliance of the project with ESD principles in the context of global warming and climate change. The report concludes the following:

*"Because the relationship between global warming and greenhouse gas concentrations is not linear 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).*

*At any point in time, it would be reasonable simply to compare the estimated emission of CO2-equivalent from the various activities with the estimated equivalent global emission of 23 Gtpa. On this basis, the emissions from the mining and burning coal from the Abel Project is estimated to be 0.034% of global CO2-equivalent annual emissions (based on estimated global emissions for the 1990s as provided in the most recent IPPC report (IPCC, 2001)). Thus, the Abel Project could be considered to contribute 0.034% 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 Abel project.*

*Based on the IPPC estimate, that a doubling of the CO2-equivalent concentration in the atmosphere would lead to a 2.5 oC increase in global average temperature, and that the current global CO2 load is 2,750 Gt, we can estimate that the annual emissions from the Abel (including mining, transporting the coal to Newcastle and burning the coal) would lead to an increase in global temperature of 0.000007 oC [(7.866 x 106/2,750 x 109) x 2.5 oC. This calculation assumes that all the CO2 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 Abel 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 Abel Project are unmeasurable. Given this, it is clear that the Abel Project 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."*

# 5. WATER-RELATED ISSUES

| Submission Issues: | Raised by: [1] |
|---|---|
| • Groundwater<br>– concern with directional flows stated and salinity of groundwater,<br>– contamination and drainage of groundwater reserves due to fracturing,<br>– contamination of groundwater by underground injection of Bloomfield tailings. | CG2, CG4-5, G1-3, G5, G9-10, L2-3, L8, L10, L12, L14, L17-18, L21, L24-25, L28-29, L31-32, A1-101, B1-129 |
| • Surface water<br>– impact on Pambalong Nature Reserve<br>– Impact on dams (water supply concerns) and creeks above underground mining,<br>– Impact on Four Mile Creek from Bloomfield discharge<br>– Monitoring of ephemeral creeks (cracking may not be noticed)<br>– Wastewater disposal details required<br>– No 'whole of catchment' analysis completed (re Pambalong/Long Gully)<br>– Long term monitoring and assessment plan required for CHPP surface and groundwater impacts to verify predictions | CG1-2, CG4-5, G1-3, G5, G9-10, L1-3, L8, L10, L12, L14, L17-18, L20-21, L24, L28-29, L31-32, A1-101, B1-129. |

*1. Refer Appendix A for key to submission numbers.*

## 5.1 Groundwater

Technical and review studies relating to water that were undertaken for the Environmental Assessment included the following:

- Groundwater Assessment – Volume 4, Appendix G of the EA;
- Surface Water Assessment for the Underground Mine Area – Section 6.3 of Volume 1;
- Surface Water Assessment and Outline Management Plan (for surface infrastructure areas) – Volume 4, Appendix F;
- Peer Review of the Surface Water Assessment and Water Balance (provided by Appendix F) – Letter contained at front of Volume 1; and
- Peer Review of the Groundwater Model – Letter provided at front of Volume 1.

Groundwater modelling was undertaken by expert modellers Aquaterra Simulations.

As noted by the DNR submission (G1), the variability of water sources and the ecosystems they support creates complexities in the groundwater impact assessment. A key principle of the project is therefore the ongoing monitoring of the mine region to enable refinement of the groundwater

model throughout the project and inclusion of transient event-based groundwater impact assessment.

The DNR submission indicates that *'further development of the groundwater model should be required to include transient impact predictions.*' The Abel groundwater consultant advises that these were carried out during the impact assessment. What hasn't been done is a transient calibration of the model, and it is proposed that this be done at regular intervals during the project, so that the model can be progressively calibrated as mining proceeds, by comparing the actual observed impacts against the model predictions.

Donaldson is in agreement with DNR that the model requires continued refinement and this was catered for by the draft Statement of Commitments provided by Section 7, Part 8 of the EA (Volume 1).

The exclusion of mining under Pambalong Nature Reserve and the restriction to first workings only under more sensitive ecosystem areas will minimise any impact on these items due to changes to groundwater or fracturing.

Concern was raised that the injection of tailings to Bloomfield's former underground mine areas could contaminate regional groundwater. As stated by Section 6.4.4 (iv) of the EA (Volume 1), it is considered that current tailings disposal and water recovery at Bloomfield Colliery is maintaining a groundwater sink within the Bloomfield lease. Therefore, there is believed to be no discharge of tailings leachate off the Bloomfield lease. It is anticipated that this sink will continue as operations continue. Groundwater monitoring bores at locations around the Bloomfield lease will monitor groundwater quality throughout the life of the project.

## 5.2 Response to Kalf Groundwater Study Review

The Department of Planning commissioned an independent review of the groundwater study completed for the Abel Underground Mine project. The review was undertaken by Dr Frans Kalf of Kalf and Associates. Dr Kalf's comments from his review were provided to Donaldson Coal, who were requested to respond as appropriate. A response has been prepared by the Abel project's groundwater study expert and is provided as Appendix D.

## 5.3 Response to Newcastle Herald Letter (5/1/07)

A letter by Leanne Saccaro to the editor was published in the Newcastle Herald on 5 January, 2007. DOP requested that Donaldson Coal response to this letter.

Ms Saccaro raised concerns that the proposed Abel Underground Mine will affect the viability of the Hexham Nature Reserve as the mine will pump out about 3 megalitres per day from underground workings. The impact of the project on the Hexham Nature Reserve and the separate Pambalong Nature Reserve, both of which are well to the east of the proposed mine, is

assessed in detail in the Environmental Assessment Report and associated technical reports.

The Groundwater Assessment report prepared by Peter J. Dundon (Volume 4 of the EA Report, Appendix G) notes as follows:

1. There is no mining proposed underneath or immediately adjoining either Hexham Nature Reserve or Pambalong Nature Reserve. Both swamps will not be affected by mine subsidence at all. Moreover full extraction is not proposed underneath the Blue Gum Creek alluvium, a feeder stream into Pambalong Swamp through the proposed mining area (p. 31).

2. Mine related subsidence is not predicted to cause hydraulic interconnection between the mine workings and the surface or surface alluviums such as to drain surface inflows or alluvial groundwater inflows into the swamps (p. 31).

3. While there is a good hydraulic connection between the swamp water levels and the surface alluvium, there is a distinct lack of correlation between the deeper groundwater levels such as the coal measures and swamp levels, indicating there is negligible connection between the swamps and the deeper groundwater, and hence no likelihood that the pumping of water from the mine workings will deprive the swamps of water (p. 19 - 20 and 21-22).

These conclusions are based upon the detailed expert mine subsidence modelling, data from piezometers adjacent to the swamps and detailed ground water modelling.

Hence there is a high level of confidence that the Pambalong Nature Reserve and the Hexham Swamp will be unaffected by the proposed Abel Underground Mine and that there is no basis for the concerns expressed by Ms Saccaro.

## 5.4 Surface Water

Concerns were raised regarding the potential for impact on Pambalong Nature Reserve and dams and creeks above underground mining areas. Pambalong Nature Reserve was recognised as a sensitive, important ecosystem by the risk assessment undertaken early in the project planning phase. The Reserve has been excluded from mining together with a buffer area. The upstream alluvium area and Blue Gum Creek will experience first workings only to protect water flow to the Reserve.

Some degree of impact to privately owned dams above proposed underground workings is predicted. A dam subsidence management plan for each dam will be prepared prior to any mining below a particular dam. This management plan will detail monitoring to be undertaken and actions to be taken in the event of any damage. Alternative water supply will be provided by Donaldson if required during the repair period.

Potential impact on Four Mile Creek was raised as a concern by a number of submissions. The Surface Water Assessment and Outline Water Management Plan describes how the potential for detrimental impact will be reduced by the proposed alteration to the current water management arrangements. Site water discharge to Four Mile Creek will continue to be from Lake Kennerson. However, the revised water management system aims to reduce discharge from this point and to reduce potential salinity and TSS impacts on Four Mile Creek. Four Mile Creek will be included in the Integrated Surface Water Monitoring System throughout the project life. Maitland City Council's submission (G9) states that it is not clear whether an adequate environmental flow will be maintained in Four Mile Creek. Item 4 of Section 5 of the Surface Water Assessment (App F Volume 4) notes that '*Whilst a reduction in discharge from Lakes Kennerson and Foster is desirable for purposes of minimising potential salinity or TSS impacts on Four Mile Creek, some discharge from this system is required to maintain flows in the creek.'*

## 5.5 Clarification of First Workings under Alluvium and Blue Gum Creek

Volume 1 of the EA contains an error with regard to proposed workings under the Blue Gum Creek alluvium.

Figure 2.2 shows first workings beneath the Blue Gum Creek alluvium, whereas Section 2.4.2 states *"The Blue Gum Creek alluvium will not have first workings".* This sentence is incorrect and the paragraph containing this sentence should read:

*'Negligible subsidence impact – being 20 mm or less of subsidence (which is considered to have negligible impact) achieved by leaving blocks or areas of coal with first workings, designed so as to provide up to 20 mm of subsidence on the surface. This has been applied to Primary residences within the mine site, Black Hill School, Church and cemetery and the Blue Gum Creek Allluvium (refer Section 7 for more detail).'*

Figures 2.2 and 2.8 are correct in showing first workings beneath the Blue Gum Creek alluvium (which on pages 6.36 and 7.5 is referred to as the 'Pambalong Alluvium').

Figures 2.2 and 2.8 also show that the alluvium is located partly above the confluence of Blue Gum Creek and Long Gully. The location of the alluvium is based on the advice of the soil and water consultant engaged for the project and has been taken into consideration in the Mine Plan, which only provides for first workings beneath this alluvium area as shown on Figure 2.2. References to the Alluvium area in Section 6.3.4 (pages 6.36 and 6.38) and item 5.3 of Section 7 (page 7.5) should therefore not include the bracketed statement (*'from the confluence of Long Gully and Blue Gum Creek downstream'*), as the alluvium area has been determined as extending a short way up both Long Gully and Blue Gum Creeks, as shown on Figure 2.2.

## 5.6 Correction to Statement of Commitments – Schedule 1 Streams

Item 5.2 of Section 7, the Statement of Commitments, contains a typographical error. The last dot point should be 2 dot points, reading:

- *'stream channels are maintained with minimal incision from bed grade change; and*
- *stream bed grade change is minimised to provide stable stream length.'*

# 6. FLORA AND FAUNA

| Submission Issues: | Raised by: [1] |
|---|---|
| • Rainforest importance not recognised<br>• Inadequate flora and fauna assessment<br>• Biodiversity of dams not assessed<br>• Section addressing Pambalong Nature Reserve as a whole not included<br>• Need to provide EEC offset area for EEC clearing<br>• More details plans of CHPP expansion area required | CG1-2, CG4, G1-3, G9, L1-3, L8, L10, L12, L21, L224-25, LL28, L32, A31, A33, A52, A63, B1-129 |

*1. Refer Appendix A for key to submission numbers.*

The ecological consultants, in their flora and fauna impact assessment prepared for the Abel Underground Mine project, recognised the importance of the rainforest areas surrounding Long Gully Creek and mapped these areas, as shown on various figures provided in the Environmental Assessment (EA). The rainforest was noted in Table 15 of the EA as particular units of vegetation that were listed as endangered ecological communities or preliminary listed endangered ecological communities.

The ecological importance of Pambalong Nature Reserve was also recognised and discussed in Section 6.7.4 of the EA. The flora and fauna assessment recommended that subsidence be planned so that there would be no loss of ground water or surface flow to these communities, so that they would not be adversely impacted by the proposal. These principles were adopted in the mine design with only first workings proposed under rainforest areas and no workings under Pambalong Nature Reserve.

Submission CG4 Issue 13 lists some of the requirements from the DEC guidelines for a flora and fauna assessment. In the planning focus meeting DOP stated that where areas were to be protected, such as farm dams, or where impact was negligible, such as generalised subsidence across forested areas, then a full flora and fauna assessment and 7-part test was not necessary.

Questions were specifically asked of DOP by the ecological consultant about the farm dams and the response was that if the subsidence was to be managed so that the farm dams would not be damaged then an investigation of these dams for the presence of threatened amphibians (for example, the Green and Golden Bell Frog) would not be necessary.

However as some farm dams (EA Vol 1, p6-17) will suffer water loss and require repairs, Donaldson agrees that an impact assessment of these dams should be conducted and will be undertaken at the SMP stage as part of the detailed property assessments. An assessment at this stage is more appropriate as the mine plan will be more detailed and precise impacts to dams known. Similarly, many dams will not be undermined for many years

and accordingly the flora and fauna characteristics of them could change greatly in this time. Such an approach is appropriate given the flexible mine method proposed and the ability it gives to control surface impacts where the results of such studies require it.

The submission provided by the NSW Department of Environment and Conservation requested that an offset area of 20 hectares of Spotted Gum-Ironbark (being an Endangered Ecological Community) be acquired by Donaldson elsewhere to compensate for the clearing of 8 hectares of such community surrounding the Coal Handling and Preparation Plant (CHPP). There was also concern regarding the amount of clearing that may be required for the construction of the overland conveyor to transport coal from the portal ROM coal stockpile to the CHPP ROM coal stockpile.

Donaldson agrees with the requirement to provide for an EEC offset area.

An appropriate clearing width along the conveyor route would be approximately 15 metres, providing for the conveyor itself and a 3 metre formed track on either side for access and bushfire prevention. This clearing would require the removal of an additional 0.13 ha of Tall Moist Forest (at the crossing of Four Mile Creek) and 2 hectares of Lower Hunter Spotted Gum vegetation community.

# 7. NOISE, VIBRATION/BLASTING & AIR QUALITY

| Submission Issues: | Raised by: [1] |
|---|---|
| • Impact of noise and dust from coal stockpiles, preparation plant<br>• Additional train movements<br>• Internal haulage by truck<br>• Ventilation fan noise and air quality<br>• Cumulative impacts of noise from 4 facilities<br>• Black Hill School and Church not adequately assessed<br>• Need for a Noise Management Plan | CG1, CG4-5, A1-A101, B1-B129, C1, G2-3, G9, L1-L3, L6, L8-L10, L20, L26, L28, L30, L33 |

*1. Refer Appendix A for key to submission numbers.*

## 7.1 Noise Impact Assessment Study

Several submissions were concerned that particular items had not been addressed or were errors in the Environmental Assessment. The impact of noise from the Coal handling and Preparation Plant, train movements, internal haulage, the fan and cumulative impacts were assessed by the Noise Impact Assessment provided as Appendix H Vol 5 of the Abel Underground Mine Environmental Assessment. The impact of noise from these items was found to be below criteria, with the exception of 1 residence with an existing Donaldson Coal agreement regarding noise.

A concern was raised regarding Vol 5 App H Section 5 'reduction of Bloomfield CHPP noise by 10dBA'. This sentence should read as per Volume 1 Section 6.5.4 stating 'partial enclosure and noise screening of drives and conveyors of the Bloomfield CHPP...' which will achieve the 10dBA reduction from existing levels.

Submissions were concerned that the use of internal coal haulage versus a conveyor was not assessed. This was included in Table 13 of the Vol 5 App H Noise Impact Assessment which describes operational scenarios on which the Noise Impact Assessment was based.

Submission L3 was concerned regarding Figures 2.7 and 2.14. Figure 2.7 does not show 2 conveyors as stated by the submission - it shows a sealed haul road/overland conveyor. Figure 2.14 shows a process schematic from the ROM coal stockpile at the CHPP, not at the portal prior to transport to the CHPP.

Vol 5, App. H, Table 1 identifies the lower required noise criteria for schools and places of worship. Table 14 lists Black Hill School (D) and identifies that predicted noise levels will be below the required criteria.

## 7.2 Construction Noise

The Bloomfield Coal Handling and Preparation Plant (CHPP) is currently operational and the impact of noise associated with its operation has been considered in the Noise Impact Assessment (NIA). It is considered that noise from the construction activities associated with upgrading the CHPP will be similar in character to that of the current operation. It is also predicted that the impact of noise from construction will be less than that of operational noise from the CHPP.

## 7.3 Noise Monitoring and Management Plan

A Noise Management Plan will be prepared before the commencement of operation of Abel Coal Mine. This management plan will include a noise monitoring programme which will include measurements of the impact of noise from the CHPP. The noise monitoring programme will be used to verify predicted noise levels contained in the NIA.

## 7.4 Ventilation Fan

Some concern was raised by the submissions regarding the size and scale of the ventilation shaft and fan to be located south of John Renshaw Drive. The Visual Impact Assessment provided as Appendix M, Volume 5 of the Environmental Assessment noted that the lower topography of the immediate area and intervening vegetation would provide a 'visual screen' for the ventilation infrastructure from surrounding areas. One submission (L28) was concerned that the ventilation site was on their land. The proposed site is on land owned by Donaldson Coal.

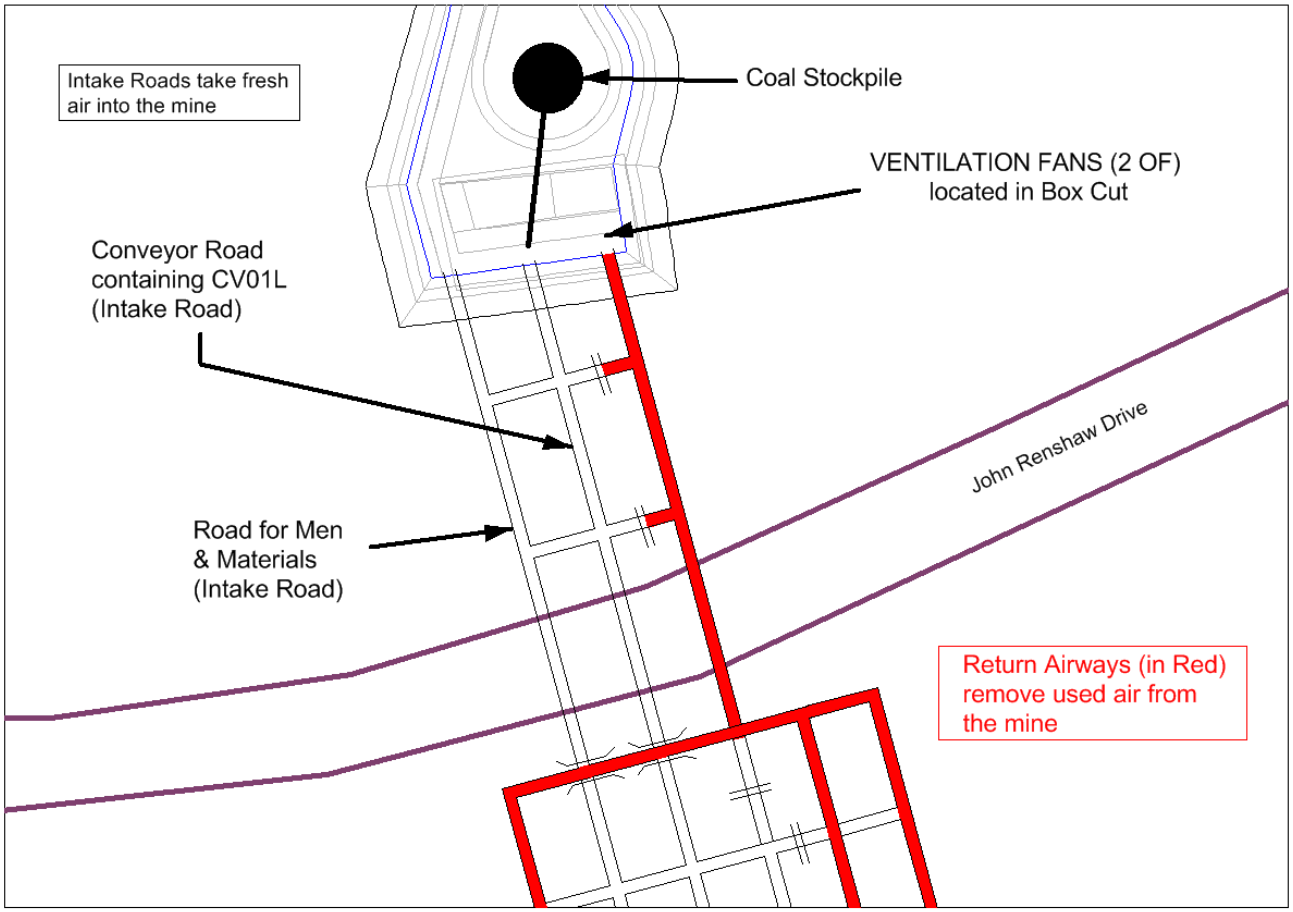
Due to the concerns raised regarding the ventilation shaft and fan, it is now proposed to locate the required infrastructure on the northern side of John Renshaw Drive, near the underground portal that provides access to the Abel mine. This revised location is shown on Figure 2. The ventilation fan would be placed at the eastern portal. Figure 3 shows a graphical representation of a similar ventilation system, showing what the Abel ventilation system would look like within the portal. As can be seen by Figure 3, the system would be located within the void and hidden from external viewpoints by the high void walls.

The ventilation fan infrastructure in this revised location would generally be screened from locations outside the site as it would be within the void created by the completion of Donaldson Open Cut Coal Mine. Any part of the fan that could be viewed from more distant viewpoints, for example, Black Hill, would be seen in this location as a part of the general mine infrastructure.

The project noise and air quality consultants have considered any change in impact from the relocation of the ventilation fan to the portal area. The Noise consultants note that *'the revised ventilation fan location has advantages in terms of noise emission as additional noise attenuation is*

*provided b the mine pit surrounding the portal. The additional topographic screening will result in a reduction on noise levels at receivers surrounding the site. The relocation…will result in a decrease of noise from the ventilation fan at noise sensitive receivers surrounding the Abel Coal Mine site.'*

The air quality consultants consider that *'relocating the ventilation system to the portal would not be expected to have any adverse air quality impacts.'* Appendix C provides details of this response.




| | | |
|---|---|---|
| ABEL PROJECT | Ellemby Resources - 3 January 2007 | |
| FIGURE 2 - REVISED LOCATION OF VENTILATION FANS | Scale = 1:5,000 | S.Thornton |

**Figure 3 Ventilation fan – graphical representations**

Single fan (2 slightly larger adjacent fans are proposed for Abel) at the portal of a mine – this arrangement (with 2 slightly larger fans) is proposed for Abel Underground Mine.

Two adjacent fans (as proposed for Abel Underground Mine) shown prior to installation – people in picture show size and scale of fans and fan housing.

# 8. ABORIGINAL AND OTHER HERITAGE

| Submission Issues: | Raised by: [1] |
|---|---|
| • More comprehensive consultation with knowledge holders in the local Aboriginal community and a comprehensive archaeological survey of the whole site is needed.<br>• Long Gully Aboriginal artefacts<br>• Disused Anglican cemetery not addressed | G3, L20, L28 |

*1. Refer Appendix A for key to submission numbers.*

Submission G3 from Department of Environment and Conservation provided 10 'Conditions relating to protection of Aboriginal cultural heritage'. The project Aboriginal Cultural heritage consultant, Southeast Archaeology, notes the following in response to these conditions:

- With the exception of H1 and H2, essentially the conditions are as we have specified in the report and Aboriginal Heritage Management Plan;
- H1 – the Department of Planning Director-General's requirements were to refer to the DEC Guidelines for Aboriginal Cultural Heritage Impact Assessment and Community Consultation. We have referred to these guidelines as they relate to Aboriginal consultation and involved the Aboriginal community, particularly the Local Aboriginal Land Councils, throughout the assessment, and undertaken to continue to involve these stakeholders in the ongoing management of the heritage resources.
- H2 – the continued involvement of the Aboriginal community in the ongoing management of heritage is well set-out in the Aboriginal Heritage Management Plan provided in Appendix K Volume 5 of the Environmental Assessment.
- H3 – removal of the reference in the first sentence to the "Aboriginal stakeholder reference group" is requested, otherwise H3 is consistent with our submitted study.

The location and importance of Long Gully Aboriginal artefacts was noted by the Aboriginal Heritage Assessment and their location was considered during the mine planning process. Their location in Long Gully is one of a number of factors that led to the Gully being identified as an area for first workings only, to minimise any subsidence impact.

The disused Anglican Cemetery is known to the study team and is identified under Item 4 of Table 3 (Volume 1) of the EA as 'small cemetery off John Renshaw Drive'. This cemetery will have the same subsidence limitations placed on it as the Black Hill cemetery and church.

# 9. VISUAL ISSUES

| Submission Issues: | Raised by: [1] |
|---|---|
| • Size/scale of ventilation fan<br>• Visual impact to Black Hill residents<br>• Floodlighting of Bloomfield stockpiles<br>• Visual quality of Black Hill and Sugarloaf area | CG4, L6, L8, L10, L12, L30 |

*1. Refer Appendix A for key to submission numbers.*

Concern regarding the size and scale of the ventilation fan, as well as access concerns, has led Donaldson to propose relocating the fan to the area north of John Renshaw Drive near the portal. This will reduce any visual impact of this structure that will be seen amongst other similar structures to be located at the portal (refer Section 7.4 for details).

The visual impact of proposed surface infrastructure to Black Hill residents and Ashtonfield residents was assessed by Appendix M of the EA. This assessment concluded that the visual impacts associated with the proposal were low. Lighting of Bloomfield stockpiles for night operations would be directional and shielded from residential viewpoints to the north.

The visual quality of the Black Hill and Sugarloaf area is recognised by Donaldson and was a key consideration in the selection of an underground mining method that would lead to minimal surface disturbance and ensure the continued retention of tree cover. In this way, the proposal is in keeping with the objectives of the Lower Hunter Regional Strategy to retain the Watagan to Stockton Green Corridor.

# 10. SOCIAL AND COMMUNITY ISSUES

| Submission Issues: | Raised by: [1] |
|---|---|
| • Need to assess social capital<br>• Reduction in property values<br>• Health and wellbeing impacts | L2, L32 |

*1. Refer Appendix A for key to submission numbers.*

Two submissions discussed the need to assess 'social capital' within the local region. Social capital includes the value placed on lifestyle, community pride, social wellbeing and cumulative environmental threats. The submissions requested that the social cost to the community should be assessed, including mental health and wellbeing and property values.

Formation of a Mine Subsidence District or undermining of an area does not necessarily lead to a reduction in property values, as shown by high value areas that are part of Mine Subsidence Districts in Newcastle, such as The Hill and Merewether. An Exploration Licence has been held over areas of Black Hill for many years and mining has historically occurred in various parts of Black Hill. However, Black Hill remains a desirable place of residence as shown by property value increases over the past 20 years.

Donaldson recognises and values the social capital of the Black Hill area and has shown this by its decision to propose underground mining with the ability to reduce subsidence to protect sensitive surface features. Health and wellbeing is considered in the assessment of impacts such as air quality, noise and visual impact. All of these impacts have been shown to be minimal or below required or recommended levels.

Donaldson has successfully operated the Donaldson Open Cut Coal Mine within the local community and provides employment for many local residents. It has an active Community Consultative Committee that shows interest in the mine and reports back to the local community, enabling input into key mine decisions.

# 11. ROADS AND TRAFFIC

| Submission Issues: | Raised by: [1] |
|---|---|
| • Safety of Black Hill Road and John Renshaw Drive intersection (not assessed, cumulative impact)<br>• Need for buffer between John Renshaw Drive and surface facilities to reduce distraction to drivers on John Renshaw Drive<br>• Traffic assessment of water haulage by trucks if this occurs<br>• Detail of internal arrangements, including during construction, area required | L2, L6, L8, L10, L21, L27, 32, A32, A34, B1-129 |

*1. Refer Appendix A for key to submission numbers.*

Several submissions were concerned that the Traffic and Transport Assessment (Appendix L Volume 5) prepared for the EA did not assess the intersection of John Renshaw Drive with Black Hill Road. No mine transport is proposed to use this intersection on a regular basis. The only mine–related traffic that would use this intersection would be a small number of personnel visiting the area to monitor subsidence or other environmental parameters, visit residents or undertake any ameliorative works due to subsidence.

The performance of the John Renshaw Drive/Black Hill Road intersection was assessed for the Tasman Mine, which will haul coal by truck to the upgraded Donaldson Open Cut Mine intersection. The additional amount of traffic from Abel that are predicted to use John Renshaw Drive west of the Donaldson intersection (ie: that part of John Renshaw Drive containing the Black Hill Road intersection) was assessed in Table 5.1 of the Abel Traffic and Transport Assessment as 56 vehicles per day, or 0.8%, which is considered a negligible increase by the assessment. There should therefore be negligible change on the performance of the John Renshaw Drive/Black Hill Road intersection.

Figures 2.11 and 2.13 of the EA show the vegetated bund that is currently in place to screen Donaldson Open Cut Mine operations from John Renshaw Drive, and how this will be extended parallel to the road to continue screening the Abel surface infrastructure area once the Donaldson operation is completed. This bund, together with the placement of most surface facilities within the Donaldson Mine final void, will screen operations from John Renshaw Drive.

The potential impact of water haulage to Tasman Mine was assessed by the Tasman Mine EIS, previously approved by the Department of Planning.

Internal traffic arrangements will be detailed in the mine construction plans required as part of the Mining Lease. They will include adequate parking for both Donaldson and Abel Mine personnel and contractors, including temporary arrangements during the construction period.

# 12. COMPATIBILITY WITH EXISTING POLICIES

| Submission Issues: | Raised by: [1] |
|---|---|
| • Proposal is not compatible with the Lower Hunter Regional Strategy or Draft Lower Hunter Regional Conservation Plan<br>• Proposal not compatible with the recommendations for a green corridor proposed by the Draft Thornton/Killingworth Sub-Regional Conservation and Development Strategy | G2, G5, CG4, L1, L8 |

*1. Refer Appendix A for key to submission numbers.*

Several submissions were concerned that the Abel Underground Mine proposal does not comply with relevant regional Strategies.

The Newcastle City Council submission (G2) states that the proposal complies with the objectives of the Lower Hunter Regional Strategy. The submission also notes that the subject land has been identified by the Strategy as forming part of the Watagan to Stockton Green Corridor and that lands within the corridor are to be managed for conservation purposes. Newcastle City Council's submission notes that *'there is no statement in the Lower Hunter Regional Strategy indicating that access to mineral resources should be restricted to protect the proposed green corridor providing issues are thoroughly addressed….It is considered that the proposed underground mine is consistent with the State Government direction for the region.'*

The submission provided by Newcastle City Council also states that the proposal is consistent with the draft Lower Hunter Regional Conservation Plan and the objectives of the current land zoning for that area of land within the Newcastle Local Government Area.

As Abel Mine is an underground mining proposal, the natural values and green corridor of the Black Hill area will be maintained, enabling mining to occur whilst still retaining the green corridor from the Watagans to the north-east.

# 13. CUMULATIVE IMPACTS

| Submission Issues: | Raised by: [1] |
|---|---|
| • Noise and dust impacts from Bloomfield, Donaldson, Tasman and Abel Mines<br>• Traffic flows from Tasman, Donaldson and Abel Mines<br>• Greenhouse gases – cumulative impact from coal mines | CG1, CG3-5, C1, G2, L1-2, L8, L26, L32-33, A1-A101, B13 |

*1. Refer Appendix A for key to submission numbers.*

Cumulative impacts from nearby operational mines were taken into consideration in each technical study prepared for the Abel Environmental Assessment (EA). For example, the air quality impact assessment considered dust from the Donaldson, Bloomfield and Tasman Mines in its assessment of the Abel proposal, as did the Noise Impact Assessment.

The traffic assessment considered the use of John Renshaw Drive by trucks hauling coal from Tasman Mine to the south.

The cumulative impact of greenhouse gases is discussed in Section 4 of this Response to Submissions Report.

Cumulative impact was addressed directly by the EA in Section 6.13 of Volume 1. This section described how the Abel Underground Mine will interact with the operations and scheduling of all nearby mining activities. A key component of the Abel Underground Mine proposal is the development of an Integrated Monitoring Network to ensure that cumulative impact from the Bloomfield, Donaldson, Abel and Tasman Mines is monitored throughout the life of the project. Submission G3 by the Department of Environment and Conservation states that *'DEC welcomes the proponent's proposal to integrate the surface water, noise, groundwater and air quality monitoring programs for the Abel, Donaldson, Bloomfield and Tasman Mines.'*

# 14. RESPONSE TO DPI SUBMISSION

The submission by the NSW Department of Primary Industries (15 November 2006) raised several items that have been reviewed and information is provided as follows. A Donaldson/DPI meeting was held in December 2006 to clarify issues and discuss this response.

## 14.1 Regulatory Process

Excavation of the box-cut (where the underground portal and many surface facilities will be located) and construction of the access road to the box-cut will require modification to the existing Donaldson Open Cut Mine Operations Plan (MOP), which will be undertaken by Donaldson.

An application for a Mining Lease will be submitted in January 2007.

A Draft MOP for Mine Construction and Initial Underground Development will be submitted for consideration during the first quarter of 2007. The MOP will deal with the detailed civil works that are required to build the mine infrastructure, construction of mining infrastructure (both temporary and permanent) and development of the underground mine to a point where the first panel scheduled for secondary extraction will commence.

Donaldson will not commence construction until any Management Plans required by the Project Approval have been submitted and approved, the Mining Lease has been granted, the Construction MOP has been accepted and the Protection of the Environment Operations Licence (required from DEC) has been granted.

Following granting of the Mining Lease, Donaldson will seek the advice of the DPI's Principal Subsidence Engineer with regard to the need for a Subsidence Management Plan (SMP) for the roadways created during the initial development of the mine.

- Prior to commencement of construction:
  - The operator of the mine will be nominated; and
  - The manager of the mine will be nominated.
- Prior to commencement of initial development:
  - The mine will reach agreement with the NSW Roads and Traffic Authority on the support requirements for roadways driven under John Renshaw Drive that will provide a long term stable environment.
- During the initial development of the mine:
  - A MOP will be submitted dealing with up to 7 years of operations at the mine.

- The process of obtaining an SMP and Section 138 Approval will be undertaken.

The mine will not create workings that will potentially lead to subsidence until an approved SMP is in place, nor will the mine commence secondary extraction until an approved SMP is in place and the Section 138 Approval (or the relevant clause under new legislation) has been obtained.

## 14.2 Subsidence

The following response has been prepared with regard to the section of the DPI submission dealing with subsidence and in particular comment 5.

Donaldson has identified all dwellings and the vast majority of other structures above the proposed underground mine area. All major and most minor water storage dams have also been identified. Schedule 2 creeks have been physically examined and all rainforest areas, cliff lines and rocky outcrops have been located either by aerial photography or physical examination.

Where surface constraints exist, appropriate levels of subsidence have been discussed with stakeholders as part of the consultative process.

The strategies for mine planning flexibility remain as per the EA document, being:

- Use of bord and pillar techniques that allow the extraction percentage to be varied (which varies the degree of subsidence);
- Leaving long term stable pillars, or groups of pillars, under surface structures that need management of their subsidence profile, or where surface constraints exist; and
- Pillar design will be undertaken using geotechnical principles.

With regard to the concluding paragraph that deals with the need for SMP requirements within the Project Approval, Donaldson believes that first workings beyond those referred to in Section 3.1 (2) and (3) of the DPI Guidelines have been adequately covered by the existing EA process and that there is no need for them to be brought into consideration by inclusion in the conditions of consent.

Donaldson will seek advice from the DPI's Principal Subsidence Engineer to determine whether an SMP is required for areas where only first workings are planned but not associated with secondary extraction (eg: during the initial development). Donaldson would request that this information be provided in writing in a timely manner.

# 15. CONCLUSION

282 submissions were received by the Department of Planning as a result of the exhibition of the Abel Underground Mine Environmental Assessment.

Submissions received may be categorised as:

- 10 Government agency/representative submissions;
- 3 commercial interest group submissions (1 objection and 2 non-objections to the project);
- 6 community group submissions (5 objections and 1 non-objection);
- 101 copies of a Form Letter 'A', (91 not raising issues in addition to those noted on the form letter);
- 129 copies of a Form Letter 'B', (112 not raising issues in addition to those noted on the form letter); and
- 33 individual letters (all objections).

Several individual letters were received from different individuals within the one household but have been considered as separate submissions.

DOP provided a matrix categorising submission content into various issues. This matrix (slightly modified by Donaldson to assist with number identification) has been used as the basis of Donaldson's response to the submissions. The matrix shows that a large number of submissions were concerned with the potential global impacts of an increase in greenhouse gases from the combustion of coal from the Abel project. This assessment has therefore been prepared as part of this response and concludes that although the Abel contribution is negligible, the impact of this increase should be considered cumulatively.

Other issues that were of concern to a large number of submissions included potential air, noise and water impacts. This Response to Submissions highlights where these issues are addressed in the EA and shows that they have been dealt with in accordance with the requirements of the Director-General.

Many submissions indicated that Donaldson Coal did not consult with the community outside of the area directly above the proposed underground mine. Residents of Ashtonfield, East Maitland, Thornton, Avalon Estate and east of the Freeway considered that they had not been consulted. Section 2 of this report details all of the consultation undertaken for this project and considers that these communities had adequate opportunities to be made aware of the project and to participate in meetings and discussions.

This Response to Submissions has considered all the submissions made by the various stakeholders and community. It is considered that all concerns have now been adequately addressed. It also notes the requirements by the government agencies for various items to be included in the Statement of Commitments and agrees in principle to all requested items forming part of the project commitments.

# Appendix A

## PROPOSED ABEL UNDERGROUND COAL MINE

## SUMMARY OF SUBMISSIONS AND ISSUES RAISED

## Groups/Agencies

| | | Main Issues Raised | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| No. | Company | Sub. | GHG | Surface water | Ground water | F/F | Offsets | Noise | Blast/Vib | Air / Dust | Aboriginal heritage | Non-indig. Heritage | Visual | Social | Traffic | H&S | Cum. impacts | Other |
| **Individual** | | | | | | | | | | | | | | | | | | |
| CG1 | The Black Hill Public School Parents & Citizens Association | 1 | | 1 | 1 | 1 | | 1 | | | | | | | 1 | | 1 | Lack of Community Consultation, Inadequate EA |
| CG2 | Buttai Valley Landcare | 1 | 1 | 1 | 1 | 1 | | | | | | | | | 1 | | | Lack of Community Consultation, Inadequate EA |
| CG3 | Rising Tide Newcastle | | 1 | | | | | | | | | | | | | | 1 | |
| CG4 | The Black Hill Environment Protection Group & The Buttai Community Development Group | 1 | 1 | 1 | 1 | 1 | | 1 | 1 | 1 | | | 1 | | 1 | 1 | 1 | Lack of Community Consultation, Inadequate EA |
| CG5 | Hunter Environment Lobby | 1 | 1 | 1 | 1 | | | 1 | | 1 | | | | | | | 1 | Lack of community consultation |
| CG6 | Community Liaison Committee | | | | | | | | | | | | | | | | | Community Committee Minutes |

## Commercial Interests

| | | Main Issues Raised | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| No. | Company | Sub. | GHG | Surface water | Ground water | F/F | Offsets | Noise | Blast/Vib | Air / Dust | Aboriginal heritage | Non-indig. Heritage | Visual | Social | Traffic | H&S | Cum. impacts | Other |
| C1 | Diocese of Maitland-Newcastle | 1 | | | | | | 1 | 1 | 1 | | | | | 1 | | 1 | Supports proposal |
| C2 | Environmental Resources Management | 1 | | | | | | | | | | | | | | 1 | | |
| C3 | Coal & Allied Operations | | | | | | | | | | | | | | | | | Landowner Agreement |

## Agencies

| | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| G1 | Department of Natural Resources | 1 | | 1 | 1 | 1 | | | | | | | | | 1 | | | |
| G2 | The City of Newcastle | 1 | | 1 | 1 | 1 | | 1 | | 1 | | | | | 1 | | 1 | Community Consultation |
| G3 | Department of Environmental Conservation | | | 1 | 1 | 1 | | 1 | | 1 | 1 | | | | | | | Waste, Stormwater, Chemical Storage |
| G4 | Department of Primary Industries | 1 | | | | | | | | | | | | | | 1 | | Require a Mining Operations Plan |
| G5 | Cessnock City Council | 1 | | 1 | 1 | 1 | | | | | | | | | 1 | | | Lack of Community Consultation, Inadequate EA |
| G6 | Hunter Regional Development Committee | | | | | | | | | | | | | | 1 | | | Lighting |
| G7 | RTA | | | | | | | | | | | | | | 1 | | | Upgrades to roads |
| G8 | Mine Subsidence Board | 1 | | | | | | | | | | | | | | | | |
| G9 | Maitland City Council | | 1 | 1 | | 1 | 1 | 1 | | 1 | | | | | | | | MOU between C&A and govt re offsets |
| G10 | John Mills MP Member for Wallsend | 1 | | 1 | 1 | 1 | | 1 | | 1 | 1 | 1 | 1 | 1 | 1 | | | Community concerns of constituents |

**Submissions - Individuals**

**Individual Letters**

| | | | Main Issues Raised | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| No. | Suburb | Sub. | GHG | Surface water | Ground water | F/F | Offsets | Noise | Blast/Vib | Air / Dust | Aboriginal heritage | Non-indig. Heritage | Visual | Social | Traffic | H&S | Cum. impacts | Other |
| L1 | Black Hill | 1 | 1 | 1 | | 1 | | 1 | | 1 | | | | | | | 1 | |
| L2 | Black Hill | 1 | 1 | 1 | 1 | 1 | | 1 | | 1 | | | | 1 | 1 | | 1 | Inadequate consultation, inadequate EA |
| L3 | Buttai | 1 | 1 | 1 | 1 | 1 | | 1 | | 1 | | | | | | 1 | | Inadequate EA |
| L4 | Black Hill | 1 | | | | | | | 1 | 1 | | | | | | | | |
| L5 | The Hill | | 1 | | | | | | | | | | | | | | | |
| L6 | Black Hill | 1 | | | | | | 1 | | 1 | | | 1 | | 1 | | | Lack of community consultation, inadequate EA |
| L7 | Epping | | 1 | 1 | 1 | 1 | | | | 1 | | | | | | | | Inadequate EA |
| L8 | Black Hill | 1 | | 1 | 1 | 1 | | 1 | | 1 | | | 1 | | 1 | | 1 | Lack of community consultation, inadequate EA |
| L9 | Wallsend | 1 | 1 | | | | | 1 | | | | | | | | | | Decrease in property value |
| L10 | Buttai | 1 | 1 | 1 | 1 | 1 | | 1 | 1 | 1 | | | 1 | | 1 | 1 | | |
| L11 | Auburn | | 1 | | | | | | | | | | | | | | | |
| L12 | Stockrington | 1 | | 1 | 1 | 1 | | | | | | | 1 | | | | | Mining under gas pipeline |
| L13 | Lambton | | | | | | | | | | | | | | | | | Code of Conduct re: community. Landholder compensation |
| L14 | | | 1 | 1 | 1 | | | | | | | | | | | 1 | | Renewable energy sources |
| L15 | | | 1 | | | | | | | | | | | | | | | |
| L16 | | | 1 | | | | | | | | | | | | | | | |
| L17 | | 1 | 1 | 1 | 1 | | | | | | | | | | | | | |
| L18 | Stockrington | 1 | | 1 | 1 | | | | | | 1 | | | | | | | Had to be advised by peers of the community about plans for mining. |
| L19 | Stockrington | 1 | | | | | | | | | | | | | | | | |
| L20 | Stockrington | | 1 | 1 | | | | 1 | | | 1 | | | | | | | Decrease in property value. Insufficient information given at meetings |
| L21 | Stockrington | 1 | 1 | 1 | 1 | 1 | | | | | | | | | 1 | | | Decrease in property value, size and scale of underground mine. |
| L22 | | | 1 | | | | | | | | | | | | | | | Sustainable energy |
| L23 | Black Hill | 1 | 1 | 1 | 1 | 1 | | | | | | | | | | | | Inadequate EA |
| L24 | | | 1 | 1 | 1 | 1 | | | | | | | | | | | | |
| L25 | Avalon Forest | | | | | | | 1 | | 1 | | | | | | | 1 | Have not been consulted but are closest to the mine |
| L26 | Black Hill | 1 | | | | | | | | | | | | | 1 | | | Insufficient time to review EA. |
| L27 | The Junction | 1 | 1 | 1 | 1 | 1 | | 1 | 1 | 1 | | 1 | | | | | | Inadequate EA, was not consulted until 02/11 by proponent, cemetary |
| L28 | Fivedock | | 1 | 1 | 1 | | | | | | | | | | | | | |
| L29 | Black Hill | 1 | | | | | | 1 | | 1 | | | 1 | | | | | Inadequate consultation, inadequate EA |
| L30 | Stockrington | 1 | | 1 | 1 | | | 1 | | 1 | | | | | | | | |
| L31 | Black Hill | 1 | 1 | 1 | 1 | 1 | | 1 | 1 | 1 | | | | 1 | 1 | | 1 | |
| L32 | Thornton | 1 | | 1 | 1 | | | 1 | | 1 | | | | | | | 1 | |
| L33 | Ashtonfield | | | 1 | 1 | | | | | 1 | | | | | | | | |

| | | | Main Issues Raised | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| No. | Suburb | Sub. | GHG | Surface water | Ground water | F/F | Offsets | Noise | Blast/Vib | Air / Dust | Aboriginal heritage | Non-indig. Heritage | Visual | Social | Traffic | H&S | Cum. impacts | Other |
| **Form Letter A** | | | | | | | | | | | | | | | | | | |
| A1 | Ashtonfield | 1 | | 1 | 1 | | | 1 | | 1 | | | | | | | 1 | Lack of community consultation |
| A2 | Thornton | 1 | | 1 | 1 | | | 1 | | 1 | | | | | | | 1 | As above |
| A3 | Tanilba Bay | 1 | | 1 | 1 | | | 1 | | 1 | | | | | | | 1 | As above |
| A4 | Kearsley | 1 | | 1 | 1 | | | 1 | | 1 | | | | | | | 1 | As above |
| A5 | Thornton | 1 | | 1 | 1 | | | 1 | | 1 | | | | | | | 1 | As above |
| A6 | Ashtonfield | 1 | | 1 | 1 | | | 1 | | 1 | | | | | | | 1 | As above |
| A7 | Ashtonfield | 1 | | 1 | 1 | | | 1 | | 1 | | | | | | | 1 | As above |
| A8 | Ashtonfield | 1 | | 1 | 1 | | | 1 | | 1 | | | | | | | 1 | As above |
| A9 | Ashtonfield | 1 | | 1 | 1 | | | 1 | | 1 | | | | | | | 1 | As above |
| A10 | Ashtonfield | 1 | | 1 | 1 | | | 1 | | 1 | | | | | | | 1 | As above |
| A11 | Ashtonfield | 1 | | 1 | 1 | | | 1 | | 1 | | | | | | | 1 | As above |
| A12 | Thornton | 1 | | 1 | 1 | | | 1 | | 1 | | | | | | | 1 | As above |
| A13 | Black Hill | 1 | | 1 | 1 | | | 1 | | 1 | | | | | | | 1 | As above |
| A14 | | 1 | | 1 | 1 | | | 1 | | 1 | | | | | | | 1 | As above |
| A15 | Ashtonfield | 1 | | 1 | 1 | | | 1 | | 1 | | | | | | | 1 | As above |
| A16 | Ashtonfield | 1 | | 1 | 1 | | | 1 | | 1 | | | | | | | 1 | As above |
| A17 | Ashtonfield | 1 | | 1 | 1 | | | 1 | | 1 | | | | | | | 1 | As above |
| A18 | Ashtonfield | 1 | | 1 | 1 | | | 1 | | 1 | | | | | | | 1 | As above |
| A19 | Cardiff | 1 | | 1 | 1 | | | 1 | | 1 | | | | | | | 1 | As above |
| A20 | Greta | 1 | | 1 | 1 | | | 1 | | 1 | | | | | | | 1 | As above |
| A21 | Morpeth | 1 | | 1 | 1 | | | 1 | | 1 | | | | | | | 1 | As above |
| A22 | Ashtonfield | 1 | | 1 | 1 | | | 1 | | 1 | | | | | | | 1 | As above |
| A23 | Telarah | 1 | | 1 | 1 | | | 1 | | 1 | | | | | | | 1 | As above |
| A24 | Cardiff | 1 | | 1 | 1 | | | 1 | | 1 | | | | | | | 1 | As above |
| A25 | | 1 | 1 | 1 | 1 | | | 1 | | 1 | | | | | | | 1 | As above |
| A26 | Ashtonfield | 1 | | 1 | 1 | | | 1 | | 1 | | | | | | | 1 | As above |
| A27 | Ashtonfield | 1 | | 1 | 1 | | | 1 | | 1 | | | | | | | 1 | As above |
| A28 | Ashtonfield | 1 | | 1 | 1 | | | 1 | | 1 | | | | | | | 1 | As above |
| A29 | Ashtonfield | 1 | | 1 | 1 | | | 1 | | 1 | | | | | | | 1 | As above |
| A30 | Ashtonfield | 1 | | 1 | 1 | | | 1 | | 1 | | | | | | | 1 | As above |
| A31 | Thornton | 1 | | 1 | 1 | 1 | | 1 | | 1 | | | | | | | 1 | Lack of community consultation, depreciating house values |
| A32 | Ashtonfield | 1 | | 1 | 1 | | | 1 | | 1 | | | | | 1 | | 1 | Lack of community consultation |
| A33 | Thornton | 1 | | 1 | 1 | 1 | | 1 | | 1 | | | | | | | 1 | As above |
| A34 | Ashtonfield | 1 | | 1 | 1 | | | 1 | | 1 | | | | | 1 | | 1 | Lack of community consultation, mine too large |
| A35 | Ashtonfield | 1 | | 1 | 1 | | | 1 | | 1 | | | | | | | 1 | Lack of community consultation, cannot use house alarm system when mine is in operation due to movement of the land |
| A36 | Ashtonfield | 1 | | 1 | 1 | | | 1 | 1 | 1 | | | | | | | 1 | Lack of community consultation |
| A37 | Ashtonfield | 1 | | 1 | 1 | | | 1 | | 1 | | | | | | | 1 | As above |
| A38 | Ashtonfield | 1 | | 1 | 1 | | | 1 | 1 | 1 | | | | | | | 1 | As above |
| A39 | Ashtonfield | 1 | | 1 | 1 | | | 1 | 1 | 1 | | | | | | | 1 | As above |
| A40 | Ashtonfield | 1 | | 1 | 1 | | | 1 | | 1 | | | | | | | 1 | As above |
| A41 | Ashtonfield | 1 | | 1 | 1 | | | 1 | | 1 | | | | | | | 1 | As above |

| | | | Main Issues Raised | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| No. | Suburb | Sub. | GHG | Surface water | Ground water | F/F | Offsets | Noise | Blast/Vib | Air / Dust | Aboriginal heritage | Non-indig. Heritage | Visual | Social | Traffic | H&S | Cum. impacts | Other |
| A42 | Ashtonfield | 1 | | 1 | 1 | | | 1 | | 1 | | | | | | | 1 | As above |
| A43 | Ashtonfield | 1 | | 1 | 1 | | | 1 | | 1 | | | | | | | 1 | As above |
| A44 | Ashtonfield | 1 | | 1 | 1 | | | 1 | | 1 | | | | | | | 1 | As above |
| A45 | Ashtonfield | 1 | | 1 | 1 | | | 1 | | 1 | | | | | | | 1 | As above |
| A46 | Thornton | 1 | | 1 | 1 | | | 1 | | 1 | | | | | | | 1 | As above |
| A47 | Ashtonfield | 1 | | 1 | 1 | | | 1 | | 1 | | | | | | | 1 | Lack of community consultation, new school opening - children affected |
| A48 | Ashtonfield | 1 | | 1 | 1 | | | 1 | | 1 | | | | | | | 1 | Lack of community consultation |
| A49 | Ashtonfield | 1 | | 1 | 1 | | | 1 | | 1 | | | | | | | 1 | As above |
| A50 | East Maitland | 1 | 1 | 1 | 1 | | | 1 | | 1 | | | | | | | 1 | Lack of community consultation, alternative power resources |
| A51 | Singleton | 1 | 1 | 1 | 1 | | | 1 | | 1 | | | | | | | 1 | Lack of community consultation |
| A52 | Cessnock | 1 | 1 | 1 | 1 | 1 | | 1 | | 1 | | | | | | | 1 | As above |
| A53 | Wangi | 1 | | 1 | 1 | | | 1 | | 1 | | | | | | | 1 | As above |
| A54 | Millfield | 1 | 1 | 1 | 1 | | | 1 | | 1 | | | | | | | 1 | As above |
| A55 | Wallsend | 1 | 1 | 1 | 1 | | | 1 | | 1 | | | | | | | 1 | As above |
| A56 | Ashtonfield | 1 | | 1 | 1 | | | 1 | | 1 | | | | | | | 1 | As above |
| A57 | Ashtonfield | 1 | | 1 | 1 | | | 1 | | 1 | | | | | | | 1 | As above |
| A58 | Ashtonfield | 1 | | 1 | 1 | | | 1 | | 1 | | | | | | | 1 | As above |
| A59 | Ashtonfield | 1 | | 1 | 1 | | | 1 | | 1 | | | | | | | 1 | As above |
| A60 | Ashtonfield | 1 | 1 | 1 | 1 | | | 1 | | 1 | | | | | | | 1 | As above |
| A61 | Ashtonfield | 1 | | 1 | 1 | | | 1 | | 1 | | | | | | | 1 | As above |
| A62 | Ashtonfield | 1 | | 1 | 1 | | | 1 | | 1 | | | | | | | 1 | As above |
| A63 | Ashtonfield | 1 | | 1 | 1 | 1 | | 1 | | 1 | | | | | | | 1 | As above |
| A64 | Ashtonfield | 1 | | 1 | 1 | | | 1 | | 1 | | | | | | | 1 | As above |
| A65 | Ashtonfield | 1 | | 1 | 1 | | | 1 | | 1 | | | | | | | 1 | Lack of community consultation, lighting should be aimed downward |
| A66 | Black Hill | 1 | | 1 | 1 | | | 1 | | 1 | | | | | | | 1 | Lack of community consultation, depreciating house values |
| A67 | Ashtonfield | 1 | | 1 | 1 | | | 1 | 1 | 1 | | | | | | | 1 | Lack of community consultation |
| A68 | Comboyne | 1 | 1 | 1 | 1 | | | 1 | | 1 | | | | | | | 1 | As above |
| A69 | Ashtonfield | 1 | 1 | 1 | 1 | | | 1 | | 1 | | | | | | | 1 | As above |
| A70 | Thornton | 1 | | 1 | 1 | | | 1 | | 1 | | | | | | | 1 | As above |
| A71 | East Maitland | 1 | | 1 | 1 | | | 1 | 1 | 1 | | | | | | | 1 | As above |
| A72 | Ashtonfield | 1 | | 1 | 1 | | | 1 | | 1 | | | | | | | 1 | As above |
| A73 | Ashtonfield | 1 | | 1 | 1 | | | 1 | | 1 | | | | | | | 1 | Lack of community consultation, depreciating house values |
| A74 | Pelaw Main | 1 | | 1 | 1 | | | 1 | | 1 | | | | | | | 1 | As above |
| A75 | Singleton | 1 | | 1 | 1 | | | 1 | | 1 | | | | | | | 1 | As above |
| A76 | Raworth | 1 | | 1 | 1 | | | 1 | | 1 | | | | | | | 1 | As above |
| A77 | East Maitland | 1 | 1 | 1 | 1 | | | 1 | | 1 | | | | | | | 1 | As above |
| A78 | Aberdeen | 1 | | 1 | 1 | | | 1 | | 1 | | | | | | | 1 | As above |
| A79 | Singleton | 1 | | 1 | 1 | | | 1 | | 1 | | | | | | | 1 | As above |
| A80 | Morpeth | 1 | 1 | 1 | 1 | | | 1 | | 1 | | | | | | | 1 | As above |

| | | | Main Issues Raised | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **No.** | **Suburb** | **Sub.** | **GHG** | **Surface water** | **Ground water** | **F/F** | **Offsets** | **Noise** | **Blast/Vib** | **Air / Dust** | **Aboriginal heritage** | **Non-indig. Heritage** | **Visual** | **Social** | **Traffic** | **H&S** | **Cum. impacts** | **Other** |
| A81 | Maitland | 1 | | 1 | 1 | | | 1 | | 1 | | | | | | | 1 | Lack of community consultation, too close to residential & schools |
| A82 | Maitland | 1 | 1 | 1 | 1 | | | 1 | | 1 | | | | | | | 1 | Lack of community consultation |
| A83 | Mindaribba | 1 | 1 | 1 | 1 | | | 1 | | 1 | | | | | | | 1 | As above |
| A84 | Cessnock | 1 | 1 | 1 | 1 | | | 1 | | 1 | | | | | | | 1 | As above |
| A85 | Phoenix Park | 1 | 1 | 1 | 1 | | | 1 | | 1 | | | | | | | 1 | As above |
| A86 | Newcastle | 1 | 1 | 1 | 1 | | | 1 | | 1 | | | | | | | 1 | As above |
| A87 | Hamilton South | 1 | 1 | 1 | 1 | | | 1 | | 1 | | | | | | | 1 | As above |
| A88 | Callaghan | 1 | 1 | 1 | 1 | | | 1 | | 1 | | | | | | | 1 | As above |
| A89 | Hamilton | 1 | 1 | 1 | 1 | | | 1 | | 1 | | | | | | | 1 | As above |
| A90 | East Maitland | 1 | | 1 | 1 | | | 1 | | 1 | | | | | | | 1 | As above |
| A91 | Ashtonfield | 1 | | 1 | 1 | | | 1 | | 1 | | | | | | | 1 | As above |
| A92 | Ashtonfield | 1 | | 1 | 1 | | | 1 | | 1 | | | | | | | 1 | As above |
| A93 | East Maitland | 1 | | 1 | 1 | | | 1 | | 1 | | | | | | | 1 | As above |
| A94 | Maitland | 1 | 1 | 1 | 1 | | | 1 | | 1 | | | | | | | 1 | As above |
| A95 | Waratah | 1 | 1 | 1 | 1 | | | 1 | | 1 | | | | | | | 1 | As above |
| A96 | Rosebrook | 1 | 1 | 1 | 1 | | | 1 | | 1 | | | | | | | 1 | As above |
| A97 | Newcastle | 1 | | 1 | 1 | | | 1 | | 1 | | | | | | | 1 | As above |
| A98 | Raymond Terrace | 1 | | 1 | 1 | | | 1 | | 1 | | | | | | | 1 | As above |
| A99 | Ashtonfield | 1 | | 1 | 1 | | | 1 | | 1 | | | | | | | 1 | As above |
| A100 | Ashtonfield | 1 | | 1 | 1 | | | 1 | | 1 | | | | | | | 1 | As above |
| A101 | Thornton | 1 | | 1 | 1 | | | 1 | | 1 | | | | | | | 1 | As above |

| | | | Main Issues Raised | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| No. | Suburb | Sub. | GHG | Surface water | Ground water | F/F | Offsets | Noise | Blast/Vib | Air / Dust | Aboriginal heritage | Non-indig. Heritage | Visual | Social | Traffic | H&S | Cum. impacts | Other |
| **Form Letter B** | | | | | | | | | | | | | | | | | | |
| B1 | Raymond Terrace | 1 | 1 | 1 | 1 | 1 | | 1 | | 1 | | | | | 1 | | | Lack of community consultation |
| B2 | Kurri Kurri | 1 | | 1 | 1 | | | 1 | | 1 | | | | | | | 1 | As above |
| B3 | Black Hill | 1 | 1 | 1 | 1 | 1 | | 1 | | 1 | | | | | 1 | | | Lack of community consultation, safety of children at school |
| B4 | Black Hill | 1 | 1 | 1 | 1 | 1 | | 1 | | 1 | | | | | 1 | | | Lack of community consultation, concerned for horses |
| B5 | Black Hill | 1 | 1 | 1 | 1 | 1 | | 1 | | 1 | | | | | 1 | | | Lack of community consultation, rainforest on the property |
| B6 | Black Hill | 1 | 1 | 1 | 1 | 1 | | 1 | | 1 | | | | | 1 | | | Lack of community consultation |
| B7 | Valentine | 1 | 1 | 1 | 1 | 1 | | 1 | | 1 | | | | | 1 | | | As above |
| B8 | Stockrington | 1 | 1 | 1 | 1 | 1 | | 1 | | 1 | | | | | 1 | | | Lack of community consultation, experienced mine worker - questions enforcement of not mining coal under residential properties |
| B9 | Buttai | 1 | 1 | 1 | 1 | 1 | | 1 | | 1 | | | | | 1 | | | Lack of community consultation |
| B10 | Black Hill | 1 | 1 | 1 | 1 | 1 | | 1 | | 1 | | | | | 1 | | | As above |
| B11 | Cooks Hill | 1 | 1 | 1 | 1 | 1 | | 1 | | 1 | | | | | 1 | | | As above |
| B12 | Newcastle | 1 | 1 | 1 | 1 | 1 | | 1 | | 1 | | | | | 1 | | | Lack of community consultation, compensation |
| B13 | Black Hill | 1 | 1 | 1 | 1 | 1 | | 1 | | 1 | | | | | 1 | | 1 | Lack of community consultation, depreciation of house value |
| B14 | Black Hill | 1 | 1 | 1 | 1 | 1 | | 1 | | 1 | | | | | 1 | | | Lack of community consultation |
| B15 | Buttai | 1 | 1 | 1 | 1 | 1 | | 1 | | 1 | | | | | 1 | | | As above |
| B16 | Black Hill | 1 | 1 | 1 | 1 | 1 | | 1 | | 1 | | | | | 1 | | | As above |
| B17 | Stockrington | 1 | 1 | 1 | 1 | 1 | | 1 | | 1 | | | | | 1 | | | As above |
| B18 | Buchanan | 1 | 1 | 1 | 1 | 1 | | 1 | | 1 | | | | | 1 | | | As above |
| B19 | Buchanan | 1 | 1 | 1 | 1 | 1 | | 1 | | 1 | | | | | 1 | | | As above |
| B20 | East Maitland | 1 | 1 | 1 | 1 | 1 | | 1 | 1 | 1 | | | | | 1 | | | As above |
| B21 | Stockrington | 1 | 1 | 1 | 1 | 1 | | 1 | | 1 | | | | | 1 | | | As above |
| B22 | Stockrington | 1 | 1 | 1 | 1 | 1 | | 1 | | 1 | 1 | | | | 1 | | | As above |
| B23 | Stockrington | 1 | 1 | 1 | 1 | 1 | | 1 | | 1 | | | | | 1 | | | As above |
| B24 | Ashtonfield | 1 | 1 | 1 | 1 | 1 | | 1 | | 1 | | | | | 1 | | | As above |
| B25 | Black Hill | 1 | 1 | 1 | 1 | 1 | | 1 | | 1 | | | | | 1 | | | As above |
| B26 | Black Hill | 1 | 1 | 1 | 1 | 1 | | 1 | | 1 | | | | | 1 | 1 | | As above |
| B27 | Bolwarra Heights | 1 | 1 | 1 | 1 | 1 | | 1 | | 1 | | | | | 1 | | | As above |
| B28 | Narara | 1 | 1 | 1 | 1 | 1 | | 1 | | 1 | | | | | 1 | | | As above |
| B29 | Narara | 1 | 1 | 1 | 1 | 1 | | 1 | | 1 | | | | | 1 | | | As above |
| B30 | East Maitland | 1 | 1 | 1 | 1 | 1 | | 1 | 1 | 1 | | | | | 1 | | | As above |
| B31 | Buttai | 1 | 1 | 1 | 1 | 1 | | 1 | | 1 | | | | | 1 | 1 | | As above |
| B32 | East Maitland | 1 | 1 | 1 | 1 | 1 | | 1 | | 1 | | | | | 1 | | | As above |
| B33 | Butterwick | 1 | 1 | 1 | 1 | 1 | | 1 | | 1 | | | | | 1 | | | As above |

| | | | Main Issues Raised | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| No. | Suburb | Sub. | GHG | Surface water | Ground water | F/F | Offsets | Noise | Blast/Vib | Air / Dust | Aboriginal heritage | Non-indig. Heritage | Visual | Social | Traffic | H&S | Cum. impacts | Other |
| B34 | Telarah | 1 | 1 | 1 | 1 | 1 | | 1 | | 1 | | | | | 1 | | | As above |
| B35 | Telarah | 1 | 1 | 1 | 1 | 1 | | 1 | | 1 | | | | | 1 | | | As above |
| B36 | Mount Rivers | 1 | 1 | 1 | 1 | 1 | | 1 | | 1 | | | | | 1 | | | As above |
| B37 | Pelaw Main | 1 | 1 | 1 | 1 | 1 | | 1 | | 1 | | | | | 1 | | | As above |
| B38 | Lochinvar | 1 | 1 | 1 | 1 | 1 | | 1 | | 1 | | | | | 1 | | | As above |
| B39 | Newcastle West | 1 | 1 | 1 | 1 | 1 | | 1 | | 1 | | | | | 1 | | | As above |
| B40 | Cedar Creek | 1 | 1 | 1 | 1 | 1 | | 1 | | 1 | | | | | 1 | | | As above |
| B41 | Aberglasslyn | 1 | 1 | 1 | 1 | 1 | | 1 | | 1 | | | | | 1 | | | As above |
| B42 | Morpeth | 1 | 1 | 1 | 1 | 1 | | 1 | | 1 | | | | | 1 | | | As above |
| B43 | Bolwarra | 1 | 1 | 1 | 1 | 1 | | 1 | | 1 | | | | | 1 | | | As above |
| B44 | Butterwick | 1 | 1 | 1 | 1 | 1 | | 1 | | 1 | | | | | 1 | | | As above |
| B45 | Bolwarra Heights | 1 | 1 | 1 | 1 | 1 | | 1 | | 1 | | | | | 1 | | | As above |
| B46 | Lochinvar | 1 | 1 | 1 | 1 | 1 | | 1 | | 1 | | | | | 1 | | | As above |
| B47 | Wollombi | 1 | 1 | 1 | 1 | 1 | | 1 | | 1 | | | | | 1 | | | As above |
| B48 | Wollombi | 1 | 1 | 1 | 1 | 1 | | 1 | | 1 | | | | | 1 | | | As above |
| B49 | Ashtonfield | 1 | 1 | 1 | 1 | 1 | | 1 | | 1 | | | | | 1 | | | As above |
| B50 | Thornton | 1 | 1 | 1 | 1 | 1 | | 1 | | 1 | | | | | 1 | | | As above |
| B51 | Thornton | 1 | 1 | 1 | 1 | 1 | | 1 | | 1 | | | | | 1 | | | As above |
| B52 | Raworth | 1 | 1 | 1 | 1 | 1 | | 1 | | 1 | | | | | 1 | | | As above |
| B53 | Black Hill | 1 | 1 | 1 | 1 | 1 | | 1 | | 1 | | | | | 1 | | | As above |
| B54 | Black Hill | 1 | 1 | 1 | 1 | 1 | | 1 | | 1 | | | | | 1 | | | As above |
| B55 | Black Hill | 1 | 1 | 1 | 1 | 1 | | 1 | | 1 | | | | | 1 | | | As above |
| B56 | Black Hill | 1 | 1 | 1 | 1 | 1 | | 1 | 1 | 1 | | | | | 1 | | | As above |
| B57 | Black Hill | 1 | 1 | 1 | 1 | 1 | | 1 | | 1 | | | | | 1 | | | As above |
| B58 | Black Hill | 1 | 1 | 1 | 1 | 1 | | 1 | | 1 | | | | | 1 | | | As above |
| B57 | Black Hill | 1 | 1 | 1 | 1 | 1 | | 1 | | 1 | | | | | 1 | | | As above |
| B58 | Black Hill | 1 | 1 | 1 | 1 | 1 | | 1 | | 1 | | | | | 1 | | | As above |
| B59 | Black Hill | 1 | 1 | 1 | 1 | 1 | | 1 | | 1 | | | | | 1 | | | As above |
| B60 | Black Hill | 1 | 1 | 1 | 1 | 1 | | 1 | | 1 | | | | | 1 | | | As above |
| B61 | Stockton | 1 | 1 | 1 | 1 | 1 | | 1 | | 1 | | | | | 1 | | | As above |
| B62 | Bolwarra | 1 | 1 | 1 | 1 | 1 | | 1 | | 1 | | | | | 1 | | | As above |
| B63 | Phoenix | 1 | 1 | 1 | 1 | 1 | | 1 | | 1 | | | | | 1 | | | As above |
| B64 | Beresfield | 1 | 1 | 1 | 1 | 1 | | 1 | | 1 | | | | | 1 | | | As above |
| B65 | Tenambit | 1 | 1 | 1 | 1 | 1 | | 1 | | 1 | | | | | 1 | | | As above |
| B66 | Mindaribba | 1 | 1 | 1 | 1 | 1 | | 1 | | 1 | | | | | 1 | | | As above |
| B67 | Black Hill | 1 | 1 | 1 | 1 | 1 | | 1 | | 1 | | | | | 1 | | | As above |
| B68 | Black Hill | 1 | 1 | 1 | 1 | 1 | | 1 | | 1 | | | | | 1 | | | As above |
| B69 | Black Hill | 1 | 1 | 1 | 1 | 1 | | 1 | | 1 | | | | | 1 | | | As above |
| B70 | Black Hill | 1 | 1 | 1 | 1 | 1 | | 1 | | 1 | | | | | 1 | | | As above |
| B71 | Buttai | 1 | 1 | 1 | 1 | 1 | | 1 | | 1 | | | | | 1 | | | As above |
| B72 | Black Hill | 1 | 1 | 1 | 1 | 1 | | 1 | | 1 | | | | | 1 | | | As above |
| B73 | Black Hill | 1 | 1 | 1 | 1 | 1 | | 1 | | 1 | | | | | 1 | | | As above |
| B74 | Black Hill | 1 | 1 | 1 | 1 | 1 | | 1 | | 1 | | | | | 1 | | | As above |
| B75 | Black Hill | 1 | 1 | 1 | 1 | 1 | | 1 | | 1 | | | | | 1 | | | As above |
| B76 | Stockrington | 1 | 1 | 1 | 1 | 1 | | 1 | | 1 | | | | | 1 | | | As above |
| B77 | Stockrington | 1 | 1 | 1 | 1 | 1 | | 1 | | 1 | | | | | 1 | | | As above |
| B78 | Holmesville | 1 | 1 | 1 | 1 | 1 | | 1 | | 1 | | | | | 1 | | | As above |
| B79 | Black Hill | 1 | 1 | 1 | 1 | 1 | | 1 | | 1 | | | | | 1 | | | As above |
| B80 | Stockrington | 1 | 1 | 1 | 1 | 1 | | 1 | | 1 | | | | | 1 | | | As above |
| B81 | Black Hill | 1 | 1 | 1 | 1 | 1 | | 1 | | 1 | | | | | 1 | | | As above |
| B82 | Stockrington | 1 | 1 | 1 | 1 | 1 | | 1 | | 1 | | | | | 1 | | | As above |
| B83 | Buttai | 1 | 1 | 1 | 1 | 1 | | 1 | | 1 | | | | | 1 | | | As above |
| B84 | Black Hill | 1 | 1 | 1 | 1 | 1 | | 1 | | 1 | | | | | 1 | | | As above |
| B85 | Black Hill | 1 | 1 | 1 | 1 | 1 | | 1 | | 1 | | | | | 1 | | | As above |

| | | | Main Issues Raised | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| No. | Suburb | Sub. | GHG | Surface water | Ground water | F/F | Offsets | Noise | Blast/Vib | Air / Dust | Aboriginal heritage | Non-indig. Heritage | Visual | Social | Traffic | H&S | Cum. impacts | Other |
| B86 | Black Hill | 1 | 1 | 1 | 1 | 1 | | 1 | | 1 | | | | | 1 | | | As above |
| B87 | Black Hill | 1 | 1 | 1 | 1 | 1 | | 1 | | 1 | | | | | 1 | | | As above |
| B88 | Black Hill | 1 | 1 | 1 | 1 | 1 | | 1 | | 1 | | | | | 1 | | | As above |
| B89 | Black Hill | 1 | 1 | 1 | 1 | 1 | | 1 | | 1 | | | | | 1 | | | As above |
| B90 | Black Hill | 1 | 1 | 1 | 1 | 1 | | 1 | | 1 | | | | | 1 | | | As above |
| B91 | Buttai | 1 | 1 | 1 | 1 | 1 | | 1 | | 1 | | | | | 1 | | | As above |
| B92 | Buttai | 1 | 1 | 1 | 1 | 1 | | 1 | | 1 | | | | | 1 | | | As above |
| B93 | Newcastle | 1 | 1 | 1 | 1 | 1 | | 1 | | 1 | | | | | 1 | | | As above |
| B94 | Stockton | 1 | 1 | 1 | 1 | 1 | | 1 | | 1 | | | | | 1 | | | As above |
| B95 | East Maitland | 1 | 1 | 1 | 1 | 1 | | 1 | | 1 | | | | | 1 | | | As above |
| B96 | East Maitland | 1 | 1 | 1 | 1 | 1 | | 1 | | 1 | | | | | 1 | | | As above |
| B97 | Cedar Creek | 1 | 1 | 1 | 1 | 1 | | 1 | | 1 | | | | | 1 | | | As above |
| B98 | Thornton | 1 | 1 | 1 | 1 | 1 | | 1 | | 1 | | | | | 1 | | | As above |
| B99 | Eleebana | 1 | 1 | 1 | 1 | 1 | | 1 | | 1 | | | | | 1 | | | As above |
| B100 | Cessnock | 1 | 1 | 1 | 1 | 1 | | 1 | | 1 | | | | | 1 | | | As above |
| B101 | Fullerton Cove | 1 | 1 | 1 | 1 | 1 | | 1 | | 1 | | | | | 1 | | | As above |
| B102 | Ashtonfield | 1 | 1 | 1 | 1 | 1 | | 1 | | 1 | | | | | 1 | | | As above |
| B103 | Bar Beach | 1 | 1 | 1 | 1 | 1 | | 1 | | 1 | | | | | 1 | | | As above |
| B104 | Black Hill | 1 | 1 | 1 | 1 | 1 | | 1 | | 1 | | | | | 1 | | | As above |
| B105 | Black Hill | 1 | 1 | 1 | 1 | 1 | | 1 | | 1 | | | | | 1 | | | As above |
| B106 | Black Hill | 1 | 1 | 1 | 1 | 1 | | 1 | | 1 | | | | | 1 | | | As above |
| B107 | Black Hill | 1 | 1 | 1 | 1 | 1 | | 1 | | 1 | | | | | 1 | | | As above |
| B108 | Black Hill | 1 | 1 | 1 | 1 | 1 | | 1 | | 1 | | | | | 1 | | | As above |
| B109 | Buttai | 1 | 1 | 1 | 1 | 1 | | 1 | | 1 | | | | | 1 | | | As above |
| B110 | Black Hill | 1 | 1 | 1 | 1 | 1 | | 1 | | 1 | | | | | 1 | | | As above |
| B111 | Black Hill | 1 | 1 | 1 | 1 | 1 | | 1 | | 1 | | | | | 1 | | | As above |
| B112 | Black Hill | 1 | 1 | 1 | 1 | 1 | | 1 | | 1 | | | | | 1 | | | As above |
| B113 | Black Hill | 1 | 1 | 1 | 1 | 1 | | 1 | | 1 | | | | | 1 | | | As above |
| B114 | Black Hill | 1 | 1 | 1 | 1 | 1 | | 1 | | 1 | | | | | 1 | | | As above |
| B115 | Black Hill | 1 | 1 | 1 | 1 | 1 | | 1 | | 1 | | | | | 1 | | | As above |
| B116 | Black Hill | 1 | 1 | 1 | 1 | 1 | | 1 | | 1 | | | | | 1 | | | As above |
| B117 | Black Hill | 1 | 1 | 1 | 1 | 1 | | 1 | | 1 | | | | | 1 | | | As above |
| B118 | Black Hill | 1 | 1 | 1 | 1 | 1 | | 1 | | 1 | | | | | 1 | | | As above |
| B119 | Black Hill | 1 | 1 | 1 | 1 | 1 | | 1 | | 1 | | | | | 1 | | | As above |
| B120 | Kurri Kurri | 1 | 1 | 1 | 1 | 1 | | 1 | | 1 | | | | | 1 | | | As above |
| B121 | Woodberry | 1 | 1 | 1 | 1 | 1 | | 1 | | 1 | | | | | 1 | | | As above |
| B122 | Tarro | 1 | 1 | 1 | 1 | 1 | | 1 | | 1 | | | | | 1 | | | As above |
| B123 | Black Hill | 1 | 1 | 1 | 1 | 1 | | 1 | | 1 | | | | | 1 | | | As above |
| B124 | Black Hill | 1 | 1 | 1 | 1 | 1 | | 1 | | 1 | | | | | 1 | | | As above |
| B125 | Black Hill | 1 | 1 | 1 | 1 | 1 | | 1 | | 1 | | | | | 1 | | | As above |
| B126 | Adamstown Heights | 1 | 1 | 1 | 1 | 1 | | 1 | | 1 | | | | | 1 | | | As above |
| B127 | Black Hill | 1 | 1 | 1 | 1 | 1 | | 1 | | 1 | | | | | 1 | | | As above |
| B128 | Buchanan | 1 | 1 | 1 | 1 | 1 | | 1 | | 1 | | | | | 1 | | | As above |
| B129 | Black Hill | 1 | 1 | 1 | 1 | 1 | | 1 | | 1 | | | | | 1 | | | As above |

# Appendix B

## PROPOSED ABEL UNDERGROUND COAL MINE

## GREENHOUSE GAS EMISSIONS

12 December 2006

Prepared for
Donaldson Coal

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 Donaldson Coal. It provides a response to submissions on the greenhouse gas assessment undertaken for the EA for the Abel Underground Coal Mine Project and received during exhibition of the EA. Examples of the submissions are those received from Rising Tide Newcastle and others.

The report provides, in respect of the Abel Coal Project:

- Estimates for Scope 3 GHG emissions; and
- an analysis of compliance of the project 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 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 project 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.

## 2 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

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

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 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 $^{o}$C) (**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.

[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.

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 $CO_2$.

## 3 QUANTIFYING GREENHOUSE EFFECTS

Scientific publications sometimes refer to the quantity of carbon stored in the atmosphere or may refer to the equivalent quantity of carbon dioxide. In this context, 1.0 t of carbon is the same as 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 IPCC (**IPCC, 2001**) estimates that in the 1990s emissions of $CO_2$ from burning fossil fuels and the production of cement, was 6.3 Gt of carbon per year or 23 Gt of $CO_2$ per year. Australia's estimated net emission of greenhouse gases in 2004 (the latest published figure) was 564.7 Mt $CO_2$-equivalent[3] (i.e. 2.4% of the global anthropogenic total).

Because the relationship between global warming and greenhouse gas concentrations is not linear[4] 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*

[3] The use of the term $CO_2$-equivalent is explained in Section 4.

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

*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 °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 °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 $Wm^{-2}$."*

## 4 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.

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 Abel Project, 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 gases 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 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 are not particularly gassy (see later).

Inventories of greenhouse gas emissions[5] can be calculated using published emission factors. Different gases have different greenhouse warming effects (referred to as

[5] 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.

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.

### *4.1 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:

> **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 Abel project.

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 4.4. 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 Abel Project in common with many other mining projects, 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.

### *4.2 Emission factors*

In the EA for the Abel, 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 Abel mine 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).

## *4.3 Abels' Emissions*

### *4.3.1 Emissions from mining*

The project will liberate greenhouse gases as a result of the combustion of diesel to power mining equipment, the use of electrical energy and the emission of methane from the ventilation system

The estimated annual emission of $CO_2$-equivalent are in the range 5,807 t/y in Year 1 to 709,560 t/y in Year 25 (see EA). These can be compared with the estimated total $CO_2$-equivalent emissions for Australia in 2003 of 550 Mt calculated using the Kyoto protocol calculation methods (**Australian Greenhouse Office (2005)** - web site).

### *4.3.2 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 5,807 to 709,560 t/y 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 Abel Project does not propose, nor does its application for approval, seek approval to burn any of the coal produced.

### *4.4 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 30 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 4.5 Mtpa of product coal from the mine to Newcastle to would result in the emission of 1,661 t of $CO_2$-e [12.3 g/t-km x 4,500,000 t x 30 km].

Abel'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.

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.

The mine will export coking coal and thermal coal. These export categories will be derived from mine's production of an average of 4.5 Mtpa (ROM) over 21 years, which is expected to have an 80% yield of product after washing.

The exported product coking coal will average 1.620 Mtpa [4.5 Mtpa x 0.45 x 0.8] and the exported product thermal coal will be 1.980 Mtpa [4.5 Mtpa x 0.55 x 0.8].

Analysis of the coal indicates that coking coal will have a moisture content of 8% and ash content of 10%. Thus on an ash-free dry basis the coking coal will be 82% [100% - 10% -8%] of the total product coking coal. Similarly, the thermal coal will contain 8% moisture and 15% ash, which means that on an ash-free dry basis the thermal coal will be 77% [100% - 8% - 15%] of the total product thermal coal.

Further, the carbon content of the coking coal on an ash-free dry basis is estimated to be 70% and the carbon content of the thermal coal on an ash-free dry basis is estimated to be 67%.

To calculate the quantity of carbon exported it is necessary to convert the exported quantities to an ash-free dry basis and then use the information on the fixed carbon content of the ash-free dry coal to estimate the exported carbon.

Therefore the total carbon exported will then be 1.951 Mtpa [4,500,000 t x 0.55 x 0.80 x 0.77 x 0.67(for thermal coal) +4,500,000 t x 0.45 x 0.80 x 0.82 x 0.70 (for coking coal)]

Assuming that all the carbon in the coal is converted to $CO_2$ and that the $N_2O$ emission is negligible[6]. (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).

Thus, the total annual emission of $CO_2$-equivalent assuming 1.951 Mtpa of carbon is exported and burnt is approximately 7.155 Mtpa.

The total $CO_2$-equivalent emission is therefore 7.866 Mtpa [709,560 tpa (from mining in the worst year) + 7,155,000 tpa (from burning coal/coke in power station or blast furnace) + 1,661 t of $CO_2$-e from transport of coal from Abel 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.)

In addition, there may be a small emission of $CO_2$ from the residual carbon in washery waste, which will be buried and may or may not oxidise depending on how effectively the burial is in excluding oxygen from the carbon. In any case most of the washery waste will be non-combustible and it would not be unreasonable to assume it is negligible.

## 5 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[7] 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*

[6] That the $N_2O$ emissions are a relatively small component of the GHG emission can be seen from the data for power station emissions in the AGO Workbook (see AGO, 2005).
[7] Population remaining fixed and the per capita consumption of energy being fixed.

*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.*

## 6 CONTRIBUTION TO GLOBAL WARMING AND CONCLUSIONS

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

Because the relationship between global warming and greenhouse gas concentrations is not linear[8] 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 3** 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 of 23 Gtpa. On this basis, the emissions from the mining and burning coal from the Abel Project is estimated to be 0.034% of global $CO_2$-equivalent annual emissions (based on estimated global emissions for the 1990s as provided in the most recent IPPC report (**IPCC, 2001**)). Thus, the Abel Project could be considered to contribute 0.034% 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 ABEL.

Based on the IPPC estimate, that a doubling of the $CO_2$-equivalent concentration in the atmosphere would lead to a 2.5 $^{o}$C increase in global average temperature (see **Section 3**), and that the current global $CO_2$ load is 2,750 Gt, we can estimate that the annual emissions from the Abel (including mining, transporting the coal to Newcastle and burning the coal) would lead to an increase in global temperature of 0.000007 $^{o}$C [(7.866 x $10^6$/2,750 x $10^9$) x 2.5 $^{o}$C. This calculation assumes that all the $CO_2$ liberated in a year stays in the atmosphere.

[8] 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 3**).

There will clearly be no measurable environmental effect due to the emissions of greenhouse gases from the Abel 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 Abel Project are unmeasurable. Given this, it is clear that the Abel Project 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.

## 7 REFERENCES

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

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.

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.

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

# Appendix C

## PROPOSED ABEL UNDERGROUND COAL MINE

## Air Quality Implications of Relocating Abel Mine Ventilation System

Prepared for
Donaldson Coal

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

Suite 2B 14 Glen Street,
Eastwood, NSW 2122
Phone 61-2-9874-8644
Fax 61-2-9874-8904
E-mail : Nigel.Holmes@holmair.com.au
ACN 003-741-035
ABN 79-003-741-035

22 December 2006

Ellemby Resources Pty Ltd
67 Bulwer Street
NSW 2320

Attention: Mark McPherson

Dear Mark,

**AIR QUALITY IMPLICATIONS OF RELOCATING ABEL MINE VENTILATION SYSTEM**

## Introduction

You recently enquired about the air quality effects of relocating the ventilation shaft for the Abel Underground Coal Mine from the position proposed in the Environmental Assessment (EA), to the mine portal, which is located to the south of John Renshaw Drive. This letter discusses the proposed change and considers the air quality effects of the change.

## Analysis and discussion

The original location proposed for the ventilation shaft was north of John Renshaw Drive as shown in the attached Figure 2.11 from the EA. The new proposal is to discharge the ventilation air from the mine entry portal located in the Abel Box Cut, a hundred or so metres to the north of John Renshaw Drive.

As described in the air quality assessment, initially mine ventilation air would be discharged at approximately 30 $m^3/s$ but this would be increased over time, reaching approximately 300 $m^3/s$ by Year 25.

In the EA it was noted that the concentration of particulate matter in the ventilation air is unknown and will depend on a number of factors, in particular the effectiveness of dust controls in the mine. Concentrations are unlikely to exceed 5 $mg/m^3$ and so an upper limit for the estimated dust emissions from the ventilation system, working at 300 $m^3/s$, is 47,304 kg/y [300 $m^3/s$ x 5 x $10^{-6}$ $kg/m^3$ x 3600 s/h x 8760 h/y]. This quantity of emission was included in the modelling assessment. Conservatively, it was assumed that the emission would be a volume-source ground-based emission. Thus, the new proposed method of discharge for the ventilation air was in fact modelled in the original assessment. The only difference is that the source is

now 300 to 400 m further to the north and further from the closest residences. The effect that these emissions would have on the dispersion of particulate matter emissions would be to reduce the concentrations of particulate matter at the residences to levels lower than predicted in the EA.

The ventilation air is also a source of greenhouse gas emission but it is irrelevant whether the greenhouse gases are released vertically from a vent shaft or from the portal; the effect on global warming is unchanged.

Finally, since the level of odour in the ventilation air cannot be known until the ventilation system exists, it was not possible to make a reliable quantitative prediction as to odour levels at this time. However, a number of underground mines in NSW have undertaken odour level tests on their ventilation air emissions and odour levels measured have been found to be in the range of less than 60 to 170 ou. In the case of a mine with an odour level of 170 ou, a litre of mine-air would require dilution with 170 litres of odour-free air before the odour would be diluted to the point where 50% of the population could just detect the odour in laboratory conditions. For isolated rural residences the DEC specify an odour goal that requires that the 99-percentile 1-hour average odour level (adjusted using a factor specified by the DEC to allow for the nose response times) should not exceed 7 ou.

The nose response factor for a ground-based volume source is 2.3. Ausplume model runs undertaken assuming the worst-case emission (300 $m^3/s$ and 170 ou) indicate that the 99% ou contour (adjusted for nose response time) is not likely to extend beyond 500 m of the point of emission. There are no residences within this zone and so odour levels would comply with the DEC's assessment criterion.

## Conclusion

Relocating the ventilation system to the portal would not be expected to have any adverse air quality effects.

Please feel free to contact us should you need clarification on any of the above.

Yours faithfully
Holmes Air Sciences

Nigel Holmes PhD
Atmospheric Physicist

# Appendix D

## RESPONSE TO INDEPENDENT GROUNDWATER STUDY REVIEW BY KALF AND ASSOCIATES

**Peter Dundon and Associates**

**Peter Dundon & Associates Pty Limited**
ACN 083 246 459
ABN 27 083 246 459

12 Dakara Close, PYMBLE NSW 2073
telephone: 02-9440 2666
facsimile: 02-9449 3193
mobile: 0418 476 799
email: pjdundon@ozemail.com.au

10 January 2007

Eco Central
9 Willow St
THE ENTRANCE, NSW 2261

Attention: Ms Nicole Croker

Dear Nicole,

**Re: Abel Project – Response to Issues Raised in Kalf Review Report**

I have considered the review report prepared by Dr Frans Kalf for the Department of Planning. This letter provides a response, where appropriate, to the various issues raised in the Kalf review report. The numbering used by Dr Kalf has been followed to facilitate cross-referencing of the responses.

**The Dundon Report**

1. No comment.

2. No comment.

3. No comment.

4. It is agreed that a plot of deviations of monthly rainfalls from the long-term mean rainfalls would be useful to demonstrate the impact of dry climatic conditions in recent years. However, it is not considered necessary as the climatic impact is already quite clear from the hydrographs.

5. It is agreed that the groundwater in the deeper coal measures can interact with the near-surface unconfined groundwater within the regolith or weathered zone, but only in areas where the coal measures aquifers sub-crop or outcrop. However, in a vertical sense, only the uppermost part of the coal measures would be potentially connected to the surficial groundwater in a particular location. The less permeable interburden sediments act as aquitards that effectively isolate the deeper groundwater from the surficial aquifer immediately above it.

   Accordingly, the groundwater associated with the wetlands in Pambalong Nature Reserve is hydraulically isolated from groundwater in the coal measures aquifers at depth, eg the Donaldson seam aquifer and other aquifers in the coal measures. There would be a very small component of vertical flow through the aquitards, but the predominant flow path within the coal measures would be along the bedding. This is a function of the relative permeabilities of the coal seams and the aquitards. The horizontal permeability of the coal seams would be 3-4 or more orders of magnitude higher than the vertical permeability through the aquitards. The vast difference in groundwater levels between the shallow groundwater and the deeper coal measures groundwater confirms that the component of vertical flow is very minor.

   The Donaldson seam aquifer would only be in hydraulic connection with the surficial groundwater in the areas where the seam outcrops, ie updip to the north in the vicinity of the existing Donaldson open cut mine.

I do not agree that the groundwater levels at C081A and B indicate that there would be upward flow of groundwater from the coal measures. The difference in groundwater level merely shows that there is potential for upward flow, which can only occur if there is hydraulic connection vertically between the two aquifers. The water levels in the two aquifers screened in C081A and C081B are determined by the elevations of the respective recharge zones (ie the outcrop or subcrop areas) of these two aquifers. The higher groundwater level in C081B relative to C081A merely indicates that the recharge zone of the aquifer screened in C081B (well to the north of the bore site) is higher than the recharge zone of the aquifer screened in C081B (local to the bore site).

Bore C081A is screened in the shallow near-surface groundwater (ie the alluvium and/or weathered bedrock), and its groundwater level reflects the topography nearby. The deeper piezometer C081B is screened in the Donaldson seam, and its groundwater level reflects the surface topographic elevation in the recharge zone, well updip to the north.

There would theoretically be some flux from the coal measures upwards to the shallow aquifer in this area, as the intervening aquitards do possess some (albeit very low) permeability. However, if the flux were significant, it would cause a depression in the potentiometric surface of the Donaldson seam aquifer towards the Pambalong Swamp. As there is no noticeable decline in the coal seam potentiometric levels in this area, the magnitude of vertical upward flux must be below a significant level.

The potential for mining activity to cause some change to the hydraulic interconnection between aquifers, at least within proximity to the mine, is acknowledged in our report. The impact on overlying strata will be significantly less at Abel compared with typical Hunter coalfields underground mines since the Abel project will not involve total extraction mining.

A comprehensive monitoring program has been proposed, to be implemented during the first few mining panels, to assess the actual subsidence-related groundwater impacts. Based on the impacts observed in the early panels, further modifications to the mine layout could be made if necessary.

6. No comment.

7. See 5 above.

8. It is agreed that the correct terminology is “potentiometric head” and “potentiometric surface”.

9. See 5 above.

10. No comment.

11. No comment.

**The Aquaterra Report**

1. No comment.

2. Layer top and bottom elevations were generated from the regional geological model prepared by Donaldson Coal Pty Ltd.

3. The vertical scale is not shown on Figure 10 of the Aquaterra report (or Figure 11 from Dundon report). This was an oversight. The vertical interval between the major horizontal coordinates shown in bold on Figure 10 of the Aquaterra report is 100m. The minor coordinates shown by faint lines on the figure are spaced at 20m intervals. Thus the vertical separation between the West Borehole seam and the Donaldson

seam is around 200m.

4. It is agreed that further discretisation of the thicker model layers would have been desirable, however the layer configuration used is considered appropriate. There is insufficient data on groundwater levels within Layer 4 to assist calibration of additional layers.

5. Dr Kalf points out that the vertical permeability (Kv) of the alluvium beneath Hexham Swamp was set at a very low value (vertical-horizontal ratio 1:12,000). This was done to simulate the substantial head difference of 20m+ between the alluvium and the deeper coal measures aquifer. In hindsight, it would have been preferable to have lowered the vertical permeability of the coal measures in Layer 4 to achieve the same result. The model predictions would have been essentially the same in these two cases, but a lower Kv in the coal measures would probably be more consistent with the geology than the very low Kv that we assigned to the alluvium.

6. Donaldson Coal Pty Ltd is proposing to set up a larger regional groundwater model for use in monitoring and management of groundwater impacts during the mine development and operational phase. This model would incorporate additional layer discretisation to allow more precise modelling of groundwater flow and water level impacts at a range of depth intervals within the coal measures. The proposed model would also incorporate an improved representation of the surficial aquifer system, developed within the alluvium/colluvium weathered bedrock layer. The model used for assessment of impacts for the EA was necessarily simplified due to the limited detailed hydrogeological information available for the entire project area. Further exploration drilling is ongoing, in conjunction with additional multi-level piezometers, which will continue to expand the available database for calibration of the more detailed model proposed.

7. As indicated in 6 above, an expanded model is to be set up which will eliminate or reduce the reliance on general head boundaries.

8. See 6 above.

9. No comment.

10. No comment.

11. No comment.

12. The proposed improved groundwater model discussed in 6 above, in conjunction with the proposed subsidence monitoring program outlined in Section 5 of the Dundon report, will enable the subsidence impacts on hydrogeology to be simulated and assessed against the broad impact predictions presented in the EA reports.

Yours faithfully,

Peter Dundon