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Munmorah Power Station Rehabilitation

Suibmissions Report

Delta electricity

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Contents

Index of Figures

Index of Tables

1. Purpose of this Document

1.1 Introduction

This submissions report has been prepared by Aurecon on behalf of, and in conjunction with, Delta Electricity (the proponent). It provides the proponent's response to the submissions received from the public exhibition and the associated NSW government agency review of the Environmental Assessment for the proposed Munmorah Power Station Rehabilitation. The proponent's response has been sought by the Department of Planning in its letter of 24 November 2009 (Attachment A).

It is anticipated that the proponent's review of submissions provided in this submissions report will form part of the matters considered by the NSW Department of Planning in its review of the Project Application that is assessed under Part 3A of the Environmental Planning and Assessment (EP&A) Act. As is normal practice by the Department it is expected that the submissions report will be made publicly available on the Department's web-site.

1.2 Structure of this report

The submission report provides a review of the issues raised by the various respondent submissions. Table 1.1 below provides the structure and content of the submission report.

Table 1.1 – Structure and content of the submissions report

Chapter Number	Description
1	General introduction
2	Background to the project
3	Addresses the submissions received from the various government agencies and each government agencies is addressed separately.
4	Addressed the submissions received from the general public and NGOs. There is some overlap of issues raised by the submissions and it was therefore considered reasonable for matters to be dealt with on an issue by issue basis. The sections relating to specific issues treat the collective respondent statements on the specific issue together rather than dealing with all matters for each respondent individually.
5	Conclusions
Attachments	**Description**
A	Proponent's amended Statement of Commitments
B	Updated Air Quality Assessment Report
C	Threatened species predicted to occur in project area

Respondent statements are shown in a grey block to distinguish them from the proponent's response. References to individual respondents in Section 4 use the codes shown in the left hand column of Table 2.3 and Table 2.4 as abbreviations for the full respondent name.

It is considered that this submissions report addresses all the key matters raised by the respondent submissions and enables the Department of Planning to undertake its review of the respondent submissions from the public exhibition of the Environmental Assessment in the light of the proponent's comments on the submissions.

2. Background and Review of the NSW Planning Process

2.1 The proposal

The main objective of the Munmorah Power Station refurbishment Proposal is to restore the output of Units 3 and 4 to 350 MW to maintain base load generating capacity using the existing infrastructure to meet short to medium term energy requirements of NSW and the National Energy Market (NEM). In addition the project also aims to:

- reduce the greenhouse gas emissions (GGE) per unit of electricity generated.
- provide for the rehabilitated boilers to be readily converted to accept co-firing with coal and up to 75% gas according to fuel availability and competitive constraints as the CPRS evolves.
- include modifications or provisions required to enable Munmorah Power Station to be carbon capture ready
- identify, minimise and manage environmental and social impacts that might arise as a result of the rehabilitation

2.1.1 Overview of Proposal details

The proposed rehabilitation programme would not involve any significant changes to the current layout of the site and would not alter the general electricity generation process. The majority of the works would occur within the existing plant layout of the power station. The components of the Proposal considered by the environmental assessment included:

- rehabilitation of Units 3 and 4 steam turbine and generator components
- refurbishment of major boiler components
- provision for coal and gas firing options
- replace, upgrade, modify and/or maintain auxiliary equipment which includes condenser, circulating water system components, air heater , pulverised fuel mills, fans
- replacement of instrumentation and control system
- make Munmorah Power Station carbon capture ready
- fuel delivery – coal conveyor capacity increase
- removal of obsolete plant.

Restoring the output of Units 3 and 4 to 350 MW would provide 700 MW baseload generation equivalent to around 4,800 GWh of electricity per annum. The rehabilitation work could extend over about 24 months and the rehabilitated power station would have up to an estimated 20 year operating life.

The rehabilitated power station would consume around 2 million tonnes of coal per annum for the 100% coal fired operation. It is estimated that this would reduced to 0.53 million tonnes for the 25% coal / 75% gas operation. Some 34 PJ/annum gas would be consumed for co-firing of up to 75%.

2.2 The proponent

The proponent is a State Owned Corporation that operates four large coal fired power stations in NSW (Munmorah, Vales Point, Wallerawang and Mt Piper Power Stations) and one major gas fired power station, Colongra, adjacent to Munmorah. The proponent is also involved in the development of a range of other power projects including gas turbine power stations and cogeneration facilities fuelled by sugar mill waste.

The proponent produces about 12% of the electricity used by the NEM. Reliability of supply and competitive pricing are important business performance criteria and each of The proponent's plants is subject to routine performance monitoring and management reviews.

The operation of a successful business is also of benefit to:

- The proponent's stakeholder, the NSW Government
- consumers that receive reliable electricity supplies at competitive pricing
- employees of The proponent who are remunerated for application of their knowledge and skills to assist the Corporation achieve its business objectives
- the local economy through direct employment and flow on benefits through the provision of services.

The proponent has been very active in the investigation of future directions for its business and has identified feasible options for both new generation plants and existing plant improvements. The rehabilitation of Munmorah Power Station Units 3 and 4 has been assessed as one of The proponent's feasible proposals.

It is recognised that the NSW Government has indicated its intention to include the Munmorah Rehabilitation Project as a Development Project which could be offered for sale as part of the NSW Energy Reform Strategy. Should this occur then it is proposed that the development approvals being sought would be transferred to the new project owner. In this regard the term Proponent has been included in this document to refer to Delta Electricity currently, or to the future project owner.

2.3 NSW planning process

The planning process was formally initiated with the lodgement of a Project Application and Preliminary Environmental Assessment with the NSW Department of Planning on 12 May 2009. The Department had previously advised that the project would be considered as a Major Project and be subject to assessment under Part 3A of the Environmental Planning and Assessment (EP&A) Act, 1979. The project was also deemed to be Critical Infrastructure under Section 75C of Part 3A of the EP&A Act by virtue of a declaration made by the Minister for Planning on 26 February 2008.

The key stages of the formal planning process undertaken to date are shown in Table 2.1.

Table 2.1 – Key stages of the planning process

Timing	Description of planning phase or event
26 February 2009	Director-General declares the proposal a project to which Part 3A of the EP&A Act applies and confirms Critical Infrastructure status of project
12 May 2009	Project Application and Preliminary Environmental Assessment lodged with Department of Planning
19 May 2009	Planning Focus Meeting attended by key government agencies and the proponent
4 July 2009	Director- General's requirements for the Environmental Assessment issued
June to September 2009	Environmental studies completed and Environmental Assessment prepared
9 September 2009	Draft Environmental Assessment submitted to NSW Department of Planning
13 October 2009	Adequacy review by Department of Planning and amendment and finalisation of Environmental Assessment by proponent
21 October to 20 November 2009	Exhibition of Environmental Assessment. Submissions received by Department of Planning.
4 November 2009	Department of Planning visits and inspects Munmorah Power Station site
20 November 2009	Period for receipt of supplementary submissions closed and all submissions provided to proponent for review and comment provided as this submissions report
November – December 2009	Submission report prepared.

A Planning focus meeting was held on 19 June 2009 at the Department of Planning in Sydney with representatives from various authorities attending the meeting.

2.3.1 Preliminary Environmental Assessment

Based on the Preliminary Environmental Assessment and consideration of the potential issues to be considered by the approval process, the Director-General of the NSW Department of Planning issued Environmental Assessment requirements in June 2009. Preparation of the Environmental Assessment was substantially undertaken and a draft Environmental Assessment was submitted to the Department of Planning 9 September 2009.

Following an adequacy review by the Department of Planning, supported by key NSW government agencies, the Environmental Assessment was amended by the proponent and subsequently accepted by the Department of Planning as being suitable to be placed on Public Exhibition.

2.3.2 Exhibition of the Environmental Assessment

The Environmental Assessment was placed on exhibition for 30 days from 21 October 2009 to the 20 November 2009.

The Department of Planning arranged advertising for the exhibition of the Environmental Assessment in the local print media. The proponent also provided notification of the public exhibition to stakeholders in the vicinity of the project site through mail out.

Submissions received by the Department were forwarded to the proponent to provide comment on the matters raised and where appropriate clarifications provided. The Department has sought a response from the proponent in respect of the submissions received. The submissions have been reviewed by the proponent and the proponents' response to relevant matters is provided in this Submissions Report.

2.3.3 Details of submissions received

A total of 43 submissions were received from government agencies, individuals or organisations.

Government agencies

Eight of the 43 submissions were received from NSW government agencies (Table 2.2). The submissions from the government agencies are addressed in Chapter 3. Table 2.2 includes the reference to the relevant section in the report

Table 2.2 – Government agencies responding to public exhibition of the Environmental Assessment

Aurecon Reference	Government agencies	Section in the report
A1	Department of Environment, Climate Change and Water (DECCW)	3.1
A2	Department of Defence	3.2
A3	Roads and Traffic Authority (RTA)	3.3
A4	Lake Macquarie City Council	3.4
A5	Northern Sydney Central Coast Area Health Service	3.5
A6	Marrickville Council	3.6
A7	NSW Office of Water	3.7
A8	Wyong Shire Council	3.8

Non Government Organisations (NGO)

Eight submissions were received from NGOs. These are listed in Table 2.3 below.

Table 2.3 – NGOs responding to public exhibition of the Environmental Assessment

Aurecon Reference	DOP Reference	Non Governmental Organisations
B1	5	Deidrie Jinks, Ourimbah Community Inc
B2	11	Annie Nielsen, Winston Hills, Parramatta Climate Action Network
B3	14	Nikki Brown, Climate Action Newcastle
B4	20	Anthony Gleeson, Broadwater, Ballina Climate Action Network
B5	21	Felicity Crombach, Mona Vale, Climate Action Pittwater
B6	29	Lindsay Soutar, Enmore Climate Action Newtown
B7	30	John Hepburn, Sydney, Greenpeace
B8	34	Cate Faehrmann, Executive Director, Nature Conservation Council (NCC) of NSW

General public

Twenty six submissions were received from the general public in various locations around NSW. One of these submissions was received from the Queensland Hunter Gas Pipeline a private company which has possible capabilities for supplying sufficient gas for combustion at Munmorah Power Station. Table 2.4 provides a list of all the respondents.

Table 2.4 – Public responses to public exhibition of the Environmental Assessment

Aurecon Reference	DOP Reference	General Public
C1	1	Richard Weller, Somersby
C2	2	Al Black, Halekuleni
C3	3	Liam Cooler, Hamilton
C4	4	Cherie Heilbronn, Hamilton
C5	6	Susan Wise, Narara
C6	7	David Dixon, Narara
C7	8	Mira Wroblewski, Gosford
C8	9	Wenny Theresia, Killara
C9	10	Jacqui Bonnitcha, Woolwich
C10	12	Mark Diesendorf, University of New South Wales (UNSW)
C11	13	David Holyoake, Environmental Lawyer, Carnegie
C12	15	Mark Cachia MacEnviro, Collective Macquarie University
C13	16	Laura Ealing, University of Newcastle
C14	17	Jill Hartley, North Ryde
C15	18	Moira Williams, St Peters
C16	19	Holly Watson-Reeves, Abbotsford
C17	22	Steve Denshire, Hamilton East
C18	23	Deborah Burt, Epping
C19	24	Susan Morley, Islington
C20	25	Pablo Brait, Fitzroy
C21	26	Greer Taylor, Figtree
C22	27	Andrew Barnard, Waratah
C23	28	Jennifer Kent, Oatley
C24	31	Vivien Langford, Paddington
C25	32	Ilma Hynson, Yamba
C26	33	Garbis Simonian, Queensland Hunter Gas Pipeline (QHGP) Sydney

2.3.4 References

Some respondents have referenced material drawn from various sources, including web based material (see Table 2.5 below).

Table 2.5 – Reference articles quoted in respondents' submissions to the Department of Planning

Subject	Author / Title / Date / Website
Climate Change	IPPC 2007 Report, February 2007
Ocean Acidification	The Montreal Declaration on Ocean Acidification
Climate Change	International Alliance of Research Universities: Synthesis Report – Climate Change Global Risks, Challenges & Decisions, COPENHAGEN 2009, 10-12 March (www.climatecongress.ku.dk)
Climate Change	Australia's commitments under the Kyoto Protocol in greenhouse gas reductions
Climate Change	US Climate Change Research Programme: Climate Change Impacts in the United States
Climate Change	CSIRO Reports on impacts of climate change
Climate Change	Ross Garnuat (2008): Garnaut Climate Change Review: Final Report
Climate Change	Solomon *et. al (2008):* Irreversible Climate Change due to Carbon Dioxide Emissions (www.pnas.org_cgi_doi_10.1073_pnas.0812721106)
Climate Change	James Cook University (2009) Expansion of the Tropics, July 2009
Climate Change	Will Steffen (2009): Climate Change 2009 – Faster Change and More Serious Risk, Department of Climate Change, Australian Federal Government (www.anu.edu.au/climatechange/wp-content/uploads/2009/07/climate-change-faster-change-and-more-serious-risks-final.pdf)
Climate Change	Professor James Hansen, NASA Godard Institute
Energy efficiency	Rutovitz and Dunstan, Institute of Sustainable Futures (2009): Meeting NSW Electricity Needs in a Carbon Constrained World: Lowering costs and emission with distributed energy
Climate change	Scientists speak out: coal-fired power stations are responsible for global warming (May 2009) (www.crikey.com.au/2009/05/01/scientists-speak-out-coal-fired-power-stations-are-responsible-for-global-warming/)
Performance and operations of the economy	University of Newcastle, CofFEE Reports and Submissions (http://e1.newcastle.edu.au/coffee/publications/reports.cfm)
Renewable energy availability	Greenpeace (2008): Energy Revolution: A sustainable Australia energy outlook
Carbon storage	Parliament of the Commonwealth of Australia (2007): Between a rock and a hard place – the science of geosequestration, August 2007
Carbon storage	Werner *et. al* (2008): Identifying sites for CO2 geosequestration in the Sydney Basin
Carbon storage	In brief: Greenhouse gas offshore acreage release, AusGeonews Issue 94 June 2009 (http://www.ga.gov.au/image_cache/GA14232.pdf)

3. Government Submissions

Various NSW Government agencies and Councils provided responses to the exhibition of the Environmental Assessment. The submissions are summarised and addressed in this chapter.

3.1 Department of Environment, Climate Change and Water (DECCW)

The NSW DECCW require that certain issues be addressed as part of the submissions report. To provide maximum certainty for all parties, DECCW have requested that, where practicable, the issues be addressed in this response to submissions rather than deferring these matters to the project approval application.

3.1.1 General Comments

DECCW notes that the proposal does not address the upgrade of the existing gas pipeline or construction of additional pipelines, should the proponent wish to proceed with gas co-firing

DECCW has reviewed the Information provided and determined that it does not object to the proposal as described in the EA, subject to the proponent addressing issues raised including: air quality, greenhouse gas emissions, noise, water, aboriginal cultural heritage, threatened species and waste.

DECCW also provided recommended conditions of approval.

3.1.2 Air quality issues

DECCW has made a number of comments which are addressed by an updated air quality assessment provided as Attachment B. The issues raised are summarised in this section.

Section 2.1 Comments on Emission Scenarios

100% coal firing is conservative:

The power station burners will likely combust a combination of coal and natural gas. As the proportion of each fuel type has not yet been determined, the assessment has been conducted based on a 100% coal-fired scenario. Coal firing will lead to higher emissions than natural gas of nitrogen oxides, sulphur oxides, fluoride, particulate matter and trace elements (such as metals). As such, assessing 100% coal firing is conservative.

Proponents response

Noted.

Section 2.2.1 – Comments on SO_2 and NO_2 Exceedances

No assessment results are presented for sensitive receptor locations. It is reasonable to infer, however, that the modelled impact at nearby sensitive receptors would be less than the results presented in the assessment. It is also possible that exceedances would be predicted at nearby residences. The assessment does not provide sufficient information to remove this uncertainty.

Proponents response

An investigation of sensitive receptor locations has been included in the updated air quality assessment. The cumulative impacts of SO_2 and NO_2 at these locations following the rehabilitation have been assessed. See Section 6 of Attachment B. A small number of exceedances of the short term SO_2 goal and one minor exceedance of the one hour NO_2 goal were predicted at the sensitive receptor locations by modelling of the worse case scenario. The assessment concluded that there is likely to be little to no adverse impact upon local air quality as a result of the rehabilitation.

The assessment also concludes that the circumstances that predicted the occasional short term exceedances based on modelled worst case conditions are very rare events and are most unlikely to occur.

Section 2.2.2 – Comments on PM_{10} Exceedances

DECCW notes that Appendix E does not discuss or quantify fugitive dust emissions associated with the stockpile and pre-combustion handling of coal at the site. These matters should be addressed.

Proponents response

A discussion of fugitive emissions has been included in the updated air quality assessment. See Section 3 of the updated air quality assessment provided as Attachment B. The assessment highlights the dominance of natural phenomena in high readings of PM_{10}, such as wind blown dust events and bushfires, and demonstrates the small contribution that Munmorah makes under worse case conditions.

Section 2.2.3 – Comments on predicted Hydrogen Fluoride (HF) impacts

DECCW recommends that the proponent should undertake a cumulative air quality impact assessment to determine the appropriate limit for HF.

Proponents response

A cumulative assessment of the effects of HF emissions has been provided in the updated air quality assessment provided as Attachment B. A nominated emission limit below the Group 6 emission limit has been proposed for consideration by DECCW. Modelling of the cumulative impact of HF at the nominated emission rate predicted that fluoride concentrations would be within the air quality goals at the sensitive receptor locations.

Section 2.2.4 – Comments on predicted Cadmium Impacts

DECCW recommends that the proponent should undertake a revised air quality impact assessment to determine a more achievable limit for cadmium.

Proponents response

The updated air quality assessment provided as Attachment B provides a revised emission limit of 0.04 mg/m^3 for Cadmium for consideration by DECCW. Predicted ground level concentrations for Cadmium are within the air quality goal at this emissions rate.

Section 2.2.5 – Comments on contour plots

Attachment B of Appendix E presents contour (isopleth) plots for the assessment. The NO_2 and SO_2 contour plots are not appropriate for the various reasons.

Proponents response

The contour plots have been reviewed and corrected where necessary. The isopleths are presented in Appendix C of the updated air quality assessment provided as Attachment B to this report

Section 2.3 – Comment on existing environment

Section 2.3.1 – Comments on background pollution concentrations:

The background air quality data does not include potential impacts arising from the Eraring power station upgrade and only limited data from the recently constructed Colongra Gas Turbine facility. To help account for the changing nature of the surrounding environment, the assessment included NO_2 impacts from the Colongra Gas Turbine facility in the cumulative assessment. Colongra impacts were based on the Environmental Assessment results for the Colongra gas turbine facility (Holmes, 2005).

Proponents response

Chapter 6 of the updated air quality assessment (Attachment B) includes an assessment of the local air quality impacts associated with the rehabilitation of the Munmorah Power Station including the cumulative impacts of Eraring Power Station and the Colongra Gas Turbine facility. The methodology used in the updated assessment was discussed with, and agreed to, in consultation with DECCW.

Section 2.3.2 – Comments on analysis of meteorological data:

The assessment does not provide a detailed analysis of existing observed and predicted wind fields. Specifically, no wind rose plots showing the inter-annual variability of wind fields at the observation stations is provided. A combination of wind speed and wind direction used as discriminators to verify the modelled meteorological data set would provide the simplest, yet most robust method for demonstrating that the assessment adequately incorporates and resolves local dispersion meteorology in a representative manner.

Proponents response

An analysis of meteorological data has been included in Section 5 of the updated air quality assessment (Attachment B). The assessment concludes that 2004 is representative of long term meteorological conditions.

Section 2.3.3 – Comments on Sensitive Receptor Locations:

Appendix E does not discuss the local receiving environment such as the closest sensitive receptors and the distance and direction to the closest sensitive receptors is not discussed in the assessment.

Proponents response

An investigation of the sensitive receptor locations has been included in the updated air quality assessment Figure 3.1 and Table 3.1 in Attachment B provides the locations and a list of the relevant sensitive receivers identified. The investigation also included predicted incremental increases for SO_2, NO_2 and HF at these locations. The assessment demonstrates that the effects of Munmorah on local air quality will be within air quality guidelines, with the exception of rare exceedances of short term goals.

The assessment concludes that the circumstances that predicted the occasional short term exceedances based on modelled worst case conditions are very rare events and are most unlikely to occur.

Section 2.5 Recommended Conditions Prior to Project Approval

DECCW strongly recommends that the proponent be required to provide an updated air quality assessment prior to project approval, preferably as a part of its response to submissions. The updated air quality impact assessment should:

(a) address all comments from DECCW's review of the air quality assessment (titled Air Quality Impact Assessment Munmorah Rehabilitation Works Delta Electricity, prepared by Aurecon, dated 14 October 2009) submitted for project approval to the satisfaction DECCW

(b) quantify the incremental and cumulative air quality impacts from the project and demonstrate that the proposal is not likely to cause adverse air quality impacts on the local and regional receiving environment

(c) propose an in-stack emission concentration limit for all pollutants that are listed as 'TBD' in recommended condition 12 of Attachment B, based on methods generally in accordance with the Approved Methods for the Modelling and Assessment of Air Pollutants in NSW dated 25 August 2005, or as otherwise agreed to by DECCW.

Proponents response

Recommended Conditions of Approval are acknowledged. An updated air quality assessment has been prepared and is included as Attachment B. This document:

- Addresses all comments from DECCW's review of the previous air quality assessment
- Quantifies the incremental and cumulative air quality impacts from the project and confirms that the proposal is not likely to cause adverse air quality impacts on the local and regional receiving environment
- Proposes in-stack emission limits for all pollutants listed in recommended condition 12 of Attachment B of the DECCW submission and confirm that the impacts predicted are within the air quality goals.

Attachment B – Recommended Conditions Post Project Approval

DECCW has provided a number of recommended Conditions of Approval in Attachment B (of the letter). A review of the recommended conditions of approval is discussed below Table 3.1.

Table 3.1 – Proposed Conditions of Approval for Air quality provided in Attachment B

Condition of Approval	Response
Clause 10 – Approved fuels: *Natural gas and coal are the only fuels that are approved to be combusted for electricity generating works.*	This condition not acceptable as stated. The proponent uses oil burners at start up and to stabilise the boiler flame during mill change operations. This issue will be clarified with DECCW. While no alternative fuel is currently burnt at Munmorah, the current license permits up to 5% by weight of the coal feed rate. It is proposed that this provision remain because this conditions allows eligible wood wastes and sustainably harvested biomass, which has environmental benefits, to be included in the fuel.
Clause 11 – Monitoring / discharge points and areas: *The [following] points referred to in the table are identified in the license for the purposes of monitoring and/ or setting of limits for the emission of pollutants to air from the point.*	
(a) ambient air monitoring – points 2 – 4	Ambient air monitoring station located at site to be agreed upon with DECCW. This will be discussed following consideration of the updated Air Quality report. It is noted that an additional ambient monitoring site has been established by the proponent at Morisset Peninsula. As discussed in the updated Air Quality report, the proponent proposes that it may be an appropriate time to review the existing ambient monitoring network to ensure that it continues to provide an adequate level of coverage for the protection of human health and the environment. The proponent also proposes that such a review would best be undertaken cooperatively with DECCW and should include consideration of other major sources in the region and the broader network of other existing monitoring sites in the region.
(b) Weather monitoring - points 5 and 6	This issue will be clarified with DECCW given that a weather station similarly equipped to the requirements of Point 5 is already maintained by the proponent in the grounds of Munmorah Power Station. It is the proponents view there is no need for, or practical value, in establishing a second weather station in close proximity to the existing one. A new weather monitoring station consistent with Point 6, would be acceptable to the proponent on the basis that the proposed anemometer would be co-located with any new ambient air monitoring station (EPA identification number 4 – proposed condition 11) that is agreed with DECCW following consideration of the updated Air Quality assessment.

Condition of Approval	Response
Clause 12 *– For each monitoring/discharge point or utilisation area specified in the tables below (by a point number), the concentration of a pollutant discharges at that point shall not exceed the concentration limits specified for that pollutant in the table*	These limits will be developed in consultation with DECCW. In summary: • The limits that currently apply to Munmorah Power Station are essentially those specified in the Environment Protection License (EPL)[1] for Group 2 electricity generation activities. Munmorah Power Station is currently compliant with all Group 6 emission standards, with the exception of NO_x. The Group 2 emission limit for Munmorah's for NO_x is currently 2,500 mg/m^3. The proposed limit of 500 mg/m^3 is consistent with new plant and equipment and following the installation of new low-NO_x burners, as part of the rehabilitation works, the plant is predicted to be able to achieve the Group 6 limit[2] • The DECCW submission proposes a particulate emission limit of 30 mg/m^3 which is less than the Group 6 limit of 50 mg/m^3. The proponent considers that this more stringent limit of 30 mg/m^3 should not be applied as OEM guarantees cannot be obtained for this figure and it can be exceeded during bag failures. Munmorah is currently classed as a Group 2 facility and will need to comply with the limits set for Group 5 after 2012. The particulate emission limit for Group 5 is 100 mg/m^3. Best available technology should be able to cope with a more stringent limit but manufacturers will not guarantee better than 50 mg/m^3. It is proposed that measurements of pollutant concentrations shall be undertaken in accordance with reference sample methods specified in the '*Approved Methods for Sampling and Analysis of Pollutants in NSW*' at a frequency specified in the Proponent's Environment Protection Licence issued under the *Protection of the Environment Operations Act 1997*. With regard to particulate emission, the proponent proposes to install emissions monitoring equipment capable of monitoring and reporting solid particle emissions on a continuous basis in mg/m^3 as approved by the Director-General, in consultation with DECCW. Proposed emission limits are provided in the Updated Air Quality report provided in Attachment B of this document.
Clause 14 *– The selection of sampling shall be carried out in accordance with test method Approved Methods for Sampling and Analysis of Pollutants in NSW.*	Negotiations are ongoing regarding resolving sample plane issues in a satisfactory manner. The updated Air Quality report includes commitment to sample in accordance with the Approved Methods.
Clause 15 – For each monitoring point specified below (by a point number), the proponent shall monitor (by sampling and obtaining results by analysis) the parameter specified in column 1	This seems reasonable and generic. As noted, the need for a new ambient air quality monitoring station and new weather monitoring stations requires further consideration following completion of the updated Air Quality assessment. It is the proponents view there is no need for, or practical value, in establishing a second weather station in close proximity to the existing location.
Clause 16 *– The Proponent shall ensure that the design of Munmorah power station rehabilitation project provides for the retrofitting of flue gas desulfisation (FGD) technology.*	The proponent understands that the intention of this requirement relates to actions associated with the rehabilitation works. As this project is rehabilitation works, the proponent requires revised wording to reflect that this provision only applies insofar as it relates to practical measures that can be considered as part of the rehabilitation so as not to jeopardise the future installation of FGD.

[1] Protection of the Environmental Operations (POEO) Clean Air Regulations 2000
[2] Sinclair, Knight and Merz (2009): Munmorah Units 3 and 4 Rehabilitation Studies – Stage 1 finalised scope list, July 2009

3.1.3 Greenhouse gas

DECCW has reviewed the greenhouse gas assessment and provided a list of comments relating to the key areas:

- *Estimations of greenhouse gas emissions for the range of fuel mix options ie 100%, 75% coal and 25% gas, 50% coal and 50% gas and 25% coal and 75% gas.*
- *Annual greenhouse gas emissions ranging from 3.96 Mt CO_{2-e} to 2.75 Mt CO_{2-e} for the range of fuel mix options.*
- *The emissions intensity ranging from 0.868 t CO_{2-e} to 0.608 t CO_{2-e} for the range of fuel mix options. All fuel mix options will result in an improved emission intensity compared to current emissions intensity of electricity supply in NSW. The emission intensity from the maximum possible use of gas fuel will be significantly lower that current NSW Emissions intensity*
- *The emission intensity of the plant using fuel mixes of at least 15% will likely result in emission intensities superior to current best practise ultra-super-critical plant using 100% coal.*
- *The proponent has investigated a number of measures to reduce and/or offset emissions from the project including carbon capture and storage (CCS), fuel replacement using a mix of coal and gas and also biomass co-firing*
- *Amine-based post-combustion carbon capture technology is identified as the preferred CCS technology for Munmorah. A detailed analysis of post-combustion carbon capture technology using monoethanolamine (MEA) has been presented including plant design requirements to allow for retro-fitting of that technology.*
- *Although the proponent has identified that exploration of storage options within NSW is currently being undertaken by 'Industry and Investment' in NSW, the proponent has not identified currently available storage options, or transport options to those storage locations.*
- *A low order evaluation of the impact of the Carbon Pollution Reduction Scheme at emission prices of $10, $25 and $50 has been conducted based solely on the liability of the plant's emissions from fuel combustion. The analysis indicated that without CCS the marginal cost increase per MWh at carbon prices of $10, $25 and $50 is $8.68/, $21.70/ and $43.39/ for the 100% coal option and $4.26/, $10.65/ and $21.31/ for the 25%/75% coal/gas fuel option.*

Proponents response

Amine-based post-combustion carbon capture technology is identified by DECCW as the preferred CCS technology for Munmorah. The Proponent does not agree with this view as the technology is currently undergoing significant research and development. It is appropriate that the most suitable technologies available at such time as they are required are evaluated and a preferred option selected at that time. The recommended conditions of approval are shown below.

Recommended Conditions of Approval for CCS

The proponent shall

- *ensure that the design and construction of the project provides for the cost-effective retro-fitting of post combustion carbon capture technology*
- *continue to evaluate the availability and feasibility of measures to reduce the greenhouse gas emission of the project including carbon capture, re-use or storage with the aim of identifying for implementation technically and economically feasible measures to reduced greenhouse gas emissions*

Proponent response

The Proponent agrees to ensure that the design and construction of the project provides for the cost-effective retro-fitting of post combustion carbon capture technology.

As part of the development of CCS the proponent will continue to monitor the development of capture technology internationally. The proponent will also monitor the work undertaken in NSW to assess sites for carbon storage that would most effectively store emissions from Munmorah Power Station.

3.1.4 Noise impacts

DECCW has conducted a detail review of the Environmental assessment including the Noise and Vibration Assessment provided in Appendix H. The review focussed on the assessments consistency with the NSW Industrial Noise Policy (EPA, 2000) and the DECCW environmental assessment requirements.

DECCW noted that the noise and vibration assessment is generally consistent with the Industrial Noise Policy and satisfies DECCW environmental assessment requirement. The Environmental Assessment provides sufficient information to demonstrate that the proposal could be developed to achieve compliance with relevant noise criteria

Section 4.1 – Comments on mitigation measures

The Environmental Assessment identifies the project specific noise level (PSNL) for the refurbishment including the upgrade of the conveyor between Munmorah and Vales Point Power Stations to be 39 dB(A). However modelling suggests that this noise level may be exceeded at the nearest sensitive receptors located within 200 m of the conveyor.

The Environmental Assessment suggests various mitigation measures that could be employed should the PSNL be exceeded. However there is no commitment by the proponent to adopt these measures, nor is there any assessment demonstrating that these measures will achieve the PSNL.

Proponent Response:

The proponent has made the following Commitment: *"Should commissioning noise monitoring show that noise emissions from the Munmorah Power Station at the nearest sensitive receiver exceed 39 dBA, a schedule of possible mitigation measures shall be developed and incorporated into an agreed pollution reduction program to target a reduction in noise impacts to the project specific noise goal of 39 dBA."*

Section 4.2 – Comments on low frequency noise

DECCW notes that the proposed refurbishment will include provision to enable up to 75% gas to be used to fire the plant in combination with coal. The Noise and Vibration Assessment does not specifically consider noise associated with gas co-firing options. As such, the proponent should be aware that low frequency noise emissions from gas fired power station have been an issue recently in NSW.

Proponent Response:

It is understood that low frequency noise issues from gas fired power stations relate to the operation of gas turbine facilities. Any co-firing of gas at Munmorah would be in the existing boiler which is a totally different technology. Low frequency noise emissions have not previously been identified as being associated with the operation of Munmorah Power Station.

In accordance with the development application conditions, modification factors will be applied to the commissioning measurements to account for tonality, low frequency, impulsivity, etc.

Section 4.3 – Recommended Conditions of Approval

DECCW has provided a number of recommended conditions of approval in Attachment B (of the DECCW submission)

The noise limits are presented in Table 1 of Attachment B. These are the limits reflect the proposal specific design noise goals presented in the noise impact assessment of the Environmental Assessment.

The remaining Conditions of Approval are consistent with the commitments made in the Environmental Assessments.

3.1.5 Water issues

DECCW has reviewed the Environmental Assessment including the Cooling water plume modelling prepared by Cardno Lawson and Treloar (September 2009). The review has focussed on the Environmental Assessments consistency with the DECCWs environmental assessment requirements.

Section 5.1 – Comments on cooling water thermal impacts

Cooling water temperature increase

DECCW has assumed that the modelling for the 'rehabilitated' 700 MW attemperated plume was based on a cooling water discharge of 3525 ML/day and an 'excess' temperature of 5.33°C as stated in Table 8.6. However, the Environmental Assessment states on pp8-25 that the 'temperature increase at the cooling water outlet at full load [for the rehabilitated plant] is predicted to 8°C with an average of about 6.4°C for 80% capacity over a year'. These figures are inconsistent with the actual model and this raises the question of whether modelled scenario was actually 'worst case'. DECCW seeks clarification on this matter.

Proponents Response:

The reference on page 8-25 of the Environmental Assessment to the 8°C temperature rise refers to the cooling water outlet from the condensers, i.e. before attemperation. With the proposed 50% attemperation, this corresponds to a canal temperature rise of 5.33°C. In respect of "worst case" modelling, two of the modelled Scenarios (2 and 3) are potentially relevant. Both Scenarios 2 and 3 combined "worst case" environmental conditions re wind speed and direction and air and water

temperatures, in conjunction with full generation. Scenario 3 was an unattemperated case i.e. 8°C temperature rise with smaller volume discharged and Scenario 2 had an additional 50% attemperation flow, but only 5.33°C temperature rise.

Recommendations for temperature and seagrass monitoring:

To confirm the accuracy of modelling, and given the recent availability of more accurate and cost effective monitoring techniques, DECCW has recommended that the proponent be required to carry out long term monitoring of the water temperature and seagrass beds within the northern end of Lake Budgewoi. DECCW has also recommended that the proponent be required to report any observed reductions in seagrass area and, where attributable to power station operations, describe ameliorative measures to be implemented. In the case where observed impacts are considered unavoidable, DECCW has recommended that the proponent be required to offset impacts.

Proponents Response:

Although this represents an expansion of the monitoring requirements under the current Environment Protection Licence (EPL), The proponent is willing to collaborate with DECCW to develop a suitable monitoring programme. This matter is addressed further under the relevant sections of the Proposed Conditions of Approval below. In respect of possible "observed reductions in seagrass area" it should be noted that seagrass area can be influenced by many factors and, accordingly, it should not be assumed without convincing evidence that any such future reduction is attributable only to the power station.

Recommendations for Investigation into minimising thermal loads:

DECCW has also recommended that the proponent be required to investigate longer term options to minimise thermal loads. Given the proximity of Munmorah Power Station to the coast, DECCW has recommended this should include an investigation onto the feasibility of a pipeline from the ocean to supply cooling water.

Proponents Response:

It is understood that the feasibility of a pipeline between the power station and the ocean was considered and rejected many years ago, although no report has been located. Under such a scheme, due to differences in salinity between the ocean and the lakes, it would not be possible to avoid significant changes in salinity and resulting environmental impacts unless cooling water was both drawn from, and discharged to, the ocean. Due to the volumes of water required for power station operations, it would be necessary to construct two large tunnels under the lake to suitable points off shore, sufficiently spaced to avoid recirculation. Apart from their size and cost, these tunnels would present considerable technical challenges and risks, due to the fact that the area has been mined extensively. Further, the construction of the tunnels would have its own environmental impacts. Operationally, there would be a need for a large (and costly) pumping station to move the water. This pumping station would consume at least 5 megawatts of electricity, thereby reducing the station's overall efficiency and increasing its greenhouse footprint.

Having regard to the above, it is considered that the effort, expense and uncertainty of the proposed investigation cannot be justified.

Section 5.2 – Comments on discharge impacts on water quality

Lack of assessment of trace elements:

The Environmental Assessment provides a summary of water quality and trace elements monitored at the Munmorah ash dam discharge point into the outlet canal (Table 8.10, Volume 1). The data was collected during 2004-2008 period and it appears all metals discharged are below ANZECC water guideline criteria. However, there is no assessment or discussion of potential impacts from the discharge on the receiving environment.

Proponents Response:

The Munmorah ash dam discharges to the inlet canal, not the outlet. As the dam only stores bottom ash (which has inherently very low concentrations of trace elements), any contribution of trace elements from the dam itself is minimal.

The impact of the power station discharge on the receiving environment is discussed on page 8-30 of the Environmental Assessment and is based on ultra trace metal analysis by CSIRO in 2005. The concentrations of copper, cadmium, nickel and zinc in the receiving waters of lakes Budgewoi and Munmorah are all below the ANZECC (2000) guideline concentrations for the protection of aquatic life.

Recommendation for water and sediment quality testing:

Given the study referred to in the Environmental Assessment [CSIRO, 1990 report] is almost 20 years old, DECCW considers it appropriate that the proponent be required to carry out water and sediment quality studies to determine the mass load of metals being discharged from the Munmorah ash dam into Lake Budgewoi. DECCW has provided recommended conditions of approval that relate to this issue in Attachment B.

Proponents Response:

As the Munmorah ash dam currently only receives bottom ash (which has inherently very low concentrations of trace elements), its contribution of trace elements is minimal. Under the current EPL, water quality is monitored routinely at the point where water from the ash dam is discharged into the inlet canal.

Ultra trace element analysis results associated with the total power station discharge to the lake in 2005 are summarised in Table 8.11 of the Environmental Assessment, together with estimated mass discharges for two unit operation. Trace element concentrations in Lake Budgewoi sediments were measured by Wyong Shire Council in 1997 during two unit operation at Munmorah. The measured levels were below the ANZECC (2000) sediment guidelines for the protection of aquatic life.

This matter is addressed further under the relevant sections of the Proposed Conditions of Approval below.

Section 5.3 – Comments on water management plan

Recommendation for wastewater discharges:

The Environmental Assessment provides an overview of water management at the premises. DECCW notes there is no commitment to change or alter current management practises. As noted in the Environmental Assessment, the Tuggerah Lakes system, particularly Lake Budgewoi and Lake Munmorah are effectively closed systems with flows circulating between the two lakes via Budgewoi Channel. DECCW considered it appropriate with the proponent investigate feasible options to reduce, treat and/or eliminate wastewater discharges from the premises, particularly discharges from the Munmorah ash dam.

Proponents Response:

Figure 8.3 of the Environmental Assessment provided an overview of the water management system including wastewater. The existing wastewater treatment systems at Munmorah Power Station are discussed in Section 8 of the Environmental Assessment. The schematic representation of water flows shows the clean and wastewater pathways and estimated quantities.

The station wastewater management system has already undergone a major upgrade project some years ago. The drainage systems on the site are clearly identified and segregated into clean water and potentially contaminated water. As part of the system, all waste water is either reused or treated prior to discharge.

The Munmorah ash dam only receives bottom ash, which has been shown not to be a significant source of trace elements. Under the current EPL, water quality is monitored routinely at the point where water from the ash dam is discharged into the inlet canal.

In view of the foregoing, it is considered that the current management of waste water discharges is appropriate.

Attachment B – Recommended Conditions of Approval

DECCW has provided a number of recommended Conditions of Approval in Attachment B (of the letter). The standard recommended conditions of approval are acknowledged and further discussions will be undertaken between the proponent and DECCW to finalise the recommended conditions.

Specific comments on proposed conditions relating to water and aquatic ecology are set out in Table 3.2 below.

Table 3.2 – Specific Comments on Proposed Approval Conditions for Water as per Attachment B

Condition of Approval	Response
Clause 29 – POEO Act Compliance –*Except as may be expressly provided by a licence under the Protection of the Environment Operations Act 1997 in relation to the development, section 120 of the Protection of the Environment Operations Act 1997 shall be complied with in connection to carrying out the development*	Noted
Clause 30 – Soil and water management – *Soil and water management controls shall be employed to minimise soil erosion and discharge of sediment and other pollutants to lands and/or waters during construction activities in accordance with the requirements outlined in Managing Urban Stormwater: Soils and Construction (Landcom, 2004).*	Noted
Clause 31 – Temperature and seagrass monitoring – *The proponent shall develop and submit for the approval of the Director-General a Temperature and Seagrass Monitoring Program to determine the thermal extent of cooling water discharges and to monitor the distribution of seagrasses in the northern end of Lake Budgewoi. The program shall be developed in consultation with Industry and Investment NSW (Fisheries). It shall:*	Noted. See comments on specific sub-clauses (a) to (g), below
(a) monitor the water temperature at the northern end of Lake Budgewoi, between the outlet canal and Goobarabah Point, using real-time temperature loggers and monthly Landsat data to determine the correlation between temperature loggers, modelled temperature isotherms and Landsat data	The proponent is willing to extend its existing water temperature monitoring programme to include real-time temperature loggers as proposed. However, as such loggers are subject to theft and vandalism, it will be necessary for the licence conditions to incorporate suitable provisions to ensure that the proponent is not exposed to penalty in the event of loss of data due to theft or vandalism. It is envisaged that the number of continuous temperature sites/locations required be determined in consultation with Industry and Investment NSW (Fisheries). It is also noted that near shore temperatures are heavily impacted by solar radiation due to the relative shallow depths of Budgewoi Lake. Whilst recognising the potential benefit of using Landsat imaging as a monitoring tool, the proponent is of the view that, with the current state of technology, Landsat data is likely to be of limited value for the purpose. Specific issues include the coarse resolution and dependence on satellite availability and weather conditions. Subject to the above reservation, following rehabilitation, the proponent is agreeable to investigating the possible correlation between logged temperatures and Landsat data over a twelve month period as part of the overall monitoring programme.

Condition of Approval	Response
(b) monitor the distribution of seagrasses in the northern end of Lake Budgewoi, between the outlet canal and Goobarabah Point, using low altitude, high resolution digital photography, annually in March	Noted. While monitoring of seagrass by means of photography gives a useful overview of the presence or absence of seagrass, its adequacy for the quantification of the nature and extent of any recorded changes in seagrass has not been established. This concern is addressed further under sub-clauses (e) and (f) below. As modelling and previous monitoring of seagrass has previously been carried out during summer, changing the monitoring time to March could invalidate comparisons with modelling and historical records. The proponent suggests that February is the most appropriate month for monitoring. Whether it is annual or two yearly should be dependent on the program developed in consultation with Industry and Investment NSW (Fisheries). Subject to satisfactory resolution of appropriate protocols, the proponent would raise no objection to the monitoring of seagrasses in Lake Budgewoi.
c) present data from real time temperature loggers, highlighting temperature differentials between the outlet canal and Lake Budgewoi's ambient water temperature	Noted
(d) present the thermally calibrated Landsat images showing monthly changes in the water temperature	As noted under (a) above, the proponent has reservations regarding the usefulness of Landsat data other than, perhaps showing the general shape of the surface plume. It is also pointed out that such images represent a snapshot in time and are subject to variation depending on the amount of generation, prevailing wind and general air and lake temperatures. Subject to these reservations, we are agreeable to incorporating these images into the proposed twelve month programme of investigation to enable their usefulness to be assessed.
(e) quantify the nature and extent of any recorded changes in annual seagrass mapping in the northern end of Lake Budgewoi and describe any correlations between observed changes in seagrass mapping, water temperature and power station operation	As noted under (b) above, the use of digital photography to monitor the nature or extent of changes in seagrass has not been established and, as a consequence, correlation of such results with water temperatures and power station operations may not be reliable. Interpretation of results may also be complicated by natural variations, including climatic variation, as well as silt and nutrient inputs from the urbanised catchments around the lake, all of which can affect seagrass abundance and distribution. It is also noted that near shore temperatures are heavily impacted by solar radiation due to the relative shallow depths of Budgewoi Lake. Accordingly, the proponent seeks further discussion with DECCW regarding the methodology for seagrass mapping and the interpretation of results, followed by a trial period of implementation over several cycles.
(f) where observed changes indicate a reduction in seagrass area and the observed changes are likely to be attributable to power station operation, describe ameliorative measures, including the time frame for management actions; and, in the case where impacts are considered to be unavoidable the Program shall describe how such impacts will be offset	The current distribution of seagrass between the outlet and Buff Point has adapted to the power station operations over the past decades, it is not expected that there would be any further impacts on the seagrass beds from the proposed future operations. Nevertheless, as noted above, seagrass distribution is inherently variable and there is a lack of current data, thereby making attribution of observed changes to any single cause difficult. To enable suitable protocols to be developed, it is suggested that this matter be incorporated into the proposed seagrass monitoring trial period, following the rehabilitation.

Condition of Approval	Response
(g) report back on the outcome of any prior ameliorative management actions and/or offset measures	Noted. Offset measures will be problematic to quantify due to the influence of non power station impacts.
*The proponent shall submit a **Temperature and Seagrass Monitoring Program Report** to the Director-General, Industry and Investment NSW, and DECCW annually in June, or as otherwise agreed in writing by the Director-General. The proponent shall undertake monitoring for five years following commencement of operation. The proponent shall make these Reports available to the public via its website.*	Noted. Due to potential issues of commercial confidentiality in the context of the competitive national electricity market in which it operates, the proponent wishes to clarify the form and content of the proposed report with DECCW.
***Clause 32 – Maximum discharge temperature –** See below*	
The proponent shall design, construct, operate and maintain the project to ensure that the temperature of water discharged from the cooling water outlet canal to Lake Budgewoi never exceeds 37.5°C. This condition does not apply in the event that the proponent is directed, pursuant to the National Electricity Rules, to maintain, increase or be available to increase power generation for system security.	Noted.
Clause 33 – Reduction in thermal impacts	
Not withstanding condition 32, the proponent shall undertake an investigation of all practical measures that could be taken to reduce the thermal impacts of Munmorah power station on Lake Budgewoi. This should include but not be limited to, an investigation of the feasibility to construct a pipeline between the power station and the ocean for the supply and/or discharge of cooling water, and an investigation into alternative attemperating arrangements. The proponent shall submit a report to the Director-General and DECCW on the outcomes of its investigations within 12 months of project approval.	As noted under 5.1 above, it is considered that the effort, expense and uncertainty of the proposed investigation of ocean supply and/or discharge cannot be justified. The proponent is willing to undertake an investigation into the operational implementation of attemperation regimes with a view to optimising them. However, it is more appropriate that this investigation be undertaken by the project proponent at the detailed design and early operation stages.
Clause 34 – Water and Sediment Quality Study	
*The proponent shall undertake a **Water and Sediment Quality Study** of Lake Budgewoi, focussing on the quality of water discharged from the outlet canal and its potential impacts on the receiving environment of Lake Budgewoi. The study shall be prepared in consultation with DECCW and include, but not be limited to:*	Noted. See comments on specific sub-clauses (a) to (e), below The potential impacts on the receiving environment are primarily a consequence of the inlet water quality upstream of the ash dam outlet and it will be very difficult to characterise insignificant and marginal changes arising from outlet canal water quality changes (if they can be measured excluding temperature).

Condition of Approval	Response
(a) characterisation of the water quality discharged from the Munmorah ash dam into the outlet canal including concentration and daily mass loads of cadmium, copper, lead, manganese, selenium (and associated speciated forms) and zinc	As noted under Section 5.2 above, the Munmorah ash dam discharges to the inlet canal rather than the outlet canal. Ultra-trace element sampling is proposed to be undertaken in sufficient detail to define daily loads of the trace elements from the ash dam. As it only receives bottom ash, its contribution of trace elements is minimal. The character of the discharge is influenced by catchment inputs as well as the stored ash. Around 50% (318 ha of 662 ha) of the ash dam catchment is upstream of the ash dam and on land not under the control of the proponent.
(b) characterisation of the water quality discharged from the outlet canal into Lake Budgewoi, including concentration and daily mass loads of cadmium, copper, lead, manganese, selenium and zinc within the sediments	Noted. Reference to the sediments appears misplaced. It appears to be covered in (c) below.
c) investigation of the impact of the water discharged from the outlet canal on sediments within Lake Budgewoi with a focus on the concentration of cadmium, copper, lead, manganese, selenium and zinc within the sediments	Noted. The investigation should only proceed on the basis that the power station is not the only source of these elements in the outlet canal catchment or the remainder of the lake.
(d) determination of selenium concentrations in biota within Lake Budgewoi and the potential bioaccumulation impact within the aquatic food chain	Table 8.10 of the Environmental Assessment shows that selenium levels in the ash dam discharge are low. This proposed Condition of Approval should be conditional upon the characterisation undertaken under (b) above showing that the station is a significant contributor of selenium to the lake. In the absence of such a contribution, the study is unwarranted.
(e) details of amelioration measures that can be adopted to reduce, treat and/or prevent the discharge of metals into Lake Budgewoi	As noted under 5.3 above, the station wastewater management system has already undergone a major upgrade project some years ago. The drainage systems on the site are clearly identified and segregated into clean water and potentially contaminated water. As part of the system, all waste water is either reused or treated prior to discharge.
The proponent shall submit a copy of the Study to the Director-General and DECCW within 12 months of commencement of operation, unless otherwise agreed in writing by the Director-General. ***Note****: Subject to a full assessment of the study, DECCW may require additional ameliorative measures to minimise any significant impacts on the receiving environment.*	Noted

3.1.6 Aboriginal Cultural Heritage

Aboriginal Heritage Impact Permit (AHIP) No. 2780:

DECCW notes that proponent has not provided additional details of the results of previous investigations undertaken in accordance with Aboriginal Heritage Impact Permit (AHIP) No. 2780, as requested in DECCW correspondence dated 16 September 2009.

The investigation report recommended that a 20 m buffer zone be placed around Aboriginal sites 45-7-0249 (PAD 1 – Munmorah) and 45-7-0250 (PAD 2 – Munmorah) to prevent inadvertent impacts on these sites. DECCW supports the establishment of a buffer for these sites and highlights the importance of maintaining the buffer throughout all works associates with the refurbishment.

Proponent response

PAD 1 (AHIMS 45-7-0249) and PAD 2 (AHIMS 45-7- 0250) are located within the Munmorah Power Station perimeter land in the north western portion of the site and are the sites identified to be in the vicinity of the MV conveyor. These sites were excavated in October 2007 under (Heritage Impact Permit # 2778). Seven stone artefacts were recorded for PAD 1 and eight artefacts from PAD 2. Darkinjung representatives were actively involved with all phases of the excavation process.

To minimise any impact to these sites a buffer zone of 20 m was recommended. Figure 3.1 shows the location of the PADs and provides a series of coordinates to restrict activity or impact to potentially sensitive areas. These buffer zones would be identified in the project EMP and appropriate procedures developed to ensure that the buffer zones are avoided.

It is noted that the existing MV conveyor is located on the opposite side of the access road that passes these locations. The installation of the upgraded MV conveyor as proposed would occur within the existing road/conveyor bench which is already disturbed and would avoid these areas.

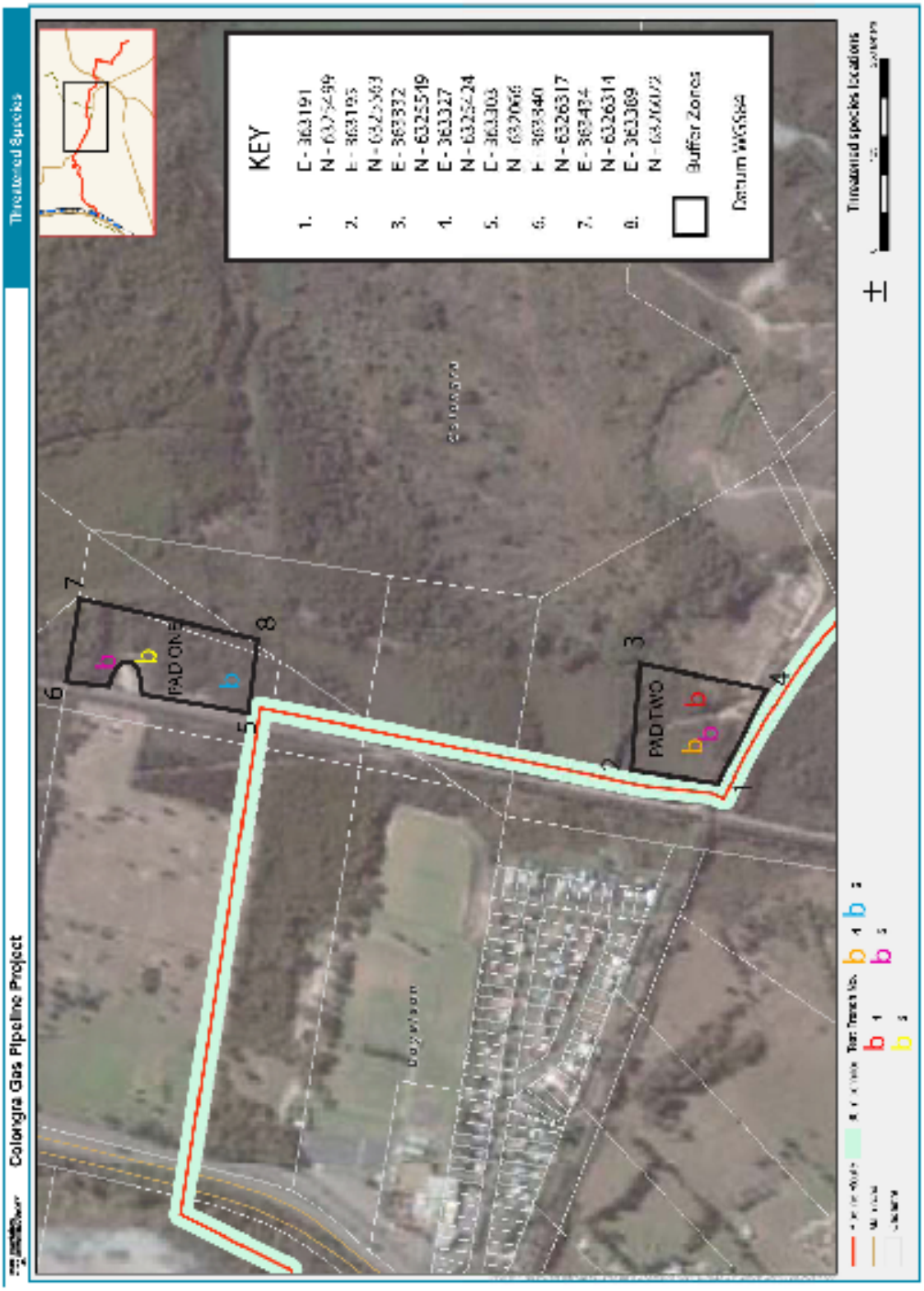

Figure 6.9: Constraints map of buffer zones around PADs 1 and 2

Figure 3.1 – Constraints map of Buffer Zones (from Heritage Concepts Pty Ltd, May 2008)

Aboriginal community consultation:

DECCW also notes that there is no evidence provided by the proponent that the local Aboriginal Community has been consulted regarding this project application

Proponent response

The installation of the upgraded MV conveyor would occur on the existing road/conveyor bench which is already disturbed and would avoid the areas demarcated in Figure 3.1. Should any deviation from the conveyor route be proposed, further investigation of the area would be undertaken and consultation with the local Aboriginal Community will be initiated.

Attachment B – Recommended Conditions of Approval

DECCW has provided a number of recommended Conditions of Approval in Attachment B (of the DECCW submission). Recommended conditions of approval are acknowledged however are only likely to be applicable if any activity related to the upgrade of the MV conveyor occurs outside of the existing road/conveyor bench.

3.1.7 Threatened species

- *DECCW notes that no recent flora and flora surveys of the sites had been undertaken and that the Environmental Assessment relies on ecological surveys undertaken in 2002 and 2005. However given the lack of vegetation disturbance proposed, the relevance of previous ecological surveys undertaken in the area to this project, the ecological assessment is deemed adequate.*
- *The mitigation measures and safeguards detailed in Section 12.2.6 and the Statement of Commitments in Section 14 of the Environmental Assessment (Volume 1) are supported by DECCW.*
- *DECCW has not provided any recommended conditions of approval for threatened species*

Proponents response

Noted – Impacts on flora, fauna and threatened species are not expected due to the majority of works occurring within the existing plant area of the power station. Safeguards would be incorporated in the project environmental management plan to appropriate management of any unforseen issues.

3.1.8 Waste issues

Section 8.1 – Comments on ash disposal:

Fly ash generated at Munmorah Power Station is currently disposed of as a lean slurry and is delivered via pipeline to Vales Point ash dam while bottom ash generated at Munmorah Power Station is disposed of at the Munmorah ash dam. The Environmental Assessment states that the current disposal arrangement could continue until 2019, at which time it is predicted that the capacity of Vales Point ash dam would be compromised. However, under worse case scenario condition, an alternative disposal site for fly ash generated at Munmorah Power Station may be needed as early as 2011.

The Environmental Assessment also describes a number of ash dam management options that could be applied to both Munmorah and Vales Point ash dams to increase the capacity and therefore, prolong the life of these ash dams. However, it is clearly states that these management options are at a concept phase only and further feasibility studies will need to be carried out before any commitment to future ash disposal location(s) is made by the proponent.

Proponents response

Noted – The proponent has made a commitment to undertake a detailed investigation and to consider alternative ash storage arrangements for ash storage beyond the surplus capacity of Vales Point Ash Dam.

Recommendations for ash disposal

Section 8.1 – Recommendations on ash disposal:

The generation and disposal of ash has the potential for significant impacts on water quality (ground and surface), flora and fauna (via the construction and expansion of ash dams) and air quality (through dust generation). The potential impacts associated with ash dams located on the NSW's central coast are generally greater than those for inland plants due to discharge of supernatant waters into estuarine lake systems and the limited amount of developable land to support expanded facilities. In this regard, it is important to note that the area surrounding Munmorah and Vales Point Power Stations supports a number of endangered ecological communities (EECs) and that expansion in these areas should be avoided.

Accordingly, DECCW has recommended that the proponent be required to develop a comprehensive environmental management framework for the on-going management of ash disposal to prevent dust generation and water pollution, consistent with contemporary best environmental practice.

Proponents response

The ash dams servicing Munmorah Power Station are managed through Delta Electricity's Central Coast Ash Dam Management plan, which is revised on a five yearly basis. This management plan includes consideration of environmental issues and in particular water quality, air quality and the EECs referred to by DECCW.

The Proponent aims to maintain a comprehensive environmental management program that targets compliance with all statutory environmental regulations and continual improvement of environmental performance. The proponent has had third party certification to ISO 14001 since June of 2002 and has an EMS Corporate Standard which is based on *AS/NZS ISO 14004 Environmental Management Systems – General Guidelines on principles, systems and supporting techniques*.

In summary the following

- **Water Management:** A report is prepared on a two yearly basis for the proponent that records the results of water monitoring as required by the EPL.

- **Air quality:** Ambient air quality and stack emissions data is routinely collected in order to maintain the performance of Munmorah Power Station. The Central Coast Air Quality data is regularly reviewed, and historically, dust deposition rates have remained within the EPA's guidelines for nuisance dust. Similarly, concentrations of total suspended particulates as measured at Wyee have been below the relevant health criteria. The operating principals for the ash dam aim to ensure that large areas of the ash deposit are not exposed due to low water levels to prevent nuisance dust in times of high wind. The storage levels are however kept low enough, to ensure that in the even of heavy rain, spills do not occur.

- **Flora and fauna:** A study undertaken in 2008 for the development of the proponents 2009 Land Management Plan identified the potential for several key threatening processes impacting on flora and fauna. A number of mitigation measures have been provided in order to minimise any further impacts.

The proponent will continue to monitor the potential impacts of the ash dam and would ensure that mitigation measures proposed in the Land Management and Ash Dam Management Plans are continually improved and best environmental practises are followed.

Section 8.1 – Recommendations on ash disposal:

DECCW has also recommended that the proponent be required to develop a framework for the on-going identification and evaluation of alternative ash disposal measures and re-use opportunities from the proposed power station.

Proponents response

Opportunities for the beneficial use of ash products have been pursued by the proponent on an ongoing basis. Fly ash has been used in concrete and also conditioned for transport by truck for use as construction fill. Approximately 450,000 m^3 of conditioned ash was used for the raising of Vales Point Ash Dam. Furnace ash is collected and processed to provide a graded course furnace ash product. Cenospheres are also being harvested on a regular basis from the ash storage area.

The Central Coast Ash Dam Management plan includes a requirement to identify a number of possible uses for flyash, furnace ash and cenospheres, some of which are currently constrained by legislative barriers. Extensive research is currently being undertaken by various agencies that address environmental issues associated with waste management and opportunities for waste utilisation. The proponent will endeavour to maintain worlds' best practice in sustainable development and will continue to seek opportunities to increase the beneficial use of ash.

Current ash sales reflect the state of the market for the beneficial use of ash products at present and significant increases may be unlikely without market and regulatory changes. In the absence of new markets, sales of ash (flyash, furnace ash and cenospheres) are expected to continue at around current rates (~17%). While the proponent aims to increase these sales in the future and continues to encourage development of new markets for these products, increases in the volume of ash sales are not certain.

Section 8.2 – Comments on other waste:

The construction and operational waste streams (aside from ash disposal) identified in the Environmental Assessment and the proposed reuse, recycling and disposal options are appropriate.

Proponents response

Noted – the proponent will continue to comply with the NSW Government's WRAPP as identified in the Statement of Commitments.

Attachment B – Recommended Conditions of Approval

DECCW has provided a number of recommended Conditions of Approval in Attachment B (of the DECCW submission). Recommended conditions of approval are address in Table 3.3 below

Table 3.3 – Proposed Conditions of Approval for Waste provided in Attachment B

Condition of Approval	Response
Clause 40 – *If coal is selected as the preferred fuel, the proponent shall develop an* ***Ash Management Strategy*** *for the transport, storage and disposal of ash for the life f the project. The Strategy shall include, but not limited to*	
(a) a framework for the ongoing identification and evaluation of alternative ash disposal measure and re-use opportunities, with a particular focus on the minimisation of ash disposal on site and beneficial re-use of ash	The proponent has made a commitment to undertake a detailed investigation and to consider alternative ash storage arrangements for ash storage beyond the surplus capacity of Vales Point ash dam. Opportunities for the beneficial use of ash products have been pursued by the proponent on an ongoing basis.
(b) a goal of 80% ash re-use by 31 December 2015 and, if re-use options are slow to emerge, the proponent shall pursue alternative disposal measures with the aim to avoid the need to expand existing disposal facilities on site.	Currently the market for ash products consumes around 20% of the ash produced by Vales Point Power Station. The development of markets for ash products is affected by many factors beyond the control of the proponent, including legislative restrictions. This being the case it is unreasonable to impose a requirement that may not be practicably achievable due to the efforts of the proponent alone and it would not be appropriate to consider higher utilisation goals until such time that legislation permits the development of sufficient new market opportunities (see Note below). The proponent aims to increase ash sales in the future and continues to encourage development of new markets for these products
(c) a framework for the optimisation of ash disposal capacity on site and periodic review of ash management practises to achieve this outcome	Munmorah and Vales Point ash dams are managed through the Central Coast Ash Dam Management plan, which is revised on a five yearly basis. This management plan addresses the operational and safety issues, ash dam capacity etc and also includes consideration of environmental issues.
(d) full details of the proposed ash disposal facilty(s) including location, capacity and hydro-geological characteristics *(e) proposed collection handling, conditioning transport and storage*	The proponent has made a commitment to undertake a detailed investigation and to consider alternative ash storage arrangements for ash storage beyond the surplus capacity of Vales Point ash dam. These details would be available once a final design for the rehabilitated power station has been selected
(f) a comprehensive environmental management framework for the on-going management of ash disposal to prevent dust generation and water pollution, consistent with contemporary best environmental practice	The Delta Electricity Central Coast Ash Dam Management plan includes consideration of water quality, air quality and the EECs referred to by DECCW. In addition the proponent aims to maintain a comprehensive environmental management program that targets compliance with all statutory environmental regulations and continual improvement of environmental performance. The proponent ISO 14001 certification and has an EMS Corporate Standard (based on *AS/NZS ISO 14004).*
Clause 40 *– Hazardous or industrial waste shall be stored and disposed of in a manner to minimise its impact on the environment including appropriate segregation for storage and separate disposal by a waste transporter license by DECCW*	The proponent will continue to comply with the NSW Government's WRAPP as identified in the Statement of Commitments.

NOTE: DECCW has noted that "fly ash and any material containing fly ash is considered a "waste" under the definition of the Protection of the Environmental Operations Act 1997 (POEO Act) and as such cannot currently be used in construction or engineering purposes as it contains a number of heavy metals, persistent organic compounds and is alkaline in nature and if not managed appropriately can cause environmental harm. However, consistent with DECCWs waste avoidance objectives, DECCW is in the process of finalising an exemption to the POEO Act that will enable fly ash to be used for construction or engineering purposes, provided it meets a number of criteria."

3.2 Department of Defence

One submission was received concerning aviation safety.

Chapter 10.6.4 of the Munmorah Rehabilitation Environmental Assessment has a section entitled "Aviation Safety". The report states that the rehabilitation will not involve any alteration to the two existing 155 m high chimneys at the site but plume modelling outcomes demonstrates a small increase in the initial stack exit velocity to 19.4 m/s. The report does not appear to provide height details for where the plume vertical velocity reduces to 4.3 m/s. As the exhaust stack is 155 m in height, the exhaust plume vertical velocity will be greater than 4.3 m/s at a height 110 m above ground level and therefore in accordance with the CASA Advisory Circular 139-05(0) should be assessed by CASA. Defence would have no objection to the proposal subject to CASA assessment.

Proponent response

Consultation has been continuing with CASA. It has been established that CASA is aware of the Munmorah stack and its emissions. Following further consultation with CASA, it has been established that an additional investigation is required to confirm if the recently established 'danger zone' envelope for the adjacent Colongra Gas Turbine plume is adequate.

Modelling in accordance with the CASA Advisory Circular 139-05(0) will be undertaken to investigate the dispersion of the plume and establish the relevant boundaries. Results of the modelling will be forwarded to CASA for their consideration once completed. The CASA requirements will be finalised prior to the commencement of rehabilitation of the power station.

3.3 Roads and Traffic Authority

One submission was received in respect of traffic and transport issues.

The RTA understands that the major impacts associated with traffic and transport will occur during the delivery of a large turbine and generator parts and the transport of large equipment for major maintenance activities.

In accordance with the Roads Act 1993:

- *The Pacific Highway (SH10), Scenic Drive (H30) and Motorway Link (MR 675) are classified State roads and Council is the roads authority*
- *The F3 motorway is a classified road and the RTA is the roads authority*

RTA concurrence is required for works and structures in, on, under or over state roads with Council consent, under Section 138 of the Act.

Proponent response

As stated in Section 12.1.5 a Transport Management Plan (TMP) was prepared for the construction and operation of the Colongra Gas Turbine project. The TMP includes the currently approved routes for overmass and oversize vehicles. The proponent aims to update the current TMP to ensure that all consent conditions listed in the submissions are taken into account.

It is not anticipated that any further works will be required on upgrading the roads in the vicinity of the power station. Oversize and overmass vehicles have been used in the past for the ongoing maintenance of the plant and for the transport of equipment for the construction of the Colongra gas turbine.

The proponent also acknowledges that if approval is granted, discussions will commence with Wyong Council and RTA once the technical details and the equipment required are finalised. The required licenses and permits would be obtained prior to commencing the transport of the equipment.

Respondents Recommended Consent Conditions

1. *…….A Transport Management Plan (TMP) should be prepared, addressing but not limited to the preferred route/s, transport dates and times supported by traffic profiles, route constraints and contingency plans for emergency breakdowns*
2. *The TMP should also address potential impacts of the transport of large equipment for maintenance activities on local traffic conditions*
3. *All required permits are to be obtained for the transport of overmass equipment for construction and maintenance activities*
4. *The developer is advised that conditions of consent determined by the Minister do not guarantee the RTA's final consent under the Roads Act 1993 to the specific road work, traffic control facilities and other structures or works on the classified road network.*

Proponent response

Acknowledged – The delivery of overmass and oversize equipment has already occurred for the Colongra Gas Turbine project. The proponent is aware of the requirements for transport of equipment and will obtain the relevant permits in accordance with the Roads Act 1993.

3.4 Lake Macquarie City Council

Lake Macquarie City Council advises of having no specific comment in relation to the Environmental Assessment for the Munmorah Power Station Rehabilitation

Proponents response

Noted. No response is required.

3.5 Northern Sydney Central Coast Area Health Service

The Northern Sydney Central Coast Area Health Service response has indicated that project specific issues that relate to health include greenhouse gas emission, air quality, noise and electromagnetic fields (EMF). These issues are addressed below.

3.5.1 Greenhouse gas emissions

The potential for increased greenhouse gases to adversely impact on the environmental and indirectly on human health has been well accepted. It is important that all practical steps should be taken to reduce and mitigate greenhouse gas emissions from projects such as power station rehabilitations. In particular it is noted that changes to the coal/gas firing scenario has a significant impact on the intensity of emissions from Munmorah Power Station (Figure 6.1). As such all practical steps should be taken to maximise gas use and all practical steps should be taken to mitigate greenhouse gases

Proponent response

The main objective of the Munmorah Power Station refurbishment Proposal is to restore the output of Units 3 and 4 to 350 MW to maintain base load generating capacity using the existing infrastructure while aiming to reduce the greenhouse gas emissions (GGE) per unit of electricity generated.

3.5.2 Air quality

In relation to air quality, Data in the Environmental Assessment is insufficient for comprehensive health impact assessment. A full evaluation of likely health effects requires information on the incremental increase in levels of the various air quality indicators (SO_2, NO_2 and PM_{10})

Predicted increases should be related to a representative sample of sensitive receptors, for example, nearby residential areas or schools. Therefore it is recommended that the proponents undertake further modelling to provide predicted incremental increases in SO_2, NO_2 and PM_{10} for a sample of sensitive receptors.

Proponent Response

An investigation of the sensitive receivers has been included in the updated air quality assessment Figure 3.1 and Table 3.1 in Attachment B provides the locations and a list of the relevant sensitive receivers identified. The investigation also included predicted incremental increases for SO_2, NO_2 and PM_{10} at these locations in Section 6.2 of the updated air quality assessment. It is noted that the maximum permitted SO_2 based in coal sulfur content will decrease from the current license limit of 1% to 0.7%. Through the installation of low NO_x burners, NO_2 emissions will be limited to an emission of 500 mg/m^3 which is significantly reduced from the currently permitted maximum emission rate of 2,500 mg/m^3. With regard to particulate emission, it is noted that fabric filters which are world best practise technology for the collection of particulates were fitted to Munmorah Power Station in 1990/1. This technology, which removes 99.9% of particulate emissions, will continue to provide effective management of particulate emissions from the power station. The predicted impacts under worse case conditions are within the ambient air quality goals at the sensitive receptor locations.

Sulfur dioxide emissions:

The World Health Organisation's (WHO) guideline values for 10 minute and 24 hour SO_2 concentrations are 500 μg/m^3 and 20 μg/m^3 respectively. The levels of SO_2 following rehabilitation are expected to exceed these values (Table 7.16). As the Environmental Assessment does not report the incremental increase in SO_2 concentration for a sample of sensitive receptors it is not possible to comment on the likely health impact of these exceedances in more detail.

Given that the predicted SO_2 concentrations are expected to be above guideline values, it is recommended that best practise mitigation methods are incorporates into this development. It is also recommended that gas or low sulphur content coal is used as the fuel source where possible.

Proponent Response

The SO_2 impacts reported in the Environmental Assessment are based on worst case conditions. The updated air quality assessment concludes that these levels are unlikely to occur as they are based on the coincidence of maximum coal sulfur levels occurring with maximum power station output under very infrequent adverse meteorological conditions with contributions from new sources not represented in the existing air quality.

National air quality standards vary according to the approach adopted for balancing health, technology, economic and other social and political factors. The WHO guidelines in general addresses single pollutants, rather than the heterogeneity which would normally be experienced due to mixtures of chemicals and the influence of additive, synergistic or antagonistic effects. The WHO acknowledge that governments should consider their own local circumstances before adopting the recommended guideline values. It should be emphasized that the guidelines are health based or based on environmental effects, and are not standards *per se*. [3] [4].

[3] Air quality Guidelines for Europe, 2nd Ed 2000. WHO Regional Publications, European Series, No. 91. ISBN 92 890 1358 3
[4] WHO Air quality guidelines for particulate matter, ozone, nitrogen dioxide and sulfur dioxide - Global update 2005 - Summary of risk assessment

The existing environment has been characterised through an analysis of the location of sensitive receivers along with a review of the meteorology and current air quality of the study area. The assessment has demonstrated that the meteorological and background air quality inputs to the modelling are representative and acceptable. Allowance has been made for new approved emission sources that are likely to overestimate the additional contribution of these sources to air quality.

The analysis of the existing environment has shown that the air quality through this region is good. An assessment of the air quality data has shown that only a very small percentage of the records are above what is regarded as a low baseline. This record includes the effects of the currently operating Munmorah Power Station.

The extent of worst case predictions of air quality impacts has been provided in the updated air quality assessment and the worst case predictions at the identified sensitive receivers has been assessed. The assessment is based on the coincidence of maximum coal sulfur levels occurring with maximum power station output under very infrequent adverse meteorological conditions with contributions from new sources not represented in the existing air quality.

In addition to this the proponent has also committed to a reduction in the licensed maximum sulfur content in coal from 1.0% to 0.7% sulphur. The assessment has also assumed a worst case coal composition for the other elements assessed, based on historical data and available assessments from potential future supplies.

The air quality assessment concludes that there is likely to be little to no adverse impact upon local air quality as a result of the rehabilitation. Following rehabilitation the contribution of Munmorah to local air quality is expected to remain similar, or in the case of NO_x emissions, improve. The consideration of cumulative impacts has shown the importance of contributions from the other sources in the region.

Based on modelling using maximum expected emission rates and inputs from new sources at maximum predicted contribution rates, the modelling has predicted very infrequent exceedances of short term assessment criteria for SO_2. The assessment also observes that the predicted exceedances would be most unlikely to occur in reality as all the factors contributing to these predictions are unlikely to coincide in time and space.

Nitrogen oxide emissions:

The WHO has set an air quality guideline for NO_2 of 40 $\mu g/m^3$ (annual mean) and 200 $\mu g/m^3$ (1 hour mean). Assuming a conversion factor of 1.88 $\mu g/m^3$ = 1 ppb, Table 7.17 shows that the predicted annual NO_2 level complies with this guideline and that the highest predicted 1 hour ground level concentration for NO_2 exceeds this guideline value. However, a comprehensive health assessment is not possible because the incremental increase in NO_2 concentration for sample of sensitive receptors has not been presented

Proponent Response

As stated above, the WHO guidelines in general addresses single pollutants and generally health based or based on environmental effects, and are not standards *per se*.

The extent of worst case predictions of air quality impacts has been provided in the updated air quality assessment and the worst case predictions at the identified sensitive receivers has been assessed. As stated above, the air quality assessment concludes that there is likely to be little to no adverse impact upon local air quality as a result of the rehabilitation. The contribution of Munmorah to local air quality following rehabilitation is expected to be reduced in the case of NO_x.

Based on modelling using maximum expected emission rates and inputs from new sources at maximum predicted contribution rates, the modelling has predicted very infrequent exceedances of short term assessment criteria for NO_x. These predicted exceedances would be most unlikely to occur in reality as all the factors contributing to these predictions are unlikely to coincide in time and space.

See Attachment B for more details.

Particulates:

The predicted 24 hour average PM_{10} concentration exceeds the DECCW limit of 50 $\mu g/m^3$ (Table 7.18). Table 7.18 also describes an increase in annual PM_{10} of 1.3 $\mu g/m^3$ above background. As with SO_2 and NO_2 a comprehensive health assessment is not possible because the incremental increase in PM10 concentration for a sample of sensitive receptors has not been presented.

Proponent Response

As stated above, the air quality assessment concludes that there is likely to be little to no adverse impact upon local air quality as a result of the rehabilitation. The contribution of Munmorah to local air quality is minimal and there will be no change following rehabilitation.

Based on modelling using maximum expected emission rates and inputs from new sources at maximum predicted contribution rates, the modelling has predicted very infrequent exceedances of short term assessment criteria for PM_{10}.

The majority of any predicted exceedances of PM_{10} limits will be associated with local wind blown dust events and bushfires. The assessment has demonstrated the negligible contribution that emissions from Munmorah make to cumulative PM_{10} levels. See Attachment B for more detail.

The Munmorah Rehabilitation – Technical Investigation Report s3.5 p13 (Appendix C of the Environmental Assessment (Aurecon 2009) also provided a succinct description of the dependency of particulate emissions on fly ash conditions and percentage of gas combusted. A comparison of historical levels (2004-06) against the Group 6 guidelines shows that the emission concentrations are generally below the Group 6 standard of 50 mg/m^3 (as shown in Table 4.7 of Attachment B), this is likely to remain largely unchanged. The report noted that the volumetric flow of the flue gas will be largely unchanged for all options, and the dust burden in the flue gas will vary with the amount of natural gas firing. The more gas firing that takes place, the lower the inlet dust burden of the fabric filter plant. Reduced inlet dust burden levels may assist in lowering fabric filter dPs and lengthening fabric filter bag cleaning cycles.

3.5.3 Noise impacts

There is evidence that community noise can pose a general public health risk. Certain groups, such as infants, school children, shift workers and people with mental health conditions are at most risk. Excessive noise may also be a source of considerable annoyance. It is strongly recommended that the proponent develops a "noise control plan" in consultation with local community with the objective on mitigating impacts from the proposal.

It is recommended that the project specific noise goal presented by the proponent be reviewed by DECCW. In making this assessment the cumulative impact of noise from Colongra gas turbine facility, the MV conveyor and the existing Munmorah Power Station should be considered.

Proponent Response:

The proponent has assessed noise emissions from the proposed rehabilitation against the applicable community standards (the NSW Industrial Noise Policy) and determined that there is a low probability of excessive noise generation. The INP has been developed to minimise community harm from noise sources as described in the comment and therefore these risks have been adequately mitigated.

Limited comments can be made based on predicted noise impacts as described in the Environmental assessment but these are contingent on the confirmation of the project specific noise goal. The proponent's model shows that the project specific noise goal will be exceeded at various residential sites around the power station and adjacent to the MV Conveyor. In addition to "acceptable noise goals", the NSW Industrial Policy describes "maximal noise goals" to provide guidance on an upper limit to the level of noise from industry. Its states that "in all cases it is expected that all feasible and reasonable mitigation measures would be applied before the recommended maximum noise levels are references". It is recommended that best practise noise mitigation methods are used to achieve the "acceptable project specific noise goal" that is established.

Proponent Response:

The proponent has committed to undertaking all feasible and reasonable mitigation measures will be implemented in the design stage of the project to minimise noise emissions to the community. Post construction commissioning measurements will be conducted to assess the noise emissions from the completed project against the noise criteria, and if found to be excessive, further mitigation strategies will be implemented to ensure adherence to the environmental noise emission goals.

3.5.4 Electromagnetic fields (EMF)

Generation and transmission of electricity is a source of EMF, which may be associated with health effects. It is unclear whether this project is expected to significantly increase EMF levels from those currently present and clarification of this should be sought from the proponent.

Proponent Response:

In power stations, the electric and magnetic fields (EMFs) have two components, the electric field which is due to the voltage of the equipment and the magnetic field which is caused by the current (Amps) flowing through it. These two components are addressed separately below.

- **Electric Fields:** The proposed rehabilitation will not affect the operating voltage of the plant or the sending out voltage. Accordingly, the electric fields will be unchanged.

- **Magnetic Fields:** The proposed rehabilitation will restore two of the station's four generating units to their original 350 MW capacity. Accordingly, the magnetic fields in the vicinity of the individual units will be similar to those which existed in earlier years. The magnetic fields associated with the external connection to the electricity grid will be about 20% higher than in recent years but some 50% lower than when all four units were operating.

3.6 NSW Office of Water

Provided the power station upgrade complies with current corporate licensing requirements and sourcing of additional water supply is in accordance with the principles and access rules in force under the Central Coast Water sharing plan 2009, the proposal will be supported.

Proponents Response:

WaterPlan 2050 sets out the strategy to secure and sustain the Central Coast water supply system over the next 45 years. A number of water saving measures have been implemented at the proponents Central Coast power stations which has estimated to have saved around 500 million litres water per annum, compared to the potable water consumption in 2005.

While the power station's domestic water usage is dependent on generation levels, the proponent, in consultation with Wyong Council, is continuing to review options for further water savings across the Central Coast. These are outlined in the current Water Management Plan for the site.

3.7 Marrickville Council

On 20 October 2009, Marrickville Council adopted the position of opposing all new coal-fired power stations in NSW, on the grounds that it is incompatible with mitigating dangerous climate change.

Council notes the Premiers support for a new base load power station in NSW to be gas not coal and asks that new coal-fired power stations are rejected and investment is directed toward energy efficient measures and renewable power sources instead.

Proponent response

The NSW Energy Reform Strategy of March 2009 noted that renewable fuels and gas are anticipated to increase their share of total generation capacity with the introduction of the Renewable Energy Target of 20% by 2020 and the CPRS, but that coal fired generators will still be expected to play a crucial role. Demand management initiatives are considered beneficial to society however it is not the proponent's role to develop these initiatives, other than in its own operations, which it already does.

Approval is being sought to rehabilitate the existing Munmorah plant using either coal or gas firing, achieving higher efficiency and lower GHG emissions. The choice of gas as the fuel will depend on availability and pricing in the overall context of the new CPRS.

3.8 Wyong Shire Council

3.8.1 Noise and amenity

There is expected to be construction impacts of a minor nature and that a "Construction Noise and Vibration Management Plan would need to be developed to assess in detail the impact of construction noise on the local community"

Proponent response

The Proponent has made a commitment to developing a Construction Noise Management Plan (CNMP) which would be developed prior to the commencement of construction. The CNMP implement methodologies that may include:

- Minimising tonal reversing alarms with the implementation of broadband reversing alarms
- Using a "forward working procedure" minimising reversing trucks, forklifts etc, wherever possible
- Using low noise construction practices, where possible
- Locating noisy machinery as far from nearest sensitive receivers, where possible
- Consideration of noise emissions from heavy vehicle routes delivering equipment to site and removing waste from site to sensitive receivers
- Limiting noise sensitive activities to between 7 am and 6pm Monday to Friday, 7 am to 1 pm on Saturdays;

Secondly some exceedances are expected from the rehabilitated plant at surrounding residences. The report proposed that commissioning measurements be conducted after completion of the rehabilitation and if found excessive, remedial action would be implemented to reduce noise emission.

Proponent response

The Proponent has made a commitment to developing a Construction Noise Management Plan. in addition the proponent has made the following Commitment: *"Should commissioning noise monitoring show that noise emissions from the Munmorah Power Station at the nearest sensitive receiver exceed 39 dBA, a schedule of possible mitigation measures shall be developed and incorporated into an agreed pollution reduction program to target a reduction in noise impacts to the project specific noise goal of 39 dBA."*

The following noise and amenity related conditions are recommended.

- *The 'commissioning measurements' proposed in the report should be completed. This will demonstrate that the noise levels at the receivers do not exceed the 39 dBA proposal specific design noise goal as stated in the acoustic report.*
- *To ensure that reasonable acoustic amenity for the surrounding properties is maintained, all on-site mitigation measures proposed in acoustic report prepared by Aurecon dated October 2009 accompanying the application, must be complied with. This is to ensure that the sound levels do not exceed the 39 dBA proposal specific design noise goal as stated in the acoustic report.*
- *The preparation of the Construction Noise and Vibration Management Plan prior to commencement of works to address potential noise and vibration impact during the construction phase. All recommendation contain the Plan shall be met during the construction phase.*
- *The preparation of a commissioning acoustic report after completion of the rehabilitation addressing potential impacts on surrounding residences. Identified noise impacts shall be addressed through additional acoustic treatment to reduce noise emission on surrounding residence to acceptable levels.*

Proponent response

The recommended conditions are acknowledged.

3.8.2 Ecological assessment

Wyong Shire Council has indicated that there appears to be a number of deficiencies in the supporting information provided in relation the ecological impacts of the proposal. Additional information as discussed below would be required to complete an ecological assessment.

Comments on general ecology

Aquatic ecology:

The Environmental Assessment states that the distribution of seagrass in Budgewoi Lake has changed in response to variation in the operating capacity of the power station therefore the volume of cooling water discharges. The Environmental Assessment compares the aquatic ecological impact of the rehabilitated power station to that of the power station operating at 'as built'/maximum capacity (4 units – 1,200 MW) and reduced capacity (2 units). In Chapter 9 the Environmental Assessment considers another scenario being 'Munmorah not rehabilitated' and closing in 2012. The Environmental Assessment should therefore also compare the impacts on aquatic ecology of the rehabilitated power station against the scenario of the power station closing in 2012.

Proponent response

In respect of the first sentence, the Environmental Assessment actually states "The distribution of seagrass from the outlet to Buff Point has changed in response to variation in the operating capacity of the power station *and its interaction with the naturally varying conditions due to catchment inputs*."

Regarding the scenario of the power station closing in 2012, assessment of the impact on aquatic ecology would require speculation regarding the subsequent land use/development of the site. While any impacts associated with the cooling water discharge would cease, there could well be an expectation that impacts due to other catchment inputs would increase as a result of changing land use, particularly the effects of any significant expansion in new urban areas that would likely be developed within the catchment.

Ash dams viability / life span:

The assessment of the viability/life span of the ash dams has not considered the potential impacts of climate change.

Proponent response

The October, 2008 DECC publication, *"Summary of Climate Change Impacts Central Coast Region NSW Climate Change Action Plan*" suggests a sea level rise of 40 cm above the 1990 average by 2050. By interpolation, this suggests a 26 cm rise by the end of the power station life in 2030. As the ash dam is 3 m above the lake level, water level rise is not an issue for operation of the ash dam. In respect of rainfall, summer rainfall is projected to increase across the region by 20% to 50%, with a smaller increase in spring. Winter rainfall is projected to decrease. Any increased runoff from the ash dam catchment would flow through the existing arrangements described in the Environmental Assessment into the inlet canal.

Accordingly, the potential impacts of climate change are unlikely to affect ash dam viability or life span.

Potential contamination of groundwater and leachate:

Consideration of the potential impacts/risks of the proposal on the SEPP14 wetland that occur adjacent to the inlet canal and ash dam is required, in particular in regards to potential contamination of groundwater and leachate from the ash dam as the ash dam reaches capacity.

Proponent response

It is shown on Page 8-31 of the Environmental Assessment that the wetland in the path of any ash dam seepage has been unaffected by the 40 years of operation of the ash dam and the assessment also states that the water level in the ash dam is expected to remain unchanged. Accordingly, seepage and the quality of seepage to the local groundwater is not expected to change over the life of the ash dam.

Any changes associated with the current ash management operation would be subject to their own environmental assessment and approval process, which is beyond the scope of the current proposal.

Community Consultation:

No reference in the Environmental Assessment could be found in regards to the 'Friends of Colongra' and 'Colongra Bay Landcare' group that work on the subject site. It is recommended that the Environmental Assessment acknowledge the objective of these groups and assess any impacts of the proposal on the work of the group.

Proponent response

As indicated in the Environmental Assessment, the Central Coast Community Access Regional Environmental (CARE) Forum and is made up of representatives of local communities and organisations, including the 'Friends of Colongra'. Quarterly meetings are held with senior Delta Electricity managers to discuss the general activities and environmental monitoring results of Delta Electricity's Central Coast operations

Additional consultation has been undertaken with the Chain Valley Bay/Lake Munmorah Precinct Committee.

Bushfire risk:

No assessment of bushfire risk could be found in the Environmental Assessment. Is there any vegetation proposed to be removed/managed for bushfire purposes?

Proponent response

The proponent manages some 1,500 hectares of native vegetation, which is generally classified as 'High Bushfire Hazard' land in the Wyong and Lake Macquarie Bush Fire Management plans. Under the Rural Fires Act, the proponent is required to ensure that adequate measures are undertaken on its behalf to protect neighbouring properties from damage caused by fires originating on or passing through Delta Electricity land. A Central Coast Power Stations Bushfire Risk Management Plan has been developed and is reviewed regularly.

The aim of the Central Coast Power Stations Bush Fire Risk Management Plan is to:

- Meet the requirements of the Rural Fires Act;
- Comply with a 2002 directive of the Minister for Energy to:
  - Identify all possible sources of bush fires initiation, including work practices, operational procedures, plant and equipment, and;
  - Determine the level of risk for each source, and the necessary actions and equipment to control the risk, taking into account the various possible levels of bush fire risk category (e.g. during the Bush Fire Danger Season and Total Fire Ban Days).
- Be consistent with the management aims of the Vales Point and Munmorah Power Station Land Management Plans (Delta Electricity 2001 and Delta Electricity 2002) and the Lake Macquarie and Wyong Bush Fire Management Plan.

In addition the Delta Electricity Central Coast Power Stations Bushfire Risk Management Plan allows for the development of two-year operation plans for the proponents land managers to enable planning for annual fire risk management programs. All bushfire risk management activities by the proponent are undertaken in consultation with Rural Fire Service.

The current proposal does not require the removal of any vegetation.

Comments on North Wyong Shire Structure Plan

The proposal needs to address the requirements of the North Wyong Shire Structure Plan which is currently being prepared by the Department of Planning. In particular the proposal should address the requirement to maintain a vegetated corridor throughout the study area.

Proponent response

The non operational areas of the power stations require active management to ensure they are maintained in a condition that is acceptable to both the proponent and the surrounding community. The development and implementation of Land Management Plans (LMP)s provides a firm and consistent basis to actively manage the land resource associated with the Delta Electricity Central Coast Power Stations (Munmorah and Vales Point) consistent with Delta Electricity's Environmental Management System.

Comments on aquatic ecosystems

The impact of the power station (mainly increased temperature) on the lake ecology has not been adequately addressed under the submitted information ie macroalgal growth, macrofauna and meiofauna in the sediments and their associated nutrient cycling capacity.

Proponent response

As stated on page 8-37 of the Environmental Assessment, outside the immediate cooling water outlet area, the water temperature increase of Lake Budgewoi, is mostly confined to the surface waters. The bottom water temperature rise is generally <1°C to 2°C, as shown in Figure 8.6 in the Environmental Assessment. This small temperature increase is within the ANZECC (2000) guidelines for protection of aquatic life in Budgewoi Lake, including macroalgae, macrofauna and meiofauna.

The Environmental Assessment showed the cooling water plume from the rehabilitated plant will be smaller and cooler than the “as built" plume and a recently recorded plume in January 2009. The cooling water plume would therefore have a smaller effect on the aquatic ecology of the seagrass beds from the cooling water outlet to Buff Point. This includes the macroalgae and benthic animals in the seagrass beds, which are the main habitat in the lakes. The Wyong Shire Council Estuary process study by Roberts (2001) found that the trace metal concentrations in the sediments of Lake Budgewoi were within the ANZECC (2000) sediment quality guideline limits for the protection of the aquatic life in the lake.

The information submitted has relied on existing data on the system to justify the potential impacts – some of which is very dated.

Proponent response

As correctly inferred by Wyong Shire Council in Statement 1 under “Ecology – General” comments, the seagrass survey in 1985 (Figure 8.14 in the Environmental Assessment) represents power station two unit operation (up to 700 MW), which is the expected level of generation for the rehabilitated power station. In our view, given the direct relationship between station output and heat rejection to the lake, the matching of output level at the time of the survey with that anticipated following rehabilitation is an appropriate method of gaining insight as to future outcomes, notwithstanding the age of the data.

As the power station will be rehabilitated to operate two units at the historical level of generation assessed, the use of existing data to assess potential impacts is justified.

There is no “current data” supporting a recent assessment of the impact of the power station on the lakes.

Proponent response

As stated in the Environmental Assessment, the Director-General’s requirements are to provide an assessment of the likely risks to aquatic ecology of the rehabilitation of the plant back to its original two unit capacity. The Environmental Assessment states in page 8-32 *"Electricity generation from 1996, after the power station was downgraded to a two unit station, is too low to represent the effects on the seagrass distribution for operation at 700 MW.*" For this reason, "current data", such as the 2003 seagrass distribution shown in Figure 8.16 is not considered to be as valid as the earlier data for assessment of effects of the rehabilitated power station on seagrasses in the lakes.

The applicant also states that a lot of the data was collected during periods of low power station operation and this is raised as a concern as the impacts cannot be adequately assessed.

Proponent response

As noted above, while the more recent data which was collected at times of low load is of interest, the earlier data covering power station operation at loads similar to the 700 MW now proposed is considered to be more relevant. For this reason, it was used in the assessment.

The information accompanying the proposal is more of a literature review than a specialised study into the impact of the power station on the Tuggerah Lakes.

Proponent response

The impact assessment was able to draw on the long-term seagrass mapping undertaken for assessment of effects of the power station, current cooling water plume distribution mapping and water quality data, Fisheries screening studies and the extensive CSIRO review of effects of the four unit power station, as well as a review of existing research and studies in the lakes, such as the WSC Estuary Process Study by Roberts (2001).

Most of the data collected was not collected for the purpose of assessing the impact of the power station and as such provides little comparative relevance for assessment purposes.

Proponent response

The long-term seagrass mapping (which quantifies the distribution of each species and provides a measure of their health), cooling water plume mapping, water quality monitoring, screening studies and the CSIRO review were undertaken for assessment of the actual impact of the power station during operation. They provide a sound basis for assessment of the proposed operating regime. The 1985 seagrass survey (see comment above) coincided with power station operation up to 700 MW, which is the expected generation for the rehabilitated power station.

There is no discussion of the potential impacts of the cooling water in relation to the proliferation of pest species and/or pathogens and disease

Proponent response

As noted above, the Environmental Assessment showed that the rehabilitated cooling water plume will be smaller and cooler than that from the existing power station and, accordingly, will have a smaller effect on the aquatic ecology of Budgewoi Lake.

To ensure the impacts of the cooling water do not exceed that predicted by the modelling, ongoing monitoring of seagrass distribution and health should be included as a safeguard

Proponent response

Noted – The proponents has committed to surveying the distribution of seagrass in the Tuggerah Lakes during the 2009/10 summer and will also undertake a survey of the distribution of seagrass in the Tuggerah Lakes following the completion of rehabilitation works.

Comments on flora and fauna

Wyong Council's vegetation mapping indicates that the 'Freshwater Wetlands' and 'Swamp Oak Floodplain Forest' EECs also occur on the site. Table 12.4 identifies the habitat communities, it does not identify the habitat significance of these communities.

Proponent response

Noted – The table below is updated based on the submission raised

Table 3.4 – Habitats of significance identified on the Munmorah Power Station site

Survey	Habitat Community	Habitat Significance
Robert Payne ES&M, 2002	Woodland	Sydney Coastal Estuary Swamp Forest
	Swamp Oak Forest	The Scientific Committee, established by the Threatened Species Conservation Act, has made a Final Determination to list Swamp Oak Floodplain Forest of the NSW North Coast, Sydney Basin and South East Corner bioregions, as an EEC in Part 3 of Schedule 1 of the Act. Listing of endangered ecological communities is provided for by Part 2 of the Act. EEC (DECCW 2008)
	Wetland	
	Colongra Wetland (natural)	
	Forest Red Gum Forest	Sub unit of EEC (1) River-Flat Eucalypt Forest on Coastal Floodplains of the NSW North Coast, Sydney Basin and South East Corner bioregions under the TSC Act(2)
Parsons Brinckerhoff, 2005	Wyong Paperbark Swamp Forest	Sub unit of EEC (1) Swamp Sclerophyll Forest on Coastal Floodplain under the TSC Act(2)
	Riparian Melaleuca Swamp Forest (3)	

Note: (1) EEC – Endangered Ecological Community
(2) *Threatened Species Conservation Act 1995*
(3) Lower Hunter and Central Coast Regional Environmental Management Strategy 2003b

These areas are remote from any of the activity, which is the subject of the proposal. Appropriate measures will be included in the project Environmental Management Plans to ensure their locations are known and impacts avoided.

Comments on conservation significance

Wyong Council's Wyong Ground Orchid Survey Wyong Shire predicts that the potential habitat for several orchids of local conservation significance occur along the coal conveyor. It is recommended that the Environmental Assessment consider the impacts on these species and propose mitigation measure if work be conducted along the conveyor.

Proponent response

The installation of the upgraded MV conveyor would occur on the existing road/conveyor bench which is already disturbed and would avoid these areas. If any clearing is required a full assessment will be undertaken of the area, appropriate approval obtained and mitigation measure put in place to avoid

It appears that a more recent search of the NSW Wildlife atlas has not been conducted. An assessment of the suitability of habitat on the site for threatened species recorded on the local area is necessary, in accordance with DECC (2007) Threatened Species Assessment Guidelines – The Assessment of Significance.

Proponent response

Threatened plant and animal species are listed on schedules under the TSC Act and the EPBC Act. A search of the Department of the Environment, Water, Heritage and the Arts (DEWHA) *Protected Matters Search Tool* was undertaken in June 2009 to confirm the presence of protected species in the area identified in the previous two surveys. The rehabilitation does not propose to disturb areas of native vegetation on the site.

The Environmental Assessment does not acknowledge that the coal conveyor dissects a major east – west wildlife corridor identified by Wyong Council. The impact of the ongoing use of the conveyor on the corridor should be assessed compared to the scenario of the power station closing in 2012 and the conveyor easement being rehabilitated.

Proponent response

The installation of the upgraded MV conveyor would occur on the existing road/conveyor bench which is already disturbed and would avoid these areas. The proposal is concerned with the rehabilitation of operational components if the Munmorah Power Station. This does not include any activities that would impact

Table 12.6 states that important roosting habitats are not present on the site for the Large-footed Myotis, however in accordance with the DECCW threatened species website, this species may utilise buildings, mine shafts and stormwater channels for roosting. Therefore potential rooting habitat does occur on the site for this species.

Proponent response

Parson Brinckerhoff undertook field surveys for the Colongra Environmental Assessment in 2005 which included a Threatened Species Conservation Act assessment of Microchiropteran Bats, including the Large-footed Myotis[5] . The conclusion was that it is likely that microchiropteran bats roost in dead and living trees which occur in the vicinity of the power station and the Large-footed Myotis a forage along waterbodies and tree lined creeks which were considered to make up a relatively small area of the site.

The proposal is concerned with the rehabilitation of operational components of the Munmorah Power Station and does not include any activities that would impact on foraging sites or potential habitats.

To improve transparency, it is recommended that the Environmental Assessment list the migratory species predicted to occur on the site and discuss the adequacy of the surveys in regard to each species. If surveys are found to be inadequate for a species, an assessment should be completed assuming that the species occurs at the site

[5] Parson Brinckerhoff (2005)Technical Paper 1 – Flora and fauna assessment - Proposed Munmorah Gas Turbine Facility. December 2005

Proponent response

A search of the Department of the Environment, Water, Heritage and the Arts (DEWHA) *Protected Matters Search Tool* was undertaken in June 2009 to confirm the presence of protected species in the area identified in the previous two surveys. The list was compared to the previous assessments and the results summarised in the Environmental Assessment. A number of migratory species were predicted to occur in the area based on DEWHA search results (See Table 3.4), however none of the migratory species were recorded in the area and as such there is unlikely to be an impact on migratory species. The full report for the search is included in Attachment D.

Table 3.5 – Migratory species predicted to occur in the vicinity of Munmorah Power Station

Scientific Name	Common Name	Likelihood of occurrence
Migratory Terrestrial Species		
Haliaeetus leucogaster	White-bellied Sea-Eagle	Migratory Species or species habitat likely to occur within area
Hirundapus caudacutus	White-throated Needletail	Migratory Species or species habitat may occur within area
Merops ornatus	Rainbow Bee-eater	Migratory Species or species habitat may occur within area
Monarcha melanopsis	Black-faced Monarch	Migratory Breeding may occur within area
Myiagra cyanoleuca	Satin Flycatcher	Migratory Breeding likely to occur within area
Rhipidura rufifrons	Rufous Fantail	Migratory Breeding may occur within area
Xanthomyza phrygia	Regent Honeyeater	Migratory Species or species habitat likely to occur within area
Migratory Wetland Species		
Ardea alba	Great Egret, White Egret	Migratory Species or species habitat may occur within area
Ardea ibis	Cattle Egret	Migratory Species or species habitat may occur within area
Gallinago hardwickii	Latham's Snipe, Japanese Snipe	Migratory Species or species habitat may occur within area
Rostratula benghalensis s. lat.	Painted Snipe	Migratory Species or species habitat may occur within area
Migratory Marine Birds		
Apus pacificus	Fork-tailed Swift	Migratory Species or species habitat may occur within area
Ardea alba	Great Egret, White Egret	Migratory Species or species habitat may occur within area
Ardea ibis	Cattle Egret	Migratory Species or species habitat may occur within area

It is noted that the rehabilitation project is confined to existing operational areas and does not involve disturbance of habitat. In addition a comprehensive Flora and Fauna survey was undertaken of the entire land holding in 2002.[6]

[6] Robert Payne Ecological Survey and Management (2002): Flora and Fauna Survey Munmorah Power Station and Colongra Wetlands Final Report

The Environmental Assessment states that the rehabilitation works would generally be located within the existing plant are of the power station. It is unclear from the Environmental Assessment whether the ongoing use of the ash dams would result in further loss to the surrounding vegetation. In particular the existing extent of the Vales ash dam shown in Figure 12.1 appears to encroach into several areas of fringing remnant native vegetation. Clarification is required as to whether ongoing as disposal will result in further loss of vegetation (in particular Angophora iopina) and if so the significance of the impact should be assessed.

Proponent response

The management of Vales Point as dam is subject to the operation of the Delta Electricity's Central Coast Ash Management Plan. The proposal has been based on operation covered by the plan. The Vales Point ash dam operates under it own existing approvals. The proposal does not seek to alter the current operation of the Vales Point ash dam.

The Environmental Assessment considered the impact of noise and disturbance, but not on artificial light, on threatened species. Therefore the conclusion that there will not be impact on terrestrial flora and fauna is premature.

Proponent response

The rehabilitation of the existing facilities at Munmorah Power Station does not create any new artificial light sources.

The Tuggerah Lakes Wetland Management Plan (Australian Wetlands – June 2009) ranked the Colongra Wetland, Lake Munmorah as the fourth highest priority wetland in the Tuggerah Lakes catchment, in regards to value and recovery potential, out of a total of 31 wetlands. The Environmental Assessment does not acknowledge the significance of this wetland.

Proponent response

Noted. The sensitivity of the Colongra Wetland and surrounding areas was mentioned in Section 12.3 of the Environmental Assessment. The area was transferred from Delta Electricity to DECCW in recognition of its environmental values and is now the Colongra Nature Reserve, Their area is remote from the proposed rehabilitation works and is not predicted to be impacted by the proposal.

Comments on groundwater impacts from the ash dam

Concern is raised regarding impact associated with Boron leaching from the ash dam into the ground water. Concern is also generally raised regarding the ability of the applicant to monitor to ensure no leaching is occurring, given the ash dam is an old wetland and not a purpose built, clay lined ash dam.

Proponent response

It is shown on Page 8-31 of the Environmental Assessment that the wetland in the path of any ash dam seepage has been unaffected by the 40 years of operation of the ash dam. This situation is reinforced by the fact that its condition recently satisfied the DECCW/DOP requirements for the area to be established as a green offset. Page 8-8 of the Environmental Assessment notes that seepage water is collected by a system of toe drains which direct the water to the cooling water inlet canal. Seepage rates at the ash dam wall are routinely measured for dam safety requirements.

Comments on filling of the ash dam

The proposal does not appear to take into consideration the fill material from other sources currently being deposited in both of Delta Electricity's ash dams that will have implications for the lifespan of the ash dams and hasten the need for alternatives.

Proponent response

Section L5 (Waste) of the DECCW issued licence, authorises the disposal of the various other wastes (eg soil capping materials, coal fines, mill pyrites, residual detergents, boiler blowdown) generated on the premises. The amount of these other wastes deposited, other that soil capping materials, would be negligible compared to the amount of ash being disposed of and are therefore not considered to play a significant role in reducing the lifespan of the ash dam.

Soil for capping and earth bund construction purposes is imported from off-site and the proponent has advised that virgin excavated natural material (VENM) is used for this purpose. It is managed in accordance with the POEO (Waste) Regulation 2005 – *General Exemption under Part 6 Cl 51 and 51A -The Excavated Natural Material Exemption 2008*.

Soil for capping and earth bund construction was taken into account when calculating the estimated lifespan of the Vales Point ash dam. There are no current proposals to import capping material to the Munmorah ash dam, which receives bottom ash from the Munmorah Power Station.

Comments on water and sewer

The Environmental Assessment does not indicate if an increased loading on the Council's sewerage system is expected. This will require clarification.

Proponent response

A total of 123 staff were employed at Munmorah Power Station for the 2007-2008 financial year[7]. This is expected to be similar for the operational staff rehabilitated plant. The operational Colongra Gas Turbine facility is expected to be staffed by an additional 5 to 10 staff.

The indicative average workforce numbers at any time during the rehabilitation programme would be in the order of 100 employees, while actual numbers being employed would vary according to design. The construction activities are likely to take approximately 24 months,

Therefore, other than an increase in the number of staff during the construction phase of the rehabilitation project, no additional loading is expected on the Council's sewerage system.

Contributions for water supply (and sewerage, if extra load is generated as a result of development) will be applicable and will require further comment by Wyong Council as the Water Authority for the proposal. The following conditions will need to be included requiring the proposal to be referred back to Council for assessment under the Water Management Act 2000.

- *Prior to the commencement, the applicant must apply under Section 305 of the Water Management Act 2000 to Wyong Shire Council as the Water Supply Authority for any works and contributions required for the obtaining of a Section 307 Certificate of Compliance.*
- *The obtaining of a Section 307 Certificate of Compliance under the Water Management Act 2000 for water and sewer requirement for the development of Wyong Shire Council as the Water Supply Authority prior to occupation. All completed works for the development, if any, must be approved by Council prior to the issue of a Certificate of Compliance.*

[7] Delta Electricity Sustainability Report - 2008

Proponent response

The proponent acknowledges the requirements of Wyong Shire Council and will continue to work closely with the Council to ensure that any legislative requirements are met prior to the rehabilitated power station being fully operational.

Comments on sustainability

Concerns are raised that the proposal does not adequately address the principles of Ecologically Sustainable Development, particularly the precautionary principle. The focus of the proposal appears to be oriented towards securing the NSW electricity supply to meet increasing demand by predominantly maintaining the status quo for energy production and entrenching energy production from coal rather than investing in more sustainable alternatives. The seriousness of the implications of climate change resulting from this type of major investment in coal-fired power stations have not been given significance under the proposal.

Although the proposal is put forward as a 'greener' alternative than that currently practised (enabling carbon capture ready and making provision to enable gas to be used as a fuel source), the proposed development is not considered to be ecologically sustainable. There appears to be little evidence of serious consideration or investment being given to the adoption and implementation of renewable energy projects and other sustainable alternatives for energy generation, including initiatives for managing demand.

Proponent response

Delta Electricity is an electricity generation business. As such, it operates a portfolio of generation assets of varying ages and technologies on a commercial basis. In the context of sustainability, in recent years, it has been active in the development of gas-fired and renewable projects but this does not diminish the merits of maximising the efficiency of its older plant. From the resource conservation point of view, extending the life and improving the efficiency of an existing major asset is considered to have considerable merit.

While it is undoubtedly true that demand management initiatives are beneficial at a societal level, it is not the proponent's role, nor is it well placed to implement them other than in its own operations, which it already does.

Within the NEM, the extent to which power stations actually generate is determined by the overall electricity demand, which is driven by the community, and the price at which the individual station can supply electricity to the market. This price, in turn, is influenced by the efficiency of the plant. As the greenhouse gas emission rate from the rehabilitated plant will be well below that of many other plants, especially those fuelled by brown coal, it is likely that, as carbon pricing in one form or another comes into play, market forces will favour efficient black coal and gas fired plant over the higher greenhouse gas emitting brown coal plant. It is envisaged that the rehabilitated Munmorah Power Station will play a part in this process.

Comments on mine subsidence

The broader environmental implication of mine subsidence on the region do not appear to have been adequately considered in the continued expansion of mining operation required to supply coal for the proposal once the current available supplies are exhausted. In this regards the Colongra Wetland has already experienced the undesirable adverse impacts of mine subsidence.

Proponent response

Coal mining is controlled by Department of Industry and Investment, who regulate the extent and management of impacts of coal mining. Coal supplies for Munmorah Power Station are determined by competitive contracts. The extent and impacts of coal mining are subject to their own assessment and approval processes, which is outside the scope of this project. The Greenhouse Gas Reduction Scheme implications of the proposal have been addressed in the Environmental assessment with additional information in Section 3.3.1 and 4.2 of the document.

The Vales Point Power Station and ash dam is located within the Mannering Colliery lease area (formerly Wyee Colliery) which has been and will continue to be subject to mining subsidence. Munmorah Power Station and ash dam overlies the former Newvale No. 2 Colliery, which is no longer operational.

Mannering Colliery has workings in both the Great Northern and Fassifern seams. The upper seam (Great Northern) is being mined by conventional board and pillar and by panel and pillar methods, and includes extensive areas of total extraction. The lower seam (Fassifern) has been mined using longwall mining. Mining under the dams is subject to control and approval by the NSW Dam Safety Committee, the Department of Mineral Resources and the Mine Subsidence Board.

The routine ash dam inspections and safety concern take into account mine subsidence in the area and monitoring equipment has been installed to monitor the effects of mine subsidence beneath the dry ash walls.

During the 2006 to 2008 period, the Mannering Colliery mined the Great Northern Seam just downstream of the dam embankment using first workings only. No subsidence was measured from the mining in these workings.

It is also likely that future coal supplies will be sourced from outside the region. Such coal would be delivered by rail to the Wyee coal unloader to Vales Point Power Station. This system of coal delivery was subject to its own approval in the 1980s. Coal from Vales Point Power Station will be delivered by the upgraded MV conveyor to Munmorah.

4. Public and NGO Submissions

4.1 Summary of key issues raised

The key issues raised by the various respondent submissions relate to the topics that are listed below and described in the following sections.

Key Issue	Section
Greenhouse gas emissions	4.2
Carbon capture and storage	4.3
Strategic justification	4.4
Energy efficiency and demand management	4.5
Gas supply and use	4.6
Investment into renewables and low emission alternatives	4.7
Air quality	4.8
Water quality and water usage	4.9
Waste generation	4.10

The proponent's response to the respondent statements is shown in the following sections.

4.2 Greenhouse gas emissions

Twenty three of the 34 submission received from the general public and NGOs relate to the issues of climate change and greenhouse gas emissions. Selected submissions are provided below but these represent the recurring theme of many of the submissions.

4.2.1 General Comments on climate change

Respondents C5 and C6 Statements: *There is scientific consensus that climate change is a global crisis that requires urgent and immediate action. There is also consensus that massive short term and long term reductions in greenhouse gas emissions are needed to avoid dire consequences. The coal-fired electricity sector is the number one greenhouse gas emitter in Australia and must gradually contract in order to achieve these reductions.*

Respondent C12 Statement: *I believe that the building of the power station will cause Australia's emission to increase further increasing Global Warming, which will lead to local, regional and global climate change and instability.*

Respondent C17 Statement: *I am strongly opposed to any expansion of coal fired power on the grounds that coal is one of the biggest contributors to climate change. We don't need more coal what's wrong with renewables*

Respondents C14 to C16 and C18 to C22 Statements: *No to coal.*

Proponent response

The proponent acknowledges that the management of greenhouse emissions a most important sustainability challenge and the Commonwealth Government's proposed CPRS legislation is regarded as the mechanism by which reductions in omissions will be determined. The NSW Government has also instituted a number of schemes and plans aimed at improving sector efficiency and reducing greenhouse gas emissions associated with the production and use of electricity. The proponent actively participates in a number of these schemes and is continually identifying ways to improve the overall sustainability of operating a coal fired power stations.

The proponent and the electricity generation industry as a whole will face a period of significant change and opportunity with the introduction of the Commonwealth Government's Carbon Pollution Reduction Scheme (CPRS). The proposed development has been designed to fit within the likely structure of the CPRS by allowing for coal, gas and the later addition of carbon capture and storage technology at the appropriate time. This will require the owner of the power plant to purchase permits to emit greenhouse emissions under the CPRS and the price of permits will drive the adoption of emissions reductions measures. The proponent is also developing a portfolio of low emission generation projects to reduce their greenhouse emissions. The projects include

- renewable energy plants
- gas peaking plants
- trialling the CO_2 capture
- research into potential geological sites for CO_2 storage

The Owen Review and subsequent studies have highlighted the need for more base load generating plant in NSW to meet forecast electricity requirements. In the short and medium term this baseload plant must be either coal or gas fired. A rehabilitated Munmorah would provide one option to meet this baseload requirement.

The Munmorah rehabilitation works will improve the generating capability of the two remaining operational units at the site, while reducing the overall carbon emissions per unit of electricity generated, making it environmentally competitive with existing baseload generation. The efficiency improvements that would result from the rehabilitation will mean the combined output of Units 3 and 4 will increase by around 100 MW for the same fuel consumption. Operating at base load capacity will produce around 700 additional GWh of electricity per year. This is equivalent to providing the electricity needs for around 14,000 standard households. This will be achieved by replacing outmoded and worn components with the commercially best available technology for a coal fired power station.

4.2.2 Comments relating to NSW emissions

Respondents C3, C4, C7, C15 Statements: *Climate change is a global crises and coal-fired station are the single greatest threat to the climate, and therefore to life on earth. Greenhouse pollution must begin to fall immediately in NSW and expanding coal-fired power stations would drastically increase NSW greenhouse pollutions.*

Proponent response

The Proponent acknowledges that Climate change is an important global issue and notes the range of current initiatives at the state, national and international level. It is currently anticipated that the Commonwealth Government's CPRS, or alternative national measures will be the principal vehicle for managing the greenhouse gas emissions of electricity generators and other major industries to achieve national targets. The Proponent will operate the proposed work in conformity with any such scheme.

It is likely that, in the future, generators will require permits to emit greenhouse gases. The improvements to Munmorah will allow it to reduce its emissions rate and potentially displace higher emitting power plants. The upgrade would be designed to facilitate a change in fuel to reduce emissions and for the addition of carbon capture and storage technology should that be driven by the CPRS and be economically viable compared to other options. The reduction of greenhouse gas emissions through the CPRS will be Australia wide and potentially internationally. Coal fuelled plants with the highest emissions will, as a result, reduce their output or be closed down. Upgrading Munmorah will not necessarily increase overall emissions as that will be determined by the CPRS.

Respondent C1 Statement: *The impact on greenhouse gas emission will raise the total NSW emissions by approximately 25% when we should be achieving 25% to 40% reductions.*

Proponent response

As indicated in Table 6.13 of the Environmental Assessment, the rehabilitated Munmorah is estimated to contribute 0.68% for the 2010 total Australian emissions and 0.55% to the estimated 2030 total Australian emissions if 100% coal is used. These percentages will decrease with increased gas usage. NSW contributed about 27% (151.2 Mt $CO_{2\text{-}e}$) of the total Australian greenhouse gas emission of 541.2 Mt $CO_{2\text{-}e}$, in the 2007 National Greenhouse Gas Accounts (Federal DEC, May 2009)[8].

Munmorah Power Station will not increase the NSW greenhouse gas emissions by 25%. From Table 6.5 in the Main Volume of the Environmental Assessment, the Munmorah contribution to the NSW greenhouse gas emission would be about 4 Mt $CO_{2\text{-}e}$/year (for 100% coal) or 2.75 Mt $CO_{2\text{-}e}$/year (25% coal and 75% gas). The estimated NSW emissions for 2010 would be 157.4 Mt $CO_{2\text{-}e}$ based on the 2007 contribution by NSW to the actual national emissions. Munmorah Power Station would therefore contribute about 2.5% for 100% coal and 1.8% for 25% coal and 75% gas co-firing.

However, in 2010 it would not necessarily cause any increase in emissions as it would displace less efficient existing coal fired plant. The electricity demand drives the emissions and the demand is met by the available plants. The improved efficiency of Munmorah Power Station would assist in decreasing emission should it be scheduled.

4.2.3 Comments on general coal fired power station operation

Respondent B1 Statement: *This facility is one of the most polluting power stations in the world. As well as many health destroying pollutants, this facility will emit many tonnes of carbon into the atmosphere.*

Respondent C10 Statement: *To cut greenhouse gas emission, it is essential to close down old coal-fired power stations and to ban new coal-fired power station without CCS. Munmorah is very old and deserves to be decommissioned, not renovated or extended.*

Respondent B5 Statement: *I am against the use of coal for the generation of electricity because of the carbon emissions. Gas may be a little better but I would like to see the power station closed and the people involved retrained and given jobs in renewable energy.*

Respondents C5 and C6 Statements: *The current plan for Munmorah is unacceptable because the upgraded station will still have the potential to burn coal for another 20 years. It is reckless and negligent to prolong this capacity when out energy system needs to be going in the opposite direction. We must seize this unique opportunity to permanently remove a significant quantity of carbon-intensive power from the grid.*

Respondents C19, C23 Statements: *No to coal.*

Proponent response

There are a number of advantages in upgrading Munmorah to provide the additional base load generation that will be required in the near future. The existing buffer zone with the surrounding community and existing fuel delivery, transmission and other infrastructure connections significantly reduce the level of impact when compared to an equivalent greenfield development.

The infrastructure required to distribute the electricity generated at the site already exists and is suitable to meet the ongoing generation from the site. Upgrading of the current coal supply infrastructure is required however this will occur within the existing conveyor easement using modern

[8] Department of Climate Change: State and Territory Greenhouse Gas Inventories 2007.

'low noise' conveyors. The existing 'once through' salt water cooling system has adequate capacity for the rehabilitated plant. The salt water cooling system results in greater generation efficiencies when compared with other wet and dry cooling systems, as well as providing generation security during times of severe droughts when inland power stations water supplies are threatened.

As detailed elsewhere in this Report, the proposed rehabilitation works will replace dated and worn components with current technology, thereby improving the plant's efficiency and lowering the emission of greenhouse gases and other pollutants per unit of electricity generated, comparable with the best plants currently in operation in NSW.

Munmorah Power Station even in its current form has an average emissions rate for coal fired power stations. Once it has been rehabilitated the emission rate for a station of its type will be low by comparison. In the future the greenhouse gas emissions from Munmorah Power Station will be dependent on its relative emissions and the Commonwealth CPRS which will determine the total Australian emissions.

Options for non-coal power generation include:

- Gas
- Renewable
- Nuclear

The use and supply of gas is discussed in greater detail in Section 4.6.

The Munmorah site is generally not suited to the supply of electricity from renewable energy resources as outlined below. There are more suitable sites, having better resources available elsewhere.

Renewable technologies and their applicability for the Munmorah site are as follows:

- Hydro – suitable water resource not available at the Munmorah site
- Wind – the wind energy resource is poor at the Munmorah site and there would be insufficient space for such a development
- Solar thermal – poor insolation in coastal areas; insufficient land area to achieve reasonable capacity
- Geothermal – resource not available at the Munmorah site
- Biomass – possible but distance to resources and fuel availability would be an issue for its use at Munmorah site.

The development of the Munmorah project will not preclude the development of renewable energy electricity generating projects elsewhere or their dispatch in the NEM as these projects are developed under the Commonwealth's Renewable Energy Target.

Nuclear has significant advantages in terms of base load energy delivery and CO_2 emissions over the other options. However there is no regulatory regime in Australia and current Government policy excludes the construction of nuclear power facilities.

4.3 Carbon capture and storage (CCS)

Of the 34 submissions received from the general public and NGOs, three submissions included comments about carbon capture and storage.

4.3.1 CCS needed from day one

Respondent C11 Statement: *The UK has backed down on 'capture ready' for new coal and now proposes requiring CCS to be operating from day one on at least 25% of the plants capacity. Several US states including California and Washington have legislated for emissions performance standards that have successfully prevented new coal-fired generation unless fitted with functioning CCS.*

Proponent Response

The proponent has taken into account the need for the Munmorah Power Station to be CCS Ready subsequent to the rehabilitation of the plant. CCS Ready concepts will be included in the upgraded Munmorah power station. The key dimensions that define a CCS Ready plant include:

- Plant equipment configuration to accept future capture technology
- adequate space and layout, and
- access to suitable geological storage

With regard to suitable storage sites, the NSW Government is undertaking a State Wide exploratory drilling program to determine the location of deep geological traps for optimum storage of CO_2. Preliminary studies indicate the potential for large scale storage in the Darling Basin in western NSW. Exploratory drilling may identify storage prospects closer to the power station.

Storage identified from this exploration will facilitate a 100,000 tpy CCS demonstration project proposed by the proponent subject to the availability of grant funding. Each functional element of CCS, capture, transport and storage, is technically proven at medium scale and has been used commercially in separate applications for some time. This project would demonstrate integrated Capture, Transport and Storage within a single project on Australian coals.

Ultimately, for CCS to be implemented commercially a price on carbon is necessary. By being CCS ready the power station would be capable of being retrofitted with CCS when it is economically viable under an emissions trading scheme. The proponent is preparing for this time by presenting a CCS ready plant and planning an integrated demonstration of CCS technology.

4.3.2 CCS is not proven

Respondent B7 Statement: *The proponent states that the potential for carbon capture readiness was investigated as part of the technical studies for the project. CCS technology however, is not commercialised and may never be. Planners need to be mindful of the politicised nature of the CCS debate in Australia and consider this proposal on the basis of actual data provided rather than the wishful thing of the proponents. Even if CCS proves technically feasible at commercial scales, it may prove economically unviable on a site-by-site basis, especially for power station built prior to the development…….In addition, despite extensive research by Geoscience Australia, NSW was not identified as having suitable offshore storage site for long-term CO2 storage earlier this year.*

Respondent C2 Statement: *CCS is a nice idea but not even close to feasible, so trying to accommodate that is foolish as the relevant components would be outdated by the time CCS is (if it ever is) commercially viable.*

Proponent Response

CCS includes a number of process components that are well understood. Each functional element of CCS, capture, transport and storage, is technically proven at medium scale and has been used commercially in separate applications for some time. There is still the need for these elements to be integrated with power generation technologies at large scale and demonstration projects to accelerate the deployment of CCS technology globally are under development.

A global initiative by the G8 countries to support the launch of 20 large-scale Carbon Capture and Storage (CCS) demonstration projects globally by 2010, with a view to broad deployment of CCS by 2020 is driving significant investment in CSS projects in Europe and the USA. Australia supports this initiative, with the Prime Minister launching the Global Carbon Capture Institute and allocating $2 billion toward CCS demonstrations.

These actions demonstrate a commitment from governments globally to overcome any remaining technical impediments to CCS implementation to ensure that the technology can be deployed when it becomes economically viable under an emissions trading.

For Munmorah the key elements of CCS ready would be:

- Configure the plant to accept carbon capture technology
- Allow adequate space for the capture plant

This would allow the latest technology the be installed at the time CCS technology is required to be fitted to the power station.

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4.4 Strategic justification for coal-fired base load

Three submissions relating to the need and the strategic justification for base load power were received from the general public and the NGOs.

Respondent B7 Statement: *We do not believe there is a strategic justification for this expansion. A recent analysis of projected power growth needs in NSW, subsequent to the Owen Inquiry projections used by the proponent, shows the range of green energy options combined with energy efficiency measures would leave NSW with surplus power at 2019/2020 (Rutovitz and Dunstan 2009 – see Table 2.5).*

Proponents response

The Owen report indicated that NSW would need new baseload generation by 2013/14 to meet the ~85,000 GWh of electrical energy required under a medium growth scenario or by 2016/2017 under a low growth scenario. Reviews of the Owen Inquiry in 2008 and 2009 and updates in the energy consumption predictions show that deficiency in the base load power capability would still occur by mid to late next decade. The 2009 Australian Energy Market Operator (AEMO) Statement of Opportunities indicates that additional capacity of 182 MW is required in NSW in 2015/16 based on its demand/supply forecasts. The 2009 Statement of Opportunity shows that new generation capacity would be needed over the next five to seven years and beyond, which is about the lead time for new base load generation.

Rutovitz and Dunstan 2009 have argued that energy efficiency, demand management and cogeneration opportunities would mean that increased baseload power could be delayed, given appropriate government policy. Should such opportunities be realised as a result of government policy, the effect on the need for new base-load generation will be determined in the competitive energy market place.

The 2009 Statement of Opportunities currently forecasts the need for additional base load capacity by 2015/16 and the Munmorah Rehabilitation project is responding to this forecast shortfall. As with all projects, especially long lead projects, part of the project risk is that the demand may be deferred or may occur earlier than forecast.

Respondent B8 Statement: *Coal fired stations in NSW are currently operating at only 65% capacity, well below the capacity of those in other states. This indicates that more base-load power is not required for some time. Meanwhile peak demand is still growing. The extent that new capacity is needed at all, considering the vast, untapped potential of demand management and energy efficiency, it is peak demand that needs to be addressed rather than base load.*

NSW currently has 16,300 MW of generation capacity, including imports from Queensland and Snowy. Around 12,000 MW of this capacity is base load capacity. While peak demand recently reached 13,306 MW, only 8,500 MW of this was comprised of average demand requiring base-load. It is therefore incorrect to assume that NSW needs more base load.

Coal is the wrong fuel for meeting NSW's energy need. Peak load is most effectively met by demand management or gas-fired power.

Proponents response

The NSW Government's *Inquiry to Electricity Supply in NSW*, also known as the Owen Inquiry, examined the future of electricity generation in NSW and provided advice to the Government on the actions necessary for a timely investment in new baseload generation.

The Owen report indicated that with growth in electricity demand as forecast, it was anticipated that a shortfall in available energy would occur by 2013/14. Reviews of the Owen Inquiry in 2008 and 2009 and updates in the energy consumption predictions show that deficiency in the base load power capability would still occur by mid to late next decade. This has been supported by the 2009 Australian Energy Market Operator (AEMO) Statement of Opportunities, which has predicted that a reserve deficit of 182 MW would occur in 2015/16. This would be followed by an increase in deficit to about 625 MW in 2016/17 and about 1,050 MW in 2017/18.

The forecasts take into account demand management and energy efficiency measures as well as an expansion of renewable generation. The contribution of non-scheduled generators is projected to increase from 2,000 GWh to 4,000 GWh per annum by 2016-17, with the renewable energy supplies becoming increasingly important, and with gas generation embedded in distribution or customer networks possibly contributing another 50 GWh per year.

The 2009 Electricity Statement of Opportunities shows the need for new generation capacity over the next five to seven years and beyond. This is about the lead time for new base load generation given. The Munmorah Rehabilitation is anticipated to take two years to complete which is well within the time scale suggested.

It is not the role of the Environmental Assessment to assess the market requirements for new generation but it is the view of the proponent that there are sufficient indicators, as noted above, that show the potential need for additional base load generating capacity. In the eastern States, the NEM provides a wholesale market for the supply of electricity to retailers and end-users. Consequently it is the electricity market that will determine if there is a need for this power plant. The market in a broader sense will also include consideration of the CPRS on the output and viability of the proposed power plant. The modified plant is likely to displace other less efficient plant should it become financially viable and constructed in due course.

4.5 Energy efficiency and demand management

Four submissions were received from the general public and the NGOs which related to the requirement for NSW to establish methods for improving energy efficiency and demand management.

Respondent B2 statement: *It would be much better to have more policies to reduce our energy use that to build more coal fired power stations. All air conditioners should be turned one or two degrees warmer in summer and higher in winter. If this were done in all government offices or turn the air conditioners off and use fans. A gross FIT is a good one but is only a small step.*

Respondent C10 Statement: *NSW could close down the equivalent of several Munmorah's by phasing out off-peak electric hot water, supporting efficient energy use more strongly and facilitating the expansion of wind farms and solar thermal power stations.*

Respondent C23 Statement: This proposal should be focused on decommissioning the aged plant. The NSW Government has made a commitment under it policy to reduce greenhouse gas emissions in NSW. The Government should therefore be focused on reducing energy demand, increasing energy efficiency and supporting proposals for clean renewable power generation

Respondent B8 Statement: *The Nature Conservation Council contends that the conclusions of the Owen Inquiry were severely limited by narrow terms of reference that failed to consider demand management and energy efficiency as key tools to meet NSW energy needs. NSW needs to examine these options as they comprise the quickest, cheapest and least carbon intensive means of meeting NSW energy needs.*

Proponents response

This rehabilitation project will improve the efficiency of Munmorah Power Station and decrease greenhouse gas emissions per unit of electricity generated. Measures to improve the efficiency with which electricity is used and to reduce demand are implemented by State and Commonwealth Governments. Should these latter measures be successful then the less efficient and more costly coal fired generation units would not be operated and the emissions would be reduced.

End-user demand management has been managed primarily through electricity retailers under the NSW Code of Practice (2004). This includes Demand Management strategies to:

- reduce peak level electricity demand
- reduction in electricity consumption through increases in efficiency (eg compact fluorescent light bulbs, BASIX requirements)
- alternate reticulated energy sources (such as natural gas) and renewable energy sources.

4.6 Gas supply and use

Seven submissions from the public and NGOs were received that indicated support of the Munmorah Rehabilitation only if it was fired on 100% gas. One submission was received from the Hunter Gas Pipeline Pty Ltd which indicated that sufficient gas could be made available should the proponent choose to use gas for the rehabilitated plant.

4.6.1 Using 100% gas-fired option

Respondent B2 Statement: *If this was confirmed as a gas fired power station replacing the original one I would support it, but it will be disaster if it is coal fired and extra to what is already operating.*

Respondent B8 Statement: *The Nature Conservation Council recognises that gas fired power generation produces only half the greenhouse emissions as coal-fired power generation. We note that gas has a role to play in switching from coal generation towards powering our economy with 100% renewable energy. A new gas fired base load power station would still add substantially to NSW's greenhouse gas emissions. The Nature Conservation Council can therefore only support gas-fired generation if it is replacing existing base-load generation, or providing limited peak generation. The Nature Conservation Council does not support gas-fired power generation if it is to provide additional base-load power because we believe that power needs can be met by demand management, energy efficiency and renewable power generation, and increasing overall emissions in the face of climate change is not acceptable.*

Respondent C2 Statement: *If you take a long term view, the plant should be upgraded to be converted to gas only as a main aim. Coal is a dirtier fuel, not in terms of overall CO_2, but also other emissions.*

Respondent C5 Statement: *If power from Munmorah is genuinely needed to meet future demand in NSW then natural gas is preferable as a fuel because it emits 40% less greenhouse gases than coal. Approval to upgrade the station should be granted if natural gas is stipulated as the only permissible fuel.*

Respondent C6 Statement: *A better option would be to retrofit the station to run solely on natural gas. This would immediately reduce greenhouse gas emissions by 40% and is technically feasible because Delta have just built a gas-fired facility adjacent to Munmorah at Colongra. This model strikes a balance between substantial cuts in emissions and a robust generating capacity.*

Respondent C18 Statement: *No more coal-fired power stations without CCS. Please use natural gas.*

Proponents response

The Department of Planning and a number of public submissions suggested that the option of 100% gas firing should have been considered and discussed. There are a number of reasons that 100% gas has not been proposed for the rehabilitated Munmorah, and these are discussed further below.

The main issues with the use of 100% gas at Munmorah include:

- Objectives of the project
- Munmorah redevelopment cost
- Competitiveness on gas

The purpose of this project is to provide additional base load generating capacity at minimal cost, with least environmental impacts and that can be implemented within a relatively short time frame. The upgrading of the Munmorah units meets these objectives of low capital and operating cost. It will also displace plant, depending on fuel cost, providing lower greenhouse gas emissions due to the efficiency improvements expected to be achieved. The capability to fire both gas and coal will facilitate the emissions reductions required once the CPRS has been implemented with the proportion of gas being able to be increased as greater emissions reductions are required.

The work conducted on gas firing for this proposal found that substantial boiler modification would be required for the existing plant to operate on 100% gas. This additional cost would have a significant impact on the financial viability of the project. However, up to 75% gas is achievable as proposed and would facilitate significant greenhouse gas emissions reductions as the gas proportion was increased. The continued use of coal at the power station has a number of advantages in the medium term as it provides a facility that does not immediately require the development of a new gas pipeline from Queensland (the most likely scenario to provide gas to the plant) but at the same time minimizes the cost of a facility that may, like many coal fired stations, have reduced output as greenhouse measures are implemented.

Demolishing the existing plant and redeveloping the site with gas turbine combined cycle (CCGT) technology, rather than upgrading of Munmorah would facilitate utilising 100% gas. However, a development of this nature would not meet the proposal to rehabilitate an existing asset.

Once Munmorah is rehabilitated, it will have a lower greenhouse gas intensity than other existing coal fired plant and would tend to displace the less efficient plant, potentially reducing emissions rather than increasing them. The competitiveness of the plant will depend on the future cost of coal and gas and the impact of the CPRS on the merit order of power plants in the NEM, these matters would need to be considered by the project proponents.

NSW does not have gas reserves and presently relies on supplies from Victoria and South Australia. The exploitation of coal seam gas resources in Queensland will augment eastern Australian gas reserves. However there has been significant expansion of gas based generation in NSW in the past few years and additional infrastructure would be required to service 700 MW of base load power generation at Munmorah. A key piece of infrastructure necessary is a new pipeline from Queensland to the Hunter Valley.

4.6.2 Gas supply

One submission was received from Hunter Gas Pipeline Pty Ltd, a privately owned company supporting the refurbishment of Munmorah Power Station.

Respondent C26 Statement: *Hunter Gas Pipeline Pty Ltd, trading as Queensland Hunter Gas Pipeline (QHGP), is a privately owned company which is developing a 843 km gas pipeline to be built from Wallumbilla gas hub in southern Queensland to Newcastle in NSW. The QHGP will have the capacity, once compressed, to service the proposed gas requirements of a 100% gas fired refurbishment of Munmorah Power Station as well as other users. It will run within 32 km of the Munmorah Power Station as currently planned, with the potential to extend a lateral line from the QHGP directly to Munmorah. Alternatively, additional capacity for gas supply at Munmorah could be created with the use of gas swap arrangement with Jemena's Sydney to Newcastle gas pipeline which is currently full. Under this arrangement, Jemena could supply the gas requirements of the rehabilitated Munmorah Power Station from Sydney, while QHGP provides replacement gas from the north to Jemena Newcastle market. The Jemena pipeline runs within around 8 km of Munmorah.*

Proponent Response:

Section 3.5 of the Environmental Assessment provided an overview of the options available to supply natural gas, including coal seam gas, to Munmorah Power Station. The report included the information provided by Hunter Gas Pipeline Pty Ltd.

A pipeline of the capacity already proposed would be required as the existing pipeline is close to full capacity and additional quantities of gas cannot currently be delivered to NSW.

4.7 Investment into renewables and low emission alternatives

Fifteen of the 34 public and NGO submissions received have raised the issue of more investment into renewable and low emission technologies.

Respondent B1 Statement: *The community resents the prospect of these companies being allocated carbon emission permits at our expense. This money would be better spent organising robust, sustainable non-carbon polluting power supply under local community control. Solar and wind power, together with micro-hydro are all viable options for us.*

Respondent B4 Statement: *This is a golden opportunity to start the transition to a post carbon economy, where our energy needs come from renewable sources, in particular solar and wind. We have a golden opportunity to be world leaders in this field and in the process generate tens of thousands of jobs in the new green economy. However we won't achieve this if we try and patch up our old coal fired power stations, which are going to do nothing to lower our carbon emission.*

Respondent B6 Statement: *Its time to move away from carbon polluting fossil fuels and towards renewable energy future we need. Renewable energy will create new jobs, new industry and a safe climate for current and future generations. The time for coal is over, the time for renewables is now*

Respondent C8 Statement: *We cannot consciously keep burning fossil fuels where these overwhelming and frightening information about the impacts of that activity. The NSW Government could oversee the just transition away from fossil fuels that we so urgently requires, and invest in renewable energy – why isn't it?*

Respondent C8 Statement: *We should be focusing investment in renewable energy sources.*

Respondent C11: *Unlike the developing world, Australia is not facing energy poverty. All Australian States have alternatives to coal.*

Respondent C3, C4, C7, C15 and C24 Statements: *There must be an urgent/rapid transition to renewable energy.*

Respondent C20 Statement: *We must switch to 100% renewable energy, replace the turbines with wind and solar.*

Respondent C21 Statement: *Expanding coal fired power station is not the way to go. Use the money earmarked for expansion of coal fired stations in renewable systems and research. That will be a real investment in the future.*

Proponent Response:

The main objective in rehabilitating Munmorah is to provide the capacity to generate electricity to supply base load demand. This will improve the security and reliability of electricity supply within the State.

The Munmorah site is generally not suited to the supply of electricity from renewable energy resources, not necessarily as there are no renewable resources available but because there are much better sites, having better resources available elsewhere.

Renewable technologies and their applicability for the Munmorah site are as follows:

- Hydro – not available at the Munmorah site;
- Wind – the wind energy resource is poor at the Munmorah site and there would be insufficient space in any case,
- Solar thermal – poor insolation in coastal areas; insufficient land area to achieve reasonable capacity;
- Geothermal – not available at the Munmorah site;
- Biomass – is possible but distance to resources and fuel availability would be an issue for its use at Munmorah site.

The development of the Munmorah project will not preclude the development of renewable energy electricity generating projects or their dispatch in the NEM as these projects are developed under the Commonwealth's Renewable Energy Target.

4.8 Air quality

One public submission relating to air quality issues (other than greenhouse gas emissions) was received.

4.8.1 Fugitive dust

Respondent B1 Statement: *For local people, air-borne coal dust is a continuing problem. Many of us suffer from asthma and other breathing problems.*

Proponent Response

The level of activity through the coal stock pile is expected to change, given the proposal to operate the plant at a higher level. However the appropriate maintenance of air quality management plans and adherence to mitigation measures will lead to the maintenance of satisfactory observed air quality. Furthermore, should gas co-firing be implemented, this will lead to reduced coal handling with inherently lower air-borne coal dust levels.

Coal dust air quality management is addressed with the use of water tankers and spray systems. A Water Tanker with water distribution system is used to control airborne coal dust from the stockpiles on dry, windy days especially when coal truck and dozer movements are high. On average two runs per power station per day are required and are carried out by appropriately trained and qualified personnel. This typically involves many truck movements being scheduled each day.

A truck wash facility has been placed at Vales Point to reduce coal dust on public roads. This is used every time trucks re-enter the public road system. There is no truck wash facility currently available at Munmorah Power Station. There are no coal deliveries by truck to the site.

Conveyor water sprays to suppress dust are used as required on the RV1 coal conveyor from the rail unloader to Vales Point .The conveyors from Mandalong mine also have spray systems which are used as required.

A full assessment of fugitive dust was undertaken for the updated Air Quality report. This is included in Section 3 of Attachment B.

4.9 Water quality and water usage

One submission relating to water quality and water usage was received from the general public and one submission was received from an NGO.

4.9.1 Water quality

Respondent B1 Statement: *This facility discharges warm water into our lake system, poisoning the fish and the sediment with heavy metals including mercury and toxic chemicals like chlorine. This causes excessive algal growth which strips the water of oxygen as it decays. Lake Munmorah, particularly, is in danger of tipping from a living ecosystem into a stinking sewer if industrial waste continues to be poured in.*

Proponents Response:

The Environmental Assessment shows the cooling water plume will be smaller and cooler than the existing power station operations. Trace elements in the waters and sediments of Lakes Budgewoi and Munmorah are shown in the Environmental Assessment as being within the guideline limits established by the ANZECC (2000) guidelines for the protection of aquatic life. Chlorine is not used in the power station cooling water system.

Table 8.9 in the Environmental Assessment gives the results of water quality monitoring for the power station Environmental Protection License, which shows dissolved oxygen is at normal levels in the lakes.

The Environmental Assessment describes how wastewater at the power station is treated to levels to meet the Environmental Protection License conditions through the use of settling ponds and treatment systems before discharge to the lakes. The amount of water discharged is minimized by reuse of as much wastewater as possible in the power station.

4.9.2 Water usage

Respondent B1 statement: *Mining for coal in our local catchments presents a significant threat to our agricultural lands and our town water supply. Mining and burning coal are a threat to out long term sustainability as a region.*

Respondent C14 Statement: *The Central Coast has a chronic shortage of fresh water – this unacceptable use of precious water for more coal fired generation is not only short sighted but wasteful and irresponsible.*

Proponents Response:

The Environmental Assessment shows that following rehabilitation, the power station would use slightly more freshwater than currently used in the old, worn out power station and is greatly reduced compared to the original four unit operation.

Munmorah Power Station has already implemented a number of water saving measures to reduce its use of potable water and will continue to investigate further options to reduce water usage. These are outlined in the current Water Management Plan for the site.

The majority of water used at the station is salt water from the lakes for cooling purposes, which avoids the use of large quantities of freshwater in cooling towers. The ‘once through’ salt water cooling minimises the consumption of scarce water resources compared to cooling at non-coastal thermal power stations, effectively making the coastal water cooled power stations drought resistant. Salt water cooling also results in greater generation efficiencies when compared with other wet and dry cooling systems and provide generation security during times of severe droughts when inland power stations water supplies are threatened.

4.10 Waste generation

One submission was received from the general public relating to the management of ash dams.

Respondent B1 Statement: *Many hectares of pristine bushland and wetlands have been destroyed for ash dams. The ash dams are very close to sea level and will become significant hazards as sea level rises.*

Proponents response

The Munmorah Ash Dam has been in existence since 1965 and the operational and pollution management aspects of the ash dam is governed by the existing approvals under the Environmental Planning and Assessment (EP&A) Act 1979 and the DECCW Environmental Protection Agency (EPA) licences for the sites.

The ash dam is managed through the Central Coast Ash Dam Management plan, which is revised on a five yearly basis. Management includes the ongoing monitoring of discharges from the ash dam and monitoring of dust emissions. The NSW Dams Safety Committee (DSC) is the statutory body, under the Dam Safety Act, whose basic role is to ensure that all prescribed dams are in such a condition as to not endanger downstream residents, property or the environment. The management plan also includes ongoing safety and maintenance checks of the dams as required by the Dam Safety Act. Table

Table 4.1 – Program for dam inspections and reviews for Munmorah Ash Dam

Activity	Frequency
Routine Inspection	Weekly
Intermediate Inspection	Annual
Comprehensive Inspection	5-yearly
Instrument Monitoring	4-monthly
Survey	Two-yearly

This program of inspections would identify any issue relating to dam safety.

The ash dam is 3 m above the lake level and therefore the water level rise is not considered an issue for operation of the ash dam based on the DECC (2008)[9] publication suggesting a sea level rise of 40 cm above the 1990 average by 2050. By interpolation, this suggests a 26 cm rise by the end of the power station life in 2030.

[9] DECC (October, 2008) Summary of Climate Change Impacts Central Coast Region NSW Climate Change Action Plan

5. Conclusion

Following consideration of the submissions received in response to the public display of the project Environmental Assessment, the proponent does not propose any changes to the proposed works described in detail in Chapter 3 of the Environmental Assessment.

The environmental impacts of the proposal were assessed in the Environmental Assessment and measures to manage those impacts were outlined and incorporated into the Statement of Commitments (Chapter 14). The Statement of Commitments has been modified to take into account comments and recommendations provided by the submissions. These commitments may also be further developed by the proponent at the design stage of the project.

Construction and Operational Environmental Management Plans (EMPs) for the project would be developed to ensure that the mitigation measures proposed in the Environmental Assessment are incorporated in the detailed design and implemented along with any conditions of approval issued by the Minister for Planning.

Having considered the respondent statements and reviewed the project in the light of those comments as well as updating and strengthening the proponent's Statement of Commitments it is considered that all relevant issues and concerns have been addressed and that the project should now precede for approval by the Minister. The submissions report is considered by the proponent to fulfil the requirements of Section 75H of the Environmental Planning and Assessment Act 1979.

Revised Statement of Commitments

Attachment A

Attachment A – Amended Statement of Commitments

Environmental Issue	Commitment
Greenhouse Gas Emissions	
1	The proponent will monitor and measure greenhouse gas emissions from Munmorah Power Station for the purpose of reporting in compliance with the requirements of National Greenhouse and Energy Reporting (NGER) Act 2007.
2	Under all coal/gas firing scenarios, the rehabilitation works will ultimately result in a reduction in the greenhouse intensity factor of the Munmorah Units compared to current operation.
3	Consistent with the International Energy Agency (2007) definition of carbon capture ready, as summarised in Section 6.3, the requirements necessary to make the rehabilitated Munmorah Units 3 and 4 "Carbon Capture Ready" will be considered during the detailed design for the rehabilitation.
Air Quality	
4	The proponent will limit the maximum sulfur content in coal to 0.7%.
5	The proponent will achieve 500 mg/m^3 for NO_2 under normal operating conditions. In addition the proponent will work with DECCW to reach agreement on the emission limits proposed in Section 9.4 of the updated air quality report submitted as Attachment B.
6	The proponent will take steps to ensure that, as far as practicable, measures to minimise dust generation are implemented during rehabilitation work. Such measures may include: • Ensuring that vehicles drive only on designated routes; • Ensuring that all loads are covered during haulage; • Minimising the stockpiling of material with a high dusting potential; and • Conducting audits of dust-generating sources during typical work activities to ensure that visible dust sources are mitigated as quickly as practicable.
7	In the event that earthworks are required for the upgrading of the MV conveyor, the proponent will take steps to ensure that, as far as practicable, measures to minimise dust generation are implemented during construction work. Such measures may include: a. Ensuring that vehicles drive only on designated haul routes, and that water trucks are used on all haul routes, where practicable; b. Ensuring all loads are covered during haulage; c. Ensuring that, when leaving the site, trucks do not have excessive soil on tyres that may fall off onto road ways and generate dust. (This may be achieved through measures such as rumble strips, wheel washes etc.); d. Minimising the stockpiling of excavated material that has a high dusting potential; e. Use of water sprays on stockpiles that may remain for significant lengths of time and during excavation of material with high dusting potential; and f. Revegetation or sealing of completed areas to minimise wind-blown dust.
8	The proponent will continue the monitoring and reporting of emissions to air as required by the current DECCW Environmental Protection Licence (EPL) licence for the facility
Water Cycle Management	
9	The proponent will continue to operate in accordance with the requirements of the Station's EPL.
10	The proponent will manage the appropriate use of water at Munmorah Power Station.

Environmental Issue	Commitment
11	The proponent will continue to adopt an Integrated Water Supply approach to the management of water at Munmorah Power Station and to work with the Central Coast Water Supply Authority (Gosford and Wyong Councils) to examine ways to use water more effectively
12	The proponent will regularly review its water usage by way of routine inspection, metering and reporting.
13	The proponent will survey the distribution of seagrass in the Tuggerah Lakes during the 2009/10 summer.
14	The proponent will undertake a survey of the distribution of seagrass in the Tuggerah Lakes following the completion of rehabilitation works.
Waste Management	
15	The proponent will comply with the NSW Government's WRAPP
16	All waste will be classified and disposed of in accordance with the Waste Classification Guidelines produced by the Department of Environment, Climate Change and Water.
17	Where practicable, solid waste (except ash) will be segregated into recyclable and non-recyclable products and disposed of by licensed waste contractors off-site.
18	The proponent will initiate the detailed investigation and consideration of alternative arrangements for the storage of ash beyond the surplus capacity available in Vales Point Ash Dam.
19	The proponent will continue to promote increased ash sales from the Central Coast Power Stations and encourage the development of new markets for these products. It is noted that current ash sales reflect the state of the market for the beneficial use of ash products.
20	The rehabilitation works will be designed to avoid impairing access for the provision of infrastructure suitable for the recovery of furnace and fly ash products for sale.
Hazards and Risk	
21	The proponent will incorporate appropriate safeguards into the design and operation of the proposed development to mitigate higher-level risks. These measures may include plant design features, organisational safety controls, and emergency and counter disaster procedures. Options will be evaluated on the basis of the extent of risk reduction and the extent of benefits or opportunities they create. In general, the cost of managing risks will be commensurate with the benefits obtained.
Noise and Vibration	
22	Noise levels will comply with the NSW Industrial Noise Policy amenity criteria – suburban environment
23	The proponent will specify the achievement of the project specific noise goal of 39 dBA at the nearest residential receiver as a fundamental design aim.
24	Noise monitoring will be conducted as part of the commissioning stage of the project.
25	Should commissioning noise monitoring show that noise emissions from the Munmorah Power Station exceed 39 dBA at the nearest sensitive receiver, a schedule of possible mitigation measures will be developed and incorporated into an agreed pollution reduction program to target a reduction in noise impacts to the project specific noise goal of 39 dBA.

Environmental Issue	Commitment
26	A Construction Noise Management Plan will be developed prior to the commencement of construction. The construction noise management plan will incorporate methodologies that may include: a. Minimising tonal reversing alarms with the implementation of broadband reversing alarms b. Using a "forward working procedure" minimising reversing trucks, forklifts etc, wherever possible c. Using low noise construction practices, where possible d. Locating noisy machinery as far as possible from the nearest sensitive receivers, e. Consideration of the impact on sensitive receivers of noise emissions from heavy vehicles delivering equipment to site and removing waste from site. f. Limiting noise sensitive activities to between 7 am and 6pm Monday to Friday and 7 am to 1 pm on Saturdays;
27	The proponent will conduct an assessment of noise emissions from the final design option for the upgraded MV conveyor during the design stage of the project to ensure that noise emissions from the conveyor comply with the operational noise criteria.
28	Silencers will be installed to the steam release valves.
Traffic and Transport	
29	A traffic management plan will be developed to include the required transport requirements for the rehabilitation works.
30	The Traffic and Transport Plan will make provision for the transport of oversize items and may include: a. Confirmation of the final route and haulage timetable. b. Any requirements for modification to local infrastructure c. Obtaining all required permits for transport of overmass equipment d. Phasing of delivery schedules to meet rehabilitation requirements e. Ensuring that all access roads are suitable for transport of overmass equipment f. Alerting other transport users of the transportation activities g. Notification of the community regarding the designated delivery periods, delivery routes and access points to the site. h. Access points to and from local roads to meet NSW Roads and Traffic Authority and Council requirements i. Designated speed and load limits for heavy vehicle routes and on site j. Designated reserves on the site for parking, turning, loading and unloading k. Appropriate traffic controls and on-site management measures to ensure that vehicles use designated roads only l. Inspection and maintenance of access routes and site tracks to ensure they are kept in an adequate and safe condition.
Flora and Fauna	
31	The proponent will undertake flora and fauna investigations and seek appropriate approvals in the event that detailed design investigations consider options that propose to deviate from currently established operational areas. Any such investigations shall fully assess the impacts of proposed works and the appropriate mitigation measures and safeguards established.
32	The proponent will include any identified flora and fauna safeguards and mitigation measures associated with the MV conveyor upgrade in the project Construction EMP, prior to upgrade works commencing on the MV conveyor

Environmental Issue	Commitment
33	The proponent will retain existing vegetation on the site and, as far as practicable, incorporate local endemic native species in any post-construction rehabilitation and landscaping
34	The following mitigation measures and safeguards will be implemented: a. Access for workers, their equipment and vehicles will be restricted to the designated asphalt roads, where practicable. Site inductions will include awareness training about the ecological values of areas within the power station site. b. If the threatened species *Angophora inopina* is located in the vicinity of the Munmorah - Vales Point coal conveyor upgrade works, prior to any work commencing on site, coloured tape or 'parawebbing' will be used to delineate the maximum permitted work area and 'no go' areas adjacent to the work site. c. Parking of vehicles and stockpiling or storing of equipment waiting for disposal off site, construction equipment and materials would be confined to designated areas.
Indigenous and Non- Indigenous Heritage	
35	In the event that detailed design investigations propose options that would deviate from currently established operational areas, the proponent will undertake appropriate heritage impact investigations and, obtain any necessary approvals. These investigations will fully assess the impacts of the proposed works and determine the appropriate mitigation measures and safeguards.
36	In the event that archaeological material is located during construction works, the proponent and its contractors will cease construction works immediately, isolate the area from other works and contact the National Parks and Wildlife Services (NPWS) immediately. No work will resume in the locality of the archaeological material until the NPWS has given clearance to do so.
37	Should Aboriginal objects or sites be located during the rehabilitation works, the proponent would engage a professional archaeologist, in conjunction with the relevant Aboriginal communities, to investigate and record and manage the object/site prior to its disturbance.
38	The proponent will ensure that all contractors are made aware of the project heritage management requirements prior to commencing site works.
39	Prior to the upgrading of the MV conveyor, the proponent will ensure that a 20 m buffer zone is established around PAD 1 (AHIMS 45-7-0249) and PAD 2 (AHIMS 45-7- 0250) to minimise impacts on these sites.

Environmental Issue	Commitment
Soils	
40	In the event that earthworks are required for the conveyor upgrading, a Construction Soil and Water Management Plan would be prepared in consultation with relevant agencies and would form part of the project CEMP. The plan would include an erosion and sediment control plan which would be consistent with the 'Blue Book' Managing Urban Stormwater: Soils and Construction – 4th Edition (Landcom 2004). Measures considered in the erosion and sediment control plan will include: a. Installation and regular inspection of sediment controls such as sediment fences and bunds b. Stockpiling materials away from drainage lines and waterways c. Avoiding the use of machinery near drainage lines d. Activities to minimise transfer of soils, including the use of wheel wash facilities if appropriate. e. Removal of any soils from public roads and other paved areas through the use of dry street sweepers f. Revegetation of disturbed areas if required g. Restricting the reuse on site of topsoil containing exotic seeds to situations where is to be buried more than 200 mm below the surface h. Ensuring that spill kits appropriate to any products used on site are readily available
41	The proponent will minimise erosion and the potential discharge of sediments from the site.
Community	
42	The proponent will continue to keep the community informed about the rehabilitation works through existing community information activities including the CARE Forum, media releases and local newsletter drops prior to the commencement of key activities.
43	Following formal commencement, the proponent will provide regular updates regarding progress of the rehabilitation works through existing community information activities including media releases, local newsletter drops and updates on the proponent's web site

Threatened species predicted to occur in project area

Attachment C

Australian Government
Department of the Environment, Water, Heritage and the Arts

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14 April 2009 11:11

EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected. Information on the coverage of this report and qualifications on data supporting this report are contained in the caveat at the end of the report.

You may wish to print this report for reference before moving to other pages or websites.

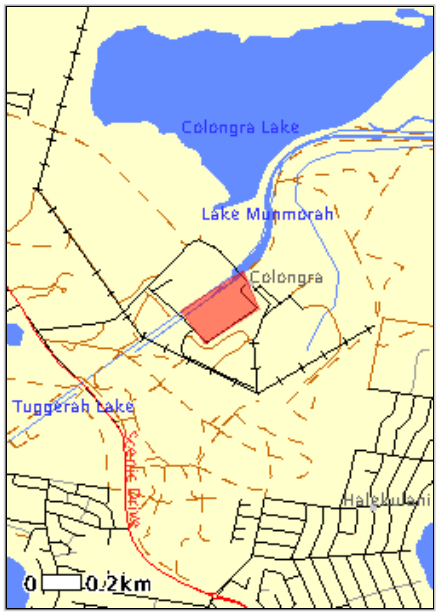
The Australian Natural Resources Atlas at http://www.environment.gov.au/atlas may provide further environmental information relevant to your selected area. Information about the EPBC Act including significance guidelines, forms and application process details can be found at http://www.environment.gov.au/epbc/assessmentsapprovals/index.html

Search Type: Area

Buffer: 1 km

Coordinates: -33.211747,151.539145, -33.213741,151.540597, -33.211624,151.543833, -33.209372,151.542874

Report Contents:



Summary

Matters of National Environmental Significance

This part of the report summarises the matters of national environmental significance that may occur in, or may relate to, the area you nominated. Further information is available in the detail part of the report, which can be accessed by scrolling or following the links below. If you are proposing to undertake an activity that may have a significant impact on one or more matters of national environmental significance then you should consider the Administrative Guidelines on Significance - see http://www.environment.gov.au/epbc/assessmentsapprovals/guidelines/index.html.

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Significance: (Ramsar Sites)	None
Commonwealth Marine Areas:	None
Threatened Ecological Communities:	None

Threatened Species:	16
Migratory Species:	14

Other Matters Protected by the EPBC Act

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the environment anywhere.

The EPBC Act protects the environment on Commonwealth land, the environment from the actions taken on Commonwealth land, and the environment from actions taken by Commonwealth agencies. As heritage values of a place are part of the 'environment', these aspects of the EPBC Act protect the Commonwealth Heritage values of a Commonwealth Heritage place and the heritage values of a place on the Register of the National Estate. Information on the new heritage laws can be found at http://www.environment.gov.au/heritage/index.html.

Please note that the current dataset on Commonwealth land is not complete. Further information on Commonwealth land would need to be obtained from relevant sources including Commonwealth agencies, local agencies, and land tenure maps.

A permit may be required for activities in or on a Commonwealth area that may affect a member of a listed threatened species or ecological community, a member of a listed migratory species, whales and other cetaceans, or a member of a listed marine species. Information on EPBC Act permit requirements and application forms can be found at http://www.environment.gov.au/epbc/permits/index.html.

Commonwealth Lands:	None
Commonwealth Heritage Places:	None
Places on the RNE:	None
Listed Marine Species:	12
Whales and Other Cetaceans:	None
Critical Habitats:	None
Commonwealth Reserves:	None

Extra Information

This part of the report provides information that may also be relevant to the area you have nominated.

State and Territory Reserves:	None
Other Commonwealth Reserves:	None
Regional Forest Agreements:	1

Details

Matters of National Environmental Significance

Threatened Species [Dataset Information]	Status	Type of Presence
Birds		
Anthochaera phrygia Regent Honeyeater	Endangered	Species or species habitat likely to occur within area
Lathamus discolor Swift Parrot	Endangered	Species or species habitat may occur within area
Rostratula australis Australian Painted Snipe	Vulnerable	Species or species habitat may occur within area
Frogs		
Heleioporus australiacus Giant Burrowing Frog	Vulnerable	Species or species habitat likely to occur within area

Litoria aurea Green and Golden Bell Frog	Vulnerable	Species or species habitat may occur within area
Litoria littlejohni Littlejohn's Tree Frog, Heath Frog	Vulnerable	Species or species habitat may occur within area
Mixophyes iteratus Southern Barred Frog, Giant Barred Frog	Endangered	Species or species habitat likely to occur within area
Mammals		
Chalinolobus dwyeri Large-eared Pied Bat, Large Pied Bat	Vulnerable	Species or species habitat may occur within area
Dasyurus maculatus maculatus (SE mainland population) Spot-tailed Quoll, Spotted-tail Quoll, Tiger Quoll (southeastern mainland population)	Endangered	Species or species habitat may occur within area
Petrogale penicillata Brush-tailed Rock-wallaby	Vulnerable	Species or species habitat may occur within area
Potorous tridactylus tridactylus Long-nosed Potoroo (SE mainland)	Vulnerable	Species or species habitat may occur within area
Pteropus poliocephalus Grey-headed Flying-fox	Vulnerable	Species or species habitat likely to occur within area
Plants		
Angophora inopina	Vulnerable	Species or species habitat likely to occur within area
Caladenia tessellata Thick-lipped Spider-orchid, Daddy Long-legs	Vulnerable	Species or species habitat likely to occur within area
Cryptostylis hunteriana Leafless Tongue-orchid	Vulnerable	Species or species habitat may occur within area
Tetratheca juncea	Vulnerable	Species or species habitat likely to occur within area
Migratory Species [Dataset Information]	Status	Type of Presence
Migratory Terrestrial Species		
Birds		
Haliaeetus leucogaster White-bellied Sea-Eagle	Migratory	Species or species habitat likely to occur within area
Hirundapus caudacutus White-throated Needletail	Migratory	Species or species habitat may occur within area
Merops ornatus Rainbow Bee-eater	Migratory	Species or species habitat may occur within area
Monarcha melanopsis Black-faced Monarch	Migratory	Breeding may occur within area
Myiagra cyanoleuca Satin Flycatcher	Migratory	Breeding likely to occur within area
Rhipidura rufifrons Rufous Fantail	Migratory	Breeding may occur within area
Xanthomyza phrygia Regent Honeyeater	Migratory	Species or species habitat likely to occur within area
Migratory Wetland Species		
Birds		
Ardea alba Great Egret, White Egret	Migratory	Species or species habitat may occur within area
Ardea ibis Cattle Egret	Migratory	Species or species habitat may occur within area
Gallinago hardwickii Latham's Snipe, Japanese Snipe	Migratory	Species or species habitat may occur within area
Rostratula benghalensis s. lat. Painted Snipe	Migratory	Species or species habitat may occur within area

Migratory Marine Birds

Apus pacificus Fork-tailed Swift	Migratory	Species or species habitat may occur within area
Ardea alba Great Egret, White Egret	Migratory	Species or species habitat may occur within area
Ardea ibis Cattle Egret	Migratory	Species or species habitat may occur within area

Other Matters Protected by the EPBC Act

Listed Marine Species [Dataset Information]	Status	Type of Presence
Birds		
Apus pacificus Fork-tailed Swift	Listed - overfly marine area	Species or species habitat may occur within area
Ardea alba Great Egret, White Egret	Listed - overfly marine area	Species or species habitat may occur within area
Ardea ibis Cattle Egret	Listed - overfly marine area	Species or species habitat may occur within area
Gallinago hardwickii Latham's Snipe, Japanese Snipe	Listed - overfly marine area	Species or species habitat may occur within area
Haliaeetus leucogaster White-bellied Sea-Eagle	Listed	Species or species habitat likely to occur within area
Hirundapus caudacutus White-throated Needletail	Listed - overfly marine area	Species or species habitat may occur within area
Lathamus discolor Swift Parrot	Listed - overfly marine area	Species or species habitat may occur within area
Merops ornatus Rainbow Bee-eater	Listed - overfly marine area	Species or species habitat may occur within area
Monarcha melanopsis Black-faced Monarch	Listed - overfly marine area	Breeding may occur within area
Myiagra cyanoleuca Satin Flycatcher	Listed - overfly marine area	Breeding likely to occur within area
Rhipidura rufifrons Rufous Fantail	Listed - overfly marine area	Breeding may occur within area
Rostratula benghalensis s. lat. Painted Snipe	Listed - overfly marine area	Species or species habitat may occur within area

Extra Information

Regional Forest Agreements [Dataset Information]
Note that all RFA areas including those still under consideration have been included.

Lower North East NSW RFA, New South Wales

Caveat

The information presented in this report has been provided by a range of data sources as acknowledged at the end of the report.

This report is designed to assist in identifying the locations of places which may be relevant in determining obligations under the *Environment Protection and Biodiversity Conservation Act 1999*. It holds mapped locations of World Heritage and Register of National Estate properties, Wetlands of International Importance, Commonwealth and State/Territory reserves, listed threatened, migratory and marine species and listed threatened ecological communities. Mapping of Commonwealth land is not complete at this stage. Maps have been collated from a range of sources at various resolutions.

Not all species listed under the EPBC Act have been mapped (see below) and therefore a report is a general guide only. Where available data supports mapping, the type of presence that can be determined from the data is indicated in general terms. People using this information in making a referral may need to consider the qualifications below and may need to seek and consider other information sources.

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

For species where the distributions are well known, maps are digitised from sources such as recovery plans and detailed habitat studies. Where appropriate, core breeding, foraging and roosting areas are indicated under "type of presence". For species whose distributions are less well known, point locations are collated from government wildlife authorities, museums, and non-government organisations; bioclimatic distribution models are generated and these validated by experts. In some cases, the distribution maps are based solely on expert knowledge.

Only selected species covered by the migratory and marine provisions of the Act have been mapped.

The following species and ecological communities have not been mapped and do not appear in reports produced from this database:

- threatened species listed as extinct or considered as vagrants
- some species and ecological communities that have only recently been listed
- some terrestrial species that overfly the Commonwealth marine area
- migratory species that are very widespread, vagrant, or only occur in small numbers.

The following groups have been mapped, but may not cover the complete distribution of the species:

- non-threatened seabirds which have only been mapped for recorded breeding sites;
- seals which have only been mapped for breeding sites near the Australian continent.

Such breeding sites may be important for the protection of the Commonwealth Marine environment.

Acknowledgments

This database has been compiled from a range of data sources. The Department acknowledges the following custodians who have contributed valuable data and advice:

- New South Wales National Parks and Wildlife Service
- Department of Sustainability and Environment, Victoria
- Department of Primary Industries, Water and Environment, Tasmania
- Department of Environment and Heritage, South Australia Planning SA
- Parks and Wildlife Commission of the Northern Territory
- Environmental Protection Agency, Queensland
- Birds Australia

- Australian Bird and Bat Banding Scheme
- Australian National Wildlife Collection
- Natural history museums of Australia
- Queensland Herbarium
- National Herbarium of NSW
- Royal Botanic Gardens and National Herbarium of Victoria
- Tasmanian Herbarium
- State Herbarium of South Australia
- Northern Territory Herbarium
- Western Australian Herbarium
- Australian National Herbarium, Atherton and Canberra
- University of New England
- Other groups and individuals

ANUClIM Version 1.8, Centre for Resource and Environmental Studies, Australian National University was used extensively for the production of draft maps of species distribution. Environment Australia is extremely grateful to the many organisations and individuals who provided expert advice and information on numerous draft distributions.

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