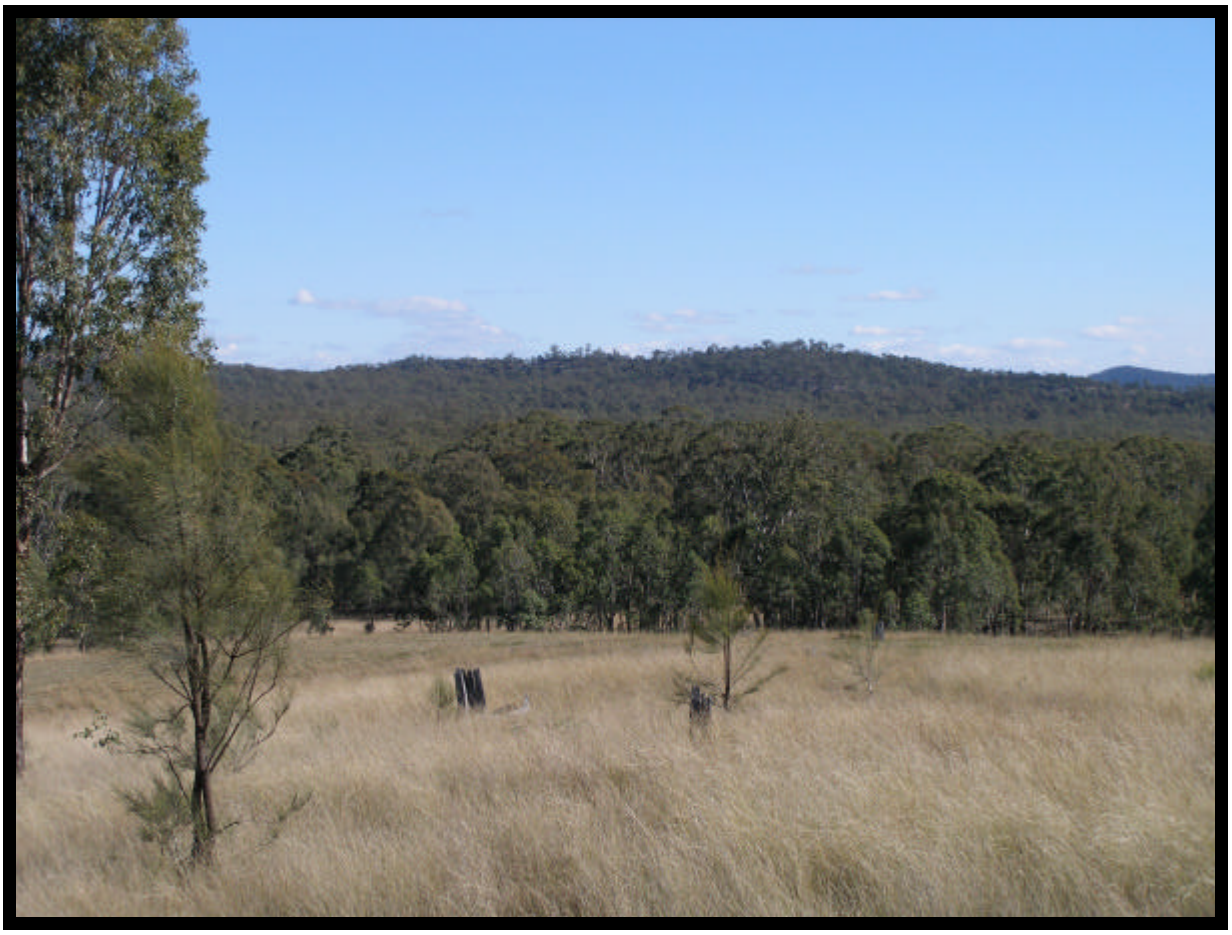
ANVIL HILL COAL PROJECT



INDEPENDENT HEARING AND ASSESSMENT PANEL
ANVIL HILL COAL PROJECT

REPORT TO THE DIRECTOR-GENERAL
DEPARTMENT OF PLANNING

JANUARY 2007

CONTENTS

EXECUTIVE SUMMARY

Centennial Coal Pty Limited (the Proponent) proposes to develop an open cut coal mine near Wybong, 20 km from Muswellbrook in the Hunter Valley region of NSW. The proposal involves open cut mining activities with a product output of up to 10.5 million tonnes of run-of-mine coal per year, construction of access and haul roads as well as rail infrastructure and construction of ancillary infrastructure including a coal handling plant and various service and administrative buildings. Mining operations would be conducted over 21 years and product coal is proposed to be transported to local power generating facilities as well as the Newcastle coal loader for export to overseas markets.

Following exhibition of the Proponent's Environmental Assessment (EA) for the proposal, the Minister for Planning constituted an Independent Hearing and Assessment Panel (Panel) under Part 3A of the *Environmental Planning and Assessment Act 1979* (EP&A Act) to provide advice to the Department of Planning on flora and fauna issues, noise and blasting issues, air quality issues as well as other significant issues raised in the submissions received by the Panel. Other significant issues assessed by the Panel included the impact of greenhouse gas (GHG) emissions from the proposal as well as downstream GHG impacts, water issues including security of water supply to the local community, visual amenity issues as well as the impact the mine may have on the social fabric of the Wybong area.

The Panel comprised the following members:

Dr Andrew Refshauge – Chair
Dr David Robertson – Ecologist
Mr Najah Ishac – Noise expert
Mr Robin Ormerod – Air Quality expert

The Panel received 2,040 submissions and held Panel Hearings in Muswellbrook in October 2006. 28 Parties made presentations to the Panel during the Panel Hearings.

Residents and public interest groups are strongly opposed to the project due to its potentially adverse impacts. Many residents living close to the proposed mining area expressed their concerns relative to social amenity and impacts on water supply. Public interest groups in their submissions were concerned with the impact the project may have on global climate change through direct and indirect greenhouse gas emissions as well as the loss of vegetation and habitat for threatened flora and fauna species. Moreover, the biodiversity offset strategies proposed by the Proponent would take many years to become effective. The local community as well as public interest groups argued that the Anvil Hill coal mine should be refused based on these grounds.

The Panel found the methodologies used by the Proponent in its Environmental Assessment (EA) to be adequate for their purpose. However, interpretation of predicted impacts relating particularly to noise and blasting impacts as well as air quality impacts were questioned by many in the local community. The Panel felt it necessary in light of this to conduct its own analysis in the areas of noise impacts and air quality impacts to test the assumptions in the EA.

Protection of local and regionally significant flora and fauna species as well as loss of vegetation and habitat was a priority concern raised in a large number of submissions. These submissions stated that the assessment in the Proponent's EA was not as comprehensive as the local community would have preferred and that many threatened species were overlooked in the assessment. They also considered the proposed biodiversity offsets inadequate and that rehabilitation and regeneration would not adequately compensate the loss of biodiversity that may result from the proposal.

The Panel notes that the Proponent has undertaken an acquisition program and has already acquired a large number of properties predicted to be significantly impacted by the project. The Panel finds such an approach not

uncommon for mining projects and welcomes such an approach to managing the impacts of the proposal and encourages the Proponent to continue working with the community to reach mutually acceptable solutions to mitigate the impacts of the proposal. At the present time, there remains some 41 properties containing residences along with 11 vacant properties predicted to be significantly impacted by the proposal currently without any form of agreement with the Proponent. The Panel finds this number to be significant when considering the potential impacts the project may have.

With regard to the potential for the project to contribute to climate change the Panel notes the assessment provided by the Proponent in its EA outlining greenhouse gas (GHG) emissions within the project boundaries as well as a further submission from the Proponent taking into consideration all GHG emissions from offsite combustion of coal product from the mine.

The Panel's report has been prepared relative to its Terms of Reference provided by the Minister for Planning. Issues raised in submissions to the Panel are highlighted throughout the report, along with the Panel's assessment of the impacts the mine may have on both natural and social environments and provides recommendations for the Department of Planning to consider in its assessment of the project.

THE PROPOSAL

Centennial Hunter Pty Limited (the Proponent) proposes to establish an open cut coal mine in the Wybong area, 20 kilometres west of Muswellbrook and 10 kilometres north of the township of Denman (figure 1). The proposal is known as the Anvil Hill Coal Project and is based on an undeveloped coal reserve of approximately 150 million tonnes.

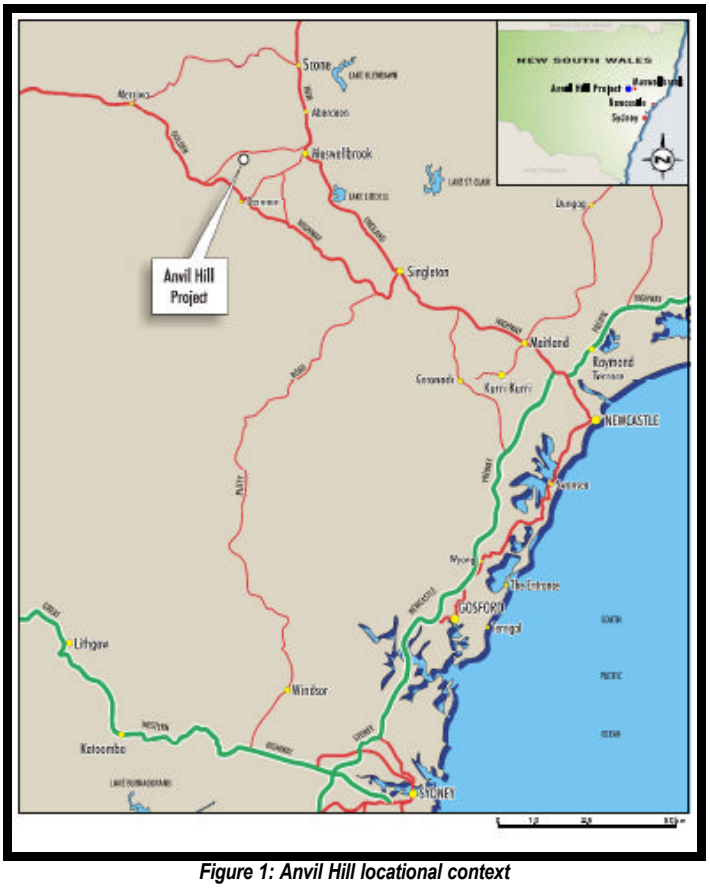


Figure 1: Anvil Hill locational context

The project comprises the design, construction and operation of:

- An open cut coal mine extracting up to 10.5 million tonnes of run of mine coal a year for 21 years;
- Coal handling, crushing and stockpiling facilities and a coal preparation plant;
- Water management, supply and distribution infrastructure;
- Handling and placement of overburden;
- Mine access road, including a new intersection on Wybong Road as well as internal access roads and haul roads;
- Ancillary infrastructure including offices, staff amenities, workshop, conveyors; and
- Rail loop and rail loading infrastructure for the transport of all coal product.

The project area covers an area of approximately 3763 hectares. Of this, the Proponent proposes a disturbance area of approximately 2238 hectares throughout the 21 year life of the mine. The Proponent proposes concurrent operation of four pits for most of the mine life. The proposed mining method has been adapted for this layout and is planned to provide for an efficient operation in which social and environmental impacts can be minimised.

The project involves rehabilitation of the site as the mine progresses to minimise the disturbed area at any time. The final land form would include self sustaining indigenous vegetation communities in addition to agricultural land uses.

INDEPENDENT HEARING AND ASSESSMENT PANEL

On 19 September 2006 the Minister for Planning directed an Independent Hearing and Assessment Panel (Panel) to be constituted under Section 75G of the EP&A Act. The terms of reference for the Panel were to:

Consider and advise on the:

(a) following impacts of the project:
- noise and blasting;
- air quality, in particular dust impacts; and
- flora and fauna, in particular vegetation offsets.

(b) relevant issues raised in submissions in regard to these impacts; and
(c) adequacy of the proponent's response to the issues raised in submissions, and

2. Identify and comment on any other significant issues raised in submissions or during the Panel hearings.

The Panel was comprised of the following members:

Dr Andrew Refshauge, Chair
Dr David Robertson, Cumberland Ecology Pty Limited
Mr Najah Ishac, ERM Pty Limited
Mr Robin Ormerod, Pacific Air International Pty Limited

Under Section 75G of the EP& A Act a Panel may receive submissions from the wider community and hold Panel Hearings before submitting a report containing their findings to the Director-General of the Department of Planning. A Panel of Experts exercises its functions in accordance with arrangements made by the Minister for Planning but is not subject to the direction of the Minister regarding the findings and recommendations of its report.

The Department of Planning publicly notified the Panel and called for submissions relating to the Panel's terms of reference. The notification appeared in the following publications; Newcastle Herald on 21 September, the Muswellbrook Chronicle on 22 September and the Hunter Valley News on 27 September 2006. A total of 2040 submissions were received and considered by the Panel.

Submitters were offered the opportunity to present their submission before the Panel and hearings were held at Muswellbrook Council Chambers between 17-19 October 2006. The Panel heard 28 submissions at the hearings. A list of presenters is contained in Appendix 4 of this report.

ISSUES & CONCERNS RAISED IN SUBMISSIONS

The Panel received 2,040 submissions. A brief summary of the key issues and concerns outlined in submissions follows. The Proponent provided the Panel with a comprehensive response to all issues raised in submissions which the Panel finds to be adequate for its assessment of potential impacts relative to its terms of reference.

Noise and Vibration

- Noise and vibration levels would significantly impact a large number of private properties.
- Vibration levels are predicted to exceed significant damage thresholds for rock structures including Anvil Rock and project approval should include measures to limit damage to rock structures.
- Council approval should be sought to close public roads during blast occurrences and buffer zones established for blasting where public roads are open during blast occurrences.
- Centennial should monitor its blasts and record over pressure and peak particle velocity levels as well as liaise with other mining operators in the area to ensure mine blasting is suitably staged to minimise impacts.
- The EA did not take into account the effects of sound reflections and amplification due to geological structures.
- There is confusion as to what noise mitigation measures would be undertaken by the Proponent where impacted properties are not acquired for whatever reason.
- The EA uses traffic noise algorithms usually suited to far different traffic scenarios than that experienced in the local area.
- It is unclear in the EA whether dilapidation surveys would be conducted by Centennial on noise and blast impacted buildings not acquired by the mine.
- Noise mitigation measures for two extra residences affected by increased noise from the Muswellbrook-Ulan train line.
- Low frequency vibrations and associated impacts.
- Noise impacts on horses.
- Noise impacts from off-site transport.

Air Quality

- Dust emissions would significantly impact a large number of private properties.
- Background PM_{10} levels may be underestimated in the EA and the calibration factor used to determine 24 hour PM_{10} concentrations may cause such concentrations to be underestimated.
- PM_{10} concentrations have not been included in the predictions of 24 hour average PM_{10} concentration.
- Air pollution from uncovered rail wagons was not addressed in the EA.
- The climatic data used by the Proponent relative to Jerrys Plains is irrelevant as it is in an unaffected area.
- Concerns regarding particulate matter generated from on site diesel emissions.
- Dust impacts on local grazing lands and vineyards.
- Cumulative effects of dust with other mining activities in the area.
- $PM_{2.5}$ particles represent the greatest health risk but these particles were not assessed in the EA.
- Air pollution will cause fences to deteriorate.
- The respiratory health of people as well as livestock will be at risk from air pollution.
- Increases in dust deposition will have adverse effects on drinking water
- No dust deposition data was collected from the north-east or south-west corners of the project area.
- No detailed study on $S0_2$, $N0_x$ and C0 emissions was undertaken.
- Concerns regarding odour emissions from spontaneous combustion of stockpiles.

- The rock to be mined is high in silica which will be a major component of the dust. Concerns regarding silicosis
- Concerns regarding gases and fumes from blasting at the mine.
- Concerns regarding the potential for increases in acid rain in the area.
- Dust emissions from the coal handling plant as well as cumulative dust from other local mining operations.

Flora and Fauna

- The project would clear 1304 hectares of treed vegetation of some conservation significance and would clear a further 934 hectares of grassland containing threatened species.
- The project is inconsistent with the objects of *Threatened Species Conservation Act 1997*; *Environmental Planning and Assessment Act 1979*; *Natural Resources Commission Act 2003*; *Catchment Management Authorities Act 2003*; and *Protection of the Environment Operations Act 1997;*
- Proposed mine site has been recommended as a high priority-urgent action area for conservation due to its biodiversity significance and it has been recommended for inclusion in conservation reserves
- The proposal will impact on significant remnant native vegetation, the habitat of threatened species, and water and catchment values;
- Cumulative impacts of the combined operation of the project together with other approved and existing mines in the Region not considered;
- There has been insufficient survey for some species, including terrestrial orchids, as well as some mammals and birds;
- The EA understates the conservation status of vegetation communities at the site and discounts the presence of three EEC's;
- The study area contains large areas of woodland that potentially meet DEH listing criteria, but these are not acknowledged as such in the EA;
- Of the fauna species likely to be significantly impacted by the proposed mine, 13 have been assessed in the 1998 NSW State Government Comprehensive Regional Assessment (CRA) of the Lower North East Region. The implication that the impact on threatened flora and fauna species will be offset by the Proposed Offset Area is false and misleading;
- The EA provides misleading definitions and information in some cases and contains contradictions and inconsistencies; and
- The EA does not consider the impacts of the proposal far enough into the future to be able to assess sustainability adequately. Approval of the proposed project would not be consistent with the principles of Ecologically Sustainable Development.
- There are no reserves on the Hunter valley floor that protect similar vegetation to that on the site;
- There is no justification for the reduction in grassland habitat;
- The remnant woodlands in the project area were identified as irreplaceable for the maintenance of flora and fauna species in the 1998 NSW State Government Comprehensive Regional Assessment of the Lower North East Region;
- The proposed development is located within two Mitchell landscapes which are regionally significant. There is no opportunity for offsets for these landscapes and they should therefore not be cleared;
- The proposed Anvil Hill mine site occurs at the intersection of three Biogeographic Regions and four Botanical Provinces and includes a number of species which are at the limit of their distribution;
- The Western Hunter Narrabeen Footslopes Ironbark-Cypress Pine Woodland is a restricted and poorly reserved community and the proposal will result in the removal of over half of the largest remnant of the community (loss of 740 ha); and
- A number of threatened species, including a viable population of Squirrel Gliders, are expected to become locally extinct in the area as a result of the proposed mine.
- Claims that rehabilitation of the mine site and replanting in the offset areas will improve connectivity in the medium to long term fails to acknowledge that connectivity will be lost in the short to medium term and that it will be some time (if ever) before any of the replanted vegetation will reach the size or maturity to provide adequate habitat resources

- Rehabilitation is likely to be poor on overburden piles due to the contamination of the soil structure.
- Rehabilitated mine sites do not replicate remnant communities that have been destroyed and attempts to re-establish natural communities have not been shown to be successful;
- The proposed Anvil Hill mine site forms part of a recognised biodiversity corridor and is critical for connectivity across the Hunter Valley floor between Manobalai Nature Reserve to the north and the Wollemi National Park and Goulburn River National Park to the south; and
- The corridor strategy is not detailed enough and there is no indication about the basis on which it has been developed.
- Compensatory re-vegetation is not ecologically sustainable in the medium term and cannot ensure the long-term persistence of populations, communities and processes;
- Proposed offset ratios are inadequate and the offsets are not like-for-like;
- There is no long term commitment to offset areas;
- The mitigation strategy fails to acknowledge that more than half of the Proposed Disturbance Area is very poorly represented in the Proposed Offset Area;
- Due to lack of data, the relative importance of the Proposed Disturbance Area and the Proposed Offset Area cannot be compared; and
- The Director General's Requirements are not satisfied because the requirement for no net loss of flora and fauna values in the area in the medium to long term has not been satisfied by the offset strategy.

Other significant issues

Greenhouse Gas Emissions (GHG) and contribution to climate change

- That the Environmental Assessment did not adequately assess the greenhouse gas impacts of the project including emissions from the spontaneous combustion of coal as well as emissions from the burning of the coal, inconsistency in considering greenhouse gas emissions from offsite production of electricity to be consumed on site yet not considering greenhouse gas emissions to be produced from offsite burning of coal.
- That the Proponent failed to consider the environmental impacts of anthropogenic climate change and that the cost of climate change far outweighs the economic benefit of coal exportation.
- That the Proponent failed to consider and assess the cumulative impact of its operations in context with other local mining operations.
- That the Proponent has not made any commitment to reduce or offset greenhouse gas emissions from the project.
- That the Environmental Assessment Report failed to consider the principles of ESD, including the principles of inter-generational equity, the precautionary principle and the polluter pays principle.

Water Issues and Security of Water Supply

- Concerns regarding impacts on downstream flows and impacts on downstream water users;
- No mitigation measures in EA regarding salinity levels in Big Flat Creek;
- Concerns regarding impacts on riparian vegetation on Big Flat Creek;
- Fears the mine will reduce the amount of water available for agricultural and other purposes;
- Concerns regarding the proximity of mining areas to watercourses;
- Impacts on long term groundwater levels;
- Impacts on the general health of creeks in the Wybong, Goulburn and Hunter River systems;
- Potential for saline water in the mine's final voids to contaminate surrounding land;

Visual Amenity

- The Proponent should construct a suitable vegetated bund wall along Wybong Road.
- What mitigation measures are proposed to reduce visual impacts from the mine?
- Concerns over loss of night sky through mine lighting.

Community Impacts

- The Wybong community will be displaced;
- The proposal is creating division within the local community;
- The proposal will impact on the lives of local residents;
- There will be social and psychological impacts on local residents;
- Some residents are opposed to relocation given their family ties to their property;
- Church services may be lost through residents' relocation;
- The sense of home cannot be easily transportable to another place;
- The Proponent must ensure community services are not lost to the area; and
- The Proponent will lease the residences it acquires and its tenants will not be good community participants.

NOISE AND BLASTING

The Proponent provided as assessment of noise and blasting impacts in Appendix 12 of the EA. The Panel's noise impact assessment can be found in Appendix 1 of this report.

Introduction and Methodology

The Panel found the Proponent's noise assessment generally to be acceptable in respect to measurement of background and ambient noise levels for the project area, in that the methodology as outlined in the Industrial Noise Policy (INP) was followed. However, the Panel noted the absence of daily charts of the monitoring of background and ambient noise levels as is often required by the Department of Environment and Conservation (DEC) to satisfy their assessment criteria.

It was necessary for the Panel to conduct their own review of data in respect of this. The results from the review showed the area currently experiences low background and ambient noise levels (below 30dB(A) for all three assessment periods and this finding concurs with the assessment provided in the EA and also the findings in the submission provided to the Panel by DEC.

The Proponent's noise assessment was based upon on-site data collected at Wybong Road between April 2002 and November 2003. The Panel noted that data from part of December 2002 and July 2003 had been omitted from the EA as well as other minor periods. Notwithstanding this, the Panel accepts the data set as being adequate for the purposes of its impact assessment for the proposal.

The Panel undertook a detailed analysis of the data provided to it as a means of reviewing the meteorological conditions accounted for in the EA. From this information it can be ascertained that still winds on winter nights account for 73% of all conditions and includes temperature inversions. Appendix 1 of this report provides detailed analysis of the meteorological data used in the EA.

Issues Raised in Submissions

The following issues relative to noise and blasting impacts were highlighted in submissions to the Panel:

- Noise and vibration levels would significantly impact a large number of private properties.
- Vibration levels are predicted to exceed significant damage thresholds for rock structures including Anvil Rock and project approval should include measures to limit damage to rock structures;
- Council approval should be sought to close public roads during blast occurrences and buffer zones established for blasting where public roads are open during blast occurrences;
- The Proponent should monitor its blasts and record over pressure and peak particle velocity levels as well as liaise with other mining operators in the area to ensure mine blasting is suitably staged to minimise impacts;
- The EA did not take into account the effects of sound reflections and amplification due to geological structures;
- There is confusion as to what noise mitigation measures would be undertaken by the Proponent where impacted properties are not acquired for whatever reason;
- The EA uses traffic noise algorithms usually suited to far different traffic scenarios than that experienced in the local area;

- It is unclear in the EA whether dilapidation surveys would be conducted by the Proponent on noise and blast impacted buildings not acquired by the mine;
- Noise mitigation measures for two extra residences affected by increased noise from the Muswellbrook-Ulan train line;
- Low frequency vibrations and associated impacts;
- Noise impacts on horses; and
- Noise impacts from off-site transport.

Noise and Blasting Criteria and Impact Analysis

Construction Noise Criteria

The Proponent proposes a construction period of up to twelve months. The EA noise assessment does not adopt the ENCM and suggests applying noise level criteria equal to that derived for operational noise. The DEC's submission to the Panel considers this approach acceptable.

The Panel concurs with this approach but recommends that construction works be limited to usual construction hours as specified in the ENCM or 7am to 6pm Monday to Friday and 8am to 1pm Saturdays, with no works on Sunday or public holidays. This time restriction need not apply where works are demonstrated to be inaudible at residences, consistent with the ENCM.

It should be noted that criteria apply at residences only and at a point anywhere within the residential property boundary, or where this is greater than 30m from a dwelling, 30m from the dwelling.

Construction Noise Impact Analysis

Predicted construction noise levels exceed the 35dB(A) adopted criterion at 47 of the 282 receiver locations. Several receivers are predicted to experience noise levels over 40dB(A) with the highest prediction being 54dB(A).

The Panel notes that construction plant for the rail spur was not modelled in a location representative of the worst case for receivers immediately to the south. Impacts would therefore be higher than those presented in the EA for those receivers at times when works are carried out on the spur nearer the main rail line. The predicted noise level at one such location (Receiver 78 – located immediately south of the rail spur) is up to 7dB(A) above adopted criteria and expected to be higher than predicted due to the location of plant closer to this property.

Operational Noise Criteria

The NSW Industrial Noise Policy (INP 2000) provides guidance on noise criteria for the project. The EA assessment adopts this approach inclusive of all on-site operational noise sources, rail load-out and rail spur movements.

The operational Project Specific Noise Level (PSNL) or criteria for residences is 35dB(A)$L_{eq,15minute}$ for the project. Operational noise levels below 35dB(A) at residences are considered to be acceptable according to the INP. Therefore noise levels above 35dB(A) are considered to result in impact according to the INP. DEC also consider that industrial noise levels greater than 10dB above the background result in significant impact. The Panel finds for this project, significant noise impact is possible at a level greater than 40dB(A)$L_{eq,15minute}$. This is based on the INP's provisional minimum background noise level of 30dB(A). It should be noted that intrusive operational noise criteria apply at residences as outlined above.

The Panel concurs with the 35dB(A)$L_{eq,15minute}$ limit and finds that at this level the project will be a significant and highly discernible noise source at residences and that the 40dB(A) level used to define significant noise

impact is high for this area due to lower than average background noise levels. It is likely that 'significant impact' threshold will be observed at lower noise levels.

Operational Noise Impact Analysis

The Project Specific Noise Level (PSNL) is 35dB(A). The EA's approach is that mine operational noise levels will more than likely exceed 40dB(A) at many residences. Predictions in the EA are that impacts are likely at a considerable number of residences in the vicinity of the proposal and the number of affected residences varies throughout the life of the mine. In all, the EA predicts up to 71 residences will be exposed to noise levels greater than 40dB(A), with a further 71 residences experiencing noise levels between 35 – 40dB(A). The Panel finds the number of affected residences to be unprecedented for this type of project.

The EA noise contours were developed by interpolation of results from 282 receiver locations. The Panel finds that the Proponent should exercise care when defining noise affectation areas on the basis of data in the EA, and particularly in areas where there are sparse receiver locations. The software used to calculate predictions in the EA is generally used to generate noise contours from a finer grid of automatically generated receptor locations based on three-dimensional mine plans and topography.

The Panel notes that negotiation between the Proponent and various property owners has occurred subsequent to the EA, resulting in either purchase of properties or agreement between the parties in respect of potential future impacts. This does not change the predicted noise affectation area or the properties that may be impacted. It has resulted in the number of private residences identified as impacted in the EA that remain without agreement with the Proponent as 39, with a further 11 vacant properties being above 40dB(A).

In addition to noise contours, the EA provides predicted tenth percentile occurrence noise levels at the nominated 282 receiver locations. The highest predicted noise levels are 61dB(A) at receiver Location 1 and 62dB(A) at receiver Location 13. It is understood that these two properties contain dwellings have been acquired by the Proponent. A further six residences predicted to experience noise levels at or above 50dB(A) do not have agreements with the Proponent at present. The Panel notes sleep disturbance is predicted at all residences where operational noise levels are above 40dB(A).

Sensitivity Analysis

The mobile plant listed in the Proponent's noise assessment is critical to its predictions as is the plants' geographical location with respect to residences. The Panel considers the quantity of plant listed in the EA to be limited when considering the impacts of a proposal of this size. The Panel considers nevertheless that this is a representative fleet of equipment for noise modelling purposes.

The Panel conducted a sensitivity analysis for mining activities at Year 10 of the operation at the North Pit for Receiver 39 (on Ridgelands Road to the north-west of the project area) which is significantly shielded from the mine by natural topography. Modelled plant included a drill, excavator and bulldozer. The Panel used weather condition 3 in the table above as this condition occurs over 61 percent of the time on winter nights. The results of this modelling gave a noise level of 34.5dB(A), demonstrating that the tenth percentile noise level is marginally lower at 33.9dB(A).

Modifying Mining Operations

The Panel conducted analysis by breaking down the various operational activities within the mine. This allows the noise contribution to be quantified for each activity. This was done again for Receiver 39 (refer to table in Appendix 1). The tenth percentile noise level determined in the EA and used to assess impact at this receiver is 41dB(A). Coaling and Overburden activity in the North Pit are the main contributing noise sources for this receiver location and cessation of either of these two activities provides a marginal 1dB reduction to total received noise.

Similarly, ceasing overburden activity in the Tailings and North Pit results in a 2dB reduction. It should be noted that these simulations are based on the results in the EA and do not consider ramifications of potential underestimation of noise levels identified earlier. The simulations demonstrate that only minor reductions in overall mine noise would be achievable.

Amenity Noise Criteria

The EA assessment correctly adopts the INP amenity criteria for residences. For rural residences, the INP recommends acceptable noise levels as follows:

- Day (7am to 6pm) - 50dB(A)$L_{eq,11hours}$
- Evening (6pm to 10pm) - 45dB(A)$L_{eq,4hours}$
- Night (10pm to 7am) - 40dB(A)$L_{eq,9hours}$

This applies to all industrial noise that may impact residences and therefore requires that these criteria are met on a holistic basis or as a result of all industrial sites cumulatively.

Other identified receiver types in the EA are places of worship. This includes churches on Wybong Road and Castlerock Road. For such receivers the INP suggests an internal noise criterion of 40dB(A)L_{eq} when in use. The EA adopts a more conservative criteria of 35dB(A) internal or 45dB(A) external and the Panel concurs with this approach.

Road Traffic Noise Criteria & Impacts

The Proponent adopts the DEC's Environmental Criteria for Road Traffic Noise (ECRTN). For new developments with potential to create additional traffic on local roads (eg Wybong Road and Bengalla Link Road) the ECRTN recommends a limit of 55dB(A)$L_{eq,1hr}$ and 50dB(A)$L_{eq,1hr}$ for the daytime and night time respectively. This limit applies to the noisiest hour in each period. The ECRTN recommends that where feasible and reasonable, existing noise levels should be mitigated to meet the noise criteria. Traffic generated from the project should not increase existing traffic noise by more than 2dB.

For Denman Road, ambiguity exists as to its classification (ie whether it is a collector or sub-arterial road) with respect to the definitions in the ECRTN. The EA conservatively adopts the collector road classification and hence a traffic noise limit would apply of 60dB(A)$L_{eq,1hr}$ and 55dB(A)$L_{eq,1hr}$ for the daytime and night time respectively. The Panel concurs with the EA's approach but wish to add that guidance from the NSW RTA Environmental Noise Management Manual (ENMM) should also be considered.

The EA predicts that the increase in road traffic volumes on Wybong Road and Bengalla Link Road will result in a 7dB and 11dB increase in existing traffic noise levels respectively. The Panel considers these increases to be significant given the current low ambient noise environment as is the view of DEC in their submission.

The EA indicates that predicted peak hourly traffic noise levels at Wybong Road and Bengalla Link Road will exceed DEC recommended criteria by up to 1.5dB. The EA recommends that monitoring be undertaken to check such predictions and mitigation offered to affected residences if levels are above DEC criteria.

A submission was made in respect of the calculation algorithm used in the traffic noise predictions. The two commonly used algorithms are the UK based Calculation of Road Traffic Noise (CoRTN) and US based Federal Highways (FHWA). The EA adopted CoRTN is often said to be inaccurate at relatively low traffic volumes.

The Panel conducted its own sensitivity analysis using the two methods for the stated volumes for Receiver 168 on Wybong Road, selected arbitrarily. There exists some ambiguity as to the parameter settings that should apply between the two methods. Nonetheless, the resulting discrepancy is either zero dB or up to 2.6dB. That is, the analysis indicates that CoRTN (and therefore the EA) calculation can be up to 2.6dB lower than that for

FHWA for the relatively low volumes on Wybong Road. This suggests the EA traffic noise levels may be underestimated in the Panel's opinion.

The Panel's conclusion therefore is that there will be a marked increase in traffic noise for Wybong Road and Bengalla Link Road residences, which is likely to create concern. The level of impact and exceedance of suitable criteria, whether 1.5dB as stated in the EA or 4dB, is best determined through monitoring as suggested in the EA.

The Panel concurs with the EA in that where traffic noise levels are measured to be above DEC criteria then building architectural treatment should be offered to protect internal noise amenity. In reaching this conclusion it should be noted that the DEC criteria is externally based and therefore architectural treatment may not result compliance with such criteria.

Maximum Traffic Noise Levels

The EA provides calculated Lmax noise levels from heavy vehicles. This highlights the potential of sleep disturbance to residents on Wybong Road and Bengalla Link Road. The EA states "*health and well being will not be significantly impacted*" as a result of the project. The Panel disagrees with this finding given calculated internal noise levels are above 55dB(A) in some cases and recommends that mitigation measures should be offered for residences adversely impacted.

Cumulative Traffic Noise Impact

The EA states that cumulative traffic noise impact as a result of the proposal when combined with the proposed Mount Pleasant Mine would be significant. For Wybong Road, traffic noise levels would remain relatively unchanged as compared to the impacts highlighted as a result of Anvil Hill project alone.
For Bengalla Link Road residences, cumulative traffic noise levels would be higher. Although only 1 additional residence is predicted to be impacted as a result of both projects as compared to Anvil Hill alone. The cumulative assessment assumes Mount Pleasant traffic is part of 'existing' traffic. This artificially inflates existing traffic noise levels and reduces the net increase in traffic noise as a result of Anvil Hill.

A DEC allowance criteria can be adopted for higher existing traffic noise. The Panel disagrees with the assumption that Mount Pleasant traffic is existing traffic. However, the consequences of such an assumption are not significant.

The traffic noise impact due to Anvil Hill alone at Bengalla Link Road residences is not as significant as that due to potential Mount Pleasant traffic. Nonetheless, exceedance of criteria due to Anvil Hill is highlighted at 203G and The Panel recommends mitigation measures be offered for this residence as well as those exceeding DEC criteria along Wybong Road.

Main Rail Line Noise Criteria & Impacts

As discussed earlier, rail spur movements are classified as part of the industrial site in the EA and are correctly assessed in this manner. The EA highlights suitable noise targets that exist in the Australian Rail Track Corporation (ARTC) Pollution Reduction Programs (PRP). These limits have been adopted for the proposal and include:

- Daytime - 65dB(A)$L_{Aeq,15hour}$
- Night time - 60dB(A)$L_{Aeq,9hour}$; and
- Anytime - 85dB(A)L_{Amax}

The Panel concurs with the Proponent's approach. However, several residences are near the junction of the spur to main line and application of the above criteria can be blurred with that applying to the spur and other site activities or the INP 35dB(A)$L_{15minute}$ target. Hence separating these two sets of criteria will be difficult in

practice (eg during compliance should the project gain consent). Wherever there is any ambiguity then the stricter INP based limit should apply.

The EA identifies two additional residences that will be impacted as a result of rail movements on the Anvil Hill to Mount Pleasant and Bengalla to Muswellbrook sections. These additional impacts are predicted to occur at night time. The Panel notes that the project is proposed to add 6 daytime and 4 night time movements to the rail network. This issue highlights the 'creeping' effect of rail traffic and therefore rail noise impact in the area. A consolidated approach to noise mitigation is needed, lead by ARTC and with input from all major rail transport operators in the region.

NOISE MITIGATION MEASURES

At Source Mitigation

The EA outlines several at source noise mitigation options, including:

- Operational noise - restricting truck and dozer movements at night time to below maximum elevation of overburden emplacement areas.
- Reducing Infrastructure plant noise – through a combination of cladding and locating plant in shielded topography.
- Reducing Rail spur noise – location of part of the rail loop is in a cut and shielded from residences. To the south, where the spur emerges from the cutting, a solid 4m high fence is proposed along the eastern side and extends to where the spur meets the main line.
- Trolley assist system - allowing haul trucks to use power from fixed over head power lines and allowing the diesel engine to simply idle. This was not adopted given the limited length of haul roads within the mine.

At Receiver Mitigation

The EA also outlines several at receiver noise mitigation options, including:

- All noise impacts – property acquisition or agreement with residents predicted to be significantly impacted by the mine.
- Traffic noise impacts – architectural treatment of impacted residences.

Panel Comment

The Panel notes the Proponent's approach to mitigation of noise impacts primarily rests upon the acquisition of property or entering into agreements to acquire property should the impacts become too great for residents. The Panel therefore highly recommends that agreements be in place with all residents whose properties are identified as being significantly impacted by the proposal prior to commencement of operations or that this be pursued by the Proponent as a priority. The definition of significant impact is described earlier in this report and is consistent with that used for other mines in the Hunter region (eg an operational noise level of 40dB(A)). There should also be provision for architectural treatment for properties predicted to exceed 35dB(A), as this is the level where impact starts according to the DEC's INP. This is of particular concern for this locality due to the unusually low existing background noise levels. The Panel also recommends the implementation of a real time noise and wind data monitoring program with the view to modifying mining operations as appropriate to reduce noise impacts.

Blast Noise Criteria, Vibration Criteria and Associated Impacts

The Proponent adopted the Australian and New Zealand Environment and Conservation Council (ANZECC) guidelines and the Panel considers this appropriate. Limits apply at residences and other sensitive receiver locations, including:

- The maximum blast overpressure should not exceed 115dB(Lin) for more than 5% of blasts in any year, and should not exceed 120dB(Lin) for any blast; and
- The maximum peak particle ground vibration velocity should not exceed 5mm/s for more than 5% of blasts in any year, and should not exceed 10mm/s for any blast

The EA considers a blast noise overpressure threshold of 133dB(Lin) for damage is appropriate and is consistent with the safe limit recommendations in Australian Standard AS2187.2 of 2006 (revision of the AS2187.2 used in the EA). Predicted blast vibration frequencies (assumed to be 10Hz based on information in the EA) are considered conservative based on the use of the 1993 Standard and the Panel concurs with this approach. The adopted limits are:

- Structures that may be particularly susceptible to ground vibration – 5mm/s;
- Houses and low-rise residential buildings; commercial buildings not included below – 10mm/s
- Commercial and industrial buildings or structures of reinforced concrete or steel construction – 25mm/s

The EA identifies 23 residences likely to experience ground vibration levels above recommended criteria. An additional 21 residences are predicted to experience blast noise overpressure levels above assessment criteria. It can be concluded that dwellings inside the 5mm/s blast induced ground vibration contour prediction have the potential to face structural damage.

The adopted damage limit of 50mm/s for the Transgrid 500kV power transmission towers is said to be exceeded. The Panel notes that referenced specific calculated vibration levels at pylons are missing from the EA. The EA states that Transgrid have suggested a ground vibration limit of 50mm/s to apply at the power line towers which the Panel considers appropriate.

The RCA Geotechnical report (RCA) in the EA concedes that based on preliminary blast ground vibration predictions also in the EA there is the potential for damage to be caused to rock structures and shelters. RCA goes on to outline treatment options that the Proponent would investigate as mining proceeds. The report also provides Estimated Significant Damage Threshold values for identified rock structures in terms of peak particle velocity (ppv) and measured in mm/s. These threshold values range from 90mm/s for Anvil Rock and The Book to 210-280mm/s for a given rock shelter and depends on the risk of damage estimation developed for each structure. RCA also recommends treatment options specifically for each structure.

The Panel disagrees with the derived peak particle velocity criteria by RCA as outlined in the EA. These criteria are considered too high given the uncertainty surrounding the condition of rock structures and potential impacts from blasting. This view is confirmed by the review of the RCA Geotechnical report conducted by Pells Sullivan and Meynink Pty Ltd Engineering Consultants Rock-Soil-Water (Pells). This review can be found in Appendix 1 of this report. The Panel instructed Pells to provide a desktop review and the results of the review suggest the Proponent should apply a precautionary approach to blast induced ground vibration for rock structures.

Accordingly, the Panel recommends the following criteria be applied:

- Highly Vulnerable (fragile) structures - <5mm/s;
- Vulnerable structures - 10 to 40 mm/s; and
- Robust structure - 100mm/s.

The EA highlights blast induced ground vibration levels in excess of adopted limits during the latter part of mining when blast locations are closest to such rock structures. The EA particularly notes significant exceedances at Anvil Rock and The Book structures. The potential impact on Aboriginal rock shelters and other rock features in the area remains significant. The Panel considers the risk of potentially significant damage to rock structures remains high.

Panel Comment

The Panel generally agrees with the assumptions and predictions in the EA with regard to blast noise and vibration. The Pells assessment shows however that the potential for damage to rock structures through blasting is high and the Panel recommends a precautionary approach be taken by the Proponent relative to its blasting regime and that monitoring of rock structures should take place so that the impacts on those structures can be analysed. With regard to impacts on residences, the Panel finds the Proponent should undertake inspection of privately owned residences inside the 5mm/s contour before and after blasting occurs and that damage to residences from blasting should be mitigated by the Proponent, irrespective of any agreement in place between the owner and the Proponent.

RECOMMENDATIONS

Noise Impacts

In regard to noise impacts from the project, the Panel recommends the following:

- The Proponent undertakes to perform at source mitigation measures as outlined in the EA and in this section.
- The Proponent continues to offer negotiation agreements to affected residents predicted to be exposed to noise levels over 40dB(A). The Proponent should attempt to enter into agreement with as many residents as possible prior to commencement of mining activities.
- Where residents are exposed to noise levels between 35-40dB(A), the proponent should offer other mitigation measures such as architectural treatment of residences.
- For main rail line noise, limits should not exceed those outlined in the EA in accordance with ARTC Pollution Reduction Programs.
- Mitigation measures including architectural treatment be offered by the Proponent to affected residences along Wybong Road exceeding DEC criteria for traffic noise impacts
- The Proponent should offer mitigation measures to the owner of residence numbered 203G in the EA regarding traffic noise impacts on Bengalla Link Road
- A comprehensive real time noise and wind data monitoring program be developed and implemented. This will include real time noise monitoring at several locations representative of the most exposed residences at the time.

- Mine operational noise modelling should be expanded to include that for a temperature inversion of 4°C/100 metres and easterly and south-easterly winds of 2.5 metres per second. Alternatively, the Proponent should rely on thorough noise monitoring to determine the extent of impacted properties.

Blasting Impacts

With regard to the impacts of blasting the Panel recommends the following:

- The Proponent should adopt a precautionary approach to its blast regime.
- In the earlier stages of mining when blasting is stated to occur furthest from rock structures, all blasts should be monitored and ground vibration transmissibility better defined by the Proponent. This will allow more accurate and site specific predictions for future blasts.
- The Proponent should employ appropriate qualified persons to inspect rock structures of significance to better understand effects of blasts during the first blast regime.
- The Proponent should include ground vibration monitoring at rock structures so that effects can be analysed with respect to actual blast vibration levels at the structures. From this information a threshold ground vibration limit may be derived depending on the results of this analysis.
- Where identified rock structures of significance are predicted to be exposed to ground vibration above 40mm/s ppv, monitoring should be carried out by the Proponent, including ground vibration levels at the structures and inspection of rock condition before and after each blast. Where monitoring identifies and demonstrates ppv limits above 40mm/s is not likely to cause damage, then these limits may apply.
- Privately owned residences inside the 5mm/s blast contour should undergo thorough inspection prior to commencement of any blasts and should be re-inspected after blasting in areas nearest to these residences. This should take place irrespective of the existence of agreements between the resident and the Proponent. Where damage is identified, repairs should be undertaken at the Proponent's expense.
- Blast times should be strictly limited to daytime only (ie 9:00am to 5:00pm)

AIR QUALITY

The Proponent provided an air quality assessment in Appendix 10 of the EA. The Panel's air quality assessment can be found in Appendix 2 of this report.

Introduction and Methodology

The EA Air Quality Assessment is a thorough, comprehensive and detailed study that follows an accepted methodology. The panel concurs with most elements of the assessment in the EA and the Proponent's responses to air quality issues in general. However, some elements of the methodology used by the Proponent are questioned by the Panel. These relate to the following:

- Reliance on a 90% level of dust control for haul roads;
- Assumptions about the level of emissions from some other sources; and
- Estimation of atmospheric stability classes in the dispersion modelling.

The EA incorporated a baseline air quality monitoring program, measuring dust deposition at 20 sites and the concentration of PM_{10} at 2 sites. TSP was also measured at one of the PM_{10} monitoring sites. Meteorological data was used in the Proponent's modelling in two ways, to provide the necessary information on wind and turbulence in the lower atmosphere to estimate the dispersion of dust from the mine, and to calculate dust emissions that are dependent on wind speed and/or rainfall.

Rainfall data from Jerrys Plains was used for emissions estimation as no local data was available. The Proponent also developed a meteorological file containing relevant data for every hour of a one-year period for dispersion modelling and the choice of method was dictated by the nature of the data measured by the weather station.

The Proponent selected the Industrial Source Complex Short-Term Model version 3 (ISC3) to model plume dispersion. ISC3 has wide application in Australia for mining dust assessments. DEC expressed concern in its submission that a correction factor used by the Proponent in the prediction of 24-hour PM_{10} concentrations may have led to the underestimation of 24-hour average PM_{10} concentrations.

A separate study was undertaken by the Proponent comparing modelled and measured dust levels at the Bengalla mine near Muswellbrook, leading to the adoption of a correction factor of 1.6 for 24-hour average PM_{10} concentration predictions for the project. Subsequently, the Proponent's Response to Submissions (Part B, Section 4) showed that a modified version of ISC3 (ISCMOD) yielded very similar predictions without the need for a correction factor.

Issues Raised in Submissions

The following issues were raised in submissions to the Panel relative to air quality impacts:

- Dust emissions would significantly impact a large number of private properties.
- Background PM_{10} concentrations may be underestimated;
- Use of a calibration factor to adjust predicted 24-hour average PM_{10} concentrations may lead to underestimation of impact;
- Background PM_{10} should be included in 24-hour average PM_{10} concentration predictions;
- Greenhouse gas emissions estimation;

- The contribution to global warming of greenhouse gas emissions from the mine and from coal combustion;
- Coal dust from open trains;
- Use of climatic data from Jerrys Plains;
- Diesel emissions;
- Impact of dust on pasture for grazing animals;
- Dust impact on vineyards;
- Dust impacts on surface water;
- Cumulative effects of dust from other mines;
- Absence of assessment of ultrafine dust particles ($PM_{2.5}$), which represent the greatest health hazard;
- Fence deterioration from acid gases and particles depositing and causing corrosion;
- Serious respiratory ailments in foals and yearlings caused by dust;
- Human health impacts such as asthma;
- Effects of dust on drinking water quality from rainwater tanks;
- Perceived inadequacies in the background air quality monitoring;
- SO_2, NO_x and CO emissions;
- Odours;
- Unreliability of model predictions of dust impacts, based on experience in Muswellbrook;
- Extent of dust 'impact zone', particularly in areas downwind of mine in southeast winds;
- Silica dust and associated health impacts;
- Gases and fumes from blasting;
- Increase in 'acid rains' in the region;
- Dust from the coal handling plant and cumulative dust from other mines; and
- Visual range and dust.

Air Quality Assessment Criteria and Associated Impacts

The criteria used in the EA to assess the impacts of dust emissions from the mine are consistent with the normal requirements of DEC and in line with other similar assessments in NSW. The EA shows the predicted maximum 24-hour PM_{10}, annual average PM_{10}, annual average TSP as well as the annual average dust deposition. For the annual average results, the enhanced (bold) contours presented in the EA in Figures 12 to 16 indicate the level at which the predicted contribution from the mine and the existing background combine to equal the relevant DEC criterion.

The Panel reviewed Proponent's modelling approach and revealed a number of specific issues that might have lead to the underprediction of impacts. These are:

- The non-conservative approach to haul road dust control efficiency;
- Possible underestimation of emissions from topsoil stripping, loading material, dumping overburden, unloading ROM coal, loading coal to stockpiles, and loading coal to trains; and

- Overestimation of unstable dispersion conditions, and associated potential for underestimation of predicted dust impacts.

When considered in detail, these sources of potential underestimation are not individually large, but in combination are considered to be significant. One consequence arising from this is a number of additional residences would be likely to appear in the impact zone at some time in the life of the mine. These residences are identified in Appendix 2 of this report.

The Panel recognises that air quality modelling contains inherent uncertainties, and that the available criteria do not fully address all aspects of dust impacts, particularly in relation to the nuisance potential from deposition. Therefore, it may well eventuate that, over time, either more or fewer properties than have been identified will be adversely affected by dust.

The primary issue with the predicted dust impacts is the potential for nuisance, associated with excessive dust deposition, which tends to be concentrated over time into discrete events. Residents may also be annoyed by the visual impacts of elevated dust levels from the mine (and other sources). The health impacts associated with mine dust, whilst real, are limited by virtue of the fact that the bulk of mine-generated dust particulate matter is not small enough to lodge deep in the lungs.

Emission estimates

The emissions data used in the EA were estimated using emission factors published in either the National Pollutant Inventory (NPI) Emissions Estimation Techniques (EET) Manual for Mining (NPI, 2001) or the report of the National Energy Research and Demonstration Council Project 921 (NERDCC 1988). The Panel finds these sources acceptable for the purposes of estimating emissions from the mine.

The EA assumes a 90% control efficiency on haul roads. This assumption does not provide the basis for a conservative assessment and is unlikely to be achievable on a consistent basis. It is noted that some submissions to the Hearing provided evidence that other existing mining operations do not always comply with strict conditions to control haul road dust. Operational conditions almost inevitably include situations where, for whatever reason, proposed or required levels of dust control are not always achieved. The consistent achievement of 90% control efficiency on haul road dust emissions will depend on the application of techniques that have not been identified in detail in the EA.

The emission rates of TSP are reported in the Air Quality Assessment but PM_{10} emissions are not reported. The EA outlines the distribution of particles as: $PM_{2.5}$ is 4.68% of the TSP; and $PM_{2.5\text{-}10}$ is 34.4% of TSP. This indicates that about 39% of total TSP is PM_{10}. This ratio is broadly consistent with expectations for the mining operation as a whole and is unlikely to have introduced significant errors into the calculations.

Mitigation Measures

Construction Phase

With regard to construction activities the EA proposes mitigation measures including the following:

- Use of water sprays and standard dust control measures used on construction sites;
- The defining of trafficked areas, the imposition of site vehicle speed limits and constraints on work under extremely unfavourable weather conditions.

Operation Phase

The EA identifies proposed measures for controlling both wind-blown dust and dust generated by mining. These measures include:

- Disturbing the minimum area necessary for mining and rehabilitating completed overburden areas as soon as practicable;
- Use of water carts on coal handling areas and haul roads;
- Use of water sprays on coal stockpiles;
- Use of dust suppression equipment on drill rigs and the lowering of dust aprons; and
- Confinement of blast charges;

The Panel finds the above mitigation measures to be standard for this type of project and concurs with the approach of the Proponent in this regard.

Panel Comment

The Air Quality Assessment and relevant aspects of the Proponent's responses to submissions provide a thorough, detailed account of the expected impacts of dust emissions from the proposal. Overall, the assessment is based on accepted methodologies, in line with current practice in NSW.

The Panel finds the responses the Proponent provided with regard to air quality issues raised in submissions to be adequate and well explained, and generally support the basis of the results presented in the EA. The Panel also finds the quality of the directly measured data (wind direction, wind speed, temperature, rainfall, sigma theta) to be acceptable. The Panel's review of the meteorological file indicates that it has been developed in line with DEC recommendations. However, the Panel believes there is some overprediction of unstable conditions but it is matched by an apparent underprediction of stable classes. This anomaly will have contributed to a slight (unquantified) underprediction of dust impacts.

There are some aspects of the Proponent's assessment which the Panel has not accepted. These are

- Reliance on a 90% level of dust control for haul roads;
- Assumptions about the level of emissions from some other sources; and
- Estimation of atmospheric stability classes in the dispersion modelling

Overall, the Panel finds the dust impacts likely to be somewhat greater than predicted in the EA, and some additional properties have been identified as being potentially within the dust impact zone, mainly due to the influence of 24-hour PM_{10} predictions. Of those additional properties, one is not on the current (January 2007) schedule of properties significantly affected by noise. Therefore, effective ongoing monitoring, dust management and community consultation will be an essential requirement for the mine should it be approved.

Whilst the Panel finds the mitigation measures outlined by the Proponent to be acceptable, it is matter of concern that such a large number of residences are expected to be adversely affected by dust from the proposed mine. The Proponent should be aware that the property acquisition program may need to be expanded further if actual mine performance shows that further impacts are experienced.

RECOMMENDATIONS

- The Wybong Road weather station continue to be operated at its present location, that PM_{10} monitoring continue at the current two monitoring locations, as a minimum, and that dust deposition monitoring continue at the current locations.
- A real-time dust monitoring and dust management system be implemented to provide the basis for reduction of dust generating activities during adverse weather conditions.
- An effective complaints management system and community consultation program be established, including the provision of monitoring data to the community via the Internet.

- After 12 months' operation of the mine, a dust model validation study be conducted. Should the validated model predict that properties other than those identified in the Air Quality Assessment and in this review will be adversely affected by mine dust, then the program of property acquisitions should be amended accordingly.

FLORA AND FAUNA

Many submissions, and particularly from interest groups, raised concerns regarding impacts the project would have on flora and fauna in the project area as well as the adequacy of biodiversity offsets proposed by the Proponent. Major concerns raised in submissions are listed in the Summary of Concerns Raised in Submissions section of this report. A thorough analysis of concerns raised in submissions relative to flora and fauna issues can be found in Appendix 2 of this report.

The flora and fauna assessment in the EA at Appendix 9 set out to determine the communities present within the project area and compile a comprehensive listing of plant and animal species that occur or have the potential to occur in the project area as well as conduct targeted searches for threatened species under relevant NSW and Commonwealth legislation. The assessment looked also to report on the condition of habitat and the effects on various species. After careful consideration the Panel believes the flora and fauna assessment conducted by the Proponent is adequate.

Issues raised in submissions

General Comments

- The project would clear 1304 hectares of treed vegetation of some conservation significance and would clear a further 934 hectares of grassland containing threatened species.
- The Project is inconsistent with the objects of *Threatened Species Conservation Act 1997*; *Environmental Planning and Assessment Act 1979*; *Natural Resources Commission Act 2003*; *Catchment Management Authorities Act 2003*; and *Protection of the Environment Operations Act 1997;*
- Proposed mine site has been recommended as a high priority-urgent action area for conservation due to its biodiversity significance and it has been recommended for inclusion in conservation reserves
- The proposal will impact on significant remnant native vegetation, the habitat of threatened species, and water and catchment values;
- Cumulative impacts of the combined operation of the project together with other approved and existing mines in the Region not considered;
- There has been insufficient survey for some species, including terrestrial orchids, as well as some mammals and birds;
- The EA understates the conservation status of vegetation communities at the site and discounts the presence of three EEC's;
- The study area contains large areas of woodland that potentially meet DEH listing criteria, but these are not acknowledged as such in the EA;
- Of the fauna species likely to be significantly impacted by the proposed mine, 13 have been assessed in the 1998 NSW State Government Comprehensive Regional Assessment (CRA) of the Lower North East Region. The implication that the impact on threatened flora and fauna species will be offset by the Proposed Offset Area is false and misleading;
- The EA provides misleading definitions and information in some cases and contains contradictions and inconsistencies; and
- The EA does not consider the impacts of the proposal far enough into the future to be able to assess sustainability adequately. Approval of the proposed project would not be consistent with the principles of Ecologically Sustainable Development.

Loss of species

- There are no reserves on the Hunter valley floor that protect similar vegetation to that on the site;
- There is no justification for the reduction in grassland habitat;

- The remnant woodlands in the project area were identified as irreplaceable for the maintenance of flora and fauna species in the 1998 NSW State Government Comprehensive Regional Assessment of the Lower North East Region;
- The proposed development is located within two Mitchell landscapes which are regionally significant. There is no opportunity for offsets for these landscapes and they should therefore not be cleared;
- The proposed Anvil Hill mine site occurs at the intersection of three Biogeographic Regions and four Botanical Provinces and includes a number of species which are at the limit of their distribution;
- The Western Hunter Narrabeen Footslopes Ironbark-Cypress Pine Woodland is a restricted and poorly reserved community and the proposal will result in the removal of over half of the largest remnant of the community (loss of 740 ha); and
- A number of threatened species, including a viable population of Squirrel Gliders, are expected to become locally extinct in the area as a result of the proposed mine.

Rehabilitation & Corridor Strategy

- Claims that rehabilitation of the mine site and replanting in the offset areas will improve connectivity in the medium to long term fails to acknowledge that connectivity will be lost in the short to medium term and that it will be some time (if ever) before any of the replanted vegetation will reach the size or maturity to provide adequate habitat resources
- Rehabilitation is likely to be poor on overburden piles due to the contamination of the soil structure.
- Rehabilitated mine sites do not replicate remnant communities that have been destroyed and attempts to re-establish natural communities have not been shown to be successful;
- The proposed Anvil Hill mine site forms part of a recognised biodiversity corridor and is critical for connectivity across the Hunter Valley floor between Manobalai Nature Reserve to the north and the Wollemi National Park and Goulburn River National Park to the south; and
- The corridor strategy is not detailed enough and there is no indication about the basis on which it has been developed.

Offsets

- Compensatory re-vegetation is not ecologically sustainable in the medium term and cannot ensure the long-term persistence of populations, communities and processes;
- Proposed offset ratios are inadequate and the offsets are not like-for-like;
- There is no long term commitment to offset areas;
- The mitigation strategy fails to acknowledge that more than half of the Proposed Disturbance Area is very poorly represented in the Proposed Offset Area;
- Due to lack of data, the relative importance of the Proposed Disturbance Area and the Proposed Offset Area cannot be compared; and
- The Director General's Requirements are not satisfied because the requirement for no net loss of flora and fauna values in the area in the medium to long term has not been satisfied by the offset strategy.

Key Flora and Fauna in the Proposal Area

Vegetation Communities

The Panel notes that the proposal will directly impact upon 2238 hectares of vegetation communities comprising 1304 hectares of treed vegetation and 934 hectares of grassland. The extensive expanses of forest, woodland and grassland habitats within the proposed mining area support a high diversity of native flora and fauna, including a substantial array of flora and fauna listed on the Threatened Species Conservation Act and/or the Environment Protection Biodiversity Conservation Act.

Two vegetation communities (Ironbark Woodland complex and Slaty Box Woodland) cover the majority of the area of the proposal. They are considered of regional significance and are comparable to central Hunter Valley vegetation communities likely to meet the Commonwealth Department of Environment and Heritage listing criteria.

Mammals and Birds

Six threatened species both of mammals and birds were recorded by the Proponent in the area of the proposal as well as the proposed offset area. These are listed in Appendix 2 of this report.

The proposed offset areas have records of the Koala (*Phascolarctos cinereus*), Squirrel Glider, Brush-tailed Rock Wallaby (*Petrogale penicillata*), Eastern Freetail Bat (*Mormopterus norfolkensis*), Eastern bentwing bat, Eastern false pipistrelle (*Falsistrellus tasmaniensis*), large eared pied bat, large footed myotis and the Eastern Cave Bat.

Threatened Flora

Eight Threatened flora species are recorded in the project area (refer to listing in Appendix 3 of this report).

Three of these species occur within the proposed disturbance area: *Cymbidium canaliculatum*; *Goodenia* macbarronii; and *Pomaderris queenslandica*. Two endangered flora populations were recorded from within the project area, namely *Cymbidium canaliculatum* and *Acacia pendula*.

One EEC, Weeping Myall Woodland was recorded as occurring in the project area but not in the proposed disturbance area. Painted Diuris and Narrow Goodenia are listed under the EPBC Act and assessments of significance were conducted for both species. These found that the records of Painted diuris and Narrow Goodenia within the Study area are likely to be at or approaching the eastern limit of the known range for these species, and therefore it is likely that they form an important population of these species.

The records of Narrow Goodenia within the proposed disturbance area represent the largest area of known habitat for this species within the Hunter region. All of this known habitat will be lost as a result of the proposal.

The Proponent considered it possible by that the project will lead to a significant impact on important populations of Painted Diuris and Narrow Goodenia due to the probability of a long term decrease in the size of the populations, a reduction in the area of their occupancy, likely disruption to their breeding cycle, fragmentation of populations and the likely interference with the recovery of these species at a local level.

MITIGATION MEASURES

The EA outlines proposed biodiversity offsets to mitigate the project's ecological impacts. Two main components are highlighted:

- rehabilitation of the site through revegetation and regeneration of the post mining landscape, as well as plans for bushfire and feral animal control; and
- biodiversity offset strategies containing additional mitigation components specifically designed to address effects on key threatened species identified in the EA.

Site Rehabilitation

Submissions to the Panel from the local community reveal concerns regarding the effectiveness of the measures proposed the rehabilitate the site. Such submissions highlight the chance of weed species becoming prevalent and the risk of native species not being successful due to contamination of soils.

Revegetation and Regeneration

Revegetation and regeneration strategies would contribute to the rehabilitation of mined areas as well as providing habitat corridors and augmentation. The Proponent proposes to revegetate almost 515 hectares of land, comprising 386 hectares of woodland, 101 hectares of riparian and floodplain vegetation and 29 hectares of shrubland. In addition, the majority of the area proposed to be disturbed by mining activities will be progressively revegetated.

Offset Strategies

The Proponent included a suite of measures in the EA to offset the impacts of the loss of vegetation caused by mining in addition to the rehabilitation of the mined areas. These include:

- Establishment and protection of proposed offset areas;
- Revegetation and regeneration strategies (see above under rehabilitation);
- Conceptual corridor strategy;
- Augmentation of existing vegetation to increase habitat quality; and
- Development of an Ecological Monitoring Program for the life of the mine.

Offset Areas

The Proponent proposes an offset area of 1707 hectares, of which 1038 hectares currently contains treed vegetation. It is proposed to protect and manage 1078 hectares of the total proposed offset area as a conservation area with 629 hectares of habitat enhancement area being regenerated and revegetated. The Proponent has also agreed to provide an additional 600 hectares of land for offsetting purposes in accordance with DEC requirements and states the proposed offset areas will be adequate to protect the majority of vegetation types proposed for removal from the area of disturbance.

Conceptual Corridor Strategy

The Proponent devised the Conceptual Corridor Strategy to address the reduction in opportunities for native fauna movement. This strategy looks to regenerate and revegetate existing movement corridors in the vicinity of the proposed disturbance area to increase their functionality. The Proponent identified 8 corridor options in the EA, including two options each for both northern and western fauna movements.

Habitat Augmentation Strategy

Habitat Augmentation strategies can increase the quality of habitat for threatened species in the area. The Proponent proposes to implement such a strategy in the proposed offset areas, corridors as well as other areas proposed for revegetation. The strategy would include such measures as the provision of nest boxes, salvage and re-erection of hollows in timber, replacement of habitat features such as hollow logs, fallen timber and boulders, and planting of specific habitat resources and foraging features to increase quality of habitat for target key threatened species.

Ecological Monitoring Program

The Proponent also proposes to implement an ecological monitoring program to assess the adequacy of the Standard Impact Management Strategy and the Biodiversity Offsets Strategy. This will require the design and implementation of a systematic monitoring program that allows for adaptive management of all aspects of the monitoring program. This will include monitoring of any retained vegetation, revegetated and regenerated areas, fauna, nest boxes, threatened species, aquatic species and landscape function analysis. The program would include completion criteria by way of assessing the success of the program.

Ecological Monitoring Program and Completion Criteria

The adequacy of the Standard Impact Mitigation Strategy will be assessed by a monitoring program that is yet to be designed. The EA indicates that the monitoring program will include monitoring of retained vegetation, revegetation and regeneration areas, fauna monitoring (including nest box, threatened species and aquatic monitoring) and landscape functional analysis. The Panel recommends the Proponent design the ecological monitoring program in consultation Government agencies and the community.

Completion criteria identify when an area of land has reached a condition that allows an organisation to relinquish responsibility of a rehabilitated site. The Department of Primary Industries (DPI) recommend that the proponent establish a Rehabilitation Research and Development Committee, including community and academic representation as well as the DPI, within two months of obtaining project approval and the Panel concurs with this recommendation.

The Proponent has developed a set of conceptual completion criteria that broadly follows the principles recommended for rehabilitation completion criteria for Native Ecosystem Establishment by the Australian Centre for Minerals Extension and Research (ACMER). They indicate that completion criteria would be developed after the project gains approval. The criteria are unspecified, however the Proponent has indicated it will incorporate key elements of the ACMER recommendations including:

- Stakeholder consultation;
- Cost effective best practice;
- Principles of continuous improvement and review of criteria;
- Completion criteria for all stages of the mining operation;
- Development of completion criteria being an iterative process; and
- Target standards being used to trigger actions if the criteria are not met.

Land Management Strategy

The Proponent also proposes to establish a Land Management Strategy to contribute towards its corporate sustainability goals. The Wybong Uplands Land Management Strategy will target sustainable land management across the broader Wybong area and will promote sustainable agriculture measures, establish demonstration farms, as well as managing riparian zones and ecological corridors. The Proponent has committed $100,000 per year to the strategy for five years should the project gain approval.

Panel Comment

The adequacy of the survey effort was a common theme highlighted in submissions to the Panel, with many submitters expressing concern about the level of survey effort undertaken for the EA. The Panel finds that when compared with the latest DEC guidelines for surveying general there has been enough survey effort to fully understand the ecological values of the subject land.

The Proponent's survey, although not meeting the DEC guidelines in some respects found a wide range of threatened species and more than other surveys found on the same land as well as providing detailed descriptions of the available habitats on the site. DEC state they are satisfied with the rigour of the assessment and considered the results and survey methods to be adequate. The Panel's evaluation of the Proponent's survey effort is included in Appendix 2 of this report.

The project area contains flora and fauna of high ecological significance being part of an area of native vegetation that comprises one of the largest patches remaining in the upper Hunter Valley. The extensive expanses of forest, woodland and grassland habitats within the proposed mining area support a high diversity of native flora and fauna including a substantial array of flora and fauna that are listed on the TSC Act and/or the EPBC Act.

The proposal will remove 2238 ha of vegetation of which 1304 ha (58%) is forest, woodland and shrubland. Approximately 934 ha (42%) of the vegetation to be removed is grassland, produced by clearing of the original native vegetation. Much of the grassland appears to be dominated by native grasses and other native herbaceous plants.

In terms of the area proposed for revegetation, the Panel finds inconsistencies between figures provided in the EA, the Executive Summary of the EA and the Proponent's response to submissions (Part B). The Project area is over 2,000 hectares. Of this, 1304 hectares contains native vegetation supporting a high level of biodiversity. As a result of the level of biodiversity in the area, as well as the mature age of the vegetation, habitat diversity and

corridor connectivity, the area has been recommended by the Hunter-Central Rivers Catchment Management Authority for immediate action for conservation through agreements, as a managed trust or a wildlife refuge.

The Proponent proposes to conserve significant areas of vegetation as an offset (1037 hectares of treed vegetation and a total area of 1904 hectares). DEC recommended the offsets be increased by 600 hectares and the Proponent has agreed with this recommendation. However, this still represents a low ratio of disturbance to offset area (<1:1), considering the high ecological value of the project area. An offset ratio of at least 1:1 is a common requirement for proposals of this type and considering the very high value of this area The Panel considers the degree of compensation to be inadequate and recommends the ratio be raised to at least 2:1.

The Ecological Management Strategy Presented in the EA is designed to address the impacts on flora and fauna. Impacts are addressed through biodiversity management of mining operations (including standard impact mitigation strategies) and biodiversity offset strategies. The Proponent proposes an ecological monitoring program to track the impacts of the mine as well as the efficacy of site mitigation strategies. Such site mitigation strategies include tree felling procedures, management of weeds and feral fauna, bushfire management as well as aquatic management and the implementation of a mine rehabilitation plan.

A monitoring strategy to measure the success of the mitigation measures should include collection of floristics data, photo monitoring, assessments of flora and fauna diversity, habitat balance, weeds and feral animals, security of protected areas, revegetation and regeneration of vegetation communities as well as an assessment of the resilience of ecosystems and analysis of biogeochemical functioning of the landscape.

The Panel finds the Proponent's mitigation measures to be adequate, practical and feasible to achieve standard practice for large projects such as the proposal as well as being generally appropriate to assist the mitigation of impacts. The Panel however recognises there will be successive loss of fauna habitat during mining operations that will not be able to be compensated in the short term by progressive rehabilitation of the site because of the timeframe necessary for successful habitat formation and tree hollow development during on-site ecosystem rehabilitation.

The clearance of native vegetation is largely unavoidable if the project proceeds. The impacts resulting from the scale of the proposed clearance, in the context of the Hunter Valley which has been extensively cleared, would have a significant impact upon native flora and fauna generally, and threatened species in particular. If the development is to be approved the Panel's recommendations should be adopted as conditions of consent.

The scale of impact proposed needs to be recognised and, for the project to proceed, the Proponent must provide substantial offsets to compensate for the short, medium and possibly long term impacts of the proposal on biodiversity. Additionally, conditions of consent should be directed towards ensuring high quality rehabilitation by requiring more stringent completion criteria for diversity of native plant species and plant strata aimed for in the rehabilitation, feral flora and fauna control as well as the way in which threatened species are managed during rehabilitation. Conditions of consent should also be aimed at ensuring that the Proponent uses best practice techniques for rehabilitation and revegetation.

RECOMMENDATIONS

- All mitigation measures and compensation measures that are currently proposed should be adopted and implemented;
- The proposed offset (excluding revegetation proposed within the disturbance area) should be increased in area to provide a ratio of 2 hectares of offset for every 1 hectare of native vegetation to be cleared for the project (native vegetation should include treed vegetation and native grassland dominated by native grasses and herbs);
- Revegetation work should prescribe replanting of canopy, subcanopy (if relevant), understorey and ground strata to be replanted;

- The offset package should contain Forest Redgum Riparian Woodland at least equivalent to that which is to be cleared within the proposed disturbance area;
- Forest Redgum (*Eucalyptus tereticornis*) and other koala food trees should be replanted extensively within offset area to maintain potential koala habitat;
- Surveys should be conducted to elucidate the distribution of native terrestrial molluscs of conservation significance and, where relevant, habitat requirements should be provided for within the offset package;
- Revegetation work should focus on the re-creation of an understorey and ground stratum for each recreated vegetation community where native species dominate and where a grassy understorey is to be rehabilitated or recreated, key performance objectives should be developed to provide a target for the minimum percentage cover to be achieved prior to mine closure;
- More detailed examination and categorisation of grassland areas is warranted and this should be taken into consideration when considering offsets for the project;
- Conduct further surveys to elucidate the distribution and abundance of threatened herbaceous species such as terrestrial orchids across the proposed disturbance area and particularly within grassland areas;
- The areas of native grassland within the proposed disturbance area should be reinvestigated and where possible "salvaged" by means of topsoil transfer. The layer of topsoil containing grassland dominated by native species should be stripped and placed on pre-prepared recipient sites to make use of the seed bank within areas to be rehabilitated or revegetated;
- Plans should be developed for replanting and all known species of threatened plant species within the proposed rehabilitation and recreation areas.
- Where information is lacking to enable replanting and revegetation with threatened species, as may be the case with orchid species for example, the proponent must fund research to develop techniques to enable such work to proceed successfully;
- Feral goats and other species that are currently impacting the hilltop areas of the Limb of Addy (in the offset area) and Anvil Hill itself should be controlled prior to commencement of mining work. Control measures should be maintained throughout the life of the mine and beyond; and
- Soil testing should be conducted to determine whether the plant pathogen *Phytophthora cinnamomi* occurs in the proposed disturbance area or the proposed offset area. If the pathogen is present, a risk assessment should be made and incorporated into management plans for conservation areas and revegetation areas.

OTHER SIGNIFICANT ISSUES

Under its Term of Reference the Panel were directed to identify and comment on other significant issues raised in submissions or during the Panel hearings.

In accordance with this requirement, the Panel identified the following significant issues:

- Greenhouse Gas emissions and the potential for the project to something global climate change;
- Impacts on local water resources and security of water supply for the local community;
- Loss of visual amenity; and
- Impacts on the local community.

The Panel also noted that there were several submissions giving support to the proposal.

GREENHOUSE GAS EMISSIONS (GHG)

Issues raised in submissions

The Panel received more than 1800 submissions raising concerns in regard to GHG emissions from the project and the implications of these emissions on global climate change. Key concerns relating to GHG that were highlighted in submissions were:

- That the EA should have included assessment of downstream (Scope 3) GHG emissions and associated impacts;
- That the EA failed to adequately address GHG emissions from some of the on-site activities proposed, including emissions associated with spontaneous combustion of coal stockpiles;
- That the project would significantly contribute to, or accelerate global warming/climate change
- That coal is 'old technology' and the demand for continued use of coal will reduce in the future;
- The project is inconsistent with NSW Government policy on GHG emissions; and
- That the EA failed to consider the environmental impacts of global warming/climate change, the principles of ESD as well as the cumulative impact of the project's GHG emissions.

The EA included an assessment of GHG emissions within the boundaries of the project as per the Director-General's requirements, including GHG emissions from fuel used in mining equipment and electricity used at the mine. Further to this assessment, the Proponent provided a more comprehensive assessment of GHG emissions in its response to submissions, taking into account potential GHG emissions from the combustion of coal product from the mine. Briefly, the document provides:

- An outline of the national and international policies and calculation methodologies for the assessment and abatement of GHG emissions;
- An assessment of the GHG emissions associated with the project, including consideration of Scope 3 emissions from the burning of the coal in Australia and overseas;
- A comparison of project-related GHG emissions with national and global emissions;
- Projections of the environmental impacts associated with global climate change in Australia and NSW;
- Project specific and corporate GHG abatement measures proposed by the Proponent to offset the emissions from the project;
- A justification for the need for the project based on an analysis of future energy demand; and
- Consideration of the principles of Ecologically Sustainable Development.

Panel Comment

The Panel has reviewed the GHG emissions assessment in the EA and finds it to be comprehensive and adequate for the purposes of the Panel's assessment. The Panel also finds the additional information provided by the Proponent with regard to life cycle GHG emissions to be comprehensive and provides information on a number of initiatives showing the Proponent has a demonstrated commitment to the reduction of GHG throughout its operations at a corporate level. With regard to Scope 3 emissions as outlined above, the Panel notes the vast majority of submissions that raised concerns with this issue and the importance this issue has within the wider community.

The Panel recognises the that the burning of fossil fuels does have implications for anthropogenic climate change and that increases in GHG may have impacts on sea level rise as well as impacts on flora and fauna species at a global level. It is noted by the Panel that the issue of anthropogenic climate change is being given high level consideration both at a Federal and State level and the appropriate mechanism to address the issue would be through these Governmental mechanisms. The Panel notes initiatives such as clean coal technology are currently being investigated and the Proponent may take advantage by being involved in such investigations.

The Panel notes that the framework for emissions counting relies on the emission's source and that the majority of emissions would occur outside of the project area (ie from the combustion of coal either at local power stations or overseas). Notwithstanding the above, the Panel recognises that current demand for power supply is reliant on the coal industry and will do so for the foreseeable future, and definitely during the life of the project.

With regard to the project the Proponent could attempt to reduce GHG emissions on site by way of a monitoring regime emphasis on reduction of instances of spontaneous combustion of coal contained in stockpiles and through other initiatives such as fuel efficiency in the on-site vehicle fleet and at on-site infrastructure.

The Panel also notes the Proponent's corporate commitments to the reduction of GHG through the initiatives outlined in its document *Response to Submissions Part A*.

WATER RESOURCES AND WATER SUPPLY

The Proponent provided an assessment of surface and groundwater impacts at Appendices 7 & 8 of the EA. The Proponent states in the EA that the mine will require up to 1200M/L of water each year to conduct its operations. Water will be sourced using a number of methods including run-off collected from the project site, groundwater inflows into the mine and Make up water pumped from Sandy Creek, the Hunter River system and/or groundwater bores adjacent to the Hunter River system.

The proposed disturbance area falls within the catchment of Anvil Creek and extends into the catchments of Big Flat Creek, Clarks Gully and Sandy Creek. Both Anvil Creek and Clarks Gully flow into Big Flat Creek. Big Flat Creek flows into Wybong Creek which is a tributary of the Goulburn River. The Goulburn River and Sandy Creek both join the Hunter River.

Issues raised in submissions

A large number of submissions received by the Panel made reference to concerns regarding effects the proposal may have on both surface water and groundwater resources as well as fears regarding the security of water supply for agricultural and other purposes. Briefly, these submissions stated:

- Concerns regarding impacts on downstream flows and impacts on downstream water users;
- No mitigation measures in EA regarding salinity levels in Big Flat Creek;
- Concerns regarding impacts on riparian vegetation on Big Flat Creek;
- Fears the mine will reduce the amount of water available for agricultural and other purposes;
- Concerns regarding the proximity of mining areas to watercourses;
- Impacts on long term groundwater levels;

- Impacts on the general health of creeks in the Wybong, Goulburn and Hunter River systems;
- Potential for saline water in the mine's final voids to contaminate surrounding land;

Panel Comment

Surface Water Issues

In regard to the management of run-off throughout the project area the Proponent claims that with proposed sediment and erosion control measures in place, sediment levels can be managed in Big Flat Creek and downstream drainage systems. Appropriate management plans should be in place prior to commencement of mining activities to ensure these impacts can be controlled. The Panel notes that the Proponent has conducted surface water monitoring since February 2002 including sampling at 16 monitoring locations on a monthly basis and after extended rainfall periods. The Panel finds the Department of Planning should closely monitor the issue of surface water quality and quantity.

The Proponent states in the EA that water necessary to operate the mine will predominantly come from run-off and water from dams to be constructed on the project site and that water sourced from Sandy Creek and the Hunter River system would only occur during the construction phase of the project and, once the mine is operational, where no other source of water is available. The Panel finds the Proponent should hold appropriate licences to extract water from the Hunter River System.

Groundwater Issues

The Proponent's groundwater assessment states groundwater seepage into mining areas would not be expected to impact on the yield of private bores within the local area. The Proponent should ensure groundwater quality and quantity is not adversely affected by the proposed mining activities. With regard to groundwater usage for agricultural purposes, the Panel notes that the EA states groundwater flowing into the mine from the surrounding fractured rock aquifer is also predicted to have high salinity levels, making it unsuitable to be used for these purposes.

Water in Final Voids

The Proponent states in the EA that final voids will be designed to intercept leachate from overburden emplacement areas as well as to minimise the discharge of saline groundwater and have been sized to ensure they do not overflow. The voids would be located at the south-western end of the proposed mining area associated with the Main and Southern Pits. The voids would be designed to capture groundwater inflow from the Main Pit and Southern Pit overburden emplacement areas and allow for the evaporation of the accumulated water. With regard to the potential for the water in the voids to cause contamination of surrounding land, the Panel notes that Proponent has stated its final voids would be designed to avoid overflow of saline water to surrounding land. The Panel finds the Department of Planning should seek to resolve this issue in its assessment.

VISUAL AMENITY

The Proponent provided a visual impact assessment as part of the EA. Many submissions raised the issue of reduced visual amenity through the mine's activities. Many residences are situated in areas overlooking the proposed mine site. Information provided to the Panel by the Proponent states it is not possible to develop an open-cut coal mine of this scale without there being visual impact of some sort.

The Proponent stated in the EA that due to the similar influence of topography in relation to both noise and visual impacts, a large proportion of local residences that are predicted to have high visual impacts will more than likely be impacted by noise and would therefore be subject to the Proponent's offer of property acquisition.

Issues raised in submissions

The Panel received a number of submissions highlighting the visual impact the mine may have one nearby residences. Submitters' concerns included the following:

- The Proponent should construct a suitable vegetated bund wall along Wybong Road;
- Mitigation measures proposed to reduce visual impacts of the mine; and
- Concerns over loss of visual amenity at night due to 'sky glow' effects.

Panel Comment

In its assessment, the Proponent noted two areas relating to mine lighting impacts, these being direct lighting effects and night lighting effects.

The potential direct lighting impacts from mining operations would be visible from a range of viewing points. The Proponent stated in its EA that night lighting impacts for both the mining areas and the infrastructure areas will vary with time and atmospheric conditions. The proposed night lighting will be primarily concentrated on the Open Cut Areas, the CPP and access roads. Lighting is anticipated to be locally concentrated within the pit at reduced heights due to the truck and shovel nature of the operations. Truck movements at night with associated headlights and warning lights are likely to be significant impacts also.

The Proponent's visual impact assessment states that the visual impact on some local residences would be high and particularly those residences located to the north and north west of the proposed disturbance area. The Proponent's assumption that those residents facing high visual impact are more than likely to be also affected by noise and would therefore be more likely to be offered the opportunity to have their property acquired by the Proponent or be offered some form of mitigation by the Proponent. The Proponent could also reduce the visual impact of its operations through the timely rehabilitation of mined areas. Further mitigation measures might also be investigated by the Proponent such as tree screening of properties having direct sight of mining operations.

The Panel notes the many submissions making comment regarding night lighting impacts. The Panel finds that the Department of Planning should give consideration to the concerns raised in submissions to the Panel as well as the impacts of both direct and night lighting when undertaking its assessment.

COMMUNITY IMPACTS

Issues raised in submissions

The Panel received a large number of submissions from the local community highlighting concerns relating to the impacts associated with community displacement and relocation through the acquisition of properties by the Proponent. Impacts on lifestyle and the potential for lifestyle change was a key issue raised by the community in submissions to the Panel. Comments in regard to these issues included the following:

- The Wybong community will be displaced;
- The proposal is creating division within the local community;
- The proposal will impact on the lives of local residents;
- There will be social and psychologic al impacts on local residents;
- Some residents are opposed to relocation given their family ties to their property;
- Church services may be lost through residents' relocation;
- The sense of home cannot be easily transportable to another place;
- The Proponent must ensure community services are not lost to the area; and
- The Proponent will lease the residences it acquires and its tenants will not be good community participants.

Panel Comment

In response to these concerns raised in submissions the Proponent outlined a range of management commitments it has undertaken and will commit to undertake, including acquisition offers and agreements to acquire properties predicted to be highly impacted by the project as well as commitments to conduct noise monitoring at those residences predicted to be moderately impacted.

In its social impact assessment the Proponent provided details of a community enhancement program, to provide funds for a range of community initiatives such as community projects and infrastructure, education and training through sponsorship of TAFE courses and traineeships as well as initiatives aimed at facilitating local employment and residential opportunities.

In addition to these measures the Proponent has committed to work with the community to document the history of the area and has assisted with the creation of an information brochure for the Wybong Hall for distribution to the local community to raise awareness of activities at the hall.

Impacts highlighted in submissions to the panel included the potential effects the project may have on the value of local properties, changes in the dynamic of the local community and the ability of new community members to integrate themselves within the local community. Concerns were also raised in regard to strain on local health services through the local community facing uncertainty as to potential impacts from mining activities and that the Proponent had not given consideration to community services such as child care facilities.

The Proponent has used and continues to use offers of acquisition to potentially affected residents. The Panel notes that this type of approach is not uncommon for projects where the impacts are predicted to be significant over the life of the mine and recommends this approach continue.

At the present time there remains approximately 39 properties containing residences along with 11 vacant properties without acquisition or compensatory agreements with the Proponent. The Panel finds the acquisition mechanism used by the Proponent to be not uncommon for projects of this type in that it gives consideration to the impacts predicted to occur throughout the life of the mine.

The Panel also notes the Proponent's commitment to the management of community impacts and its proposed measures to assist those in the community potentially affected by the proposal should they choose to remain living in the local area. The Panel finds the Department of Planning should give consideration to concerns raised in submissions to the Panel regarding the impacts on the community when conducting its assessment.

SUBMISSIONS IN SUPPORT OF THE PROPOSAL

The Panel found a number of submissions it received to be in support of the proposal. Significantly, issues raised in these submissions stated the following:

- NSW depends on the coal industry to support the economy;
- Mining contributes greatly to the local economy and the local mining industry is a major employer;
- The Proponent's community consultation program has been successful;
- Anvil Hill will provide economic benefit to the State and local economies through royalties and flow on effects to local service industries;
- The Proponent's proposed biodiversity offsets are significant; and
- The development can be managed to minimise environmental impacts and long term environmental benefits will be achieved.

Panel Comment

The Panel notes these issues raised in support of the proposal.

SUMMARY OF RECOMMENDATIONS

Noise and Blasting

Noise Impacts

- The Proponent undertakes to perform at source mitigation measures as outlined in the EA and in this section.
- The Proponent continues to offer negotiation agreements to affected residents predicted to be exposed to noise levels over 40dB(A). The Proponent should attempt to enter into agreement with as many residents as possible prior to commencement of mining activities.
- Where residents are exposed to noise levels between 35-40dB(A), the proponent should offer other mitigation measures such as architectural treatment of residences.
- For main rail line noise, limits should not exceed those outlined in the EA in accordance with ARTC Pollution Reduction Programs.
- Mitigation measures including architectural treatment be offered by the Proponent to affected residences along Wybong Road exceeding DEC criteria for traffic noise impacts
- The Proponent should offer mitigation measures to the owner of residence numbered 203G in the EA regarding traffic noise impacts on Bengalla Link Road
- A comprehensive real time noise and wind data monitoring program be developed and implemented. This will include real time noise monitoring at several locations representative of the most exposed residences at the time.
- Mine operational noise modelling should be expanded to include that for a temperature inversion of 4°C/100 metres and easterly and south-easterly winds of 2.5 metres per second. Alternatively, the Proponent should rely on thorough noise monitoring to determine the extent of impacted properties.

Blasting Impacts

- The Proponent should adopt a precautionary approach to its blast regime.
- In the earlier stages of mining when blasting is stated to occur furthest from rock structures, all blasts should be monitored and ground vibration transmissibility better defined by the Proponent. This will allow more accurate and site specific predictions for future blasts.
- The Proponent should employ appropriate qualified persons to inspect rock structures of significance to better understand effects of blasts during the first blast regime.
- The Proponent should include ground vibration monitoring at rock structures so that effects can be analysed with respect to actual blast vibration levels at the structures. From this information a threshold ground vibration limit may be derived depending on the results of this analysis.
- Where identified rock structures of significance are predicted to be exposed to ground vibration above 40mm/s ppv, monitoring of these structures should be carried out by the Proponent. Such

monitoring is to include ground vibration levels at the structures and inspection of rock condition before and after each blast. Where such monitoring identifies and demonstrates ppv limits above 40mm/s is not likely to cause damage, then these may apply.

- Privately owned residences inside the 5mm/s blast contour should undergo thorough inspection prior to commencement of any blasts and should be re-inspected after blasting in areas nearest to these residences. This should take place irrespective of the existence of agreements between the resident and the Proponent. Where damage is identified, repairs should be undertaken at the Proponent's expense.
- Blast times should be strictly limited to daytime only (ie 9:00am to 5:00pm)

Air Quality

- The Wybong Road weather station continue to be operated at its present location, that PM_{10} monitoring continue at the current two monitoring locations, as a minimum, and that dust deposition monitoring continue at the current locations.
- A real-time dust monitoring and dust management system be implemented to provide the basis for reduction of dust generating activities during adverse weather conditions.
- An effective complaints management system and community consultation program be established, including the provision of monitoring data to the community via the Internet.
- After 12 months' operation of the mine, a dust model validation study be conducted. Should the validated model predict that properties other than those identified in the Air Quality Assessment and in this review will be adversely affected by mine dust, then the program of property acquisitions should be amended accordingly.

Flora & Fauna

- All mitigation measures and compensation measures that are currently proposed should be adopted and implemented;
- The proposed offset (excluding revegetation proposed within the disturbance area) should be increased in area to provide a ratio of 2 hectares of offset for every 1 hectare of native vegetation to be cleared for the project (native vegetation should include treed vegetation and native grassland dominated by native grasses and herbs);
- Revegetation work should prescribe replanting of canopy, subcanopy (if relevant), understorey and ground strata to be replanted;
- The offset package should contain Forest Redgum Riparian Woodland at least equivalent to that which is to be cleared within the proposed disturbance area;
- Forest Redgum (*Eucalyptus tereticornis*) and other koala food trees should be replanted extensively within offset area to maintain potential koala habitat;

- Surveys should be conducted to elucidate the distribution of native terrestrial molluscs of conservation significance and, where relevant, habitat requirements should be provided for within the offset package;
- Revegetation work should focus on the re-creation of an understorey and ground stratum for each recreated vegetation community where native species dominate and where a grassy understorey is to be rehabilitated or recreated, key performance objectives should be developed to provide a target for the minimum percentage cover to be achieved prior to mine closure;
- More detailed examination and categorisation of grassland areas is warranted and this should be taken into consideration when considering offsets for the project;
- Conduct further surveys to elucidate the distribution and abundance of threatened herbaceous species such as terrestrial orchids across the proposed disturbance area and particularly within grassland areas;
- The areas of native grassland within the proposed disturbance area should be reinvestigated and where possible "salvaged" by means of topsoil transfer. The layer of topsoil containing grassland dominated by native species should be stripped and placed on pre-prepared recipient sites to make use of the seed bank within areas to be rehabilitated or revegetated;
- Plans should be developed for replanting and all known species of threatened plant species within the proposed rehabilitation and recreation areas.
- Where information is lacking to enable replanting and revegetation with threatened species, as may be the case with orchid species for example, the proponent must fund research to develop techniques to enable such work to proceed successfully;
- Feral goats and other species that are currently impacting the hilltop areas of the Limb of Addy (in the offset area) and Anvil Hill itself should be controlled prior to commencement of mining work. Control measures should be maintained throughout the life of the mine and beyond; and
- Soil testing should be conducted to determine whether the plant pathogen *Phytophthora cinnamomi* occurs in the proposed disturbance area or the proposed offset area. If the pathogen is present, a risk assessment should be made and incorporated into management plans for conservation areas and revegetation areas.