Centennial Coal

Mandalong Mine
Ventilation Air Methane
Abatement Demonstration Project

Response to Submissions

September 2011

FUTURE POWER | Centennial Coal

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1 INTRODUCTION

Mandalong Mine is an underground longwall coal mining operation located in the Lake Macquarie Local Government Area (LGA), approximately 130 kilometres north of Sydney near Morisset, NSW. Mandalong is a relatively gassy mine and accounts for approximately 55 percent of Centennial's Scope 1 (direct) emissions per annum (2009/10 Financial Year), emitting approximately 1 Mt of CO_2-e each year.

99.5 percent of Mandalong's direct greenhouse gas emissions are as a result of fugitive emissions. These emissions are divided between high purity methane drainage gas (32 percent), and methane contained in the ventilation air drawn from the mine, in the form of high flow rate ventilation air methane (VAM), accounting for 68 percent of fugitive emissions. The high purity methane drainage gas can be abated by flaring the gas, or via the beneficial use of the gas in gas engines. Mandalong has an existing approval for the installation and operation of both enclosed methane gas flare units and gas engines.

Greenhouse gas emissions associated with VAM are much more difficult to abate, because the naturally occurring gas becomes diluted in the large volumes of ventilation air that are flushed through the mine during standard mining operations. As methane typically constitutes less than 1 percent of the ventilation air expelled from an underground mine, the gas is too low in concentration to either flare or use to generate electricity.

One technology being investigated by Centennial Mandalong to abate greenhouse gas emissions associated with low concentration methane is ventilation air methane regenerative afterburners (VAM RABs). The VAM RAB system overcomes the problem of low concentration methane by directing the ventilation air into a large oxidation vessel, and oxidising the methane to carbon dioxide. This technology is based on well tested coke-oven principles, and has been developed by Corky's Sustainable Energy (CSE), a Newcastle-based engineering company.

Centennial Mandalong is seeking to modify the Mandalong Mine Development Consent (DA 97/800) to allow for the installation and ongoing operation of this technology as part of a demonstration project. Specifically, the proposed modification involves:

- Installation of a single VAM RAB unit inclusive of VAM capture duct and RAB tower elements, adjacent to the existing Mandalong Ventilation Fans;
- Provision of site services to the VAM RAB. This includes an extension of the existing methane gas drainage pipeline to connect to the VAM RAB unit, as well as the provision of power from the gas monitoring switch room and water via pipeline proximate to the plant;
- Installation of a fire suppression system for the Motor Control Centre;
- Sourcing of fill from either an existing stockpile to the north west of the proposed location of the VAM RAB, or from offsite as required, to establish appropriate foundations for the VAM RAB unit;
- Rehabilitation of the existing stockpile area as required, following the sourcing of fill from this stockpile;
- Erection of fencing around the VAM RAB;
- Minor drainage works to ensure appropriate drainage at the site;
- Increasing the Mandalong Mine Development Consent noise criteria to be consistent with the Project Specific Noise Criteria.

The proposed modification will not result in any other changes to the operations at Mandalong. No additional coal production or any other changes to mining related activities are proposed. No dedicated plant operators are required for the VAM RAB beyond the initial five weeks of experiments. During this initial period, continuous coverage (24 hours per day, seven days per week) will apply to collect data and to make adjustments as required. Beyond this time, the plant will essentially operate unattended with continuous monitoring and periodic on-site maintenance checks.

This project, which will be undertaken on behalf of the NSW government and the underground coal industry, is co-funded by the Department of Trade and Investment, Regional Infrastructure and Services (DTIRIS) via the NSW Clean Coal Fund (NSW CCF) ($2.2 million plus GST), and Centennial Mandalong ($0.6 million). If the demonstration of VAM RAB technology is proven successful, the technology could

be retro-fitted to any underground coal mine that has an issue with fugitive methane emissions above certain concentration limits (indicative 0.3 percent methane or greater), or be included in the design of ventilation systems for new mines. In addition, it would also provide an economic benefit given that these fugitive methane emissions under a carbon price mechanism would potentially be a significant cost impost to coal mining operations. The environmental and economic benefits of this project therefore have the potential to go well beyond Mandalong, with VAM RAB technology potentially having a significant role to play in the abatement of Australia's greenhouse gas emissions.

This is the only project being funded via the NSW CCF relating to the abatement of fugitive emissions from underground coal mines, and will therefore be a major contributor to the ongoing development and testing of clean coal technologies.

2 SCOPE

This report has been prepared in accordance with section 75H(6) of the EP&A Act and considers the matters raised in submissions received by the NSW Department of Planning and Infrastructure during the public exhibition of the Environmental Assessment. This report builds on information presented in the Environmental Assessment and is to be read in conjunction with the Environmental Assessment.

3 OVERVIEW OF SUBMISSIONS

The Mandalong Mine Ventilation Air Methane Abatement Demonstration Project Environmental Assessment was submitted to the Department of Planning and Infrastructure (DP&I) on 30 June 2011. The Environmental Assessment was placed on public display via the DP&I website for three (3) weeks from Wednesday 6 July until Wednesday 27 July 2011.

Ten submissions were submitted to DP&I in regards to the Environmental Assessment. Submissions were received from:

- NSW Office of Environment and Heritage (OEH);
- Heritage Branch;
- Department of Planning and Infrastructure – Major Hazards Unit;
- Division of Resources and Energy (DRE);
- NSW Office of Water (NOW);
- Roads and Traffic Authority (RTA);
- Mine Subsidence Board; and
- Individuals (3).

Of the ten submissions received seven submissions provided comments on the Environmental Assessment or requested additional information be provided. Three submission received was in objection to the Project. Table 1 provides a summary of the issues raised in the submissions received by the DP&I.

Table 1 – Summary of Issues Raised in Submissions

Concern	Raised By	Summary of Concern
Ecology	OEH	OEH generally does not accept rehabilitation as an offset due to the time lag required for planted vegetation to develop the same ecosystem function as that of the intact vegetation that it replaces which means that even if the same species mix is replanted they still do meet the 'like for like' requirement of OEH's 'Principles for the use of biodiversity offsets in NSW (OEH, 2011a). BioBanking was not discussed in the Environmental Assessment. The portion of the proposed rehabilitation in the APZ area may not achieve the ecosystem function of the intact vegetation that it is intended to replace, and thus it may not meet OEH's offset requirements. The Ecology Report does not provide details of when fieldwork was conducted on the site, and thus whether seasonal plant species were in growth or flower at the time of the site visit.
Noise	OEH and Individuals	Construction criteria nominated in Table 3 of the Noise Impact Assessment, was derived from the now outdated Environmental Noise Control Manual (ENCM) based on background+20 dB(A). It should be noted that the ENCM has been superseded by the Interim Construction Noise Guideline, but for mining projects once mining has commenced then any construction works should be assessed against the Industrial Noise Policy (INP) (i.e. background + 5 dB(A)). The meteorological assessment indicates that easterly winds are no longer a feature of the area (as indicated in the 2008 Bridges Acoustics report), replaced now by south−west winds, and that the modelling has assumed that temperature inversions are a feature of the area. Even under calm conditions the predicted noise levels from the site without the proposed VAM RAB unit (in table 10 of the NIA), exceed the consent noise limits by up to 4 dB(A). This does not appear to be explained in the Noise Impact Assessment. Section 5.1.1 of the Noise Impact Assessment indicates that the conditions of consent state that where noise levels exceed the consented limits then further monitoring should be undertaken to develop noise level

		contours to determine that not more than 25% of the land is impacted. The Noise Impact Assessment does not go into this detail to determine the percentage of land impacted by the predicted noise levels. The future consent conditions for the proposed VAM RAB unit should state that the unit is to be designed so as to not exhibit any annoying characteristics such as tonality. The proponent should provide an analysis of feasible and reasonable mitigation measures that aim to reduce noise from the site, through implementation of a Noise Management Plan. This should be included in the Statement of Commitments. The Environmental Assessment should have included a prediction of impacts from the proposed 36 units if the demonstration project proves successful as this could have a significant impact on noise levels in the future.
Aboriginal Heritage	OEH	The proponent should provide an opportunity for the registered local Aboriginal stakeholders to monitor the initial ground disturbance activities undertaken within the project area, to identify and recover any additional cultural material present. Some areas of the Project Site were heavily vegetated and provided limited visibility during field surveying. Accordingly, we acknowledge that there is a likelihood of finding evidence of Aboriginal occupation in some areas of the project area if the development proceeds.
Air Quality	Individuals	The Air Quality Impact Assessment did not assess PM10 or under. There is no reference in the Environmental Assessment as to how air quality impacts were assessed at the nearest sensitive receptors.
European Heritage	Heritage Branch	The mitigation measures outlined in Section 7.8.4 of the Environmental Assessment which requires that works are stopped and the NSW Heritage branch is notified if during the course of works significant European cultural heritage material is uncovered
Water Management	OEH	The EA does not provide sufficient assessment on the management of recovered water vapour from the VAM RAB unit
Surface Water	NOW	Detailed information regarding the potential for inundation at the site was not provided in the assessment

Construction	MSB	The VAM RAB demonstration Plant should be designed in accordance with all relevant standards and the Building Code of Australia. A copy of the final plan is to be provided to the Mine Subsidence Board prior to construction commencing.
Safety	DP&I - Major Hazards Unit	Taking into account that the development does not introduce high levels of hazards, and applying "fit-for purpose" framework, it is recommended that if approved than One month prior to construction, the Applicant shall prepare and shall submit for approval a Final Hazard Analysis of the proposed development, consistent with the Department of Planning's Hazardous Industry Planning Advisory Paper No. 6, 'Hazard Analysis'. The Final Hazard Analysis shall provide information on the third party assessment of the Safety Integrity Levels (SIL) rating. Construction, other than of preliminary works that are outside the scope of the hazard study, shall not commence until approval has been given.
Approvals	DRE	The proponent should amend the Mining Operation Plan, to include the proposed modification to the satisfaction of the Division of Resources and Energy The proponent should review the proposed modification activities in the Annual Environmental Management Report to the satisfaction of the Division of Resources and Energy. Integrated rehabilitation and environmental management reporting is to be captured in the existing Mining Operation Plan and Annual Environmental Management Report to the satisfaction of the Division of Resources and Energy's Director Environmental Sustainability. The proponent should commence discussions with Division of Resources and Energy on the requirements for the preparation and submission of a Mining Operations Plan and the Annual Environmental Management Report.

4 RESPONSE TO SUBMISSIONS

4.1 Ecology

OEH generally does not accept rehabilitation as an offset due to the time lag required for planted vegetation to develop the same ecosystem function as that of the intact vegetation that it replaces which means that even if the same species mix is replanted they still do meet the 'like for like' requirement of OEH's 'Principles for the use of biodiversity offsets in NSW' (OEH, 2011a).

The vegetation within the proposed disturbance area includes 0.35 hectares of MU38 Redgum – Roughbarked Apple Forest, which is part of an Endangered Ecological Community (EEC) listed under the *Threatened Species Conservation Act 1995* (TSC Act). The EEC proposed to be cleared is fragmented by surrounding degraded areas disturbed by previous construction activities, in particular as a result of the construction of the F3 freeway. None of the trees within the proposed disturbance footprint contain any habitat hollows.

As a result of the clearing 0.35 hectares of the EEC, Centennial Mandalong proposes to remediate existing degraded areas surrounding the site. The remediation will re-establish approximately 1.25 hectares of two EEC's listed under the TSC Act, creating approximately 5 hectares of continuous habitat within and adjacent to the Project Area. Two communities are proposed to be established in the degraded areas which include:

- 0.9ha of MU38 Redgum – Roughbarked Apple established in the areas currently mapped as 'disturbed/rehabilitated vegetation' in the project site; and
- 0.37ha of MU37 Swamp Mahogany – Paperbark established in the area currently mapped as MU46 on the eastern side of the approved gas engines and flares.

The Ecological Assessment that was undertaken for the project and provided in Appendix 5 of the Environmental Assessment, compared the data from a plot within the proposed disturbance area to a plot within the MU37 community, and found that the biodiversity of the current MU46 area will be doubled when the remediation is established. The species identified in Plot MU37 will be the type and range of species that will be the target for in the remediation of the area currently mapped as MU46. The number of native species identified within Plot MU37 is significantly greater than the number of species currently within the proposed disturbance area and the area proposed to be rehabilitated. The area currently mapped as MU46 has a low number of plants species (diversity) because the canopy has been cleared. Bringing that area back to a fully structured community with canopy trees, midstorey and low shrubs will increase the biodiversity in that area.

The species to be established as part of the remediation will be sourced from local provenance and weed management works will also be undertaken within the remediated areas to ensure improved remediation outcomes.

Due to the small amount of proposed disturbance, the fragmented nature and the limited habitat value of the EEC proposed to be cleared, Centennial Mandalong believe that the proposed rehab of 1.25 hectares of EEC adequately offsets the clearing of 0.35ha. In the medium to long term, the project will have a net benefit in the total area of EECs and result in improved habitat connectivity and habitat value than what currently exists on site. The proposed remediation approach proposed by Centennial Mandalong within the Environmental Assessment was discussed with the Office of Environment and Heritage at a meeting held between Centennial and the Office of Environment and Heritage staff on 15 September 2011. The Office of Environment and Heritage raised no additional objections to the Centennial Mandalong approach to its proposed remediation strategy discussed in the Environmental Assessment at the meeting on 15 September 2011.

BioBanking was not discussed in the Environmental Assessment.

The ecological investigation was conducted according to the:

- Threatened Biodiversity Survey and Assessment Guidelines for Developments and Activities (DEC 2004);
- Draft Guidelines for Threatened Species Assessment (DEC and DPI 2005); and

- Threatened Species Survey and Assessment Guidelines – Introduction to Field Survey Methods (DECCW 2009).

Biobanking is a voluntary alternative to the current threatened species assessment process and was not utilised or required to be utilised for this assessment. As such BioBanking was not discussed in the Environmental Assessment. A justification as to why the Biobanking method was not used for the Ecological Impact Assessment and why it was not discussed within the Environmental Assessment was provided to the Office of Environment and Heritage at a meeting held between Centennial and the Office of Environment and Heritage staff on 15 September 2011. The Office of Environment and Heritage raised no additional objections to the Centennial Mandalong approach to its ecological assessment at the meeting on 15 September 2011.

The portion of the proposed rehabilitation in the asset protection zone (APZ) area may not achieve the ecosystem function of the intact vegetation that it is intended to replace, and thus it may not meet OEH's offset requirements.

The Environmental Assessment proposes to tailor the species to be used in the remediation to suit the requirements for an asset protection zone around the gas flares and gas engines. This would be determined following a risk assessment involving relevant site staff and a qualified ecologist. Remediation within the asset protection zones would still result in improved habitat value, increased species diversity and improved habitat connectivity within the area in the medium to long term when compared to the existing environment.

The Ecology Report does not provide details of when fieldwork was conducted on the site, and thus whether seasonal plant species were in growth or flower at the time of the site visit.

Initial vegetation data was collected within and surrounding the Project Area on 14 and 15 August 2010. Additional field surveys were conducted within the Project Area on 9 February 2011, 17 February 2011 and 6 May 2011. During these surveys, all plant species within the survey plots were able to be identified, there were no seasonal or annual flowering species or any threatened species that were missed during these surveys.

4.2 Noise

Construction criteria nominated in Table 3 of the Noise Impact Assessment has been derived from the now outdated Environmental Noise Control Manual (ENCM) based on background+20 dB(A). The ENCM has been superseded by the Interim Construction Noise Guideline, but for mining projects, once mining has commenced, then any construction works should be assessed against the Industrial Noise Policy (INP) (i.e. background + 5 dB(A)).

A Noise Impact Assessment was completed by SLR Consulting for the project and was included in Appendix 5 of the Environmental Assessment. The Noise Impact Assessment assessed the impacts of construction noise against the noise criteria outlined in Schedule 2 Condition 43 of the current Development Consent (DA 97/800 Mod 4, July 2009). Condition 43 of Development Consent DA97/800) states:

> *43. The Applicant shall ensure that the contributed LA10(15min) noise level due to construction works, when measured or computed at any dwelling not owned by the Applicant shall not exceed the following noise emission levels assessed under prevailing weather conditions:*
>
> ***Daytime (0700 hours to 2200 hours)***
>
> *(i) For a cumulative noise exposure period greater than 26 weeks, the LA10(15 min) noise level should not exceed the LA90(15min) background level by more than 5 dB(A);*

(ii) For a cumulative noise exposure period between 4 and 26 weeks, the LA10(15 min) noise level should not exceed the LA90(15min) background level by more than 10 dB(A);

(iii) For a cumulative noise exposure period of up to 4 weeks, the LA10(15 min) noise level should not exceed the LA90(15min) background level by more than 20 dB(A);

Night-time (2200 hours to 0700 hours)

(iv) (iv) For any noise exposure duration, the LA10(15 min) noise level should not exceed the LA90(15min) background level by more than 5 dB(A).

The assessment against the noise criteria outlined within the current Development Consent Conditions was undertaken to confirm compliance of construction activities with those requirements.

In considering the impact of construction activities against the Interim Construction Noise Guidelines and the INP noise criteria (background +5 dB(A)), Centennial Mandalong can confirm that construction noise will comply with the background + 5dB(A) criteria during daytime (7am – 6pm) and evening (6pm – 10pm) periods. As has been detailed in Section 7.5.5 of the Environmental Assessment and within the Statement of Commitments, all construction activities will be limited to daylight hours (7am to 6pm) Monday to Friday, and 8am to 1pm on Saturday. No construction will be undertaken on Sundays or public holidays.

The meteorological assessment indicates that easterly winds are no longer a feature of the area (as indicated in the 2008 Bridges Acoustics report), replaced now by south−west winds, and that the modelling has assumed that temperature inversions are a feature of the area.

Twelve months of meteorological data from 2006 obtained from the Mandalong automatic weather station was analysed for the Noise Impact Assessment. This calendar year was chosen for consistency with the SLR Consulting Air Quality Assessment that was prepared for the project and because it appears to provide the most representative data. Mandalong weather data for more recent years contains unusually high percentage of calm conditions.

The analysis of the 2006 meteorological data indicates that the prevailing winds are those from the south-west. The same trends (prevailing South West and southerly winds) are also evident in meteorological data obtained from the nearby Cooranbong and Newstan Colliery weather stations.

For a temperature inversion to be a significant characteristic of the area it needs to occur for approximately 30% of the total night-time during winter, or about two nights per week. The Noise Impact Assessment has considered a worst case scenario, taking temperature inversions during the night-time period into consideration, as sufficient meteorological data from the Mandalong weather station was not available to determine the percentage occurrence of temperature inversions during winter nights. In addition, the current Mandalong Mine Development Consent Conditions require that current noise limits apply under 3m/s winds from all directions and under temperature inversions. As such, it was considered reasonable to take into consideration the impact of temperature inversions at night on noise levels as part of the Noise Impact Assessment.

Even under calm conditions the predicted noise levels from the site without the proposed VAM RAB unit (in table 10 of the Noise Impact Assessment), exceed the consent noise limits by up to 4 dB(A). This does not appear to be explained in the Noise Impact Assessment.

The 4 dB(A) difference in noise limits predicted by SLR Consulting when compared to the noise limits identified by Bridges Acoustics in the 2008 noise assessment can be justified as a result of:

- The use of different noise modelling software. Bridges used ENM noise modelling software whereas SLR Consulting used SoundPlan v7.0; and

- Possible slight differences in the assumed locations of operating equipment as the exact location of equipment locations used in the Bridges 2008 assessment were not able to be determined. Slightly different locations may result in noise levels being modelled lower as a result of shielding form existing buildings on site.

Both of these differences could account for the difference in predicted noise levels.

Section 5.1.1 of the Noise Impact Assessment indicates that the conditions of consent state that where noise levels exceed the consented limits then further monitoring should be undertaken to develop noise level contours to determine that not more than 25% of the land is impacted. The Noise Impact Assessment does not go into this detail to determine the percentage of land impacted by the predicted noise levels.

The noise modelling undertaken for the project provided in Appendix 5 of the Environmental Assessment indicates that with construction and operation of the VAM-RAB, Centennial Mandalong will not comply with the current noise criteria currently specified within the Development Consent. The Noise Impact Assessment indicates that current mine noise emission levels are predicted to be up to 8 dB(A) above the existing Development Consent Conditions. This is due to the fact that the current Mandalong Mine Development Consent Conditions relevant to noise were established based on predicted noise emissions provided in the Mandalong Modification to Development Consent Environmental Assessment - Appendix D (Bridges Acoustics, May 2008). Bridges' predictions differ from the current noise modelling primarily due to the different meteorological scenarios considered. As such, the proposed Mandalong Mine Ventilation Air Methane Abatement Demonstration Project is seeking to increase the current Mandalong Mine Development Consent noise criteria to be consistent with the Project Specific Noise Criteria.

The future consent conditions for the proposed VAM RAB unit should state that the unit is to be designed so as to not exhibit any annoying characteristics such as tonality.

The purpose of the Mandalong Mine Ventilation Air Methane Abatement Demonstration Project is designed to demonstrate a new ventilation air methane abatement technology (VAM-RAB) that has previously been un-tested. As part of the demonstration project, and as is identified in Section 1.0 of the Environmental Assessment, operation and testing is proposed to be undertaken over a 14 month period to verify the performance of the technology. Periodic on-site maintenance checks will be undertaken throughout the operation of the VAM-RAB unit as is identified in Section 4.2.4 of the Environmental Assessment.

As part of the testing to be undertaken, detailed noise investigations will be carried out to confirm the sound power levels utilised in the Noise Impact Assessment and provided in Appendix 5 of the Environmental Assessment. Within the Noise Impact Assessment, the sound power level of the VAM-RAB unit was estimated at 97dB(A). This was based on measurements conducted of a similar unit and information provided by the manufacturer. As a result, it was predicted that the operation of the VAM-RAB unit will increase noise levels by less than 1dB(A) at the nearest assessed residential locations.

Given its demonstration nature, Centennial Mandalong will investigate, during the testing period and as part of the ongoing periodic on-site maintenance checks, all intrusive noise characteristics, including tonality. If it is identified during the operation of the VAM-RAB unit that tonality is an issue, than additional mitigation measures will be investigated and implemented where required.

The proponent should provide an analysis of feasible and reasonable mitigation measures that aim to reduce noise from the site, through implementation of a Noise Management Plan. This should be included in the Statement of Commitments.

Mandalong Mine has an existing approved Noise Management Plan that has been developed in accordance with the conditions of the current Development Consent (Development Consent Condition

45). Centennial Mandalong will review and amended where required the existing Noise Management Plan to take into consideration the operation of the VAM-RAB unit. This commitment has been included in the revised Statement of Commitments provided in Section 5 of this Response to Submissions.

The Environmental Assessment should have included a prediction of impacts from the proposed 36 units if the demonstration project proves successful as this could have a significant impact on noise levels in the future.

The purpose of the Mandalong Mine Ventilation Air Methane Abatement Demonstration Project is designed to demonstrate a new ventilation air methane abatement technology (VAM-RAB) that has previously been un-tested. Any future expansion of VAM-RAB technology would be subject to a separate assessment and approval application and be based on the results of the monitoring and testing proposed as part of this demonstration project.

4.3 Aboriginal Heritage

The proponent should provide an opportunity for the registered local Aboriginal stakeholders to monitor the initial ground disturbance activities undertaken within the Project Area, to identify and recover any additional cultural material present.

Some of the Aboriginal groups who participated in the field surveys of the Project Area, and as is identified in the correspondence from the Awabakal Traditional Owners Aboriginal Corporation dated 9 May 2011, requested the possibility for the Aboriginal Stakeholders to observe ground works pertaining to earthworks and/or tree removal at a particular area located within the Project Application Area. The particular area identified by the Aboriginal Groups is outside the proposed disturbance boundary for the Project and as such was not included in the Projects recommendations.

Despite this, Centennial Mandalong will commit to invite representatives of the registered Aboriginal stakeholders who participated in the field surveys to attend site and inspect the topsoil stripping activities undertaken within previously undisturbed areas of the Project Application Area. This commitment has been included in the revised Statement of Commitments provided in Section 5 of this Response to Submissions.

Some areas of the Project Site were heavily vegetated and provided limited visibility during field surveying. Accordingly, we acknowledge that there is a likelihood of finding evidence of Aboriginal occupation in some areas of the project area if the development proceeds.

A Cultural Heritage Assessment was completed for the Project and is contained in Appendix 8 of the Environmental Assessment. The Cultural Heritage Assessment identifies that as the Project Area is located on gently sloping and flat lying swampy ground, the site type most likely to occur in the Project Area is isolated finds and artefact scatters. The majority of artefact scatters and isolated finds in the broader area were identified within 100 metres of a perennial watercourse. As there are no creeks or rivers located in the Project Area or within 100 metres of the Project Area, the Cultural Heritage Assessment considered it unlikely that sites with artefacts will occur within the Project Area.

Centennial Mandalong recognise that site visibility in some areas of the Project Application was limited. Despite this the majority of the Project Application Area has been previously disturbed or is highly modified. Centennial Mandalong recognise that there is a possibility of finding evidence of Aboriginal occupation in some areas of the Project Area however, due to the previously disturbed and highly modified nature of the environment within the Project Area, that likelihood is low.

Despite this, Centennial Mandalong will commit to invite representatives of the registered Aboriginal stakeholders who participated in the field surveys to attend site and inspect the topsoil stripping activities undertaken within previous undisturbed areas of the Project Application Area. This commitment has

been included in the revised Statement of Commitments provided in Section 5 of this Response to Submissions.

4.4 Air Quality

The Air Quality Impact Assessment did not assess PM10 or under.

The impacts of the existing Mandalong Mine operations on the surrounding air quality have been previously assessed within the Mandalong Mine Life Extension Project – Environmental Impact Statement (Umwelt 1997) and subsequent modifications and have been subsequently approved. The proposed VAM abatement project will not result in any increase in particulate matter above what has been previously assessed and approved for the Mandalong Mine. Dust emissions from the construction phase are anticipated to be minor assuming standard control measures are implemented and as such were not considered in detail in the Environmental Assessment. Centennial Mandalong has an existing approved Air Quality Management Plan in place for the Mandalong Mine which will continue to be implemented during the construction and operation of the VAM RAB demonstration project.

There is no reference in the Environmental Assessment as to how air quality impacts were assessed as the nearest sensitive receptors.

An Air Quality Impact Assessment was undertaken by SLR Consulting and is provided as Appendix 7 to the Environmental Assessment. SLR Consulting utilised the CALPUFF (version 6.2) modelling system to predict impacts from the proposed project on the nearby sensitive receptors.

4.5 European Heritage

The mitigation measures outlined in Section 7.8.4 of the Environmental Assessment which requires that works are stopped and the NSW Heritage Branch is notified if during the course of works significant European cultural heritage material is uncovered, should be included in the Draft Statement of Commitments for the project.

Centennial Mandalong will include the commitment to stop work and notify the NSW Heritage Branch if during the course of works significant European cultural heritage material is uncovered. This commitment has been included in the revised Statement of Commitments provided in Section 5 of this Response to Submissions.

4.6 Water Management

The EA does not provide sufficient assessment on the management of recovered water vapour from the VAM RAB unit, water associated with fire fighting or water used in the servicing provision of the VAM RAB.

Over a 12 month period of the VAM-RAB demonstration plant operations, 1161 tonnes of clean, invisible water vapour is predicted to be produced. The water vapour is in the air and is blown away as a gas similar to the water vapour in truck and car exhaust fumes that use the nearby F3 freeway. The water vapour will be dispersed due to stack gas velocity and buoyancy so that there is negligible humidity difference on or off the site.

Potable water will be provided to the site for the provision of a fire suppressant system for the Motor Control Centre. Potable water will be supplied to the site by Hunter Water. All water will be contained on site.

No water will be used to service the VAM-RAB unit.

4.7 Surface Water

Detailed information regarding the potential for inundation at the site was not provided in the assessment, it is recommended that the Statement of Commitments should include that appropriate measures will be implemented to minimise the risk arising from the location of the Ventilation Air Methane Regenerative Afterburner unit on a floodplain.

The VAM-RAB demonstration plant will be constructed above the 1 in 100 year flood level. Surface water drainage will be designed and installed to keep surface water runoff away from the VAM-RAB unit. If surface waters do rise above the 1 in 100 year flood level, the capability exists for the plant to be shut down.

4.8 Construction

The VAM RAB demonstration Plant should be designed in accordance with all relevant standards and the Building Code of Australia.

Centennial Mandalong have engaged a design engineer (Lindsay Dynan) for civil and critical plant construction techniques. The VAM-RAB demonstration plant will be designed in accordance with all relevant standards and the Building Code of Australia.

A copy of the final plan is to be provided to the Mine Subsidence Board prior to construction commencing.

The VAM-RAB demonstration plant is located adjacent to existing and proposed critical infrastructure and will not be undermined by Centennial Mandalong. All planned future mining is located at some distance from the proposed location of the VAM-RAB demonstration plant. The fact that the VAM-RAB demonstration plant will not be undermined has been confirmed to Corky's by the Mine Manager. As such provision of final plans to the Mine Subsidence Board is not considered necessary.

4.9 Safety

Taking into account that the development does not introduce high levels of hazards, and applying "fit-for purpose" framework, it is recommended that if approved than One month prior to construction, the Applicant shall prepare and shall submit for approval a Final Hazard Analysis of the proposed development, consistent with the Department of Planning's Hazardous Industry Planning Advisory Paper No. 6, 'Hazard Analysis'. The Final Hazard Analysis shall provide information on the third party assessment of the Safety Integrity Levels (SIL) rating. Construction, other than of preliminary works that are outside the scope of the hazard study, shall not commence until approval has been given.

Centennial Mandalong will prepare and submit for approval a Final Hazard Analysis of the proposed development, consistent with the Department of Planning and Infrastructures Hazardous Industry Planning Advisory Paper No. 6, 'Hazard Analysis'.

4.10 Approvals

The proponent should amend the Mining Operation Plan, to include the proposed modification to the satisfaction of the Division of Resources and Energy.

Centennial Mandalong will amend the Mandalong Mine - Mine Operations Plan to include the proposed VAM-RAB demonstration plant. Any amendments to the Mine Operations plan will be to the satisfaction of the Division of Resources and Energy.

The proponent should review the proposed modification activities in the Annual Environmental Management Report to the satisfaction of the Division of Resources and Energy.

Centennial Mandalong will include a review of the proposed modification activities in the Annual Environmental Management Report.

Integrated rehabilitation and environmental management reporting is to be captured in the existing Mining Operation Plan and Annual Environmental Management Report to the satisfaction of the Division of Resources and Energy's Director Environmental Sustainability.

Integrated rehabilitation and environmental management reporting will be captured in the existing Mining Operation Plan and Annual Environmental Management Report and will be to the satisfaction of the Division of Resources and Energy's Director Environmental Sustainability.

The proponent should commence discussions with Division of Resources and Energy on the requirements for the preparation and submission of a Mining Operations Plan and the Annual Environmental Management Report.

Centennial Mandalong will commence discussions with the Division of Resources and Energy on the requirements for the preparation and submission of a Mining Operations Plan amendment and the Annual Environmental Management Report.

5 STATEMENT OF COMMITMENTS

A revised Statement of Commitments for the Mandalong Mine Ventilation Air Methane Abatement Demonstration Project if approval were to be granted has been provided in Table 2 below.

Table 2 –Revised Statement of Commitments

Action	Timing
Flora and Fauna	
Approximately 1.25 ha of degraded areas within the project site will be rehabilitated. 0.9ha of MU38 Redgum – Roughbarked Apple Swamp Forest EEC will be established in the areas currently mapped as 'disturbed/rehabilitated vegetation' in the project site, and 0.37 ha of MU37 Swamp Mahogany – Paperbark Forest EEC will be established in the area currently mapped as MU46 on the eastern side of the approved gas engines and flares (illustrated in **Figure 6**). The species to be established as part of the remediation will be sourced from local provenance to avoid genetic conflicts between local and imported species. Redgums will be *Eucalyptus amplifolia* grown from seed collected from trees in the Mandalong floodplain. Weed management works will also be undertaken in the rehabilitated areas to ensure improved remediation outcomes.	Post construction
A bushfire risk assessment will be conducted prior to the remediation taking place to determine the width of an APZ to be maintained around the gas flares and engines. In this zone the species to be used in the remediation will be tailored to suit the APZ requirements.	Prior to remediation works commencing
Surface Water	
Appropriate erosion and sediment controls will be implemented during the construction phase and prior to re-vegetation establishment during the operation phase. Measures will include: • Land disturbance will be minimised by clearing the smallest practical area of land ahead of construction and earthmoving activities, whilst also ensuring that the land is disturbed for the shortest possible time. • Temporary sediment fencing will be constructed on the downstream side of all disturbance areas to treat sediment-laden runoff.	Prior to and during construction
Soils and Land Capability	
In the unlikely event that acid sulphate soils or potential acid sulphate soils are disturbed or exposed during construction works, the existing approved Mandalong Acid Sulphate Soil Management Plan will be implemented.	During construction
Aboriginal and Cultural Heritage	
All relevant contractors associated with construction and operation of the VAM-RAB unit will be made aware of their statutory obligations for heritage under the NPW Act and the *Heritage Act 1977*, during their mine induction process.	Prior to works commencing
Centennial Mandalong will invite representatives of the registered Aboriginal stakeholders who participated in the field surveys to attend site and inspect the topsoil stripping activities undertaken within previously undisturbed areas of the Project Application Area.	During construction
If during the course of works significant European cultural heritage material is	During construction

Action	Timing
uncovered. Centennial Mandalong will stop work and notify the NSW Heritage Branch	
Noise	
Construction will be limited to daylight hours between 7am and 6pm Monday to Friday, and 8am to 1pm on Saturday. No construction will be undertaken on Sundays or public holidays.	During construction
Centennial Mandalong will investigate, during the testing period and as part of the ongoing periodic on-site maintenance checks, all intrusive noise characteristics, including tonality. If it is identified during the operation of the VAM-RAB unit that tonality is an issue, than additional mitigation measures will be investigated and implemented where required.	During operation
Centennial Mandalong will review and amended where required the existing Noise Management Plan to take into consideration the operation of the VAM-RAB unit.	During operation
Visual Amenity	
The VAM RAB stack height is to be restricted to 10.6 metres and the RAB tower is to be restricted to approximately 9.1 metres high. The proposed VAM RAB infrastructure is to be painted a ‘mist green’ colour, excluding safety components such as handrails.	