NSW EPA

ENVIRONMENT PROTECTION AUTHORITY

Our reference: LIC06/333-19 & DOC12/7873
Your reference:

Howard Reed
A/Director Mining and Industry Projects
Department of Planning and Infrastructure
GPO Box 39
SYDNEY NSW 2000

24 February 2012

Dear Mr Reed

I refer to the Preferred Project Report (PPR) for the Moolarben Coal Mine Stage 2 Project (the Project) received by the Environment Protection Authority (EPA) on 1 February 2012.

As you may be aware, the Office of Environment and Heritage (OEH) and the Environment Protection Authority (EPA) are now separate agencies. However, at the current time, the EPA remains the lead agency responsible for collating responses to proposals being assessed under the Environment Planning & Assessment Act 1979. Therefore, the attached response to the PPR has been prepared by the EPA and references the comments of the OEH regarding the PPR.

A detailed review of the PPR provided in conjunction with a comparison of the Moolarben Coal Project Stage 2 Environmental Assessment 2009 (EA) has been undertaken. Please find the assessment of the impacts of the Project and the recommendations of the EPA and the OEH in Attachment 1.

Noise, water management and the biodiversity offset remain as significant issues. The EPA would suggest that a meeting is held between the DP&I, NSW Office of Water and the EPA to discuss the issues raised in the attached and to determine how they might be resolved.

Should you have any queries regarding this matter, please contact Sheridan Ledger at the Bathurst office of the Environment Protection Authority (EPA) on (02) 6332 7608.

Yours sincerely

**DARRYL CLIFT**
**A/Regional Manager Bathurst**
**Environment Protection Authority**

The regulatory responsibilities of the Office of Environment and Heritage (OEH) are now carried out by the Environment Protection Authority (EPA).

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## ATTCAHMENT 1

## Assessment of the Moolarben Coal Mine Stage 2, Proposed Amendments to the Statement of Commitments and Recommended Conditions of Consent

### Aboriginal Heritage

*General Comments*

The OEH considers that sufficient assessment has been undertaken and provided in regards to the level of impact on Aboriginal sites.

As indicated in the EPA's response to the draft PPR, the OEH finds it difficult to determine whether the proposed Red Hills and Powers conservation areas are distinct from those established as an offset for the Moolarben Coal Mine Stage 1 (stage 1) impacts on Aboriginal heritage. While these areas were not formally noted as conservation areas for the loss of Aboriginal heritage as a result of Stage 1, the OEH recognised these areas as being conservation areas for the loss of Aboriginal heritage in stage 1. The PPR, in particular Figure 21 does not indicate which conservation areas apply to which stage of Moolarben. As such, the OEH is not able to provide comment on the adequacy of the conservation areas.

*Recommendation*

The OEH recommends that DP&I request that Moolarben revise and resubmit Figure 21 of the PPR, clearly indicating the location of the conservation areas for both Moolarben stage 1 and 2. This should be submitted to the OEH for review and comment.

Recommended Additions to the Statement of Commitments

- establish and protect Aboriginal conservation areas separate to those which were established for Moolarben Coal Mine stage 1.

### Air Quality

Use of dust suppressant to achieve an 85% reduction in dust emissions from haul roads

The number of private receptors with predicted exceedences reduced from 77 in the draft EA to 5 in the EA, through the assumption that the use of chemical dust suppressants on trafficked areas will result in an 85% reduction in dust emissions from these areas. No validation of the assumption that dust suppressant would achieve an 85% reduction in dust emissions from haul roads has been provided previously, despite this being requested in the response to the EA in April 2009. The EPA was not able to identify in the PPR whether an 85% reduction in dust emissions from trafficked areas from the use of a dust suppressant was used in the impact assessment modelling.

Section 4.1.4 of the PPR provides that Moolarben will apply either water or a dust suppression product on all active coal and overburden haul roads to achieve a control level of 85%. In light of the inclusion of this level of control being identified as a dust minimisation management measure in section 4.1.4, the EPA considers that it is probable that such a reduction was used in the air quality modelling impact assessment.

In 2010 the EPA commissioned Katestone to undertake the NSW Coal Mining Benchmarking Study: International best practice measures to prevent and/or minimise emissions of particulate matter from coal

mines. This study included the determination of the best practice control measures to reduce particulate emissions from sources such as haul roads and the effectiveness (expressed as a percentage) of the implementation of these measures. Katestone determined that all available surface treatments for haul roads would not achieve an 85% reduction in dust emissions.

If the impact assessment modelling for the PPR was based on an 85% reduction in dust emissions from haul roads, in light of Katestone's assessment of the effectiveness of control measures for haul roads, it is possible that the PPR may have under estimated the impact of dust on surrounding residences. Should the level of reduction not be achieved, additional properties to the 5 identified in the PPR may require acquisition.

Coal Mine Particulate Matter Control Best Practice Pollution Reduction Program (PRP)

In August 2011, the environment protection licence for Moolarben was varied to include a PRP requiring a site specific determination of best practice to ensure that the most feasible and reasonable particulate control measures are implemented at the Mine.

As part of the PRP, Moolarben was required to rank the top four highest particulate generating activities at the mine which are as follows:

1. Hauling on unsealed roads;
2. Material transfer of coal;
3. Trucks unloading coal/overburden; and
4. Bulldozers on coal.

The PRP also required that the management practices currently being undertaken at Moolarben be compared with best practice and a determination made of the feasible and reasonable additional measures which could be implemented.

The EPA would like to advise DP&I that Moolarben's report concludes that there is potential value in introducing additional best practice control measures for haulage and material transfer of coal, however, Moolarben has not committed to the implementation of any additional dust control measures.

Management and Mitigation

The EPA notes from the Revised Statement of Commitments that Moolarben will implement the dust minimisation management measures in section 4.1.4 of the PPR. The EPA considers that additional measures be implemented and the recommendations are included below.

Recommended Conditions of Consent

1. Long and short term air quality criteria for particulate matter and deposited dust.
2. Air quality acquisition criteria.
3. Implementation of best practice control measures in accordance as included in the report *NSW Coal Mining Benchmarking Study: International Best Practice Measures to Prevent and/or Minimise Emissions of Particulate Matter from Coal Mining* (Katestone 2010) to reduce particulate emissions from:
    - haul roads;
    - loading and unloading coal;
    - coal stockpiles;
    - bulldozers on coal;
    - loading and unloading overburden; and

- conveyors and transfers.

4. Implement all feasible and reasonable methods to minimise offsite odour or fumes, including that generated by spontaneous combustion.
5. Implement all feasible and reasonable methods to minimise offsite dust, odour or fumes from drilling and blasting.
6. Prepare and implement an air quality and greenhouse gas management plan, blast management plan and a spontaneous combustion management plan.

Recommended Additions/Alterations to the Statement of Commitments

- Operation of a TEOM in a location representative of the properties in the Ridge Rd/Winchester Cres areas which are not mine owned.
- Validation of the real time response triggers included in the *Moolarben Coal Air Quality Management Plan March 2010.*
- Every 3 years undertake a review of particulate emission controls implemented at the mine against industry best practice.
- Develop and implement a monitoring strategy to confirm an 85% control of dust emissions from haul roads is being achieved. The strategy should consider, but not necessarily be limited to, moisture content monitoring, application rates and meteorological conditions to develop trigger response values.
- Develop and implement meteorological criteria to ensure that blasting is not undertaken under unfavourable wind and/or atmospheric conditions.

## Biodiversity Offset Strategy

General Comments

The OEH is disappointed that previous advice in regards to the biodiversity offset appears to have been completely disregarded by Moolarben when determining the offset, despite numerous attempts by the OEH to provide comment and assistance. As a general statement regarding the offset, the OEH considers that the basic principles guiding offsetting have been largely ignored by Moolarben.

Appendix H section 2.1 provides a number of attributes that "were considered to be desirable contributors" to the offset and these "were targeted when searching for suitable land". These are broadly based on the aforementioned guiding principles, however, it would appear that a number of these were given far less weight than others when analysing the rationale of the properties offered as offsets. For example,

1. Land that contains, or could be regenerated to provide *Box Gum Woodland and Derived Native Grassland*

Appendix H states that a key consideration in the selection of offsets was to ensure that offsets contain substantial areas of land that have been partially cleared but which could feasibly be regenerated, the rationale for this approach being to ensure that a net gain could be achieved. However, this may not be underpinned by the sound ecological principles required in the selection of offsets. The reconstruction of ecological communities involves high risks and uncertainties for biodiversity outcomes and is generally less preferable than other management strategies, such as enhancing existing habitat. The PPR does not indicate how the cleared land on the offset properties will be revegetated.

2. Land that is like for like in terms of bioregion, topography soils, aspect, flora and fauna and habitat values

This is a basic principle guiding offsets but it appears to have been largely ignored. The Dun Dun and Avisford area properties are not like for like habitats. The OEH considers that they are geographically distant, located in different catchments, have different geology, different elevations and different vegetation types and structures to open cut 4.

For example, the proposed offset sites include 1653 hectares of Red Stringybark – Scribbly Gum – Peppermint open forest, apparently attributed as Apple Box – Broad-leaved Peppermint dry open forest of the South-eastern Highlands in the Vegetation Types Database. Using the BioBanking tool, this vegetation type is not listed as being a match for any vegetation type impacted in the disturbance area for Moolarban Stage 2 and therefore can't be counted as part of the offset.

3. Land that builds onto existing conservation areas

This may be the case for the Avisford area property but not for the Dun Dun and Ulan area properties.

4. Lands that form new or improves existing ecological corridors and land that builds corridors between woodland areas

The OEH considers that this may be the case for the Avisford area property but is tenuous for the other two properties.

5. Land that links to other biodiversity offsets from other mining projects

The Dun Dun and Avisford area properties are a considerable distance from other biodiversity offsets for any of the Ulan, Moolarben Stage 1 or Wilpinjong Coal Mines. The Ulan area property could be considered to be relatively close however, its capacity as a linkage to offsets for other mining projects is compromised by Ulan and Moolarben Coal Mines.

Quantum

The use of different descriptions for vegetation types between the EA and Appendix H has resulted in unnecessary challenges in easily interpreting the quantum of individual vegetation types impacted and the amount of offset proposed. As such, the process of determining the adequacy of the quantum provided in the offset has been difficult and required the OEH to make a number of assumptions. While the OEH has been able provide the DP&I with some assessment of the quantum of the offset at this time, it is not confident of the level of accuracy of the comparison made.

The quantum of the offsets outlined in Appendix H appears adequate for the Box – Gum Endangered Ecological Community (EEC). However, the offset is inadequate for the vegetation types:

- Grey Box – Narrow-leaved Ironbark (HU551) (85.5 ha direct impact) and Blue-leaved Ironbark heathy woodland (CW114) (67.8 ha direct and 12.0 indirect impact) for which an offset of 118.0 ha of Ironbark Open Forest is proposed.

- Scribbly Gum – Brown Bloodwood (HU 608) (83.0 ha direct and 6.6 ha of indirect impact), Slaty Box – Grey Gum (HU618) (114.9 ha direct and 63.4 indirect impact) and Grey Gum - Narrow-leaved Stingybark - ironbark (HU553) (62.3 direct and 704.2 indirect impact) for which an offset of 23.9 ha of Scribbly Gum – Red Stringybark woodland and 198 ha of Western Slopes Dry Sclerophyll Forest is proposed.

- The EA details the loss of 682.9 ha direct and 55.0 ha indirect impact of the vegetation type Derived Grasslands of slopes of Merriwa Plateau and 673.9 ha of an unclassified vegetation type (Rough-barked Apple – Banksia woodland). Neither of these appear to have been directly offset although it is noted that the offset strategy contains189.1 ha of Secondary Grasslands and Shrubland and 585.8 ha of Low Diversity Derived Native Grassland. It is unclear whether these might be adequate matches for the Merriwa Plateau Grassland.

The OEH would like to advise DP&I that it does not support the inclusion of the properties identified as the offset for Moolarben Stage 2 as a public reserve. Some further consideration may be given to the Avisford area property, should further assessment of its condition and vegetation mapping indicate its suitability as an addition to the Avisford Nature Reserve.

The OEH notes from page 2.1 of Appendix H that Moolarben did not consider land that was within a mining lease and as such considered that there was "little land available". The OEH has in fact provided to Moolarben, on a number of occasions previously, a list of properties which it considers to be suitable as an offset for Moolarben Stage 2. A number of these properties have been the subject of a rapid assessment and vegetation mapping by the OEH and have been identified as priority properties by the National Parks and Wildlife Group of the OEH for inclusion in the OEH estate, particularly as inclusions to the Goulburn River National Park. Additionally, these properties meet all of the attributes Moolarben used to determine their offset (section 2.1 pg 2.2 of Appendix H). The OEH therefore considers that such properties could and should have formed part of the offsets provided by Moolarben.

Tenure of the Dun Dun Property

The OEH understands that Lot 80 DP704159 of the Dun Dun property may have been converted from Crown Land to freehold at some point in time. As such it may be subject to a covenant requiring biodiversity conservation or enhancement.

Securing any Offset

The OEH has three preferred mechanisms for the securing of biodiversity offsets, these are, in order or preference:

1. The establishment of biobanking sites with a Biobanking Agreement under the *Threatened Species Conservation Act 1995* (TSC Act);
2. The retirement of biobanking credits (where appropriate credits are available); and
3. The dedication of land as a public reserve under the *National Parks and Wildlife Act 1974* (NPW Act).

These mechanisms secure long term management arrangements effectively because:

- The unambiguous objective of the management is biodiversity conservation;
- Management is undertaken in accordance with a Plan of Management;
- There is a reasonable likelihood that sufficient resources will be available to implement the Plan of Management over time;
- The arrangements are in-perpetuity and, in the case of a Biobanking Agreement, conservation obligations are transparently transferred and disclosed to any new owners of the land; and
- There are appropriate accountability mechanisms to secure the outcomes and these mechanisms cannot be altered (in the case of a Biobanking Agreement, they cannot be altered without alternative and comparable offsetting arrangements being put in place).

The OEH may consider a Conservation Agreement (registered on title under s69A-KA of the NPW Act). However, this method of securing an offset is regarded as being resource intensive for OEH as it requires it to undertake ongoing monitoring and enforcement of management requirements. As such, the OEH considers that any offset for Moolarben Stage 2 should utilise one or more of the above three mechanisms for securing the offset.

*Recommendations*

1. The offset strategy is revised and re-submitted classifying vegetation types as described in the OEH's Vegetation Types Database to allow for consistency and the ease of checking matches using the BioBanking tool by OEH and the DP&I.
2. Provide land tenure information, including any covenants, for the Dun Dun property.
3. Require Moolarben to revise their offset strategy taking into account the basic principles of offsetting and OEH's preferred mechanisms for securing an offset.

Recommended Conditions of Consent

On numerous previous occasions, both verbally and in writing, the OEH has advised DP&I and Moolarben that the area known as the Drip and Corner Gorge should form part of the offset package for Moolarben Stage 2. This is supported by the area being identified as the number 1 priority property for inclusion in the Goulburn River National Park. As such, the OEH would like to recommend to DP&I that it includes the following as a condition of consent:

- the Proponent shall transfer ownership of the area known as the Drip and Corner Gorge (Lot 45 DP7570750, part Lot 30 DP755439 and Lot 39 DP720321) to the Office of Environment Heritage for inclusion in the Goulburn River National Park;
- funding requirements for the ongoing management of the Drip and Corner Gorge is to be determined in consultation with the Office of Environment and Heritage (OEH)and provided as agreed with the OEH.

It is clearly preferable that the offset be negotiated prior to the Part 3A approval. If this is not possible, it is recommended that the condition of approval relating to the offset package at least include some parameters about the nature and scale of the offset expected to adequately offset the impacts of the development. Ideally, it should also include a timeframe for meeting the offset requirements in-perpetuity and prior to the commencement of development works.

## Impact on OEH Estate

Open cut 4 of the Moolarben stage 2, shares a significant length of boundary with the Munghorn Gap Nature Reserve, which includes a section of highwall. OEH remains concerned about the potential for mining activities on the nature reserve. Details regarding these concerns were outlined in the OEH's response to the EA and the Response to Submission's Report (October 2009). The OEH notes that the issues raised by the OEH in these two documents have not only failed to be addressed in the PPR, the statement of commitments provided previously in relation to the OEH estate have been removed.

*Recommendation*

The OEH would like to draw your attention to the issues raised in its response to the EA and the Response to Submissions report and request that Moolarben address the concerns raised previously.

Recommended Conditions of Consent

1. The Proponent will implement all feasible and reasonable methods to minimise any direct or indirect adverse impacts on the value of land managed by the Office of Environment and Heritage (OEH) and ensure there is no diminution of amenity on OEH land due to the Moolarben Coal Project Stage 2.
2. Moolarben Coal Mines will establish a Memorandum of Understanding with the Office of Environment and Heritage in regards to access, survey, pest management, fire management and the conducting of works in proximity to either the Munghorn Gap Nature Reserve or the Goulburn River National Park.

Recommended Additions to the Statement of Commitments

- Ensure that the development is consistent with the "*Guidelines for developments adjoining land and water managed by the Department of Environment and Climate Change and Water (June 2010).*"
- Maintain a buffer of at least 50m between any open cut mining operations or infrastructure and the adjacent Munghorn Gap Nature Reserve.
- Identify, survey and fence the entire boundary of Moolarben Coal Mine Stage 2 with the Munghorn Gap Nature Reserve, in consultation with the Office of Environment and Heritage.

## Noise

The EPA is satisfied with the assessment provided, and as such does not raise any significant issues with the assessment apart from the EPA's advice to Moolarben dated 8 December 2011 relating to the use of an ENM correction factor. A copy of this correspondence is attached (Attachment 2).

The EPA understands that Moolarben have been given approval by DP&I to undertake further work to validate the use of a -3dB correction factor as outlined in Section 3.2 of Appendix D. Until such validation has been carried out to the EPA's satisfaction, our advice and recommendations as detailed in Attachment 2 remains unchanged.

As such, at this time, the EPA cannot provide comment on the results of the noise impact assessment or provide recommendations regarding noise limits. The EPA recommends that following an approval of the report for the six month period of validation monitoring by the EPA, noise limits and property acquisition requirements should be determined. The EPA will only provide comment on noise limits and property acquisition requirements at this time.

*Recommendations*

In light of the EPA's position regarding the use of the -3dB correction factor, the EPA does not consider it appropriate for DP&I to issue a consent to Moolarben, with noise limits and property acquisition requirements until such time as this matter is resolved.

## Soils and Land Capability

Its is the EPA's experience that soils in the area of the Moolarben Coal Mine are dispersive in nature and have highly active erosion potential. This experience is supported by an assessment report prepared by Arkhill Engineers for Moolarben (December 2011) regarding dirty water management which confirmed the dispersive nature and erodibility of soils in the area. Further, the report indicated that localised treatment and stabilisation is required including protection bunding, lining of drains and batters and the installation of temporary erosion and sediment controls.

Recommended Additions to the Statement of Commitments

- Design and implement erosion and sediment controls which are appropriate for the management of dispersive and highly erodible soils and consistent with industry best practice.
- Design and install sediment dams for a 50 year recurrence 1 hour duration rainfall event, at a minimum.

## Water Management

Creek Realignment

*General Comments*

The EPA considers that it is more appropriate that the NSW Office of Water provide DP&I with comment regarding the adequacy of the design for the realignment of Murragamba and Eastern Creeks. However, the EPA considers that the management of sediment laden water is of primary concern in regards to the creek realignment.

The EPA notes from Appendix G that rehabilitation is predicted to occur over a minimum period of 5 years (section 5.4.4 pg 21) to allow sufficient time for the overburden fill beneath the creek line to consolidate and stabilise and for the bed, banks and flood terraces to be sufficiently revegetated. It appears from Appendix G that there is some uncertainty in the time it will take for the realigned sections of the creeks to become operational.

Figures 5-10 of the PPR shows the conceptual mine plans which includes the creek realignments and importantly the proposed staged rehabilitation and clean water diversions. It is noted that no diversions appear to have been considered to prevent water entering the realigned sections of creek from the rehabilitated areas. Not only is there the potential for sediment laden water from these areas to be transported offsite, this water may also affect the stability of the realigned sections of creek.

Recommended Additions to the Statement of Commitments

- develop and implement operational criteria for the aligned sections of creek in consultation with the NSW Office of Water
- install diversions around the realigned sections of creek until such time as they become operational

Water Balance and Dirty Water Management

*Sizing of sediment dams*

The EPA notes a discrepancy between the sizes of the sediment dams proposed to be used in open cut 4. Section 4.8.2 (pg 70) states that "a target design storm of a 50 year recurrence 1 hour duration rainfall event has formed the basis for sizing sediment dams", while section 4.2.3 (pg 20) of Appendix F states "the storage volume given for each of the sediment dams listed in table 5 has been based on capturing the volume of run-off generated by the catchment during the 20 year recurrence 1 hour duration rainfall event."

In the EPA's response to the EA in April 2009, it advised that sediment dams should be designed for a 50 year recurrence 1 hour rainfall event. This position is further supported by current staff from the mine who advised the EPA that they consider that this dam size provides an increased level of flexibility and contingency during prolonged periods of wet weather. As such, Moolarben has revised the design capacity of its current sediment dams and is currently in discussions with the EPA to increase their capacity to a 50 year recurrence 1 hour duration rainfall event.

*Dirty Water Balance*

The dirty water balance for "average", "below average" and "above average" rainfall conditions is contained in tables 7-10. The volume of water captured from the mine area in surface water storages forms part of the calculation to determine whether there will a water deficit or surplus during each year of mining. Table 5 of Appendix F provides the indicative dirty water dam catchments and volumes assumed for the mine water balance. Therefore the water balance has been determined using sediment dams sizes of a 20 year recurrence 1 hour duration rainfall event.

*Maximum Harvestable Dam Rights Criteria (MHDRC)*

Section 4.8.4 (pg 73) of the PPR indicates that for one third of the life of the mine the MHDRC will be exceeded. It is unclear from either the PPR or Appendix F whether this has been determined using the sediment dam size of 50 year recurrence 1 hour duration or a 20 year recurrence 1 hour duration rainfall event. The EPA is aware that water collected in sediment dams that is not treated and discharged, for example used for dust suppression, must be considered as harvested water when assessing compliance with the MHDRC.

*Dirty Water Management*

Section 4.8.5 (pg 74) of the PPR provides the management and mitigation measures for surface water. It states that Moolarben will "design and implementation of clean water diversions, sediment dams and erosion structures to contain and manage dirty water on site as described in section 5.5.6 of the stage 2 EA."

This section of the EA again refers to a sediment dam size of 20 year recurrence 1 hour duration rainfall event. There is no detail regarding how water will be managed during rainfall events which may exceed the capacity of the dam and does not indicate whether there will be any requirement for an offsite discharge.

Additionally, section 4.8.5 includes table 5.5.3 which indicates the sediment dam storage capacities and indicative area of disturbance. As the mine footprint has been altered, table 5.5.3 is now inaccurate and should not be referred to.

*Offsite discharge*

Section 4.6 of Appendix F (pg 36) indicates that dirty water is likely to require offsite discharge in years 1-4, 17 and 24 (table 12).

Section 4.8.5 (pg 74) of the PPR indicates that "shallow groundwater which has the potential to increase the salinity of water discharging to Wilpinjong Creek will be removed during mining of open cut 4".

The EPA raised the above points in its response to the draft PPR and requested that the PPR placed on exhibition provided details regarding the likely water quality and volume of any off site discharge and the location for any such discharge.

<u>Clean Water Diversions</u>

*General Comments*

The EPA notes from the PPR that clean water is water that has been collected from areas which have either been undisturbed by mining or from sufficiently rehabilitated areas. Figures 5 – 10 of the PPR shows

the location of clean water diversions to be installed. It should be noted that the EPA will not be permitting water collected from rehabilitated areas to be discharged through the clean water system until such time as Moolarben can demonstrate that the water quality will meet the water quality discharge limits imposed on the environment protection licence. As such, Moolarben will need to determine where clean water diversions are going to be installed upslope of the rehabilitated areas and how to manage any water collected from within those areas.

It is unclear from the general assumptions (section 4.3.1) in Appendix F when water generated from the rehabilitated areas becomes "clean" and is not considered as part of the water balance. As the water balance is based on groundwater inflows, northern borefield groundwater and water collected in the disturbed areas, it is an important assumption for the accuracy of the water balance.

It appears from figures 5 – 10 of the PPR that clean water diverted from around open cut 1 will be diverted to the infrastructure area. The EPA assumes, as it is not indicated in the PPR, that Moolarben intend to connect this diversion to the existing clean water diversion currently in place around the CHPP. If this is the case, it needs to be determined whether that diversion has sufficient capacity for the added volume. If not, the water should be treated in the "dirty" water catchment and be included in the water balance.

Section 4.8.4 (pg 73) of the PPR indicates that Moolarben will develop a rainfall-runoff response curve in consultation with OEH. The EPA does not need to be consulted on the development of such a model, provided that the water is in fact "clean", however, it should be noted that it is the EPA's expectation that the model should ensure that dams M2, M3, E1 and E3 do not overtop, in all rainfall scenarios. In developing the model, Moolarben must consider the protection of the point of discharge from the pipe into Murragamba and Eastern Creeks to prevent scouring and stream bank erosion during high flow events.

Recommendations - water balance and clean and dirty water management

Indicated above is an overview of the concerns the EPA has regarding the water balance and clean and dirty water management as provided in the PPR and the EA, however, it has many other comments and could have spent considerable more time providing that further comment. For example, providing comment on the management of excess groundwater, sizing of the clean water diversion drain dam between Murragamba Creek and the Munghorn Gap Nature Reserve etc.

As the DP&I would be aware, the EPA has prosecuted Moolarben in the Land and Environment Court on two occasions for pollution of waters. On both occasions a lack of adequate planning and design resulted in significant volumes of sediment laden water entering the Goulburn River. The dirty water management system at Moolarben continues to be a significant issue. Some four years since consent was granted for Moolarben stage 1, the EPA is some still working with the company to address issues with the dirty water management system that would not have been an issue if adequate assessment, planning and design were undertaken during the approvals process. Based on the information provided in the PPR and the EA, the EPA is concerned that Moolarben is yet to fully appreciate the level of assessment, planning and design required to ensure that sediment laden water does not enter Murragamba, Eastern or Wilpinjong creeks from a catchment estimated to be some 2870 ha in size.

The EPA therefore would like to advise the DP&I, that it considers that the water balance and the clean and dirty water management assessments should be revised taking into account the above comments, and any provided by the NSW Office of Water. Prior to these assessments being re-submitted to DP&I and other government agencies, the EPA recommends that they undergo an independent peer review.

NSW EPA

ENVIRONMENT PROTECTION AUTHORITY

Our reference: LIC06/333-18 & DOC1154104
Your reference:

The General Manager
Moolarben Coal Mine
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MUDGEE NSW 2850

8 December 2011

Dear Mr Fulham

I refer to the *Moolarben Coal Operations Noise Model Validation Report* (the Report) received by the Environment Protection Authority (EPA) on 24 November 2011.

As you would be aware, following a review of the draft Preferred Project Report (PPR) for the proposed Moolarben Coal Mine – Stage 2 (the Project), Moolarben Coal Mine (Moolarben) was requested to provide a validation report to support the application of a correction factor to the noise levels predicted for the Project by the noise model RTA Technology's Environmental Noise Model (ENM).

The EPA has undertaken a detailed and thorough review of the Report, in particular, the various studies referenced in the document. To summarise the outcome of the review, the EPA would like to advise that it considers that the various studies referred to in the Report do not support the use of the minus 3 dB correction factor and additionally, the limited validation study conducted by Moolarben is not considered to be sufficiently scientifically rigorous or robust. As such, the EPA does not accept the use of the correction factor for predicted noise levels from the Project. Comment on specific aspects of the Report, are contained in Appendix 1, which is attached.

In light of this advice, the EPA is of the opinion that the noise assessment included in any PPR placed on public exhibition for the Project should include a revised noise assessment which has not utilised a minus 3 dB correction factor for enhancing meteorological conditions.

Should you have any queries regarding this matter, please contact Sheridan Ledger at the Bathurst office of the EPA on (02) 6332 7608.

Yours sincerely.

**RICHARD WHYTE**
**Manager Bathurst**
**Environment Protection Authority**
CC: Department of Planning & Infrastructure and Hansen Bailey Pty Ltd

The regulatory responsibilities of the Office of Environment and Heritage (OEH) are now carried out by the Environment Protection Authority (EPA).

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## Appendix 1 – EPA comment on specific aspects of the *Moolarben Coal Operations Noise Model Validation Report (October 2011)*

Section 1.1 – reference to various studies

In Section 1 of the *Moolarben Coal Operations Noise Model Validation* (the Report) it is stated that *"various studies have shown that, for large receptor to source distances (greater than 1000 metres), ENM over predicts noise for worst-case meteorological conditions. Those studies include two done by ERM as part of EA noise assessments for Rio Tinto:*

- *Extension of Warkworth Coal Mine, August 2002 (ERM, 2002); and*
- *Hunter Valley Operations – South Pit, Section 96 Modification of Development Consent, Statement of Environmental Effects (ERM, 2001)"*

EPA records indicate that the validation correction being sought to be applied in the:

- Warkworth Extension: applied to two locations only (6 and 10), not an overall correction to be applied to all ENM results;
- Hunter Valley Operations South Pit S96 Mod: was for wind conditions only – inversions were not assessed. The EPA noted that Coal and Allied bore the responsibility to ensure that the noise limits, based on the predicted levels, would be satisfied, and that if the correction factor resulted in an under-prediction Coal and Allied may have compliance problems.

Section 1.1 – Glendell Mine Operations Noise Impact Assessment (2007)

Section 1 of the Report also indicates that model validation was undertaken for the Glendell Mine Operations Noise Impact Assessment (2007), which found an over-prediction of 6dB. Appendix 5 of the Glendell Mine Operations Noise Impact Assessment (2007) is the source of the Statements *"Model validation undertaken for the Glendell Mine Operations Noise Impact Assessment (2007) also concluded ENM "provides a conservative assessment". In that case the over prediction was 6dB".* Tony Welbourne from Global Acoustics has since clarified (advice provide to the EPA on 7 December 2011) that the correction was actually 5dB, not 6 dB as indicated.

The page 1 quote that ENM "provides a conservative assessment" has been taken out of context. The quote comes from Part 3 – Conclusion of Appendix 5 of the Glendell Operations Noise Impact Assessment, which in full states:

> *"It has been concluded that the ENM predictions from the modelling methodology used in the* Mt Owen Operations EIS *2003 Noise Impact Assessment* ***provide an accurate assessment of the noise impacts of the proposed development.*** *However, it can also be concluded that the ENM predictions provide a conservative assessment of the noise impacts of the proposed development* ***when the recommended noise control strategies have been successfully implemented****" (emphasis added).*

What this conclusion relates to is a comparison, in Part 2 – Results, of a cumulative distribution curve of measured noise levels against one of EIS predictions (presented in Figure A5.2). The text notes that the results suggest that the ENM predictions were on average 5dB above the actual levels; however, the text then goes on to note a number of factors not accounted for in the ENM predictions, including equipment being used by the mine that is quieter than that included in the modelling; a more successful than anticipated night time dumping schedule implemented by the mine; and differences in meteorological conditions during the measurements compared to what was used in the modelling.

The last paragraph in Part 2 – Results is:

*"Not withstanding the discrepancy shown in Figure A5.2* ***ENM has been used to accurately duplicate individual night time LAeq,15minute noise levels recorded at SentlneX 5*** *(emphasis added). These occasions are typically associated with meteorological conditions and operations conditions that result in the older noisier equipment dominating the noise environment."*

The EPA considers this does not support the use of the correction factor, in fact it directly contradicts it.

Section 1.1 – Office of Environment and Heritage (OEH) approval of correction factors

With respect to the assertion, also in Section 1, of OEH "approving application of the correction factor" in the EA for:

- Bulga Coal Modification 5: OEH's submission to the Department of Planning and Infrastructure on this application noted: *"Section 3.1 of the NIA describes a -3 dB(A) correction applied to predicted noise levels to account for conservative levels produced by ENM under adverse meteorological conditions. However, OEH is aware of other circumstances where modelling software under-predicts noise levels. The use of the ENM correction factor has the potential to decrease the numbers of residences who are afforded acquisition or other noise management treatments under the conditions of the consent. For this reason, OEH recommends that conditions of development consent provide for noise management at premises in the event that actual noise levels at residential receivers are higher than predicted."*
- Ravensworth Underground Mine DA 104/96 Modification 8: application of the correction factor was in the EA, however, it should be noted that the predicted levels were more than 3 dB below the criterion and therefore didn't affect the outcome. As such, the OEH did not provide comment at the use of the correction factor, which does not constitute approval by OEH.

Section 3 – General Comments

- Distances from the noise sources to the measurement locations are not stated, nor can they be determined from the figures provided. The location of the station from which meteorological conditions were taken is not provided. The location of the Komatsu WA1200 loader is not shown in any diagram. Table 3.2 indicates two Komatsu 825A graders were operating, however Figure 2 – Modelled Plant Locations indicates only one of these graders was included.

- It's not clear how a vertical temperature gradient of 3°C/100m was obtained when the text indicates stability class was determined from sigma-theta data. Sigma-theta data will provide stability class (see Table E5 of the INP), which for F class, which includes 3°C/100m, the range is from 1.5, to less than 4, °C/100m. How was it determined that 3°C/100m was applicable and not 1.5, or 3.9°C/100m, and what effect would using these values have on the results? It's not clear how or why the particular wind speeds and directions were obtained and used in the assessment.

- The times of measurements are not provided. The equipment used for the measurements is not detailed, and there is little detail on exactly how the contribution from Moolarben was determined using direct measurement or frequency analysis.

Response to other studies

The Executive Summary of the Report states that *"various studies have shown that, for large receptor to source distances (greater than 1000m), ENM over predicts noise for enhancing meteorological conditions, and under predicts for non-enhancing meteorological conditions",* however other than the two, unpublished

studies discussed above (Warkworth 2002 and Hunter Valley Operations 2001), references for any other studies are not provided.

The EPA would like to advise that a full technical description of ENM is in Tonin (1985). Model validation results are presented by Mizia (undated), Brown (1991), Moller and Brown (1991), and Ashaari and Bullen (undated). Comparisons with other noise prediction models and methods are in Brown (1991) and Tonin (1993).

A summary of validation studies on ENM is in Tonin (1997). Tonin's summary includes a discussion of the results presented in Table 1 in the Report. Tonin's discussion notes that the 8.5dB over prediction at 400m corresponded to a location just behind the apex of a hill where the air is subjected to considerable local turbulence, and that the meteorological conditions at this point were different to that measured 400m from the source in another direction along the slope of the hill. The summary also reports the study of Moller and Brown, who made a total of 287 measurements at 95 locations between the hours of 2115 and 0515 every day, and concluded that 75% of all predicted values are within plus or minus 3dB of the measured value, and 90% fall within 4.9dB.

In light of the above validation studies, the indication that the measurements from which the proposed correction was obtained on one night (1 June 2010) only, and at four locations only, is considered by the EPA to be very limited. However, based on those four measurements Moolarben has provided that a -3dB correction is appropriate for ENM for noise enhancing meteorological conditions (at distances greater than 1000m). The EPA considers that the limited study can in no way be considered to represent defensible results and conclusions when compared to more scientifically rigorous and robust testing such as that conducted by Moller and Brown. Given this, together with the research and development effort that has gone into ENM, the EPA will not accept the proposed correction factor.

References:

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Tonin (1985). Estimating Noise Levels from Petrochemical Plants, Mines and Industrial Complexes. Acoustics Australia Vol 13. No. 2, p59-67.

Tonin (1993). Environmental Noise Modelling. Chapter 7 in Environmental Modelling Vol 1 Computer Methods and Software for Simulating Environmental Pollution and its Adverse Effects (P. Zanetti, Editor) Elsevier Applied Science, London, New York. ISBN1-85861-025-7.

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