THE GRIFFIN GROUP

strategen

Bluewaters Power Station
Phase III and IV Expansion

Pubic Environmental Review - Summary of Submissions and Response to Submissions

Prepared for
Griffin Power 3 Pty Ltd
by Strategen

November 2009

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Client: Griffin Power 3 Pty Ltd

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BLUEWATERS POWER STATION PHASE III AND IV EXPANSION

PUBIC ENVIRONMENTAL REVIEW - SUMMARY OF SUBMISSIONS AND RESPONSE TO SUBMISSIONS

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BLUEWATERS POWER STATION PHASE III AND IV EXPANSION

PUBIC ENVIRONMENTAL REVIEW - SUMMARY OF SUBMISSIONS AND RESPONSE TO SUBMISSIONS

1. INTRODUCTION

Griffin Power 3 Pty Ltd (Griffin) is proposing to expand the Bluewaters Power Station (Bluewaters) near Collie, by constructing and operating an additional two generator units comprising boilers, steam turbine, generator and associated balance of plant. The expansion is known as Bluewaters Phases III and IV (the proposal), with a capacity for each Phase to produce 229 MW of base load power (208 MW net output) and is additional to the approved Phase I and II generator units.

A Public Environmental Review (PER) of the Griffin proposal (Strategen 2009) was prepared for assessment by the Environmental Protection Authority (EPA) under Part IV of the *Environmental Protection Act 1986* (EP Act). The PER was prepared in accordance with EPA *Environmental Impact Assessment Administrative Procedures 2002*. The proposal is also being assessed as a "controlled action" under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* under the provisions of the intergovernmental agreement because of potential impacts on listed threatened species and communities and listed migratory species. The Commonwealth has accredited the Western Australian impact assessment process under the bilateral agreement between the Commonwealth and Western Australian Government and this proposal is being assessed under the provisions of that agreement.

The PER describes the proposal, examines the likely environmental effects and the proposed environmental management procedures. It includes information from environmental investigations, reviews environmental impacts, and describes management measures to mitigate effects the proposal may have on the environment.

In addition to community consultation conducted by the proponent during preparation of the PER, the document was subject to an eight week period of public review following its release on 13 July 2009. The public review period ended on 7 September 2009.

Fifteen submissions on the PER were received by the EPA. These have been collated and the Griffin response to each submission is set out in this report.

2. DOCUMENT STRUCTURE

This document contains all submissions received during the public review period of the PER and the Griffin responses to the issues raised.

The submission topics were sorted according to the general subject of the submissions and the issues raised were collated within these groupings. A full summary of the submissions is presented in Section 3. There were several common key issues raised in the submissions and Griffin has provided a detailed response to these issues in Section 4. A response is presented to every individual comment raised in the submissions (set out in Sections 5, 6 and 7), with reference to the detailed response of Section 4 where appropriate. The full list of individual submission issues and responses is presented under the following sorting arrangements:

- **Section 5** – Contains a collation of the individual comments raised in submissions from non-governmental organisations (i.e. community and environmental groups). Each comment or issue is attributed to the organisation that submitted it.
- **Section 6** – Contains a collation of the individual comments raised by individual members of the public.
- **Section 7** – Contains a collation of the individual comments raised in submissions from Government Departments, Statutory Authorities and Members of Parliament. Each comment or issue responded to is attributed to the body that submitted it, where the identity is known.

Within each of these sections, the comments/issues have been arranged according to the subject of factor they address (e.g. greenhouse gas emissions, noise, flora, etc). The comments made on the proposal are essentially provided verbatim (with original typography, grammar and spelling). Optical character recognition software was used to convert the text from the scanned documents to word processor format for reproduction in this report, and this may have resulted in some inadvertent minor errors. Every effort has been made to ensure the reproduced comments are as close to verbatim as possible, including typographical or grammatical errors.

In addition, comments on a draft version of the PER made by several agencies prior to public release of the PER have also been addressed in this document. Where a comment relates to the Draft PER, it is indicated with '*Draft PER*' next to the name of the submitting agency in the tables in Section 7. Several of the comments on the draft PER were repeated in submissions on the released version of the document.

Section 8 sets out the key characteristics of the proposal and lists the changes to the proposed management actions that have been developed in response to the submissions received. The section also provides an amended version of the proposed environmental conditions to be applied to the proposal, if approved.

3. SUMMARY OF SUBMISSIONS

A range of issues was raised in the submissions covering the following topics (in alphabetical order) and these submissions are summarised in Table 3.1 below.

- acid generation in soils
- air emissions
- compliance reporting
- culture and heritage
- fauna
- fire
- greenhouse gas emissions
- liquid waste disposal
- management plans
- marine discharge
- noise emissions
- overall objections to the proposal
- pest control
- pipeline and marine outfall construction
- surface and groundwater
- vegetation and flora
- viability and security of coal industry
- visual amenity/light shed
- water resource use
- weed and dieback management
- wetlands.

Table 3.1 Summarised submissions

Issue	Submitters	Summary of submissions
Acid generation in soils	Shire of Harvey	The submission raised issues regarding the proposal with respect to disturbance of potential acid sulphate soils.
Air emissions	Department of Environment and Conservation Department of Health Environmental Protection Authority Service Unit Individual(s) Shire of Collie South West Environment Centre (Inc)	The submission(s) raised issues regarding the proposal with respect to: • adequacy and accuracy of the air quality modelling • sulphur dioxide emission rates related to dry gas desulphurisation • cumulative air emission impacts and inclusion of the Collie Urea Plant and other emitters in the air quality impact assessment • issues with the health risk assessment with respect to several specific parameters • air quality monitoring • access to electronic copies of modelling results files • retrofitting of flue gas desulphurisation to Bluewaters Phases I and II • regulation of radiation emissions.
Compliance reporting	Shire of Collie	The submission raised issues regarding the proposal with respect to making compliance reports public.
Culture and heritage	Department of Indigenous Affairs	The submission raised issues regarding the proposal with respect to: • a need to be aware that the Aboriginal sites register is not a complete list • a need for ethnographic and archaeological surveys if any impact near Aboriginal site • a need to comply with Aboriginal Heritage Act 1972. The Department of Indigenous Affairs expressed satisfaction with the heritage management plan.
Fauna	Department of Environment and Conservation	The submission(s) raised issues regarding the proposal with respect to: • project redesign to avoid or minimise impacts on fauna habitat • a claim that Chuditch number increases in the region were not scientifically substantiated • uncertainty on the presence of breeding and foraging habitat in the pipeline corridor • the need to adhere to the Fauna Management Plan • the effectiveness of artificial nesting boxes.

Issue	Submitters	Summary of submissions
Fire	Department of Environment and Conservation	The submission raised issues regarding the proposal with respect to: • the need to address DEC requirements in the conservation estate • the impact of smoke accumulation on construction or operation • the need for a contingency plan in the event of wildfire and bushfire smoke affecting the proposal.
Greenhouse gas emissions	Department of Environment and Conservation Greenpeace Individual(s) South West Environment Centre (Inc)	The submission(s) raised issues regarding the proposal with respect to: • the adequacy of investigation of the use of renewable energy generation as an alternative • the technical and economic feasibility of carbon capture and storage • measures to be taken if the Federal Carbon Pollution Reduction Scheme is not implemented in its currently proposed form • the lack of a proposal for carbon offsetting.
Liquid waste disposal	Department of Health	The submission raised issues regarding the proposal with respect to: • a confirmation of the need for dedicated marine saltwater disposal facility • regulation of wastewater treatment plants.
Management plans	Department of Environment and Conservation Shire of Collie	The submission(s) raised issues regarding the proposal with respect to: • requiring the word “will” rather than “should” in a number of management actions in the plans • clarifying requirements in the management plans related to the power station site as against the saline water disposal pipeline • the figures in one appendix not loading (electronic issue) • the desire to comment on management plans • requirements for the proponent to adhere to management plans • a desire for involvement in the preparation of decommissioning plans.

Issue	Submitters	Summary of submissions
Marine discharge	Department of Environment and Conservation	The submission(s) raised issues regarding the proposal with respect to: • confirmation of the need for a dedicated marine disposal facility • identification of the environmental values to be protected • a need to update proposed trigger levels for marine discharges • characterisation of the saline wastewater • a need to update proposed licence limits • impact of the proposed marine outfall on the ability of neighbouring marine outfalls to meet compliance limits • how potential future third party discharges into the pipeline will be managed to meet discharge limits • impacts to BPPH outside the potential disturbance footprint • an error in the PER related to predicted BPPH losses • the need for more detail in the marine discharge management plans, including monitoring programs.
Noise emissions	Department of Environment and Conservation Individual(s) Shire of Collie	The submission(s) raised issues regarding the proposal with respect to: • cumulative noise impacts in the Collie Basin • the need to amend noise metric definitions in PER • reference to the Collie Basin Management and Planning Working Group draft report in the PER • the need for a strong process to ensure required sound levels are achieved in practice • the need for a summary of implications of noise modelling results for the eastern side of Collie and residences north of the Bluewaters site • the need to demonstrate compliance with Ministerial Statements 685 and 724 • the potential under-prediction of “worst case” noise levels by SoundPlan • the need for a procedure for specifying and verifying various noise reduction measures and monitoring • the need for commitment to meet Noise Regulations requirements. The DEC submission noted the consistency of modelling results with previous modelling.

Issue	Submitters	Summary of submissions
Overall objections to the proposal	Greenpeace Individual(s) Local residents South West Environment Centre (Inc)	The submission(s) raised issues regarding the proposal with respect to: • justifying the proposal in terms of energy demand • expressing overall objections to coal mining and coal fired power generation. • The proposed boiler and cooling technologies to be employed in the proposal • air quality impacts • water resource impacts • greenhouse gas emissions • overall justification for the proposal.
Pest control	Department of Health	The submission raised issues regarding the proposal with respect to the need for a mosquito management plan associated with any water bodies resulting from the proposal.
Pipeline and marine outfall construction	Department of Environment and Conservation Individual(s) Shire of Harvey	The submission(s) raised issues regarding the proposal with respect to: • the need for off-site disposal of blowdown water • alternative routes for the saline water disposal pipeline alignment • construction impacts on the coastline • clarification of the need for blasting • the need for more detail on impacts and management of construction of the saline water disposal pipeline, particularly through the Leschenault Inlet Conservation Park • the need for consistent reference to pipeline construction clearing widths • the need to consult with DEC on pipeline alignment and activities in the Leschenault Inlet Conservation Park and other DEC managed land along the pipeline route.

Issue	Submitters	Summary of submissions
Surface and groundwater	Department of Environment and Conservation Department of Health Department of State Development Department of Water Local residents Shire of Collie	The submission(s) raised issues regarding the proposal with respect to: • the need for the potable water supply to the power station to ensure compliance with water quality guidelines, have a water quality reporting procedure, and a Drinking Water Quality Management Plan • the co-disposal of ash with mine overburden • the leaching potential from coal combustion residues • the environmental hazards from ash leachate • groundwater abstraction and mine drainage impacts on the environment • the importance of managing water abstraction and long-term supply for industrial purposes. The Department of Water noted that under regulation under Part V of the EP Act and implementation of the proposed management plans, the proposal would not result in impacts on local water resources.
Vegetation and flora	Department of Environment and Conservation Shire of Harvey	The submission(s) raised issues regarding the proposal with respect to: • clearing of vegetation associated with the saline water disposal pipeline • the need for more detail on positive outcomes expected from proposed impact mitigation activities • the detail provided on revegetation species proposed in the saline water disposal pipeline corridor • the need to avoid vegetation clearing in the Black Cockatoo breeding season • the provision of additional information on the nature and significance of clearing of vegetation and complexes that are under-represented in the region.
Viability and security of coal industry	Department of Environment and Conservation Shire of Collie	The submission(s) raised issues regarding the proposal with respect to: • the need for EPA to confirm that the most efficient technology has been applied • the need for environmental approvals for coal mining associated with providing coal to the proposal.
Visual amenity/light shed	Individual(s) Shire of Collie	The submission(s) raised issues regarding the proposal with respect to: • the visual impact of the light shed • the visual impact of the pipeline crossing over watercourses.

Issue	Submitters	Summary of submissions
Water resource use	Department of Environment and Conservation Department of State Development Department of Water Individual(s) Local residents Shire of Collie South West Environment Centre (Inc)	The submission(s) raised issues regarding the proposal with respect to: • the potential for reductions in water use demand • using alternative cooling technologies • reliability on mine dewatering as a water source • the impact of mine dewatering on water resources and environmental values • future alternative sources to mine dewatering • water balance figures in the PER • ash disposal impacts on water resources • site drainage • the Upper Collie Water Allocation Plan providing new objectives positions and policies for allocating water in the Upper Collie catchment. The Department of Water noted the situation with its proposal to establish a water utility to coordinate water supplies in the Collie Basin.
Weed and dieback management	Department of Environment and Conservation	The submission raised issues regarding the proposal with respect to: • the need for targeted dieback management along the saline water disposal pipeline route • the need to develop a weed and dieback management plan in consultation with DEC, including monitoring requirements.
Wetlands	Department of Environment and Conservation Shire of Harvey	The submission(s) raised issues regarding the proposal with respect to: • the saline water disposal pipeline crossing the classified wetland on Buffalo Road • the significance of wetlands along the saline water disposal pipeline route • the potential for acid sulphate soils to affect wetlands as a consequence of pipeline construction.

4. GENERAL RESPONSES TO KEY ISSUES

The specific comments from each individual submission are all addressed in Sections 5, 6 and 7, dependent upon the category of the submitter. However, several significant issues required a comprehensive response and these are discussed in detail in Sections 4.1 and 4.2. These issues were:

- greenhouse gas emissions (Section 4.1)
- air emissions (Section 4.2).

4.1 GREENHOUSE GAS EMISSIONS

A number of submissions raised concerns on the greenhouse gas (GHG) emissions from coal-fired power stations. Submissions on these issues were received from:

- Greenpeace
- South West Environment Centre (Inc)
- Department of Environment and Conservation - Strategic Policy Division
- one individual.

Many of the submissions addressed specific concerns with the management of the GHG emissions of the proposal, in particular:

- the use of renewable energy generation
- carbon capture and storage
- carbon offsetting.

These issues have been each specifically addressed with a response against each of the individual submission comments in Sections 5.2.2, 6.2.2 and 7.2.4. Detailed responses are made to the primary common issues in the following sections.

4.1.1 Renewable energy generation

Submissions on renewable energy generation were received from:

- Greenpeace
- South West Environment Centre (Inc).

The following were primary areas of concern regarding renewable energy generation:

- the proponent has not fully investigated renewable energy options
- the proposal does not consider or contribute to Federal Government targets for 20% renewable energy by 2020.

Response

The following comments are made in response.

Chapter 1 Section 3.2 of the PER provides a general consideration of the potential for use of renewable energy and Chapter 3 Section 3.4.1 of the PER provides a detailed consideration of this issue, based on modelling undertaken by McLennan Magasanik Associates for the WA Office of Energy (MMA 2007). This work concluded that while costs are anticipated to fall in time, renewable energy generation continues to be more expensive than conventional fossil fuel generation. A combination of the proposed Federal renewable energy target and national emissions trading scheme will lead to significant growth of renewable energy generation in WA. However, in spite of this growth, analysis indicates that fossil fuel generation will continue to play a critical role in maintaining security of supply over the next 30 years.

While the Bluewaters Phase III and IV Expansion proposal in itself does not contribute to the Federal Government targets for 20% renewable energy by 2020, the electricity generation project portfolio under development by Griffin Energy contains a mix of renewable and non-renewable energy facilities that demonstrate a substantial contribution to the target. The Emu Downs wind farm produces 80 MW of electricity and has been in operation since 2006. A 130 MW wind farm proposed at Badgingarra is expected to be commissioned in 2010, subject to the required transmission capacity being developed in the northern SWIS. The four Bluewaters generator units will produce a total of 832 MW when commissioned, and in combination with the two wind farms will generate 1042 MW. The wind farm outputs comprise 20.15% of this total, which is directly in line with the Federal Government target and reflects the extent to which Griffin Energy has considered this aspect.

Griffin has vested significant resources in investigating and pursuing viable options in renewable energy generation.

Solar thermal generation (raised in the submission from Greenpeace), while a proven technology with demonstration facilities having been in operation from the 1980s, is far from commercially viable. The Federal Government acknowledges this with its $1.5B Solar Flagships package, where non-commercial technology is to be allocated substantial subsidies to progress to deployment. Additionally, the scale of existing solar thermal installations in other jurisdictions is relatively small, with only a handful of recent deployments being greater than 100 MW. While thermal storage systems are being developed and trialled (such as graphite and molten salts), there is no existing solar thermal development with commercially viable solar storage, making solar thermal facilities intermittent by nature and unsuited to base load (or dispatchable) operation. Notwithstanding this, Griffin is currently investigating advanced, large-scale solar thermal applications in WA. This includes two prospective developments, one in the Pilbara and one in the northern part of the SWIS, where a reasonable solar resource is available. Unfortunately, the northern part of the SWIS is currently transmission constrained. Until the transmission system is appropriately augmented, then large scale solar thermal applications in the SWIS will be unlikely.

Griffin is also in the advanced stages of deploying biomass co-firing with existing and proposed coal fired power stations. Biomass co-firing can displace between 5% and 20% of the coal (and hence emissions) used in these power stations. Again, while technically feasible, commercially this technology is subject to regulatory setting around the price of Renewable Energy Certificates (RECs) and carbon emissions. These are still uncertain with the forward curve for RECs being driven down by the likely inclusion (in the yet-to-be-released Mandatory Renewable Energy Target regulations) of small scale solar hot water and solar photovoltaic systems capable of earning multiple RECs per MWh produced; and with the price of carbon under the proposed Carbon Pollution Reduction Scheme still far from certain. While the uptake of biomass co-firing is very high in other jurisdictions (such as Europe), Griffin notes that no successful commercial biomass co-firing facility has yet been deployed in Australia.

Griffin has an ongoing development agreement with the international wave developer Ocean Power Technologies and is considering a demonstration wave generation facility off the Yanchep coast, north of Perth. Without funding assistance, this relatively unproven technology is currently not commercial to develop in the existing WA electricity market.

Griffin is investigating energy storage systems that will enable the storage of large quantities of intermittent electrical energy produced at times of low load (i.e. overnight). This will allow substantial quantities of new intermittent generation onto the SWIS as well as dramatically improving the load characteristics of the SWIS, leading to more efficient operation of thermal generation plant and consequently lower emissions.

Griffin is one of the largest producers of renewable energy in WA and currently has a significant suite of renewable energy ventures under development in WA. We will continue to investigate commercially viable renewable energy developments, including solar thermal technology. As alluded to in the PER, such opportunities have been carefully considered against existing commercial settings, including current government policy and the physical capabilities of the transmission system, and have been deemed to be currently unviable.

4.1.2 Carbon capture and storage

Submissions on these aspects were received from:

- Greenpeace
- South West Environment Centre (Inc)
- Department of Environment and Conservation - Strategic Policy Division
- one individual.

The following were primary areas of concern expressed regarding carbon capture and storage:

- the project should be assessed on currently available technologies
- it is uncertain if carbon capture and storage will be technically or economically feasible in the future
- there is insufficient information to determine if the power plant is designed to be carbon capture ready
- recommendation that the Proponent be required to prepare a feasibility study for carbon capture and storage implementation and should be required to submit the feasibility study and any updates to the EPA for approval
- the proponent should develop management measures in the event that the Federal Carbon Pollution Reduction Scheme (CPRS) is not implemented in its currently proposed form.

Response

The following comments are made in response.

The proposal is specifically based on the best currently commercially available technologies for power generation units of the proposed size, as described in detail in Chapter 3 Section 3.4 of the PER. These considerations included:

- subcritical pulverised coal
- supercritical pulverised coal
- ultra-supercritical pulverised coal
- fluidised bed technologies
- gasification technologies.

While the intention is to ensure carbon capture readiness in the design and construction of the proposal, this can only be to the extent possible based on current knowledge of the specific technology that may become commercially available. As described in Chapter 3 Section 3.5.1 of the PER, the carbon capture readiness of the proposal will be in accordance with the International Energy Agency summary of considerations for carbon capture ready power plants (IEA 2007):

"A CO_2 capture ready power plant is a plant which can include CO_2 capture when the necessary regulatory or economic drivers are in place. The aim of building plants that are capture ready is to reduce the risk of stranded assets and 'carbon lock-in'.

Developers of capture ready plants should take responsibility for ensuring that all known factors in their control that would prevent installation and operation of CO_2 capture have been identified and eliminated.

This might include:

- *A study of options for CO_2 capture retrofit and potential pre-investments*
- *Inclusion of sufficient space and access for the additional facilities that would be required*
- *Identification of reasonable route(s) to storage of CO_2."*

It should be noted that the proposal does not include carbon capture readiness as a key characteristic and is submitted for assessment based on the currently available technologies and the carbon emissions described in the PER. Nonetheless, Griffin will continue to review available technologies for a coal fired power station and adopt the most effective practicable technologies commercially available to minimise GHG emissions. Importantly, Griffin will also continue to actively support the Coal Futures Group research into potential geosequestration sites capable of being utilised by industry in the Collie region. This work effectively provides a public review of the feasibility of carbon sequestration as proposed in one of the submissions.

In addition, Griffin will monitor developments in fuel and carbon capture technologies and undertake annual evaluations of practicable applicability to the Bluewaters Power Station.

Griffin is committed to reporting GHG emissions under the *National Greenhouse Gas Emissions Reporting Act 2007* (NGER Act)[1] and to participation in the emissions trading scheme under the CPRS. Griffin believes that this approach will provide an appropriate and adequate means of management of this environmental factor in terms of a contribution to reducing overall national and international GHG emissions. The Federal CPRS will provide major economic incentives to adopt carbon capture technologies as they become commercially available.

The Greenhouse Gas Management Plan submitted with the PER (Appendix 3) describes the full range of measures proposed to be taken to reduce emissions. These are presented in Table 4.1.

Table 4.1 Management actions

Aspect	Action	Responsibility
Best practice	Griffin will continue to review the available technologies for a coal fired power station and adopt the most effective practicable technologies commercially available to minimise GHG emissions.	Griffin
	Griffin will continue to actively support the Coal Futures Group research into potential geosequestration sites capable of being utilised by industry in the Collie region.	Griffin
	Griffin will monitor developments in biomass fuel and carbon capture technologies and undertake annual evaluations of practicable applicability to the Bluewaters Power Station.	Griffin
Reduction of emissions	Griffin will design the power station units to be carbon capture ready in accordance with the International Energy Agency considerations for carbon capture readiness.	Griffin
	Griffin will install facilities to capture and store carbon when the technology is commercially viable and available.	Griffin
	Griffin will participate in the national Carbon Pollution Reduction Scheme.	Griffin
	Griffin will investigate opportunities to improve efficiency beyond the manufacturer's specifications for the generator units, including: • boiler tuning – improving combustion control to optimise the boiler mix of fuel and air to reduce waste and energy • low excess air operation to minimise the amount of hot air sent up the boiler chimney stack.	Griffin
	Ensure that the Griffin Energy portfolio of energy generation projects consists of at least 5% renewable sources.	Griffin
Monitoring and Reporting	Griffin will establish a GHG emissions monitoring program to enable reporting as required under the NGER Act, and under any future GHG emissions management legislation that may be enacted.	Griffin
	Griffin will report its GHG emissions as required under the NGER Act and under any future emissions management legislation that may be enacted.	Griffin
	Griffin will provide copies of the NGERS reports to the DEC.	Griffin

If the CPRS is not implemented in its current form for some reason, it is an entirely reasonable expectation that there will be some form of scheme that will mandate overall reductions in national emissions, and that Griffin will be required to participate in that scheme. Not all the management measures listed in Table 4.1 relate to the CPRS, and these would be implemented in any event.

[1] The *National Greenhouse Gas Emissions Reporting Act 2007* establishes the National Greenhouse Gas Emissions Reporting Scheme (NGERS) as a national framework for Australian corporations to report GHG emissions, reductions, removals and offsets, and energy consumption and production.

4.1.3 Greenhouse gas offsets

Submissions on this aspect were received from:

- South West Environment Centre (Inc)
- one individual.

The following were primary areas of concern expressed regarding carbon offsets:

- the proposal does not provide offsets for carbon emissions
- if carbon geosequestration is not operational within a set time period, then the proponent should be required to undertake carbon offset projects.

Response

The following comments are made in response.

The CPRS 'Green Paper' and White Paper' (Australian Government 2008a, 2008b) notes that the broad coverage proposed for the scheme creates limited scope for the creation of offset credits. The reasons for this are:

1. Offset credits are rewards for reductions in emissions measured against an assumed baseline, with issues regarding the determination of the baselines, and complexity of administering such systems.
2. Offsets do not increase national GHG abatement, as the provision of credits allows additional emissions in the covered sector.

The papers note that offsets may be considered for sectors not proposed to be covered by the scheme (for example, emissions from uncontrolled burning of savannah in the tropical north of Australia). However, the power generation sector will be covered by the scheme, and offsets will therefore not be considered for projects such as the Bluewaters expansion proposal.

Achievement of the Carbon Pollution Reduction Scheme targets will progressively and substantially increase the costs of permitting GHG emissions from the proposal and force the incorporation of GHG reduction technologies as they become commercially viable. Griffin believes that any additional cost imposts through offsetting requirements under the State environmental approval are not justified, as credits for any such offsets will not be recognised under the Carbon Pollution Reduction Scheme. Participation in the Scheme with an additional requirement for offsets that cannot be credited is considered unjustified and unreasonably onerous.

As outlined in the previous section, it is an entirely reasonable expectation that there will be some form of scheme in the foreseeable future, (and certainly within the life of the proposal) that will mandate overall reductions in national emissions, if the CPRS does not proceed in its current proposed form or timing.

Given the above, Griffin does not believe that provisions for carbon emission offsets should form part of the proposal.

4.2 AIR EMISSIONS

Several submissions raised matters relating to the impact of air emissions may have on the environment and to the health of the residents in the Collie area.

Submissions on these issues were received from:

- South West Environment Centre (Inc)
- Department of Environment and Conservation
- Environmental Protection Authority Service Unit
- Department of Health
- one individual.

The main aspects raised were:

- adequacy and accuracy of the air quality modelling
- cumulative air emission impacts
- health risk assessment
- monitoring.

These issues have been each specifically addressed with comment against each of the individual submissions in Sections 5.2.1, 6.2.1 and 7.2.2. Detailed responses are made to the specific agency comments in the following sections[2].

4.2.1 Department of Environment and Conservation

The issue of DEC modelling requirements has been extensively addressed by ENVIRON in consultation with the DEC Air Quality Management Branch (AQMB) since release of the PER. The specific matters of concern are discussed below.

Use of 9th highest 1-hour average SO_2 concentrations

The AQMB has advised that it does not accept the comparison of the predicted 9th highest 1-hour average ground level concentrations of SO_2 against the NEPM standard. The AQMB has advised that the predicted 9th highest 1-hour average ground level concentrations should be compared against the Kwinana Environmental Protection Policy (EPP) Area C standard of 350 $\mu g/m^3$. ENVIRON understands that one of the reasons that the AQMB has made this recommendation is because these standards (i.e. the NEPM and the Kwinana EPP) have been shown to be consistent based on the Kwinana ambient monitoring data. However, it is not clear that this relationship holds for air dispersion modelling results for the Collie region where it is thought that the current versions of TAPM are over-predicting the 1-hour average ground level concentrations and that the extent of these over-predictions is influenced by the version of the model that is used.

[2] The responses to air quality issues in this section are presented largely verbatim from a letter report prepared by Environ (copy at Appendix 2 of this report).

The screening health risk assessment (SHRA) presented in the PER did, however, use the predicted 99.9th percentile 1-hour average concentrations and the 1-hour guideline of 350 µg/m^3 to determine the hazard quotient for sulphur dioxide. Therefore, the SHRA used the guideline proposed by the AQMB.

TAPM model issues

In work that has been completed since the PER was released, several problems have been identified with TAPM when running photochemistry in Lagrangian Particle Mode (LPM). The problems resulted in very high ground level concentrations of ozone and nitrogen dioxide being predicted in very close proximity to the emission sources, particularly Muja Power Station. The CSIRO has modified the TAPM code and is currently conducting additional testing. CSIRO expects to release a revised version of the program once this is completed.

The Eulerian Grid Mode (EGM) of TAPM does not have the same issues as those identified using the TAPM LPM with photochemistry. Therefore, an additional run of TAPM has been conducted based on the following:

- TAPM Version 4.02
- sources as defined by Scenario 4b (i.e. proposed scenario with all existing sources)
- all sources modelled with EGM
- background ozone concentration of 20 ppb
- background rsmog of 0.2
- inclusion of biogenic emissions file created by CSIRO for the Collie Region
- model grid as defined in Section 2.3 of Appendix 8 of the PER.

The modelling results from this TAPM run are presented in Figure 4-1 through Figure 4-1 for ozone and nitrogen dioxide. The relevant NEPM guidelines for ozone and nitrogen dioxide are summarised as follows:

Ozone: 1-hour standard of 214 µg/m^3

Nitrogen dioxide: 1-hour standard of 246 µg/m^3
Annual standard of 62 µg/m^3

The maximum predicted ground level concentrations across the model domain are below the NEPM guidelines and are as follows:

Ozone: Maximum 1-hour average: 112 µg/m^3
99.9th percentile 1-hour average: 83 µg/m^3

Nitrogen dioxide: Maximum 1-hour average: 185 µg/m^3
99.9th percentile 1-hour average: 112 µg/m^3
Annual average: 7.6 µg/m^3

Contours of the maximum predicted 1-hour average ground level concentrations of ozone and nitrogen dioxide are presented as Figure 4-1 and Figure 4-3. The maximum predicted ozone concentrations show a low level of variability across the model domain but do show some reduction in ozone concentrations occurring downwind of the emission sources as the nitric oxide component of the

emissions react with the ozone. The maximum 1-hour average concentrations of nitrogen dioxide are predicted to occur around Muja Power Station (the modelling results presented in Figure 4-1 through Figure 4-5 include Muja A to C).

A comparison of the nitrogen dioxide ground level concentrations predicted by TAPM running with the sources in EGM was undertaken by comparing the nitrogen dioxide concentrations calculated based on the US EPA Ozone Limiting Method (OLM). For this comparison, the tracer modelling results used in the PER were reprocessed using the following assumptions:

1. Oxides of nitrogen emission rates as specified in Tables 5 and 7 in Appendix 8 of the PER.
2. 10% of the initial oxides of nitrogen emissions were in the form of nitrogen dioxide.
3. The background ozone concentration was 20 ppb.

The contours of the maximum 1-hour and annual average ground level concentrations of nitrogen dioxide calculated using the OLM are presented as Figure 4-6 and Figure 4-7 respectively. The maximum nitrogen dioxide concentrations predicted by the OLM (1-hour average of 136 µg/m3 and annual average of 5.3 µg/m^3) are lower than those predicted from the TAPM photochemistry run but show similar patterns for the peak concentrations. As the OLM calculations have just used a constant ambient ozone concentration of 20 ppb, the lower nitrogen dioxide concentrations calculated by the OLM are not unexpected. A higher background ozone concentration will result in higher predicted ground level concentrations of ozone under the OLM.

The above modelling results indicate that the predicted ozone and nitrogen dioxide concentrations will be below the NEPM standards across the modelling domain.

Inclusion of emissions from Bluewaters Phase I and II

The emissions from Bluewaters Phase I and II are included in all the modelling scenarios. Those emissions will be discharged to atmosphere though combined stacks with the Bluewaters Phase III and IV emissions. The combining of the stacks, with increased height and exit velocities resulting from combining the emissions, is the reason that the concentrations of atmospheric pollutants at ground level receptors are lower than will be experienced with Bluewaters Phase I and II alone.

Figure 4-1 Predicted maximum 1-hour average ground level concentration of ozone (µg/m³) - PER Scenario 4B, TAPM 4.02 EGM

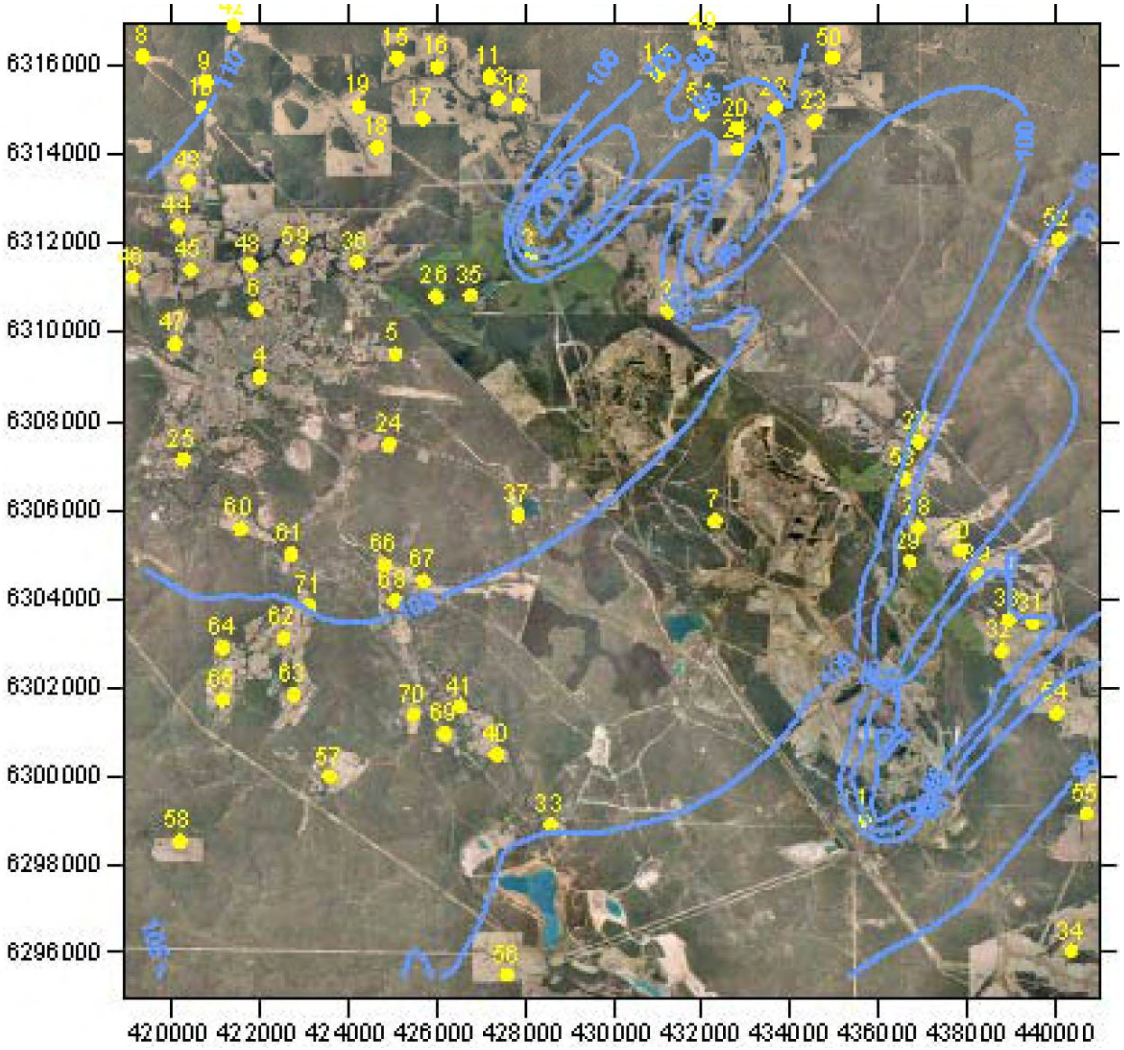


Figure 4-2 Predicted 99.9th percentile 1-hour average ground level concentration of ozone (µg/m³) – PER Scenario 4B, TAPM 4.02 EGM

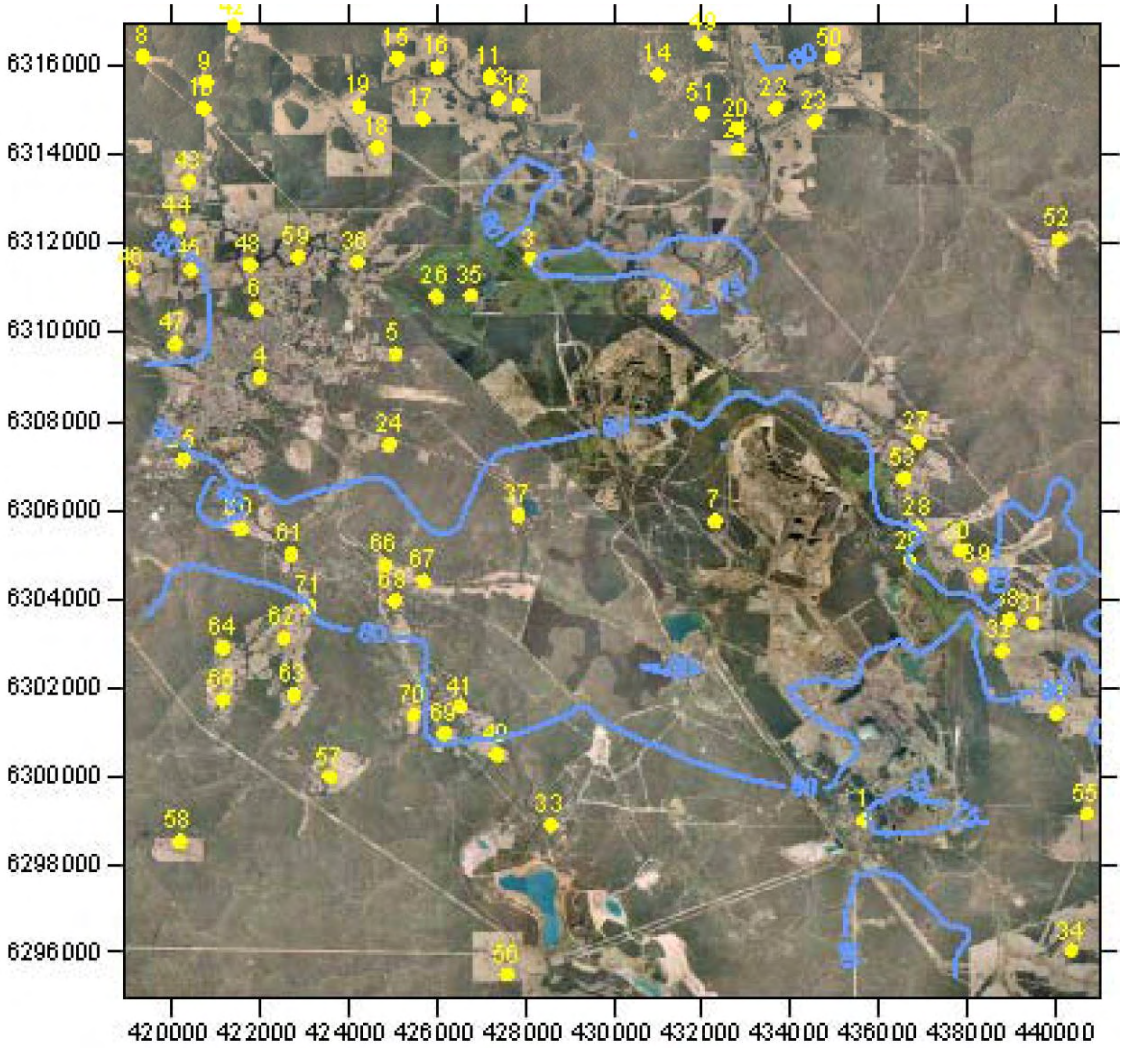


Figure 4-3 Predicted maximum 1-hour average ground level concentration of nitrogen dioxide (µg/m³) – PER Scenario 4B, TAPM 4.02 EGM

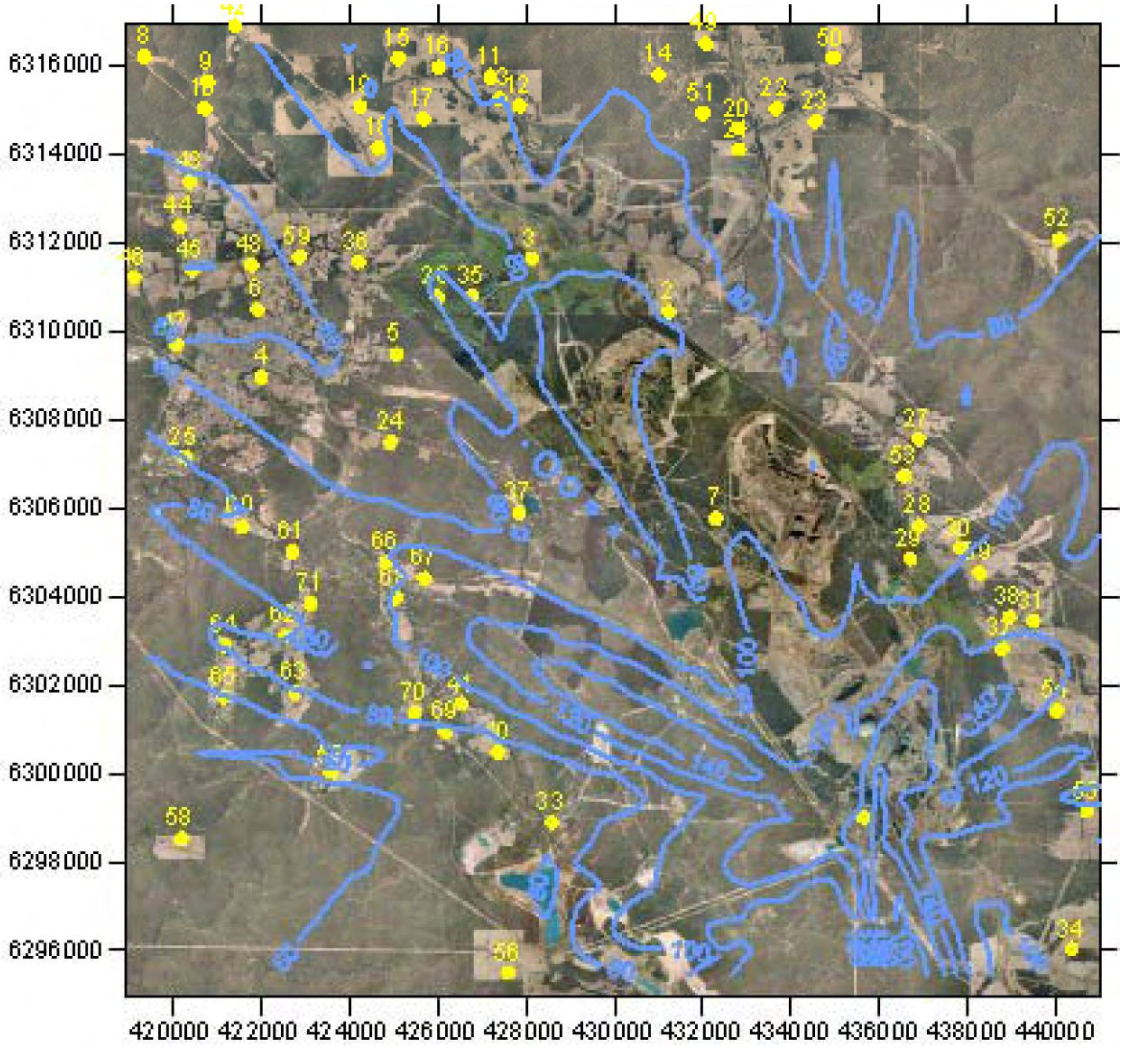


Figure 4-4 Predicted 99.9th percentile 1-hour average ground level concentration of nitrogen dioxide (µg/m³) – PER Scenario 4B , TAPM 4.02 EGM

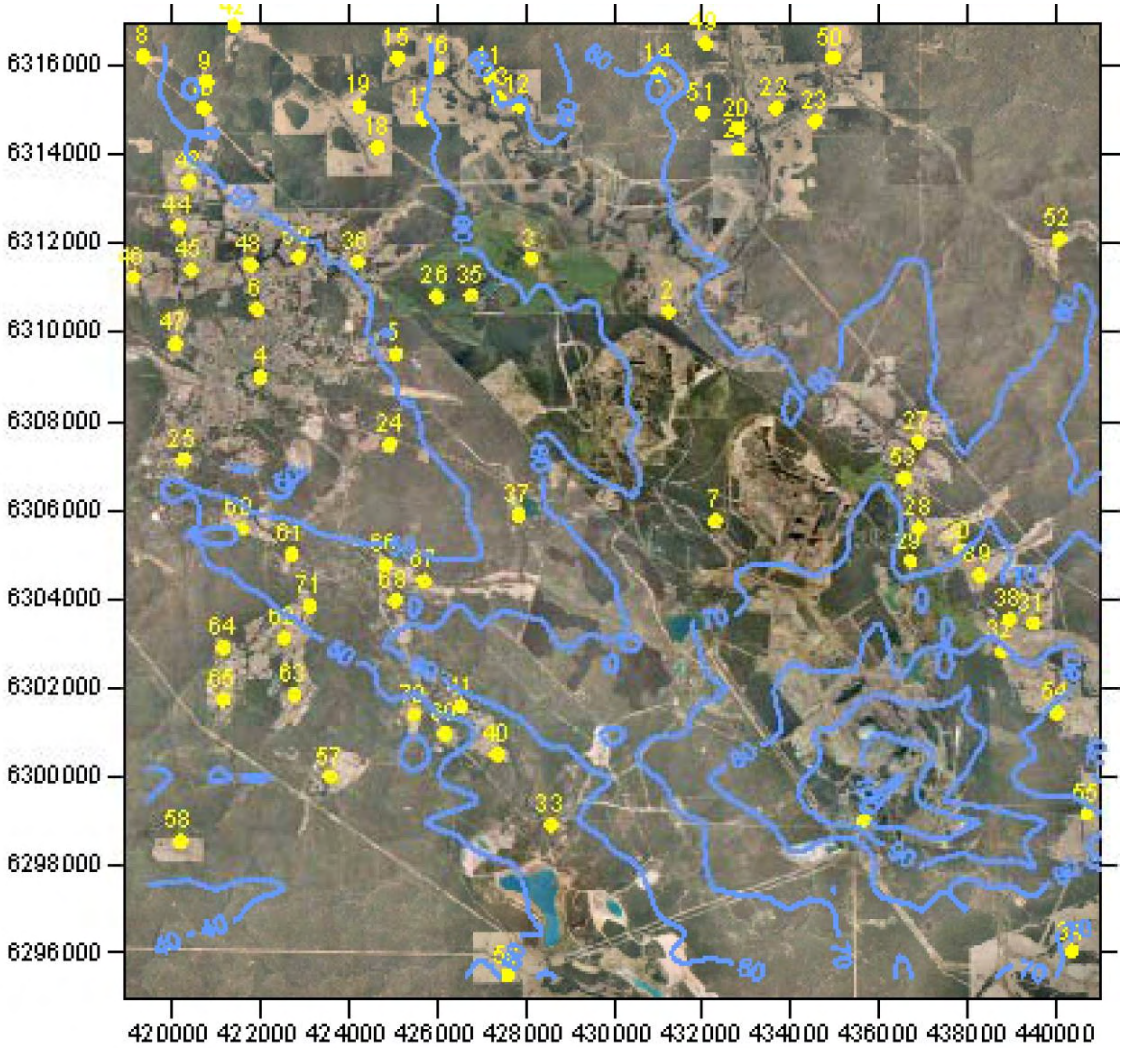


Figure 4-5 Predicted annual average ground level concentration of nitrogen dioxide (µg/m³) – PER Scenario 4B, TAPM 4.02 EGM

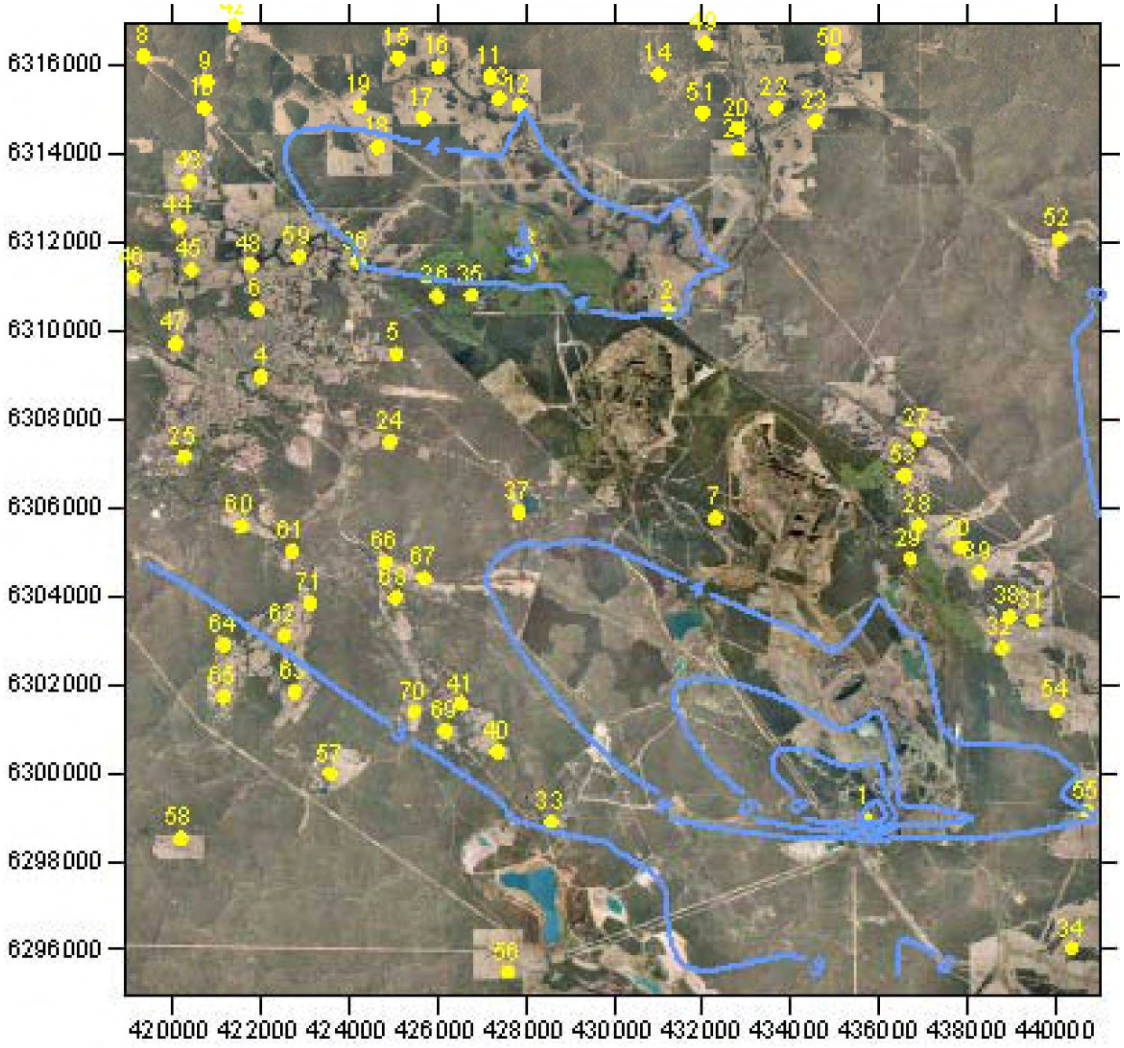


Figure 4-6 Predicted Maximum 1-Hour Average Ground Level Concentration of Nitrogen Dioxide (µg/m³) – PER Scenario 4B using OLM

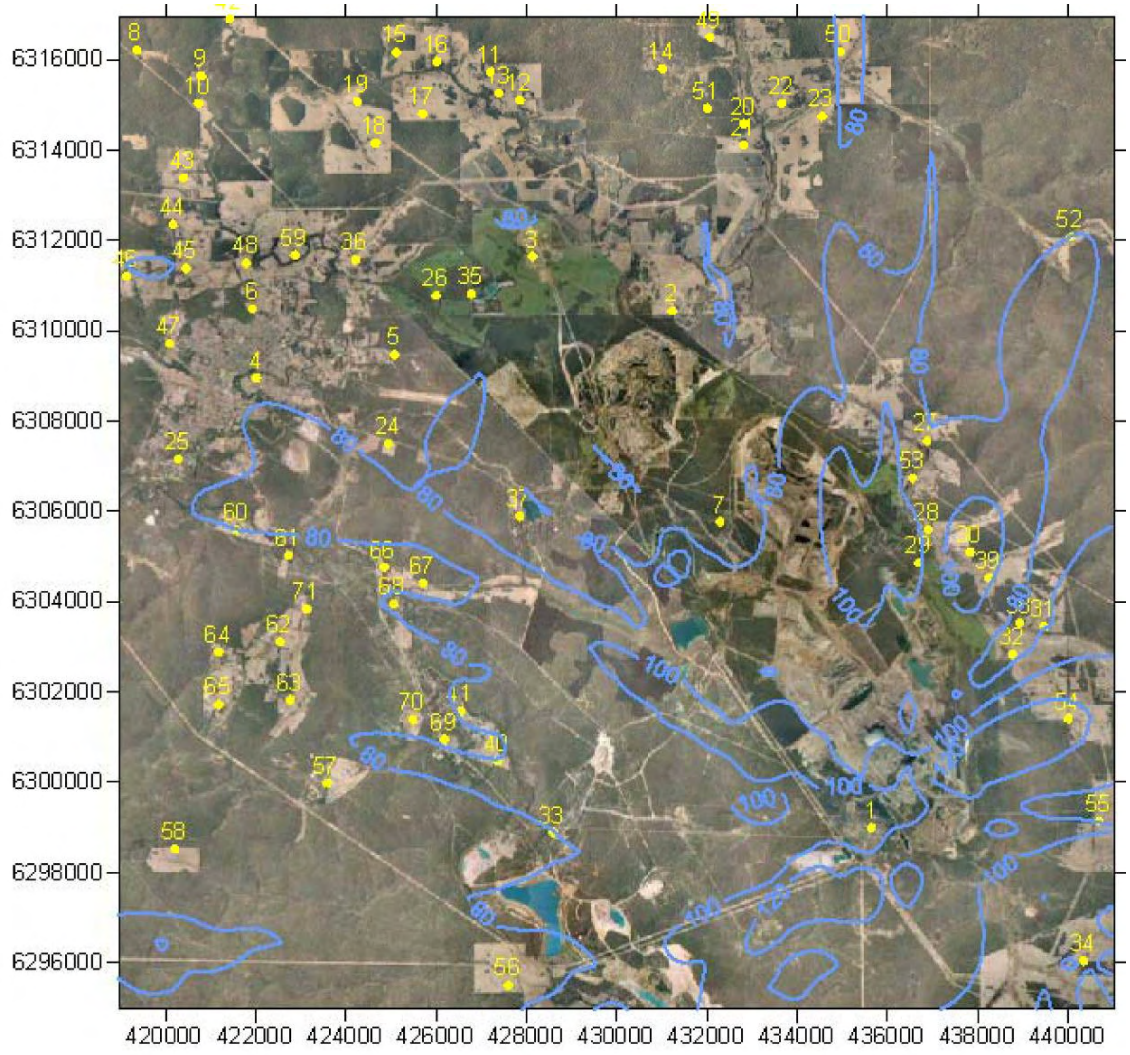
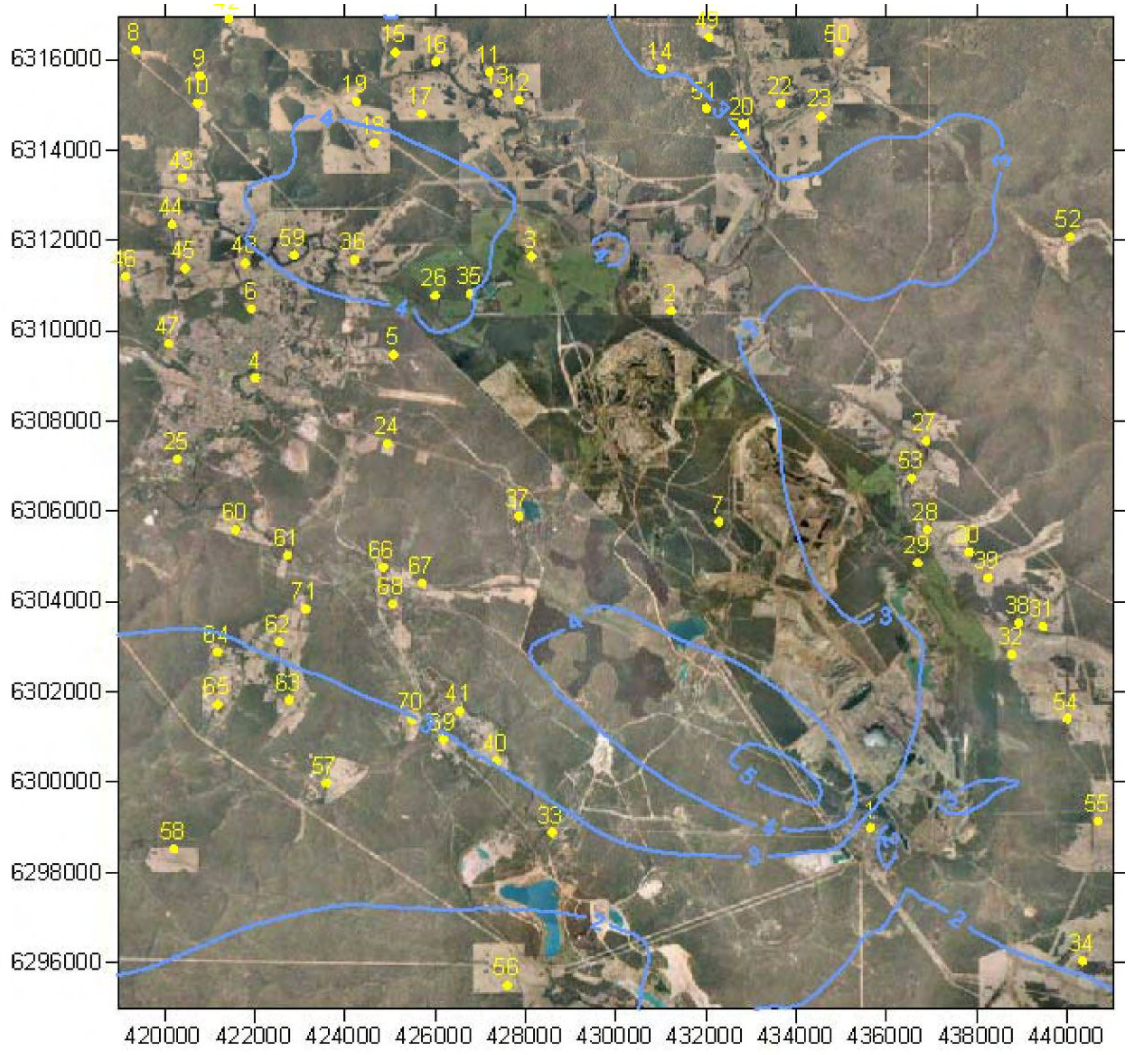


Figure 4-7 Predicted Annual Average Ground Level Concentration of Nitrogen Dioxide (µg/m³) – PER Scenario 4B Using OLM



4.2.2 Department of Environment and Conservation, EPA Service Unit

Annual emissions rates and concentrations

The EPA Services Unit requested that the emissions listed in Table 3.5 of the PER be provided as annualised emission rates and as concentrations (expressed at standard reference conditions, 6% oxygen [by volume], dry). These data are summarised in Table 4.2 for a single unit (e.g. Bluewaters Phase III emissions being discharged via the Bluewaters Phase III stack).

Table 4.2 Summary of Bluewaters Stage Emissions

Parameter	Emission Rate			Concentration
	g/s	kg/hr	tpa	mg/m^3
Sulphur Dioxide	6.90E+01	2.483E+02	2.001E+03	3.404E+02
Oxides of Nitrogen	1.12E+02	4.032E+02	3.249E+03	5.528E+02
PM_{10}	9.40E+00	3.384E+01	2.727E+02	4.639E+01
$PM_{2.5}$	5.45E+00	1.963E+01	1.582E+02	2.691E+01
Carbon Monoxide	1.12E+02	4.032E+02	3.249E+03	5.528E+02
PAH	1.90E-04	6.849E-04	5.520E-03	9.390E-04
Mercury	1.11E-03	3.996E-03	3.220E-02	5.478E-03
Fluoride Compounds	5.39E-01	1.941E+00	1.564E+01	2.660E+00
Arsenic	2.06E-04	7.420E-04	5.980E-03	1.017E-03
Cadmium	2.70E-04	9.703E-04	7.820E-03	1.330E-03
Chromium III	4.76E-05	1.712E-04	1.380E-03	2.347E-04
Chromium IV	4.76E-05	1.712E-04	1.380E-03	2.347E-04
Lead	9.83E-04	3.539E-03	2.852E-02	4.851E-03
Dioxins and Furans (Total)	2.66E-08	9.594E-08	7.732E-07	1.315E-07
Hydrochloric Acid	1.82E+01	6.541E+01	5.272E+02	8.967E+01
Beryllium	3.33E-04	1.199E-03	9.665E-03	1.644E-03
Copper	9.36E-04	3.369E-03	2.715E-02	4.618E-03
Nickel	4.24E-03	1.526E-02	1.230E-01	2.092E-02
Boron	7.57E-02	2.725E-01	2.197E+00	3.736E-01
Ammonia	8.48E-03	3.053E-02	2.460E-01	4.185E-02
Benzene	1.95E-03	7.032E-03	5.667E-02	9.640E-03
Cumene	8.18E-05	2.943E-04	2.372E-03	4.035E-04
Toluene	3.63E-03	1.308E-02	1.054E-01	1.793E-02
Xylenes	5.75E-04	2.071E-03	1.669E-02	2.840E-03
Ethylbenzene	1.42E-03	5.124E-03	4.129E-02	7.024E-03

Notes:

1. The emissions data are for a single stage of the Bluewaters Phase III or IV Power Station and do not include the emissions from either Bluewaters Phase I or II.
2. The sulphur dioxide emission rate assumes a 70% removal by dry gas desulphurisation.
3. The annual emission total has been calculated assuming a 92% availability of the Power Station over the year.
4. The emission concentration is expressed at 0°C, 6% oxygen (by volume), dry conditions.

4.2.3 Department of Environment and Conservation, South West Region

Dry gas desulphurisation

In its submission, the DEC South West Region raised a number of inter-related questions that relate to the sulphur dioxide emission rate. The Bluewaters Phase I and II project is committed to achieving a maximum sulphur dioxide emission rate of approximately 230 g/s per unit when both units are operational. The documentation states that this will be achieved by using coal with a maximum sulphur content of 0.38% or through alternative means such as coal beneficiation. The Bluewaters Phase III and IV project is proposing to use dry flue gas desulphurisation expected to achieve at least a 70% reduction in the sulphur dioxide emission rate from those units (i.e. a maximum emission rate of 69 g/s per unit). The maximum anticipated emission rate has been calculated by assuming a 70% reduction in the emission rate achieved using coal with a 0.38% sulphur content.

While the sulphur dioxide removal rate may be greater than 70% as a result of the flue gas desulphurisation, a figure of 70% has been used in the air dispersion modelling to ensure that the modelling results remain conservative. Griffin will be undertaking continuous in–stack monitoring of the sulphur dioxide emission rate and these data will be used to ensure that the nominated emission rates are not exceeded (i.e. 230 g/s for each of Bluewaters Phase I and II and 69 g/s for each of Bluewaters Phase III and IV). Griffin has approval for this maximum sulphur dioxide emission rate for Bluewaters Phase I and II and is seeking approval for the specified maximum emission rate for Bluewaters Phase III and IV. Therefore, when all four Bluewaters units are operational each stack will emit up to 299 g/s of sulphur dioxide. There are currently no plans to retrofit dry flue gas desulphurisation to Bluewaters Phase I and II.

Emission characteristics used in the air dispersion modelling

The air dispersion modelling study and screening health risk assessment report (Appendix 8 of the PER) contains a summary of the emission characteristics and of the scenarios modelled (as summarised in Table 8 of that document).

Bluewaters Phase I and II, as currently approved with the separate 100 m stacks, were both included as part of the base case modelling, as these units are now operational (Bluewaters Phase I) or being commissioned (Bluewaters Phase II) and they represent part of the existing emissions scenario.

The design of the Bluewaters Phase III and IV stacks is such that they will be able to accommodate the emission from two units (i.e. the Bluewaters Phase III stack will be used to discharge Bluewaters Phase II and III emissions while the Bluewaters Phase IV stack will be use to discharge the Bluewaters Phase I and IV emissions). The existing 100 m stacks servicing Bluewaters Phase I and II will be decommissioned once the new stacks are commissioned. The air dispersion modelling was undertaken for a range of scenarios including one and two units being discharged via the new stacks.

4.2.4 Department of Health

Inclusion of the Perdaman Chemicals and Fertilisers Pty Ltd emissions

At the time that the air dispersion modelling and screening health risk assessment was completed, information relating to the proposed Perdaman plant was not publicly available. As such, it could not be included within the air dispersion modelling and SHRA. Information that has been made available since indicates that the emissions from the proposed Perdaman plant are small relative to the existing regional power station sources and will not result in any significant increase in the cumulative air quality impacts predicted. The predicted impacts resulting from the proposed Perdaman plant are localised to the immediate vicinity of the proposed plant.

The PER for the Collie Urea Plant (GHD 2009) includes modelling of the cumulative impacts of all approved and proposed facilities in the locality, and the results confirm the conclusions in the Bluewaters Phase III and IV PER.

Cumulative emissions do not include Ewington Mine particulates or the proposed Char Plant emissions

Neither the Ewington Mine nor the proposed Ewington Char Plant emissions were included in the cumulative impacts assessment. At the time that the air dispersion modelling was undertaken for the proposed Bluewaters Phase III and IV Power Station there was some uncertainty regarding development of the proposed Ewington Char Plant, and it was consequently decided not to include this in the modelling. This was approved by the EPA in accepting the final version of the environmental Scoping Document. In the event that the Ewington Char Plant is reactivated, the air dispersion modelling that was conducted as part of its original approvals for that plant showed that the predicted impacts were minor, highly localised and had no significant cumulative impacts.

The Ewington Mine and other coal mines in the area were not included within the air quality assessment. With the exception of the Muja A and B emissions, particulate emissions from the power station sources in the region are very low. Modelling of fugitive emissions from mines is very difficult as these emissions are very dependent upon the mine activities, where the activities are being undertaken, meteorological conditions and the effectiveness of the management measures that are applied at the mine sites. As the detailed data were not available to estimate the emission from the coal mines in the region they were not included within the modelling.

Modelling does not Include non-industrial background particulate matter

The air dispersion modelling did not include non-industrial sources of particulate matter as these emissions have not been quantified and are likely to be highly variable in nature.

Emissions monitoring and ambient air quality monitoring

It is noted that the Department of Health agrees that comprehensive stack monitoring should be undertaken. As noted above, Griffin will also be undertaking additional ambient sulphur dioxide monitoring in an area to the north of Collie.

Inclusion of acetaldehyde into the SHRA

The emission factors used in the determination of the emission rates for a number of substances included in the modelling were taken from the National Pollutant Inventory (NPI) Emission *Estimation Technique Manual for Fossil Fuel Electric Power Generation (2005)*. This manual does not contain an emission factor for acetaldehyde, which is why it was not included within the SHRA. It was assumed that, as an emission factor for acetaldehyde was not included within the NPI workbook, it was not considered to be a pollutant of concern as a result of fossil fuel combustion in electric power generation.

Following from receipt of the Department of Health submission, ENVIRON has reviewed other sources of emission factors and has identified a factor for acetaldehyde in the US EPA AP42 publication (Section 1.1 Bituminous and Sub-bituminous Coal Combustion). The listed emission factor for acetaldehyde is 5.7×10^{-4} lb/ton of coal. Based on this emission factor and the estimated coal consumption for the Bluewaters Power Station, each stage of Bluewaters would emit approximately 7.84×10^{-3} g/s of acetaldehyde. It is estimated that the total emission rate of acetaldehyde from all of the power stations in the Collie Region (including Worsley) is approximately 0.077 g/s based on these emission factors.

ENVIRON has predicted the ground level concentrations of acetaldehyde for the proposed development scenario including all of the existing sources included in the modelling and compared these to the following World Health Organisation (WHO) guidelines:

- 24-hour guideline of 2000 $\mu g/m^3$
- annual guideline of 50 $\mu g/m^3$
- Incremental Carcinogenic Risk (ICR) guideline of 9×10^{-7} per $\mu g/m^3$.

Based on these guidelines the acute and chronic hazard quotients (HQ) as well as the ICR were calculated from the predicted ground level concentrations for the proposed development scenario (i.e. Scenario 4B as defined in Appendix 8 of the PER) of acetaldehyde for the model domain and the maximum values are as follows:

- Acute HQ: 3.91×10^{-6}
- Chronic HQ: 8.48×10^{-6}
- ICR: 3.83×10^{-10}.

As the maximum acetaldehyde HQ for both acute and chronic exposures are much less than one and the maximum calculated ICR is also much less than the US EPA *de minimus* level of 1×10^{-6}, it is concluded that the ground level concentrations of acetaldehyde are well below any level of concern.

Alternative ambient air quality guideline for hydrogen chloride

In its submission, the Department of Health recommends an ambient guideline of 500 $\mu g/m^3$ for hydrogen chloride as opposed to the Californian Office of Environmental Health and Hazard Assessment (OEHHA) guideline of 2100 $\mu g/m^3$ (both as 1-hour averages). ENVIRON is unaware as to the source of the standard recommended by the Department of Health, but the maximum 1- hour and 99.9th percentile 1-hour average concentration of hydrogen chloride predicted across the model domain were 83.8 $\mu g/m^3$ and 34.7 $\mu g/m^3$ respectively, both well below the standard recommended by the Department of Health.

Ambient air quality guideline for nickel

ENVIRON confirms that that correct OEHHA chronic guideline for nickel is 5.0 x 10^{-2} µg/m^3 rather than the figure of 5.0 x 10^{1} µg/m^3 quoted in the PER. This was a typographical error that was made during preparation of the SHRA report. Nickel is predicted to be a very minor contributor to the chronic Hazard Index (HI) and with the maximum HQ for nickel across the modelling domain being 0.006.

Contribution of individual sources to predicted ground level concentrations

The Department of Health and Toxikos (independent reviewer) both note that the SHRA does not present the relative contribution of each source to the predicted ground level concentrations for each source. While such an analysis could be done for the passive pollutant emissions, it would be very difficult to present, as the relative contribution of each source will depend upon a range of different factors including the relative location of the sources to the receptors of interest.

However, when the modelling was being completed for the SHRA it was recognised that that the Muja A and B power stations were significant contributors to the predicted ground level concentrations of a range of pollutants including sulphur dioxide, particulates and metals such as beryllium. In order to illustrate this, the SHRA presented results for the predicted cumulative impacts both with and without Muja A and B included. The results were presented as a summary for each of the receptors and down to the level of the contribution of each pollutant in Appendix B of the SHRA (Appendix 8 of the PER). This modelling showed that Muja A and B were predicted to be significant contributors to the ground level concentrations.

Consideration of the acute HI with Muja A and B excluded showed that sulphur dioxide was predicted to be the major contributor to the HI. Analysis of the predicted 99.9th percentile 1-hour average concentration indicated that the guideline of 350 µg/m^3 was predicted to be exceeded at only one of the identified receptors (Receptor 55). This receptor is located to the east of the Muja Power Station and therefore it is likely that Muja C and D are the prime contributing sources to this concentration. With Muja A and B excluded from the modelling, sulphur dioxide (36% to 59%) was predicted to be the major contributor to the overall acute HI (36% to 59%) with PM_{10} (5% to 29%), $PM_{2.5}$ (3% to 15%), nitrogen dioxide (6% to 12%), fluorine (5% to 15%) and ozone (5% to 13%) being the next most significant contributors. While the overall acute HI for many of the receptors was calculated to be greater than one without Muja A and B , only Receptor 55 had a single individual HQ greater than one for any of the contaminants considered at all of the discrete receptors.

The chronic HIs calculated with Muja A and B removed were all less than one, indicating that there was no cause for concern with regards to long term exposure to chronic non-carcinogenic pollutants.

The emissions of beryllium from Muja A and B were predicted to be a major contributor (between 31% and 51%) to the predicted ICRs at the discrete receptors. As for the acute and chronic HI cases, it was found that the removal of Muja A and B from the modelling resulted in a significant reduction in the calculated ICRs with the model domain maximum reducing to 1.15 x 10^{-6} for the proposed scenario and with no exceedances of the US EPA *de minimus* level of 1 x 10^{-6} at any of the discrete receptors used in the study. It was also noted that around 70% of the calculated ICR under this scenario (i.e. proposed scenario without Muja A and B) was attributable to the emissions of PAH and the very conservative way that they were treated in this assessment, which assumed that all PAHs were in the form of benzo[a]pyrene. The SHRA noted that it was likely that at least 70% of the PAH emissions would be emitted in less toxic forms such as naphthalene, phenanthrene and derivatives.

Emissions of chromium VI were predicted to be the second largest contributor to the calculated ICR at the discrete receptors (average of 15%, maximum of 19%). In the absence of detailed information on the form of chromium in the emissions, the SHRA conservatively assumed that all of the 1.5 kg/yr of chromium would be emitted in the form of chromium VI. In reality, it is expected that less than 5% of the chromium would be emitted in this form.

Therefore, given the very conservative treatment of the PAH and chromium emissions, it was concluded that the predicted ICR was unlikely to be of significant concern. In its submission, the Department of Health states that "*Nevertheless when Muja A & B are removed from the SHRA, the air-quality in the Collie basin is still compromised…*". An equivalent statement was also made by Toxikos in its peer review of the SHRA (Appendix 9 of the PER). The SHRA found that when Muja A and B were removed, the chronic HI and ICR were below 1 and 1 x 10^{-6} respectively at all of the discrete receptors.

As noted earlier, the SHRA found that while the acute HI was greater than one at many of the receptors, this was primarily driven by sulphur dioxide. Therefore, while there may be concern with the predicted air quality, particularly in the vicinity of the Muja Power Station, the air-quality in the rest of Collie basin does not appear to be compromised under the modelled development scenario. Griffin proposes to support the ambient sulphur dioxide monitoring currently being undertaken in Collie and is also committed to the establishment of an additional monitoring station in the area to the north of Collie where its sulphur dioxide impacts are predicted to be the greatest. It is acknowledged that sulphur dioxide is the most significant atmospheric emission of concern from the Region's coal fired power stations (excluding Muja A and B).

The air dispersion modelling (excluding Muja A and B) indicates that the emissions from the Muja Power Station (Stages C and D) contribute most significantly to the majority of the predicted exceedances in the model domain but that the Bluewaters Phase I and II project is also predicted to result in some exceedances to the north of Collie. The implementation of the Bluewaters Phase III and IV Project will result in an overall reduction in the maximum predicted ground level concentrations of sulphur dioxide from the Bluewaters project and reduce these to below the NEPM standard.

In recognition of the significance of the sulphur dioxide emissions in the region, Griffin has committed to include dry flue gas desulphurisation on Bluewaters Phase III and IV, which is expected to remove at least 70% of the sulphur dioxide from the emissions of those units. It is noted that the SHRA did not consider the potential cumulative impacts arising from the periodic emissions of particulates from non power station sources. The available ambient air quality monitoring data is restricted in spatial coverage but does indicate that periodic exceedances of the NEPM ambient air quality standards for PM_{10} and $PM_{2.5}$ occur. One of the conclusions in the February 2009 draft of the Collie Basin Management and Planning Group (CBMPG) report is as follows:

"*Under adverse atmospheric conditions there is a potential for particulate matter to exceed acceptable standards. This issue is prevalent in winter and is associated with unfavourable atmospheric conditions and the use of domestic wood heaters in the Collie town-site. Spring and autumn burn-offs also result in higher particulate recordings*."

Therefore, while there may be occasional exceedances of the ambient PM_{10} and $PM_{2.5}$ standards locally within Collie (e.g. due to wood heaters) and regionally (e.g. due to spring and autumn burn-offs), these exceedances are not predicted to be the result of the coal fired power station sources (in the absence of the Muja A and B emissions).

Collie Basin Management and Planning Group

Griffin acknowledges Department of Health comments in relation to the CBMPG.

General comments

Griffin acknowledges Department of Health comments and agrees that a strategic approach to air quality management is required in the Collie region. However, Griffin believes that it is important to note that air quality in the Collie airshed is not solely an industry issue and therefore requires a cooperative approach between industry and the whole of government to be successful.

5. SUBMISSIONS FROM NON–GOVERNMENTAL ORGANISATIONS

5.1 GENERAL

Two submissions included a general comment on the proposal. The comments and the proponent response are presented in the following table.

5.1.1 Overall objection to the proposal

Item	Submission	Response
1.	Greenpeace is of the firm belief that because of the many associated negative and dangerous consequences of coal combustion and mining, it would be in the best interests of the community, and the environment, if the Bluewaters 3 & 4 projects were rejected. (Greenpeace)	A justification for the proposal is provided in Chapter 1 Section 3.2 of the PER with a detailed justification of the chosen technology provided in Chapter 3 Section 3.4. The PER sets out the assessment of the potential environmental impacts of the proposal, with the full range of management measures proposed to mitigate those impacts.
2.	The global community is struggling to reduce greenhouse pollution, even in light of the overwhelming scientific evidence. This is largely caused by incumbent fossil fuel industries unwilling to move to a zero-carbon economy. Recent national debate around the Carbon Pollution Reduction Scheme and levels of compensation for 'affected industries' demonstrates the leverage existing polluting industries have over government's climate policy. Making the transition away from fossil fuels will be made all the harder, and cost the community more, if this project is approved. (Greenpeace)	Noted. As outlined in detail in Section 4.1.1, Griffin is developing a balanced portfolio of energy projects, involving 20% output being from wind farms (renewable energy), in line with the Federal target.
3.	The Bluewaters 3 & 4 perpetuates old technology at a time when CO_2 emissions as with all greenhouse emissions - are the world's biggest environmental challenge. The proponents have stated their case that "Griffin Power does not believe that direct offsets for the resulting emissions are appropriate". This statement is contra to all notions of best 'planetary' practice, all Federal and State aspirations, community expectations and in any PER, unbelievable in its context. SWEC believes that the EPA should consider this statement as fundamentally opposed to any objectives for greenhouse gas management in Western Australia and the proposal as being invalid. The South West Environment Centre holds firm to the proposition that the addition of conventional coal fired power stations, such as proposed for Bluewaters 3 & 4, cannot meet environmental protection principles related to air quality, water supply and greenhouse emissions in Collie. (South West Environment Centre (Inc))	A justification for the proposal is provided in Chapter 1 Section 3.2 of the PER with a detailed justification of the chosen technology provided in Chapter 3 Section 3.4. The PER sets out the assessment of the potential environmental impacts of the proposal, with the full range of management measures proposed to mitigate those impacts. While offsets are considered appropriate in the absence of a mandatory GHG management system, Chapter 3 Section 3.5.3 of the PER provides a detailed justification as to why offsets are not considered justified under the provisions of a mandated carbon pollution reduction scheme. The issues of meeting environmental protection principles related to water supply and air quality are addressed in Sections 5.2.1 and 5.2.3 respectively.

Item	Submission	Response
4.	The South West Environment Centre SWEC) does not support approval of the proposal by Griffin Power 3 Pty Ltd to expand the Bluewaters Power Station complex near Collie. Primary reasons for SWEC's opposition to the Griffin proposal are based on the following: 1. Air Quality - the proposal has not been proven to meet the air emissions criteria of the Department of Environment & Conservation (DEC) under Part V of the Environmental Protection Act (1986), thus it is unable to meet Environmental Protection Authority (EPA) objectives to not adversely affect "the health, welfare and amenity of people and land..." 2. Water Resources - the proposal does not fulfill the criteria of the Department of Water (DoW) under the State Water Plan (2007) or the Upper Collie Water Management Plan (2009) nor meet the basic tenet to "reduce, recycle, reuse". 3. Greenhouse Gas Emissions - the proposal does not provide offsets for carbon emissions nor does it consider or contribute to Federal Government targets for 20% renewable energy by 2020, or any realistic targets for carbon pollution production. (South West Environment Centre (Inc))	The modelling undertaken for the PER and subsequently revised has demonstrated that the proposal will meet the required air quality criteria. The reconfiguration of the Bluewaters Phase I and II stacks to be used jointly with the Bluewaters Phase III and IV stacks will improve the overall air quality outcomes at all ground level receptors. The issue is discussed in more detail in the PER and Section 4.2 of this report. The Department of Water response does not support the assertion made by the submitter. While offsets are considered appropriate in the absence of a mandatory GHG management system, Chapter 3 Section 3.5.3 of the PER provides a detailed justification as to why offsets are not considered justified under the provisions of a mandated carbon pollution reduction scheme. This is discussed further in Section 4.1.3 of this report.

5.2 ENVIRONMENTAL FACTORS ADDRESSED IN PER

Submissions were made on several environmental factors address in the PER. Those submissions and the responses are set out below.

5.2.1 Air emissions

Item	Submission	Response
5.	SWEC is gravely concerned that real data modeling for Bluewaters 3 & 4 was completed prior to the commissioning of Bluewaters 1 & 2 or the re-commissioning of Muja A & B and without consideration for the possible approval of the Perdaman Industries urea plant. Moreover, the modeling results are severely limited by the heavily conditioned key findings, e.g. the use of conditional terms such as "predicted" and "likely". The statement expressing "areas of uncertainty" leading to a subjective conclusion that Bluewaters 3 & 4 will "result in little to no change... to health effects... risk in the Collie region" is in itself an abrogation of risk assessment. Claims by the proponent that National and State emission limits will be met by "stack reconfiguration", including replacing existing stacks (2 x 100 metres) on Bluewaters 1 & 2 with higher shared stacks (2 x 150 metres) for Bluewaters 1 to 4, is unproven, edging on spurious. It is understood that the modeling for emissions has not met DEC requirements and that a combined nest of coal fired power stations at the Coolangatta industrial estate will not meet statutory requirements and acceptable standards in that air shed. (South West Environment Centre (Inc))	Modelling based on real data from Bluewaters Phase I and II was not practical in terms of achieving approval for the Bluewaters Phase III and IV proposal within the timeframe necessary to make the proposal commercially viable. Bluewaters Phase I was only recently commissioned and Bluewaters Phase II is planned for commissioning in the first quarter of 2010. The issue of inclusion of the proposed Collie Urea Plant is discussed in Section 4.2.4 *Inclusion of the Perdaman Chemicals and Fertilisers Pty Ltd emissions*. The modelling of emissions has met DEC requirements as discussed in detail in Sections 4.2.1, 4.2.2 and 4.2.3. The model (TAPM) applied to the proposal is a widely accepted and used model developed by the CSIRO. The DEC Air Quality Management Branch will examine the modelling in detail and provide advice to the EPA on the veracity of the model used, and its results.

5.2.2 Greenhouse gas emissions

Item	Submission	Response
6.	There can be no doubt that climate change poses a fundamental threat to Australians and our way of life. The primary goal for Australia, and other economies, is to reduce our greenhouse emissions. However we cannot achieve this goal, if we continue to approve, and build, new fossil fuel power stations. According to the IPCC, global emissions must peak by 2000-2015 and stabilise at 450ppm to have a roughly 50/50 chance of avoiding a global temperature increase of 2°C over pre-industrial levels. The observations in the natural world, such as the Arctic melt, are exceeding IPCC forecasts. Leading climate scientists have analysed more recent research than in the last IPCC Assessment report (http://climatecongress.ku.dkinewsroom/synthesis_report/). They concluded that even a 2°C increase will have serious impacts upon societies and that we must begin to make major emissions reductions immediately. Fortunately solutions exist to this climate emergency. Worldwide investment in renewable energy now outstrips that of fossil fuels (Global Trends in Sustainable Energy Investment 2009, UNEP.). Various renewable technologies are proven and capable of meeting large energy needs, for consumer and industry needs. Solar thermal with storage is now a commercial technology (http://www.solarmillennium.de/front_content.php?idcat=109), debunking common claims that it does not exist yet. The proponent claims to have investigated renewable energy generation options but states that it "will be unable to meet anticipated generation shortfalls within the policy settings proposed" (p.xii). We find this hard to believe. Solar thermal power plants are readily and commercially available up to 1,000MW, and can be built and commissioned more quickly than conventional fossil fuel generation options in most cases. In addition, these commercially available renewable technologies would actually deliver on Western Australian policy outcomes of reducing greenhouse emissions. (Greenpeace)	Refer to detailed response in Section 4.1.1.

Item	Submission	Response
7.	Australian climate scientists have recently written an open letter to all coal-fired power station owners requesting they urgently begin replacing current coal power stock with zero-emission generation. The science of climate change is clear, compelling and dictates immediate and rapid greenhouse reductions. There is a causal relationship between greenhouse gases and global warming, meaning that every tonne of emissions from this project, if approved, would directly contribute to additional global warming. Approval of a new coal-fired power station would be contrary to both scientific opinion and public expectations of governments acting to protect our societies. Approving a new coal-fired power station on a promise of being 'carbon capture ready' flies in the face of normal planning and approval processes. For example, commercial building owners must have approved and installed fire-fighting systems before final consent, not just promise to do so at an undetermined future date. There are considerable technical and economic challenges before carbon capture and storage is commercialised; this project should therefore only be assessed on currently available technologies. This project would likely emit over 3Mt CO_2-e annually, or 90Mt CO_2-e over a 30-year period. Given the project's significant emissions, and the fact alternative technologies exist, it is our firm opinion that the proposed project should be rejected. (Greenpeace)	Refer to detailed response in Section 4.1.2.

Item	Submission	Response
8.	The proponent proposes to mitigate greenhouse emissions through carbon capture and storage technologies "when the technology is proven to be commercially available and viable". This technology, however, is not commercialised and may never be. Environmental planners should be mindful of the politicised nature of the CCS debate in Australia and consider this proposal on the information provided in the Public Environmental Review. The proponent's stated intention to deploy CCS is not supported by any site-specific technical information. Even if CCS proves technically feasible at commercial scale, it may prove economically unviable on a site-by-site basis, especially for power stations built prior to the development of the technology. Retrofitting CCS may be technically or economically unviable given the uncertain nature and compatibility of the technologies. CCS would require some 30% more coal to power the technology with a commensurate increase in water requirements and emissions. Transporting compressed CO_2 would involve truck or pipeline transport both of which would involve considerable cost. Extensive testing will be required to find potentially suitable storage sites, and it is our understanding that this has not occurred. Infrastructure, monitoring, injection costs and liability issues remain unresolved. The Australian, and local, community is yet to have a full and proper debate over safety issues related to the long-term storage of CO_2. Given the lengthy time frames involved, the speculativeness of the technology and many of the associated issues, we believe it is highly unlikely that any commercial coal-fired power station would undertake CCS retrofitting without state or federal governments underwriting all of the costs. No commercial entity can guarantee it will implement CCS. Therefore claims of intent to deploy uncommercialised mitigation technologies, such as CCS, should be treated as a wish, rather than a promise. (Greenpeace)	The proposal does not include carbon capture readiness as a key characteristic and is submitted for assessment on the basis of the currently available technologies and the carbon emissions described in the PER. Nonetheless, Griffin will design the plant to be carbon capture ready as defined by the International Energy Agency and will continue to review available technologies for coal fired power stations and adopt the most effective practicable technologies commercially available to minimise GHG emissions. Importantly, Griffin will also continue to actively support the Coal Futures Group research into potential geosequestration sites capable of being utilised by industry in the Collie region. This work effectively provides a public review of the feasibility of carbon sequestration as proposed in one of the submissions. In addition, Griffin will monitor developments in fuel and carbon capture technologies and undertake annual evaluations of practicable applicability to the Bluewaters Power Station. Refer to detailed response in Section 4.1.2.
9.	The proposal does not provide offsets for carbon emissions nor does it consider or contribute to Federal Government targets for 20% renewable energy by 2020, or any realistic targets for carbon pollution production. (South West Environment Centre (Inc))	Refer to detailed response in Section 4.1.3. A Greenhouse Gas Management Plan is was presented in the PER and is re-presented at Appendix 3 of this report.

Item	Submission	Response
10.	The statement by the proponent that the proposed power plant "will be designed so that carbon capture technology can be utilized when technology becomes commercially viable", is pure science fiction fantasy and should be rejected by the EPA as such. It is widely accepted that commercial scale carbon emissions capture from coal-fired power plants and the sequestration of that carbon will not happen before 2030, quite likely even later. It is also acknowledged that carbon sequestration may prove to be fallible and too expensive a process and will never reach the status of a commercially viable and mature technology. At present rates of increase of greenhouse gas emissions, the accumulation of greenhouse gases will very likely tip the atmosphere over the threshold of runaway warming well before 2030. To avoid the worst impacts of climate change, global greenhouse gas emissions have to start falling after 2015, just six years away. In the context that Climate Change could become a runaway phenomenon very soon and also that it is not clear that carbon sequestration will work in the near future or even at all, no-one can justify building more coal-fired power plants that emit massive amounts of greenhouse gases and more than any other form of electricity generation. Coal fired power generation is the most greenhouse polluting of all energy generation options. Generating electricity from coal results in 75% more greenhouse gas emissions than natural gas and 100% more than most renewable energy sources wind, solar, wave, tidal and geothermal. SWEC agrees with the Conservation Council of WA position "that no additional coal fired power stations should be approved unless there is proven carbon capture and storage technology ready at the time of design and construction which would result in no greenhouse gas emissions". We have also adopted this position in our latest Strategic Plan. We very strongly urge the Environmental Protection Authority "to recommend against approving the extension of the Bluewaters Power Station on the grounds of the extent of greenhouse gas pollution generated, the failure of the proponent to demonstrate that this pollution can be effectively mitigated, the abundance of cleaner energy sources available to the SWIS (see CCWA submission to the EPA on Bluewaters), and the negative impact on the Collie Basin water supply." (quoted from CCWA submission). We agree with the Conservation Council of WA position "that it is in the State's interest to stop all new investment in fossil fuel power generation and in particular coal fired power stations" and are very strongly opposed to any expansion of coal mining and coal fired power in WA. (South West Environment Centre (Inc))	Refer to detailed response in Section 4.1 with respect to the greenhouse gas issues raised. The proposal does not propose any taking of water from the Collie Basin beyond amounts already approved for dewatering of approved mines.

5.2.3 Surface and groundwater

Item	Submission	Response
11.	SWEC is acutely aware that the proponent has made no attempt to reduce its water use at Bluewaters 3 & 4 from 6.5 GL per annum by using dry cooling methods (providing up to a 90% reduction in water use). It is understood that water resource criteria for water supply have not been addressed to DoW requirements under the Upper Collie Water Management Plan (2009). The Bluewaters Water Supply Strategy (Appendix 13) is deeply flawed in its dependency on high quality mine dewatering water, where this water has a higher value use, such as the Integrated Water Supply Scheme (resulting in reduced pressure on the Gnangara Mound) and is a diminishing resource. Water use in wet cooling coal fired power stations, such as Bluewaters, does not meet expectations in the current water resource management settings. (South West Environment Centre (Inc))	Dry cooling is a substantially less efficient option than water cooling, and results in very high noise immission levels, which is a major issue in the vicinity of the Coolangatta Industrial Estate. Contrary to the view presented, the value of water for power generation is demonstrably higher than many other competing uses (NWC 2009). Water used in the IWSS has a wide range of uses, including substantial quantities taken by industry, and also includes a range of low value uses.

5.3 OTHER ISSUES

5.3.1 Non-environmental considerations

Item	Submission	Response
12.	The mining and burning of coal is harmful to both the environment and human health. Earlier this year, a report (The Hidden Costs of Electricity: Externalities of Power Generation in Australia, ATSE 2009) attempted to quantify the uncosted impacts to the Australian community from the power sector, and arrived at the figure of $2.6 billion annually. Some of the emissions harmful to human health from burning coal include: sulfur dioxide, $PM_{2.5}$, PM_{10}, oxides of nitrogen and polychlorinated dioxins and furans. The West Australian Governments 'Fuel Diversity in Power Generation Policy' (http://www.energy.wa.gov.au/2/3199/64/fuel_diversity_pm) makes conflicting statements. The policy stresses social and environmental health throughout, but in regards to the "choice of fuel", posits that commercial considerations alone are the primary determinant. This policy does nothing to discourage dirtier fuels and encourage safer ones. The Federal Government supports sustainable development, which it defines as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs." (http://vvww.environment.gov.au/esd/index.html#what) The West Australian Government too has a sustainable energy policy to promote energy efficiency and renewable energy. These policies at both levels of government are to be applauded, however to be effective, projects such as this need to be scrutinised closely to see whether they pass the 'sustainability test'. The Bluewaters 3 & 4 Project would clearly breach any definition of sustainable development. In our opinion it would be appropriate to reject this project on this basis, thus signalling to major project developers that Western Australia was serious about implementing sustainable development. (Greenpeace)	A justification for the proposal is provided in Chapter 1 Section 3.2 of the PER with a detailed justification of the chosen technology provided in Chapter 3 Section 3.4. The PER sets out the assessment of the potential environmental impacts of the proposal, with the full range of management measures proposed to mitigate those impacts being incorporated in the appended management plans. The air emissions have been demonstrated to meet all required guideline levels and present not additional risk to human health in the Collie region (See Section 4.2 of this report).

5.3.2 Evaluation of alternatives

Item	Submission	Response
13.	The proponent claims to have investigated renewable energy generation options but states that it "will be unable to meet anticipated generation shortfalls within the policy settings proposed" (p.xiii). We find-this hard to believe. Solar thermal power plants are readily and commercially available up to 1,000MW and can be built and commissioned more quickly than conventional fossil fuel generation options in most cases. We believe that the proponent's analysis should be released, so that the community and planners can assess the rigour and methodology employed. (Greenpeace)	A detailed assessment of commercially and economically available options is presented in Chapter 3 Section 3.4 of the PER. Refer to detailed response in Section 4.1.1

6. GENERAL INDIVIDUAL PUBLIC SUBMISSIONS

6.1 GENERAL

6.1.1 Approval of the proposal

Item	Submission	Response
14.	I am not opposed to this development but expect it to be built to the highest possible standards with the least possible impact which must be acceptable to the community. The greatest concerns relate to air quality, water usage, health impacts and long term carbon capture. (Anonymous submitter 1, Submission No. 5)	Noted. All aspects of concern to the submitter have been discussed in detail as key factors in the PER, and further comment on these issues is provided in this report.

6.1.2 Overall objection to the proposal

Item	Submission	Response
15.	We are writing this submission in response to Griffin's PER for Bluewaters Stage 3&4. We do not support the proposal as, despite claims to the contrary, we believe it does not use the best world class technology possible to ensure water usage, greenhouse gas emissions and other environmental impacts are minimized. We do not support the proposal unless dry cooling is used We do not support the proposal as there is no strong evidence of serious commitment to completely minimise water use We suggest that this particular project is not immediately necessary, nor the best scenario in terms of the forecasted WA electricity demand and constraints of the WA energy market; and since it has such high environment impact it should be postponed or redrawn We would prefer Griffin Power to implement their documented plans for renewable energy projects ahead of this proposal. At a later date, if and when the WA electricity market requires a base load power station of this capacity or larger, a plant using the latest supercritical or similar technology and dry cooling is more likely to be viable. (Local residents, Submission No. 4)	The statements made are unsubstantiated and no response is considered necessary, other than to note that Griffin plans for renewable energy projects are progressing in parallel.

Item	Submission	Response
16.	Bluewaters 1 and 2 should never have been approved, someone failed their jobs there. If 3 & 4 are approved I'd really have to ask what is the point of EPA even existing. (Anonymous submitter 2, Submission No. 10)	No response considered necessary by the proponent.

6.2 ENVIRONMENTAL FACTORS ADDRESSED IN PER

Submissions were made on several environmental factors addressed in the PER. Those submissions and the proponent responses are set out below.

6.2.1 Air emissions

Item	Submission	Response
17.	Air Quality in both the text of the document and in the executive summary it is clearly stated that there are significant issues with air quality in the Collie basin. It is acknowledged that much of the issues are caused by the recently reactivated Muja A & B power stations and that in fact by increasing the stack height to 150m (spreading the emissions further) and retrofitting additional cleaning technology to Bluewaters 1 & 2 along with installing this technology on Bluewaters 3 &4 that air quality will improve. It is therefore vitally important that Muja A & B are permanently decommissioned as soon as possible or at the very least "cleaned up" to the standards acceptable today. The management of ash and the capacity for it to become airborne following the burning process will need specific and stringent controls in light of recent incidents associated with Bluewaters 1. I understand specific processes have been put in place in relation to Bluewaters 2, these measures should be independently monitored and modified to ensure compliance to the highest standard. (Anonymous submitter 1, Submission No. 5)	The issue of future operation of Muja A and B power stations are beyond the scope of the assessment of Bluewaters Phase III and IV and not matters for response by Griffin. The Operation Environmental Management Plan (Appendix 2) provides for a range of actions to minimise the risk of airborne ash dust from the Bluewaters Power Station.
18.	Health Screening Checks; the proponent should be required to undertake health screening checks on an ongoing regular basis (say every 2 years). The proponent should also be required undertake specific health screening assessments for residents who are closest to the site if requested. (Anonymous submitter 1, Submission No. 5)	As there are a number of emitters in the Collie region, it is considered unreasonable to require one proponent to be responsible for undertaking health screening checks and assessments on an ongoing basis. Griffin agrees with the Department of Health comments that a strategic approach to air quality management is required in the region (See Submission Item 56) and is willing to cooperate in a joint approach with Government and industry.

6.2.2 Greenhouse gas emissions

Item	Submission	Response
19.	Carbon Capture; the proponent has indicated the facility will be carbon capture ready which is acknowledged as is their commitment to assisting the geosequestration project. It should be required of the proponent that if within (perhaps 5 years) a set period the geosequestration is not operational then the proponent is required to undertake carbon offset projects such as tree planting for all emissions to date and for all emissions moving forward. (Anonymous submitter 1, Submission No. 5)	The proposal does not include carbon capture readiness as a key characteristic and is submitted for assessment on the basis of the currently available technologies and the carbon emissions described in the PER. Nonetheless, Griffin will design the plant to be carbon capture ready as defined by the International Energy Agency and will continue to review available technologies for coal fired power stations and adopt the most effective practicable technologies commercially available to minimise GHG emissions. Refer to detailed response in Section 4.1.3 with respect to the issue of offsets.

6.2.3 Noise

Item	Submission	Response
20.	Noise; as the nearest resident to Bluewaters, I do not have an issue with noise emanating from the site but the cumulative impact of noise from a number of industrial sources in the coal basin is a concern and any actions to mitigate the cumulative impacts should be undertaken to the highest possible standard. (Anonymous submitter 1, Submission No. 5)	Noted. The Bluewaters proposal will be developed to ensure the required sound levels are not exceeded at the boundaries of the Special Control Area around the Coolangatta Industrial Estate. The results of modelling of the expected cumulative noise levels is presented in Chapter 3 Section 2 of the PER.

6.2.4 Surface and groundwater

Item	Submission	Response
21.	No serious consideration of dry cooling is made although this is commercially proven and is already being widely used in very similar power stations in Australia and the rest of the world (Special Report. Plant Cooling: Air-cooled condensers eliminate plant water use. Power, Sep 2008 by Wurtz, William), and is being seriously considered for Collie B (Collie Mail 27108/09). It is well reported that there are critical water issues in the Collie area. It is essential that any new industry in this area puts the highest value on water saving measures and uses best practice to ensure the absolute minimum water requirements. For new power stations, dry cooling or other low water use cooling (such as seawater cooling) should be mandatory. Dry cooling can reduce water usage by up to 95% for power stations in this class (vvww.energy.old.dov.au). Dry cooling has been successfully used in other areas of the world, including areas with similar climates for several decades (e.g. South Africa, USA, the Middle East, China, Queensland). To state that the technology is ineffective and is therefore given no consideration shows that inadequate research has been carried out and that there is absolutely no commitment to mitigating water use. We ask the proponent to explain why dry cooling for Bluewaters 3&4, and indeed for the entire plant, is not considered when the technology is proven and the water issues in Collie are so critical? We ask the proponent to explain why dry cooling is not considered when the future water supply is so uncertain? (Local residents, Submission No. 4)	Dry cooling is a substantially less efficient option than water cooling, and results in very high noise immission levels, which is a major issue in the vicinity of the Coolangatta Industrial Estate.
22.	The PER states "Power stations in the Collie region currently operate under the WA Cabinet approved principle that the primary use of groundwater resources (via mine dewatering) in the area is for power generation". However, The Upper Collie Water Allocation Plan (page 28) makes it clear that while dewater from Griffin's mines is currently used for Bluewaters 1, Muja And Collie A power stations, it notes that Griffin Power 2 does not have priority for the supply of dewater to Bluewaters 2 from Griffin Coal. Wesfarmer's mine dewater is prioritised to Muja And Collie A. The statement is therefore misleading as it suggests a presumed right to the Griffin mine dewater for Bluewaters 3&4 which is not actually the case. It is clearly stated in the Upper Collie Water Allocation Plan (August 2009) that industry must not rely on the availability of sufficient mine dewater either from day to day or for the purpose of long term planning. This document also points out that mine dewater may be limited or unavailable during the summer but the PER does not address these issues. To assume that Griffin's own mine dewater can be used for its power station is presumptive. Mine dewatering can only be carried out to the extent to render mining safe and once the water hits the ground, it belongs to the state, not the mining company. (Local residents, Submission No. 4)	Griffin has expressed a strong preference for the use of mine dewater as its primary supply, however, it also acknowledges that supply through the Department of Water proposed water supply utility would be acceptable, if Government requires this to be the means of supply. Griffin recognises that there will be some variability in the availability of mine dewater, but projections for the Ewington I mine indicate that there will be significantly more available than required by the Proposal for several decades. Access to a water supply will a negotiated outcome with the Department of Water under the licensing provisions of the *Rights in Water and Irrigation Act 1914*.

Item	Submission	Response
23.	If Griffin is to mine its own coal for this power station, how will the extent of dewatering be policed? If Griffin needs more water for the power station, what is to stop it justifying more dewatering in its mine, especially when it has shown how bending the truth is its trademark in this PER? We ask the proponent to explain how it will approach the issue of mine dewatering when it clearly has a conflict of interest in deciding the amount of dewatering required (Local residents, Submission No. 4)	In the licensing of groundwater abstraction for mine dewatering, Griffin has been required to satisfy the Department of Water in a strategy to demonstrate that only sufficient water is being abstracted for mine safety purposes. This strategy is based on predictive modelling of abstractions and drawdowns, ongoing monitoring and review.
24.	The PER admits "Beyond ten years, as the level of certainty [in mine dewater availability] diminishes, the possibility of needing alternative sources [of water] progressively increases". No plan for water supply after this period has been put forward. If dry cooling were used of course, none would be needed. The scenario that uses water from the Collie River South Branch (Lake Kepwari or Western 5H) is unacceptable. The river systems in the Upper Collie are already under considerable stress through damage due to mining and industry, especially the South Branch. The South Branch; particularly between Lake Kepwari and Collie Burn, already runs dry for several months in summer and autumn. For each of the past three years many of the 'permanent' river pools have also been totally dry for several months. There is no mention in the PER of the 'period of take rule' limiting surface water abstraction to the winter flow period (Upper Collie Water Allocation Plan). We are strongly against any new licences for any surface water being taken from any river system for industrial use at any time of year, even in an emergency. We ask the proponent to explain why the fluctuation of day to day, seasonal and operational availability of mine dewater is not addressed We ask the proponent to remove all plans of, and references to, abstraction of surface water, especially that from the South Branch of the Collie River We ask the proponent to detail future plans to minimise water use on an ongoing basis and provide strong evidence of serious commitment to minimise water use We ask the proponent to detail from where it expects to obtain water in the future (after 10 years) and how Bluewaters can continue to expand in the current proposed manner when water supply is such a critical issue (Local residents, Submission No. 4)	The proposal does not include taking water from the Collie River South Branch. The water supply strategy proposed in the PER includes triggers for consideration of alternative water supply sources, if the monitoring indicates a future shortfall in the available water from dewatering. Given that this shortfall may occur some considerable time into the future, it is inappropriate to set contingency sources aside at this time, as this would sterilise them from alternative uses in the meantime. If a contingency source is required at some time in the future, the sources available at that time would be evaluated to determine which would best suit the Bluewaters requirements and access negotiated with the Department of Water under licences required by the *Rights in Water and Irrigation Act 1914*. Nonetheless, the PER provides information on potential contingency sources that might be considered if necessary in the short term, such as Wellington Dam, or mine dewatering options other than Ewington I. The annual availability of mine dewater is expected to be considerably in excess of the needs of the proposal for several decades as presented in Chapter 3 Section 4.3.1 of the PER. The day to day and seasonal fluctuations in supply can be managed through an onsite storage facility, constructed as part of the Bluewaters Phase I and II water supply system. Griffin is not prepared to remove plans for use of any potentially available water sources at this time. The allocation of water to use by Griffin is administered by the Department of Water under the licensing provisions of the *Rights in Water and Irrigation Act 1914* and any future proposal for use of natural water sources will be subject to such licensing.
25.	We comment that in any case we do not support this proposal unless dry cooling is used (Local residents, Submission No. 4)	Noted. See responses in Items 21 through 24 above.

Item	Submission	Response
26.	Ash Disposal; In Appendix 6 the EIA for ash co-disposal it indicates that some water exceedances will occur. This is unacceptable and the proponent should be required to meet all standards in relation to water quality. Hoping that dilution will achieve this is unacceptable, particularly in light of the significantly degraded state of the coal basin aquifers. (Anonymous submitter 1, Submission No. 5)	The co-disposal of ash with mine overburden is an approved approach for Bluewaters Phase I and II and the methodology has been subject to considerable investigation for those proposals and the Bluewaters Phase III and IV proposal (See Appendix 6 of the PER for a detailed environmental impact assessment). The co-disposal technique is not expected to result in any exceedance of guideline values, as dilution with the receiving waters will lower levels of any components of concern within short distances of the disposal zone.
27.	Water; the use of an additional 6.5g/l of ground water is not supported. The coal basin aquifer is already in serious decline as a result of more water being pumped out of the various sub aquifers each year than is recharged. This is a clear finding of the Upper Collie Water Allocation Plan. The plan talks about the development of a water "utility" to ensure the water in the basin is used as efficiently as possible and in the most suitable way. This plan indicated a very slight replenishment of the aquifer if the plan works fully. This allocation would continue to result in an annual deficit and the continued long term decline of the aquifer. The plan also talks about alternative water sources. The use of water from Wellington Dam should be considered. Initially the proponent should consider dry cooling technology for Bluewaters 3 & 4 and retrofitting this to Bluewaters 1 & 2. (Anonymous submitter 1, Submission No. 5)	Mine dewatering is required to ensure safe mining, and its proposed use in the Bluewaters Phase III and IV expansion is an opportunistic use of this available resource. Dewatering approvals do not form part of the Bluewaters Phase III and IV proposal. Griffin has expressed a strong preference for the use of mine dewater as its primary supply, however, it also acknowledges that supply through the Department of Water proposed water supply utility would be acceptable, if use of this supply is required by Government. See response to Submission Item 21 above regarding the application of dry cooling.
28.	Currently most of Verves bores have either dried up or are no longer usable. With Verve Muja, Collie, Bluewater 1&2 where do they expect to get the water from and keep the river systems in healthy conditions. (Anonymous submitter 2, Submission No. 10)	Mine dewatering is required to ensure safe mining, and its proposed use in the Bluewaters Phase III and IV power station is an opportunistic use of this available resource. Dewatering approvals do not form part of the Bluewaters Phase III and IV expansion proposal.

6.2.5 Pipeline construction

Item	Submission	Response
29.	Saline Water; the proposal to construct a saline water outfall pipeline to the coast is not supported in isolation. The process should be robust enough to use saline water in the process. If there were a need to have an ocean outfall facility in place (see comments about dry cooling technology) then the construction of a purpose built line to the ocean is unacceptable. With the current pipeline needing urgent repairs which may meet Verve and the Dept of Waters needs there is a suggestion that the Perdaman Fertiliser proposal will also require ocean outfall, surely if this is required one pipeline with sufficient capacity for all current and future users should be built. The ultimate aim should in fact be to pump saline water from the ocean inland to these projects when they become robust enough to utilize salt water in their plants. (Anonymous submitter 1, Submission No. 5)	The proposed marine outfall pipeline is being constructed to take substantially larger volumes of saline waste water than will be produced by the proposal alone, providing capacity for other users. The discharge volumes from the proposal are expected to be about 0.25 GL/yr. The pipeline capacity is 3.65 GL/yr. However, the preferred option for the Bluewaters expansion is use of the Verve outfall if access can be negotiated.

6.2.6 Visual amenity/light shed

Item	Submission	Response
30.	Visual Impact; the site as a result of Bluewaters 1 & 2 is currently lit up like a Christmas tree and action should be taken to reduce the light shed from Bluewaters 1 & 2 along with what is proposed in relation to 3 & 4. The 150m high stacks will also be visually obtrusive and any mechanisms which are available to mitigate their impact should be implemented. (Anonymous submitter 1, Submission No. 5)	Light spill from the proposal will be managed to minimise light emissions affecting any nearby residences, through alignment of all lighting, with appropriate shading. The issue of visual amenity should be considered in the context of the land use around the project area, which consists of a combination of farming, forestry, mining and coal power industries. The stack height for Collie A power station is 170 m and was deemed by the EPA during the formal assessments for that project to be acceptable. The proposed stack configuration is not expected to result in significant loss of visual amenity to the area. Additionally, the proposed stack configuration for the Bluewaters Phase III and IV expansion has been designed in order to ensure that emissions from the Project do not result in adverse ground level concentrations of pollutants, as predicted via dispersion modelling. It is proposed to replace the existing stacks for Bluewaters Phase I and II so that all four units are served by two 150 m stacks, which is considered to be potentially less visually obtrusive than four separate stacks.

6.2.7 Solid waste disposal

Item	Submission	Response
31.	Very little detail is given in regards to fly ash disposal. "Ash is transported to the ash silos and loaded onto trucks for transport to the Ewington Mining Operations and will then be disposed of by mixing and co-disposal with the overburden, as approved for Bluewaters Phases I and II Projects". No regard is given to the fact that with the building of Bluewaters 3&4, the volume of ash to be disposed will be at least doubled. This clearly will have significant impacts on the method used for its disposal and the resulting increased potential for groundwater contamination. There appears to be an assumption that this method will be approved for Bluewaters 3&4 just because it was for Phases 1 &2, without properly researching the impacts of the increased volumes. We ask the proponent to fully examine the environmental impact of increasing the volume of fly ash to be disposed of with the mine overburden (Local residents, Submission No. 4)	Ash disposal was not determined as being a key environmental factor in development of the EPA approved Scoping Document, and management would be through an appropriate management plan. An Ash Management Plan is contained in the Operation Environmental Management Plan presented as Appendix 2 to the PER and as Appendix 2 to this report. Investigation into the impacts of ash disposal through co-disposal of mine overburden was addressed in detail in an environmental impact assessment report by URS (2008) presented in Appendix 6 of the PER.

6.3 OTHER ISSUES

6.3.1 Justification for the project

Item	Submission	Response
32.	Whilst recognising the necessity of ensuring the security of WA's electricity supply, we suggest that this particular project is not immediately necessary in terms of the forecasted WA electricity demand and nuances of the SWIS. The PER uses the figure of a required total increase in maximum SWIS capacity from about 4000MW now to 5000MW in 2016 (PER, Fig 3.29). The maximum capacity is only required during daytime in the summer months while demand in the winter at night can be less than half this maximum. Peak demand usually occurs on hot days in summer (air conditioning load). Over 300MW of generation capacity is required that is only used for about 24 hours a year at very high cost (www.energy.wa.gov.au). Since current capacity on the SWIS is about 5000MW (www.coolimbapower.com.au), and some transmission equipment is already at full capacity (www.wpcorp.com.au) there appears to be no immediate urgency for this base load project. In fact it appears the more pressing need is for peaking and emergency contingency electricity supply (such as that provided by gas turbine or renewable power stations). The proposal acknowledges this fact when it discusses the need for only relatively small capacity additions in a 'modular fashion' to prevent oversupply and allow for diurnal and seasonal peaks and troughs in demand. The PER states "The average incremental growth in maximum demand of approximately 140 MW [per annum] suggests that units larger than 400 MW could leave the SWIS with an oversupply of electricity for periods as long as three years". Does this not suggest that a total base load capacity of over 800MW at Bluewaters Phase Is excessive at this time? The reasons for not using more environmentally friendly and best practice technology (such as supercritical, ultra-supercritical, fluidised bed and gasification), are given in relation to the restriction on the size of units currently required in the SWIS, particularly regarding base load generation for which coal-fired power stations are suitable. "The unique growth, diurnal load variation, and network security considerations of the SWIS dictate that maximum unit size for new base-load coal fired capacity should be less than 400 MW per unit". (Local residents, Submission No. 4)	Chapter 1 Section 3 of the PER sets out the substantially referenced independent information used to justify the need for the proposal within the proposed timeframe. Analysis of Independent Market Operator (IMO) data illustrates the projected capacity shortfall against IMO reserve margins required to maintain energy security and projected sent-out energy in the South West Integrated System (SWIS) to 2016/17. Over this period, forecast energy is expected to grow at approximately 2.2% on average per annum (3.5% under the high growth scenario and 1.4% under the low growth scenario). The SWIS faces a dual challenge to not only satisfy predicted growth but also upgrade ageing equipment presently in service. Griffin has identified an opportunity to develop the proposal, consistent with the predicted electricity requirements of the SWIS. The Bluewaters expansion is following a staged process intended to match the demand curve as closely as reasonably practical, to ensure returns of investment are not compromised through development of unneeded generating capacity. Section 4.1.2 of this report presents discussion of the justification for the technology in addition to the detail presented in Chapter 3 Section 3.4 of the PER.

Item	Submission	Response
33.	We would prefer Griffin Power to implement their plans for renewable energy projects ahead of this proposal "The Griffin Group will also be involved in achievement of the State Government 50% Cleaner Energy Target for the SWIS by 2010, through involvement in contributing electricity to the SWIS through a portfolio of balanced electricity generation initiatives, including several wind farms (existing and proposed)". This would also fit with the government's mandate to increase the proportion of renewable energy sources. The Commonwealth committed to expanding the MRET scheme so that 20 percent of Australia's electricity supply will come from-renewable energy in 2020 (SEDO 2008). We are of the opinion that increases in peaking and emergency contingency electricity generation capacity provided by renewable resources and gas turbines would better suit the current circumstances of the SWIS. At a later date, if and when the WA electricity market requires an additional base load power station of 400MW capacity or larger, a coal-fired plant using best practice technology (e.g. supercritical and dry cooling) is more likely to be viable. We ask the proponent to confirm the electricity supply and demand forecast, including diurnal and seasonal cycling, and to ensure the extra base load generating capacity provided by Bluewaters 3&4 is actually necessary. It appears to us that peaking and emergency contingency electricity supply, not coal-fired base load supply, is actually what is required at present. We ask the proponent to explain why this project is considered necessary at this time and to consider postponing it until a greater base load capacity is required, thereby enabling the viability of larger units and modern technology, such as supercritical generation. We ask the proponent to justify not implementing more suitable generation plant(s), preferably using renewable resources, ahead of, or instead of, this proposal. (Local residents, Submission No. 4)	See Section 4.1.1 for a response to the issue of renewable energy as an alternative option. The necessity for the project will be demonstrated by the securing of contracts to deliver electricity to customers. Griffin Energy has implemented the Emu Downs wind farm and is planning implementation of the Badgingarra wind farm as part of its balanced portfolio of energy production facilities. The Emu Downs wind farm produces 80 MW of electricity and has been in operation since 2006. The 130 MW wind farm proposed at Badgingarra is expected to be commissioned in 2010. The justification for the timing is presented in detail in Chapter 3 Section 3.4 of the PER.

6.3.2 Proposed technology

Item	Submission	Response
34.	The PER (Executive Summary) states that "The proposal incorporates world best environmental management practice in terms of the generation technology appropriate to the size of the facility (best in class). The proposal incorporates world best management practice facilities to manage the impacts associated with the key environmental factors". We refute this statement. In WA, only Muja, Kwinana and Collie Power Stations are in the same class (coal fired / steam turbine stations of similar design and capacity) and all have lower CO_2 emission intensity (pounds of CO_2 emitted per megawatt-hour of electricity produced) than the proposed Bluewaters 3&4. Of the total of 18 power stations currently operating in WA, only the small plant at Worsley has a higher emission intensity (2,813) than the proposed Bluewaters 3&4. Of the 11 similar capacity coal fired power stations operating in the whole of Australia, all have lower CO_2 emission intensities than the proposed power station. Of the more than 5000 power stations in the world, a CO_2 emission intensity of 2,642 is among the highest (data from www.carma.org). We ask the proponent to explain what is meant in the PER by 'world best environmental management practice in terms of the generation technology', to provide a comparison of the environmental impact of different technologies, and to comment on the above data. (Local residents, Submission No. 4)	The origin of the specific CO_2 emissions data from CARMA (www.carma.org) presented in the submission (re-presented in Table 6.1 below) is unreferenced, and not consistent with data from other sources. The CARMA website acknowledges the following: "*CARMA relies upon data reported to the [US] Environmental Protection Agency by the plant operators themselves as required by the Clean Air Act. CARMA also includes many official emissions reports for plants in Canada, the European Union, and India. For non-reporting plants, CARMA estimates emissions using a statistical model that has been fitted to data for thousands of reporting plants in the U.S., Canada, the EU, and India. The model utilizes detailed data on plant-level engineering and fuel specifications. CARMA reports emissions for the year 2000, the current year, and the future (based on published plans).*" Non-US plants are not subject to the Clean Air Act and do not report to the US EPA. As described in detail in Chapter 3 Section 3.2 of the PER, the Australian Greenhouse Office Technical Efficiency Guidelines outline the target values of sent–out thermal efficiency for the combustion of black coal. This states that the world best plant in 1999 had a thermal efficiency of 43.6% HHV and that after adjusting to typical Australian cooling water conditions, the best practice achievable under Australian conditions becomes 41.7% HHV, based on a supercritical plant. Best practice thermal efficiency for a <250 MW sub critical plant is considered to be 37.7% HHV and when adjusted for Collie coal is 37.1% HHV. The total GHG emissions expected to be emitted by the two generator units comprising the Proposal, when operational, are estimated to total 3.1 Mt CO_2-e/yr. The total indirect emissions (Scope 3) would be 76 263 t CO_2-e/yr, based on a GHG emissions factor of 2.3 (Office of Climate Change 2008). The Bluewaters Project is expected to achieve an average sent-out thermal efficiency of 36.4% HHV. This is considered to be close to best practice for a subcritical plant of this size (37.1% HHV).

Item	Submission	Response
35.	The reasons given for not using supercritical or other modern generation technologies in this proposal are complicated but appear to be due to the unique nature of the SWIS and availability of the right size turbine units. Since Griffin intend to build 2 X 208MW units, one must assume they intend to operate them both, which along with the existing Bluewaters 1 & 2 units brings the total capacity (832MW) well within the size of efficient supercritical units available. To build Bluewaters on a 'modular' basis is shortsighted at best. Since the EPA did not insist on the implementation of the best available technology from the beginning, will Griffin be allowed to continue to propose to add more and more units to the site, each using the initial inferior technology in order to ensure the infrastructure can be shared and therefore each having a much worse environmental impact than necessary? Of course, when one is proposing to supply one's own coal, and through mining that coal, one's own water, environmental efficiency will not be one's priority; in fact using more resources than might otherwise be needed may be financially beneficial to Griffin, but not obviously to the environment or to future generations of West Australians. We ask the proponent to explain and justify why the entire Bluewaters project was designed on this modular basis and why one or more larger supercritical units was not considered instead, when it is presumably the case that the aim is to generate the maximum capacity of 836MW whenever possible We ask the proponent to outline planned future expansions of the Bluewaters site and to justify continuing to add outdated and environmentally unsound technology in a modular fashion (Local residents, Submission No. 4)	The separate Bluewaters Phase III and IV generator units will be phased in on separate timeframes, as has been the case with Bluewaters Phase I and II, and will not operate concurrently in the initial years. The issue of self interest with respect to using Griffin Group resources for the project will be limited entirely by the ability of Griffin Energy to be able to sell its energy product, not by the fact that it has available coal and water. Building one 416 W generator unit rather than two 208 MW units would not result in any significant change in the coal or water demand. The primary justification for smaller rather than larger units relates directly to the unique and limited size of the energy market in Western Australia, and the ability to be able to be flexible in meeting variable demand profiles, as outlined in Chapter 3 Section 3.4 of the PER.
36.	Dry Cooling Technology; should be investigated for use on this development as water usage would be reduced by 90%. It is understood that plant efficiency would be reduced by 4%. This cost should be offset by all Western Australians. If these power stations are built they represent about 8% of the WA energy market. Accordingly the price of energy would need to rise by 0.32% across the board to offset this reduced efficiency which is a small price to pay for the improved health of the coal basin aquifers. This technology should apply across all new developments in the basin and where possible existing developments until the water balance and basin aquifer is restored. (Anonymous submitter 1, Submission No. 5)	Dry cooling is a substantially less efficient option than water cooling, and results in very high noise immission levels, which is a major issue in the vicinity of the Coolangatta Industrial Estate. The use of water available from dewatering of mines necessary to achieve safe mining is an opportunistic use of a readily available and suitable resource.

Item	Submission	Response
37.	Flue Gas Desulphurization; the proponent is proposing to undertake these works in their proposal and this is to be commended but they should also be required to undertake this work on Bluewaters 1 & 2. The current proposal improves air quality by building bigger stacks and spreading the emissions over a wider area. (Anonymous submitter 1, Submission No. 5)	Bluewater I and II were approved for implementation without the need for dry flue gas desulphurisation. The issue was considered in detail during the assessment process. As noted in the submission, the current proposal will improve air quality in the region through implementation of dry flue gas desulphurisation of the Bluewaters Phase III and IV emissions, together with reconfiguration of the stack arrangement for the four generator units. Spreading the emissions over a wider area will result in lower concentrations of potential pollutants at the ground level receptors, with lower environmental and health impacts.
38.	Bluewaters is old technology built on the cheap. As it is not a clean coal technology it is going to be a dirty problem for the next 50 years. (Anonymous submitter 2, Submission No. 10)	Chapter 3 Section 3.4 sets out the substantiation of the proposal reflecting current world best practice for a plant of the proposed size. There have been substantial improvements in the economic viability of a range of technologies available for coal fire power stations, and these are being adopted into the design. Comparisons with the emission rates for the Muja A and B units demonstrates the significant improvements in emission rates that can be achieved with contemporary technology.

6.3.3 Comparison with other Power Stations

Item	Submission	Response
39.	Apart from Bluewaters 1&2, all 4 similarly sized coal fired power stations built in Australia since 2001 (Kogan Creek, Tarong North, Millmerran and Callide C) have used modern technology including supercritical generation to increase efficiency and two of these have also used dry cooling to reduce water use. To revert back to subcritical technology and wet cooling 10 years later is hardly 'world best technology' as stated in the PER. [Table 6.1] compares data from black coal / steam turbine power stations of similar total capacity built in Australia since in the last 10 years (ie stations in the same class). It can be seen that far from being 'best in class', Bluewaters (when compared either as stage 3&4 or as the entire capacity 1-4) has the biggest overall environmental impact of all Australian power stations built in the last 10 years in terms of both the intensity of water usage and CO_2 emissions. Muja C&D is included as a local comparison. Even this, built almost 30 years ago and which the PER, states is 'ageing' and purports will be replaced by .the 'cleaner' Bluewaters, has both lower CO_2 emission and water usage intensity then the proposal (data from company websites and www.carma.orq). We ask the proponent to further justify the use of the proposed technology for a) Bluewaters 3&4 and b) Bluewaters as a whole, and to comment on the above data for both water usage and CO_2 emissions intensities (Local residents, Submission No. 4)	The option of using supercritical boiler technology for the Proposal was rejected because of its inappropriateness for application to units under 400 MW, as reflected in Table 6.1, and as described in Chapter 3 Section 3.4 of the PER. The origin of the specific CO_2 emissions data from CARMA (www.carma.org) presented in the submission is unreferenced, and not consistent with data from other sources. The CARMA website acknowledges the following: "*CARMA relies upon data reported to the [US] Environmental Protection Agency by the plant operators themselves as required by the Clean Air Act. CARMA also includes many official emissions reports for plants in Canada, the European Union, and India. For non-reporting plants, CARMA estimates emissions using a statistical model that has been fitted to data for thousands of reporting plants in the U.S., Canada, the EU, and India. The model utilizes detailed data on plant-level engineering and fuel specifications. CARMA reports emissions for the year 2000, the current year, and the future (based on published plans).*" Non-US plants are not subject to the Clean Air Act and do not report to the US EPA. Water usage in the Bluewaters units is comparable with the rates in other similar technology units.

Table 6.1 Power Station comparison (as presented in association with Submission Item 39)

Station	Year	Capacity MW (no. of units)	Coal usage Million Tonnes/year	Water usage GL/year	Water intensity rating	CO_2 Emissions Million Tonnes/year	CO_2 Intensity Rating	Notes
Bluewaters 3&4	Proposed	416 (2)	1.7	6.5	16	3.1	2642 *	
Bluewaters 1&2	2009	416 (2)	1.7	6.5	16	3.1	2642	
Kogan Creek	2007	750 (1)	2.8	1.5	2	3.9	2178	Supercritical Dry cooling
Tarong North	2003	450 (1)	1.6	7.0	16	2.7	2248	Supercritical
Millmerran	2003	840 (2)	3.4	0.8	1	5.2	2120	Supercritical Dry cooling
Callide C	2001	900 (2)	3.2	13	14	5.2	2121	Supercritical
Collie A	1999	330 (1)	1.0	4.0	12	2.2	2638	
Muja C&D	1981	854 (4)	3.1	12	14	5.5	2438	

Water intensity = water usage / generation capacity ratio

CO_2 Intensity = Pounds of CO_2 emitted per megawatt-hour of electricity produced

*assumption based on the same generation technology as Bluewaters 1 &2 Emissions data from www.carma.org

Station details and water/coal usage from power station company websites

7. SUBMISSIONS FROM GOVERNMENT AGENCIES, STATUTORY AUTHORITIES, MEMBERS OF PARLIAMENT

7.1 GENERAL

7.1.1 Clarification of information

Item	Submission	Response
40.	The Departmental point of contact for operational matters is to be the Wellington District office, not the DEC Regional office. (Department Of Environment and Conservation - Environmental Management Branch, *Draft PER*)	Noted.
41.	Exchange the use of the word "should" in a number of management actions, with "will". (Department Of Environment and Conservation - Environmental Management Branch, *Draft PER*)	Appropriate changes have been made to the Construction Environmental Management Plan (revised version at Appendix 1 of this report). The Operation Environmental Management Plan does not contain the word "should" in any context that can reasonably changed to "will". The Greenhouse Gas Management Plan does not contain the word "should" in any context that can reasonably changed to "will".
42.	There are discrepancies in pipeline and power station information and management. There should be separation of the procedures for environmental protection for construction work on the power station site and the work on the pipeline to ensure procedures are clear, as environmental management strategies differ markedly. (Department Of Environment and Conservation - Environmental Management Branch, *Draft PER*)	Within the Construction Environmental Management Plan (See Appendix 1 of this report), Table 1.1 *Applicability of management plans to project components in the Construction Environmental Management Plan* sets out the specific applicability of each individual plan to the power station site and the pipeline. Where an individual plan applies to both components, the plan contains headings related to either the power station site or the pipeline, as appropriate to make the requirements clear. This table was included in the plan appended to the PER and subsequently modified in the amended plan appended to this report to account for two additional plans.
43.	The figures on the disc version of Appendix 16 (Strategen Black Cockatoo assessment) do not load. (Department Of Environment and Conservation - Environmental Management Branch, *Draft PER*)	A revised version of the disc has been provided, and the website version corrected. An electronic version of the report has been provided directly to the Environmental Management Branch.
44.	The Shire of Collie would like to receive electronic copies (i.e. shape files) of the modelling results (e.g Figures 3.4 to 3.18, the separate layers on Figure 3.19, and Figures 3.20 to 3.22). (Shire of Collie)	ENVIRON has been liaising directly with Shire of Collie regarding provision of this information and the issue has been resolved to the satisfaction of the Shire.

Item	Submission	Response
45.	The Shire of Dardanup would like to advise that they have no comment to make in regard to this application. (Shire of Dardanup)	Noted.

7.1.2 Management commitments

Item	Submission	Response
46.	Griffin Power 3 Pty Ltd is proposing to expand the Bluewaters Power Station near Collie, by constructing and operating an additional two generator units comprising boilers, steam turbine, generator and associated balance of the plant. The proposal includes the possible construction of a 63 kilometre pipeline to an ocean outfall at Leschenault Inlet for disposal of cooling tower blowdown, however the decision to dispose of waste water in this manner has not been confirmed. (Department of Environment and Conservation)	Negotiations are continuing with Verve for access to the existing marine outfall form the Collie Power Station as the preferred option. If access cannot be secured, Griffin will proceed with the pipeline option as proposed in the PER.
47.	Griffin Power has provided a number of management plans as part of the submitted PER. DEC recommends that the proponent's adherence to these management plans, including reporting, be required by environmental conditions. (Department of Environment and Conservation)	Noted, and consistent with recommended conditions of environmental approval set out in the PER (Chapter 6 Section 2.2.3) and reiterated with minor amendments in Section 8.2.1 of this report.
48.	The Griffin Group has committed to prepare a preliminary decommissioning plan within six months following commencement of construction, and a final decommissioning plan at least 12 months prior to the anticipated date of decommissioning to the requirements of the Minister for the Environment on the advice of the Environmental Protection Authority. Given that the decommissioning plan is likely to consider future land use options for the site, which affect land use planning, it is considered appropriate that the Shire of Collie should be provided an opportunity to comment on the decommissioning plans. The Shire of Collie would like an opportunity to comment on decommissioning plans, particularly with respect to future proposed land uses. (Shire of Collie)	Noted. Griffin will liaise with the Shire in preparation of the plans.

Item	Submission	Response
49.	The Griffin Group has committed to prepare a number of Environmental Management Plans to address environmental impacts from construction and subsequent operations. The Shire of Collie would like the opportunity to comment on the following Construction Environmental Management Plans and Operational Plans: Noise Management Plan Fire Management Plan Weed and Dieback Management Plan (if Shire of Collie reserves are likely to be affected) Waste Management Plan Ash Management Plan (Shire of Collie)	The plans were included as appendices to the PER to enable public comment during the eight week public comment period. No specific comments were provided by the Shire.

7.1.3 Compliance reporting

Item	Submission	Response
50.	The Griffin Group have committed to providing an annual compliance report to the Chief Executive Officer of the Department of Environment and Conservation on its commitments. However, there is no indication if the reports will be available to the Shire or the public. Making compliance reports public provides transparency and where non-compliance is occurring enables The Griffin Group to explain measures being taken to remedy the situation. The Shire of Collie should be provided with a copy of the compliance reports. It would be preferable if those reports were publicly available. (Shire of Collie)	Griffin has no objection to compliance reports being made public in accordance with standard DEC requirements (via the proponent website as set out in DEC *Proposal Implementation Fact Sheet 1*). The recommended conditions of environmental approval set out in the PER (Chapter 6 Section 2.2.3) have been amended to cover this and are presented in Section 8.2.1 of this report.

7.2 ENVIRONMENTAL FACTORS ADDRESSED IN PER

Submissions were made on several environmental factors address in the PER. Those submissions and the proponent responses are set out below.

7.2.1 Key environmental issues - general

Item	Submission	Response
51.	It is difficult to provide precise comments as requested without assessing the information provided. The South West Region believes this assessment should be undertaken once the PER has been finalised. Regardless, the South West Region has undertaken a brief review, based on the information provided and provides the following general comments: The South West Region has assumed that a similar request has been made of the specialist branches within DEC and so has tried to limit its response on matters that may be covered by those branches. (Department of Environment and Conservation, South West Region, *Draft PER*)	Noted. Comments are presented and responded to in Submission Items 52, 58, 59 and 109 below.
52.	Throughout the document, the proponent regularly refers to management of environmental issues by compliance with licence conditions. This is of significant concern as at this stage, no assessment has been undertaken to determine if conditions will be set let alone what these conditions will be managing. Further, based on this statement the EPA/Minister is unable to undertake an assessment as to whether the proposed management is appropriate as there is little information to assess (this is merely a statement). (Department of Environment and Conservation, South West Region, *Draft PER*)	The information provided within the PER complies with all specific requirements of the Scoping Document approved by the EPA, and is considered sufficient to enable an assessment of the potential impacts and effectiveness of proposed management. The key reference to management of environmental issues by licence relates to those aspects that are subject to statutory regulation such that specific environmental conditions on these matters are considered duplicative and consequently redundant.
53.	That Council makes a submission on the Public Environmental Review for the Bluewaters Power Station Expansion, objecting to any proposal for an additional ocean outfall for reasons of the resulting clearing of vegetation for a new pipe route, the disturbance of potential acid sulphate soils, the impact of disturbing the coastline with an additional outfall point, and the pipeline traversing the classified wetland on Buffalo Road. (Shire of Harvey)	The marine outfall pipeline will be co-located with the existing Verve pipeline over most of its length, and any vegetation clearing will be rehabilitated after construction. Horizontal directional drilling will be utilised to traverse the coastal dune system to avoid any clearing of this sensitive environment. The plan has been modified to address the construction requirements associated with traversing the Buffalo Rd wetland and associated conservation area (addition of a Wetland Crossing Management Plan and a Conservation Area Management Plan). The amended plan is included at Appendix 1 of this report. Acid sulphate soil management is comprehensively addressed in the Construction Environmental Management Plan (see the Acid Sulphate Management Plan in Appendix 1 of this report).

7.2.2 Air emissions

Item	Submission	Response
54.	The appropriate method has been used in the assessment. However, the final screening health risk assessment (sHRA) should include the following: Emissions from Perdaman Chemicals & Fertilisers Pty Ltd as proposed by the EPA; Acetaldehyde as a potential power plant emission and pulmonary irritant should be considered or its omission justified To protect against irritant effects, the more appropriate level for acute exposure to Hydrogen Chloride should be (DOH) 500 µg/m3 (1 hr averaging period) rather than the indicated (OEHHA) 2100 µg/m3, particularly since gaseous irritants in the air shed include NOx, $S0_2$, HF & some VOCs and would have an additive health effect for irritation. Increased particulates in the air-shed would also add to the irritant effect. Proponent should confirm the OEHHA chronic nickel guideline – PER cites 5.0x101 instead of 5.0x10-2. Cumulative emissions do not include Ewington mine particulates and proposed Char plant emissions. Modelling does not include non-industrial background particulate matter (see below); The sHRA points to Beryllium, particulates and S02 from Muja A&B to be of greatest concern to health, however, as Toxikos points out, the relative contribution of pollutants by each source are not indicated in the Environ report. It is clear that when Muja A&B are not included in the scenarios there is a dramatic decrease in the calculated hazard indices and, a reduction in cancer risk to the DOH guideline (1x10-6). Nevertheless when Muja A & B are removed from the sHRA the air-quality in the Collie basin is still compromised and under such circumstances a more detailed HRA with better exposure data is generally warranted. DOH agrees with both Environ and Toxikos that a comprehensive stack monitoring program should be undertaken to verify the stack emission estimates. Ideally ground monitoring in residential areas should also be undertaken to confirm the conclusions of the sHRA. (Department of Health, *Draft PER*)	These issues are addressed in detail in Sections 4.2.4 subsections: *Inclusion of the Perdaman Chemicals and Fertilisers Pty Ltd emissions* *Inclusion of acetaldehyde into the SHRA* *Carbon capture and storage, Ambient air quality guideline for nickel* *Cumulative emissions do not include Ewington Mine particulates or the proposed Char Plant emissions* *Modelling does not Include non-industrial background particulate matter* *Contribution of individual sources to predicted ground level concentrations* *Emissions monitoring and ambient air quality monitoring.*

Item	Submission	Response
55.	The Collie Basin Management and Planning Group (CBMPG) was re-established in August 2005. Through direction from the then Minister for the Environment, the Department of Environment provided a commitment to resource significant technical studies relating to air quality that would define acceptable air shed limits for the Collie basin. The reconvened CBMPG met in May 2006 and continued to meet to monitor and review the two environmental studies on air quality and noise until early 2009. In April 2009, the CBMPG produced its final draft report to the Ministers of Planning and Environment with an anticipated public release end of June 2009. The CBMPG then disbanded. The Griffin PER cites conclusions from the draft report related to air quality, however, it should be noted: At the submission of the PER the draft report had not been approved for release by DEC or the relevant Ministers; DEC has advised DoH the conclusions in the draft report should be placed in context as follows: – conclusion # 1 (p 3-66 of the PER) relates to S02; – data (S02 & particulate matter measurements) were collected from one monitoring station and were not representative of spatial variation in the Collie Basin, hence, monitoring at another location in Collie has recently begun; – assessment of the data for particulate matter collected for the same period have not been finalised by DEC and, therefore, it should not be assumed that particulate matter is within the appropriate NEPM standard in the Collie basin. (Department of Health, *Draft PER*)	These issues are addressed in detail in Section 4.2.4 *Collie Basin Management and Planning Group.*
56.	The pollutant concentrations within the Collie air-shed are the result of emissions from many sources, although individual industrial projects that adopt best practice methods are unlikely to significantly increase current impacts to public health. DOH once again advocates a strategic approach to air quality management in the Collie region. Ongoing efforts will be required to adequately address concerns with existing and future developments. Strategies may include: Formulating an agreed framework to manage future developments; Cooperative monitoring and management of air quality by industry; Formation of an industry body to liaise closely with government and the community; Consideration of 'background' non-industrial emissions and how these should be accommodated in future proposals; Consideration of comprehensive air-quality measures that include: – wood heater upgrade or replacement; – town planning to keep new residential areas away from new emission sources; – foreshadow future power needs and potential for additional power plants and how these should be accommodated. (Department of Health, *Draft PER*)	These issues are addressed in detail in Section 4.2.4 *General comments.*

Item	Submission	Response
57.	Environmental impacts of emissions of sulfur and nitrogen oxides The effects of increasing sulfur and nitrogen oxide emissions with the expansion of the power station have only been assessed from a human health point of view, and the potential environmental impacts of the emissions have been neglected. There is a risk that increased emissions of these gases will cause increasing acidity and soluble aluminium levels in poorly buffered sandy soils in the area, and in turn lead to a decline in microrrhizal fungi levels, decline or loss of sensitive plant species, and a decline in the biodiversity of fauna in the area. These impacts have been well documented in other parts of the world, and are known to take place when deposition of sulfur and nitrogen species from power stations exceeds about 250 eq/ha/year on sensitive sandy soils such as those that are found in the Collie area. The environmental impacts from power station air emissions are considered to be one of the most significant impacts from coal power stations in other parts of the world, but this issue has been completely neglected in the draft PER. A recent internationally published paper on groundwater acidity on the Gnangara Mound provides evidence that coal combustion is contributing to widespread soil and groundwater acidification on the Swan Coastal Plain. (Department of Environment and Conservation, Environmental Management, *Draft PER*)	The risks described in the submission are largely speculative. The issue of environmental impacts of SO_2 and NO_x emissions are addressed in Chapter 3 Section 1.4.2 of the PER in accordance with the requirements of the Scoping Document approved by the EPA. The conclusions of the assessment are that there will not be any adverse effects on native vegetation from SO_2 and NO_x emissions from the proposal.
58.	Pg 3-67 - dry gas desulphurisation (or coal beneficiation to equivalent effectiveness) this section seems to be light on information provided - how is this equivalent effectiveness determined, should they not implement best practice (i.e. both). The Document outlines dry gas desulphurisation as being up to 95% effective but implies a 70% for modelling. Will 95% or 70% reduction in emissions be used in determining the coal beneficiation to equivalent effectiveness? Who will make the determination as to the management option to be implemented and the equivalent effectiveness? The document indicates that dry gas desulphurisation will be implemented in preference of coal beneficiation on page 3-67, but on page 3-68 indicates that coal beneficiation will be implemented to meet 0.38% sulphur in the coal. Is this additional to the desulphurisation or is this the beneficiation that has been outlined as an option. Will the dry gas desulphurisation (or coal beneficiation to equivalent effectiveness) be implemented on Bluewaters I and II as the Approval for these is being changed through this assessment (i.e. should they be brought up to best practice). (Department of Environment and Conservation, South West Region, *Draft PER*)	These issues are addressed in detail in Section 4.2.3 *Dry gas desulphurisation*.
59.	Page 3-75 - From the document it is difficult to determine if the parameters used in the air dispersion modelling include Bluewaters I & II. The emissions from Bluewaters I & II have been used as background. However, the emissions from these plant are proposing to be emitted from the 2 stacks outlined in this proposal. Therefore these should be removed from background and considered as part of the new project. The document is not clear on whether the modelled emissions from the new stacks include the parameters for Bluewaters I & II as well as III & IV. The table indicates that the exit velocity considers Bluewaters I & II inputs but not the other parameters (i.e. pollutants). The Table indicates that desulphurisation has been undertaken which outlined in the above point may not occur. This desulphurisation will influence emission from Bluewaters I & II as well as III & IV, while the option of coal beneficiation may not. This may have a significant bearing on the reliability of this modelling. (Department of Environment and Conservation, South West Region, *Draft PER*)	These issues are addressed in detail in Section 4.2.3 *Emission characteristics used in the air dispersion modelling*. Bluewaters Phase I and II emissions have been included in the modelling.

Item	Submission	Response
60.	Annual quantities for the emissions listed in Table 3.5 are required, together with stack emission concentration figures [mg/Nm^3 based on standard reference conditions of 6% (volume) O_2, dry basis] for sulphur dioxide (SO_2), oxides of nitrogen (NOx), and particulate matter as PM_{10}. (Department of Environment and Conservation, EPA SU)	These issues are addressed in detail in Section 4.2.2 *Annual emissions rates and concentrations.*
61.	Appendix 8 - P 25. Using the 9th highest hourly concentration and assessing it against the NEPM standard is unacceptable. The modelled 9^{th} highest 1-hour SO2 ground level concentrations should be compared with the Kwinana standard of 350 µg/m^3 1-hour 9^{th} highest. (Department of Environment and Conservation, AQMB)	These issues are addressed in detail in Section 4.2.1 *Use of 9th highest 1-hour average SO2 concentrations.*
62.	Appendix 8 - Section 4.3. Nitrogen dioxide (NO_2) and ozone (O_3) are unlikely to approach NEPM standards. However, there is a deficiency in the modelling, namely biogenic volatile organic compounds (VOCs) and oxides of nitrogen (NOx) emissions have not been included. It is also understood that the background Rsmog parameter was turned off for the modelling. There may be problems with the model (TAPM) but that is not an acceptable solution. The Bluewaters O3 results are therefore most likely underestimated and the NO2 results may also be affected (extent unknown). In the absence of reliable TAPM O3 and NO2 results, it should be demonstrated that neither of these pollutants will approach NEPM standards by referring to previous CSIRO analyses, supported by simple calculations. (Department of Environment and Conservation, AQMB)	These issues are addressed in detail in Section 4.2.1 *TAPM model issues.*

Item	Submission	Response
63.	The appropriate method has been used in the assessment. However, the following need to be addressed to more fully support the conclusions. The final screening health risk assessment (sHRA) should include the following: Emissions from Perdaman Chemicals & Fertilisers Pty Ltd as proposed by the EPA; Acetaldehyde as a potential power plant emission and pulmonary irritant should be considered or its omission justified To protect against irritant effects, the more appropriate level for acute exposure to Hydrogen Chloride should be (DOH) 500 µg/m^3 (1 hr averaging period) rather than the indicated (OEHHA) 2100 µg/m3, particularly since gaseous irritants in the air shed include NOx, $S0_2$, HF & some VOCs and would have an additive health effect for irritation. Increased particulates in the air-shed would also add to the irritant effect. Proponent should confirm the OEHHA chronic nickel guideline — PER cites 5.0x101 instead of 5.0x10-2. Cumulative emissions do not include Ewington mine particulates and proposed Char plant emissions. Modelling does not include non-industrial background particulate matter (see below); The HRA points to Beryllium, particulates and SO_2 from Muja A&B to be of greatest concern to health however as Toxikos points out the relative contribution of pollutants by each source are not indicated in the Environ report. However, it clear that when Muja A&B are not included in the scenarios there is a dramatic decrease in the calculated hazard indices and, a reduction in cancer risk to the DOH guideline (1x10-6). Nevertheless when Muja A & B are removed from the sHRA the air-quality in the Collie basin is still compromised and under such circumstances a more detailed HRA with better exposure data is generally warranted. DOH agrees with both Environ and Toxikos that a comprehensive stack monitoring program should be undertaken to verify the stack emission estimates. Ideally ground monitoring in residential areas should also be undertaken to confirm the conclusions of the sHRA. (Department of Health)	See response to Submission Item 54 above.

Item	Submission	Response
64.	The Collie Basin Management and Planning Group (CBMPG) was re-established in August 2005. Through direction from the then Minister for the Environment, the then Department of Environment provided a commitment to resource significant technical studies relating to air quality that would define acceptable air shed limits for the Collie basin. The reconvened CBMPG met in May 2006 and continued to meet to monitor and review the two environmental studies on air quality and noise until early 2009. In April 2009, the CBMPG produced its final draft report to the Ministers of Planning and Environment with an anticipated public release end of June 2009. The CBMPG then disbanded. The Griffin PER cites conclusions from the draft report related to air quality, however it should be noted: At the submission of the PER the draft report had not been approved for release by DEC or the relevant Ministers; DEC has advised. DOH the conclusions in the draft report should be placed in context as follows: – conclusion # 1 (p 3-66 of the PER) relates to S02; – data (S02 & particulate matter measurements) were collected from one monitoring station and were not representative of spatial variation in the Collie Basin hence monitoring at another location in Collie has recently begun; – assessment of the data for particulate matter collected for the same period have not been finalised by DEC and therefore it should not be assumed that particulate matter is within the appropriate NEPM standard in the Collie basin. (Department of Health)	See response to Submission Item 55 above.
65.	The pollutant concentrations within the Collie air-shed are the result of emissions from many sources, although individual industrial projects that adopt 'best practice' methods are unlikely to significantly increase current impacts to public health. DOH once again advocates a strategic approach to air quality management in the Collie region. Ongoing efforts will be required to adequately address concerns with existing and future developments. Strategies may include: Formulating an agreed framework to manage future developments; Cooperative monitoring and management of air quality by industry; Formation of an industry body to liaise closely with government and the community; Consideration of 'background' non-industrial emissions and how these should be accommodated in future proposals; Consideration of comprehensive air-quality measures that include: – wood heater upgrade or replacement; – town planning to keep new residential areas away from new emission sources; – foreshadow future power needs and potential for additional power plants and how these should be accommodated. (Department of Health)	See response to Submission Item 56 above.

Item	Submission	Response
66.	The potential effects of increasing sulfur and nitrogen emissions with the expansion of the power station have only been assessed from a human health point of view, and the potential environmental effects of the emissions have been largely neglected. Although the proposed emission control measures will help mitigate the potential environmental effects of sulfur and nitrogen oxide emissions, there is a risk that these substances will still be released at levels that will cause increasing levels of acidity and soluble metals in the poorly buffered sandy soils that occur in the area. Potential environmental impacts of acidic emissions from power stations include a decline of microrrhizal fungi levels in soils, a decline or local extinction of acid-sensitive plant species, and a decline in the diversity of fauna in the area. These impacts have been well documented on sandy soils near coal power stations in other parts of the world. Recent investigations by the Department of Environment and Conservation, and geochemical modelling by the University of New South Wales, indicate that it is likely that soil acidity on at least part of the Swan Coastal Plain has been affected by historical emissions from coal combustion. (Department of Environment and Conservation)	See response to Submission Item 57 above.

7.2.3 Radiation

Item	Submission	Response
67.	The regulation of radiation in Western Australia falls under the jurisdiction of the Radiological Council under the *Radiation Safety Act 1975.* Any correspondence can be directed to: The Secretary Radiological Council Locked Bag 2006 NEDLANDS WA 6009 (Department of Health, *Draft PER*)	Noted.
68.	The International Atomic Energy Agency has specified a number of industry sectors that are most likely to require some form of radiological regulatory consideration. This includes industries involved in the combustion of coal. Recent national guidance has been published by the Australian Radiation Protection and Nuclear Safety Agency (ARPANSA) in a Radiation Protection Series publication, entitled Management of Naturally Occurring Radioactive Material (NORM). Industries that mine and/or process natural materials may need to be regulated with respect to the build-up of naturally occurring radioactive material. Therefore, information on the uranium and thorium content may need to be provided. (Department of Health, *Draft PER*)	Noted.

Item	Submission	Response
69.	Page 1-23, Section 6.6.2 Wastes (Solid Wastes), and Appendix 6 The United Nations Scientific Committee on the Effects of Atomic Radiation (UNSCEAR) 2000 Report suggests that fly ash and bottom ash from coal combustion has a typical concentration of 0.2 Bq/g Uranium-238 series. The radiological properties of the fly ash and bottom ash have not been provided and, therefore, radionuclide content should be assessed in further investigations. (Department of Health, *Draft PER*)	The co-disposal of ash with mine overburden into mine voids should ensure that the radiological impacts on the environment are insignificant.
70.	Page 6-224, Section 2.2.1 Commitments and requirements under legislation other than the EP and EPBC Acts This section may need to include the *Radiation Safety Act 1975*, if the site requires radiological management, particularly with respect to the sections on "Ash Disposal" and "Waste Management". (Department of Health, *Draft PER*)	This comment was forwarded to the proponent after finalisation and release of the PER. The site will be subject to regulation under the *Radiation Safety Act 1975*, if and as appropriate.
71.	The regulation of radiation in Western Australia falls under the jurisdiction of the Radiological Council under the *Radiation Safety Act 1975*. Any correspondence can be directed to: The Secretary Radiological Council Locked Bag 2006 NEDLANDS WA 6009 (Department of Health)	See response to Submission Item 67 above.
72.	The International Atomic Energy Agency has specified a number of industry sectors that are most likely to require some form of radiological regulatory consideration. This includes industries involved in the combustion of coal. Recent national guidance has been published by the Australian Radiation Protection and Nuclear Safety Agency (ARPANSA) in a Radiation Protection Series publication, entitled Management of Naturally Occurring Radioactive Material (NORM). Industries that mine and/or process natural materials may need to be regulated with respect to the build-up of naturally occurring radioactive material. Therefore, information on the uranium and thorium content may need to be provided. (Department of Health)	See response to Submission Item 68 above.
73.	Page 1-23, Section 6.6.2 Wastes (Solid Wastes), and Appendix 6 The United Nations Scientific Committee on the Effects of Atomic Radiation (UNSCEAR) 2000 Report suggests that fly ash and bottom ash from coal combustion has a typical concentration of 0.2 Bq/g Uranium-238 series. The radiological properties of the fly ash and bottom ash have not been provided and, therefore, radionuclide content should be assessed in further investigations. (Department of Health)	See response to Submission Item 69 above.

Item	Submission	Response
74.	Page 6-224, Section 2.2.1 Commitments and requirements under legislation other than the EP and EPBC Acts This section may need to include the *Radiation Safety Act 1975*, if the site requires radiological management, particularly with respect to the sections on "Ash Disposal" and "Waste Management". (Department of Health)	See response to Submission Item 70 above.
75.	A Screening Health Risk Assessment has found little or no change to the health risks from air emissions based on the cumulative impact modelling undertaken to date. However, the cumulative impact modelling is being re-done to include emissions from the Perdaman Urea Project, and the modelling to date is based on assumptions about the level of contaminants in stack emissions. However, there is no commitment to re-run the Screening Health Risk Assessment based on the updated modelling or if stack monitoring finds contaminant levels higher than used in the modelling. There should be a commitment to re-run the Screening Health Risk Assessment (see p. 3-106) once the new cumulative air emissions study (see p. x) is completed. There should be a commitment to run the Screening Health Risk Assessment again if stack monitoring finds that the pollutant concentrations are higher than used in the modelling, and the results should be made available to the Shire of Collie. It would be preferable if the outcome of any re-run of the Screening Health Risk Assessment was publicly available. The modelling shows that at the National Environment Protection Measure for Ambient Air Quality (NEPM) criteria are exceeded at a number of receptor locations (see p. x). This information should be utilised to trigger land use planning measures consistent with State planning policy. The Western Australian Planning Commission has an existing Statement of Planning Policy 4.1 Industrial Buffer Zones, and has recently issued a draft Statement of Planning Policy (for public comment) to replace the existing policy. There should be a commitment to implementing measures suggested in the draft Statement of Planning Policy 4.1 Industrial Buffer Zones, particularly in respect to residential receptors affected by sulphur dioxide levels above the NEPM 1-hour standard (Shire of Collie)	Assessment of the impact of the Perdaman Urea Project is beyond the scope of the Bluewaters Phase III and IV PER, as implied in the agreement with the EPA via the Scoping Document and subsequent correspondence. Assessment of the cumulative impact of that proposal has been included in the recently released Collie Urea Project PER. Implementing measures to manage concentration levels at residential receptors is an issue that applies to all contributing emitters, not just Griffin with respect to Bluewaters Phase III and IV and is an issue beyond the management scope and power of Griffin.
76.	The PER notes that "A cumulative air quality modelling study of all existing, approved and known potential future contributors of emissions to the Collie airshed is being undertaken" (p. 6-244). More information is sought on the timing of the cumulative air quality modelling study and opportunities for public review of its findings. (Shire of Collie)	Assessment of the cumulative impact of that proposal has been included in the recently released Collie Urea Project PER. Correspondence from the EPA, subsequent to release of the PER for public comment, has relieved Griffin of its obligation in this regard.

7.2.4 Greenhouse gas emissions

Item	Submission	Response
77.	Liability under the Carbon Pollution Reduction Scheme The draft PER document notes that the project will be fully liable for its GHG emissions under the proposed Carbon Pollution Reduction Scheme (CPRS). The proponent considers that its participation under the CPRS is an adequate means of management of the proposal's GHG emissions. The CPRS Bill is currently being debated in Federal Parliament. There are uncertainties on whether the CPRS in its current proposed form will be implemented or if the Bill will be passed. Therefore the proponent should not assume that the CPRS in its current form will be implemented. Due to this uncertainty, the proponent should present in the draft PER document a more comprehensive plan to manage GHG emissions. In the event that the CPRS is not implemented or is further delayed, the proponent should be required to implement the management plan. (Department of Environment and Conservation - Strategic Policy Division, *Draft PER*)	These issues are addressed in detail in Section 4.1.2. The Greenhouse Gas Management Plan submitted with the PER (Appendix 3) describes the full range of measures proposed to be taken to reduce emissions. The plan is also re-presented as Appendix 1 to this report. If the CPRS is not implemented in its current form for some reason, it is an entirely reasonable expectation that there will be some form of scheme that will mandate overall reductions in national emissions, and that Griffin will be required to participate in that scheme. Not all the management measures listed in the Greenhouse Gas Management Plan relate to the CPRS, and these would be implemented in any event.
78.	Carbon capture ready power plant One of the proposed measures to manage GHG emission is to design and plan the plant to be capable of carbon capture when such technology becomes technically and commercially viable. This approach was also taken by Coolimba Power Pty Ltd in its Coolimba Power Station Project (URS, 2009). The information provided in the draft PER is insufficient for the OCC to determine if the power plant is indeed designed to be carbon capture ready. The OCC agrees with the proponent's decision to adopt the guidelines from the International Energy Agency (IEA) CO_2 Capture Ready Plants. However, the information provided in the draft PER is insufficient to allow judgement on whether the proposal meets the IEA guidelines. The following statement was made in the draft PER: "Developers of capture ready plants should take responsibility for ensuring that all known factors in their control that would prevent installation and operation of CO_2 capture have been identified and eliminated. This might include: A study of options for CO_2 capture retrofit and potential pre-investments Inclusion of sufficient space and access for the additional facilities that would be required Identification of reasonable route(s) to storage of CO_2 " The OCC will provide comment on each of the above three points. The EPA Service Unit should also note that the IEA guidelines further states that "Competent authorities involved in permitting power plants should be provided with sufficient information to be able to judge whether the developer has met these criteria". (Department of Environment and Conservation - Strategic Policy Division, *Draft PER*)	These issues are addressed in detail in Section 4.1.2. While the proposal will be designed and constructed to be carbon capture ready to the maximum extent possible on the basis of current knowledge of carbon capture options, Griffin is not requiring that the specific carbon capture readiness of the proposal be assessed. The proposal is required to be assessed on the basis of the environmental impacts as detailed in the PER.

Item	Submission	Response
79.	A study of options for CO_2 capture retrofit and potential pre-investments The draft PER briefly describes two technology options for carbon capture and makes reference to other sections of the document (for example e Sections 3.5.1 and 3.5.2) which describes in detail provisions made to the power plant to allow retrofitting of carbon capture technology. These sections do not exist in the draft PER. In addition, the language used in the Conclusions section on page 3-14.1 ("some provisions can be made in the initial design to accommodate incorporation of carbon capture") suggests that provisions to the plan have yet to be made. The proponent should provide detailed information such as engineering drawings and diagrams to assure the EPA that these provisions have been made. Further technical and commercial viability studies should be undertaken by the proponent to select its preferred technology for carbon capture based on current best available information. The proponent should then assess its pre-investment options against the guidance outlined in Sections 7 to 10 of the IEA CO_2 Capture Ready Plants. The section(s) relevant to the proponent's preferred technology for carbon capture should be used. Decisions on the adoption or otherwise of each pre-investment option are to be justified. (Department of Environment and Conservation - Strategic Policy Division, *Draft PER*)	These issues are addressed in detail in Section 4.1.2. While the proposal will be designed and constructed to be carbon capture ready to the maximum extent possible on the basis of current knowledge of carbon capture options, Griffin is not requiring that the specific carbon capture readiness of the proposal be assessed. The proposal is required to be assessed on the basis of the environmental impacts as detailed in the PER.
80.	Inclusion of sufficient space and access for the additional facilities that would be required The draft PER states that "space will be available on the land immediately adjacent to each of the new generator units to accommodate the measure". It is unclear how much space will be available for facilities required for carbon capture. The proponent has not provided a diagram of the proposed layout of the coal-fired generation components and the carbon capture components. The IEA CO_2 Capture as a Factor in Power Station Investment Decisions and CO_2 Capture Ready Plants documents provide some guidance on the minimum plant footprint of various carbon capture plants. (Department of Environment and Conservation - Strategic Policy Division, *Draft PER*)	These issues are addressed in detail in Section 4.1.2. While the proposal will be designed and constructed to be carbon capture ready to the maximum extent possible on the basis of current knowledge of carbon capture options, Griffin is not requiring that the specific carbon capture readiness of the proposal be assessed. The proposal is required to be assessed on the basis of the environmental impacts as detailed in the PER.
81.	Identification of reasonable route(s) to storage of CO_2 The executive summary of the IEA guidelines states that the first step in the identification of reasonable route(s) to storage location is the identification of these storage locations and further states that "the requirements for qualifying a storage reservoir for a capture ready plant will have to be defined by policy makers". The OCC considers that a plant that is carbon capture ready is pointless without the identification of a suitable geosequestration site capable of sequestering the captured carbon dioxide gas. The proponent should identify one site or a few sites each capable of sequestering the total amount of captured carbon dioxide for the lifespan of the power plant. Once the preferred site(s) is identified, the proponent's decision should be peer-reviewed by an independent third party. The proponent should also assess potential route(s) to preferred geosequestration site(s) and identify any potential barriers to using their preferred site(s). (Department of Environment and Conservation - Strategic Policy Division, *Draft PER*)	These issues are addressed in detail in Section 4.1.2. While the proposal will be designed and constructed to be carbon capture ready to the maximum extent possible on the basis of current knowledge of carbon capture options, Griffin is not requiring that the specific carbon capture readiness of the proposal be assessed. The proposal is required to be assessed on the basis of the environmental impacts as detailed in the PER.

Item	Submission	Response
82.	Implementation of Carbon Capture and Storage The OCC recommends that the Griffin Power 3 Pty Ltd be required to prepare a feasibility study for carbon capture and storage implementation similar to the study proposed by Coolimba Power Pty Ltd. Furthermore, the proponent should be required to submit the feasibility study and any updates to the EPA for approval. Coolimba Power Pty Ltd is proposing a feasibility study one year before plant commissioning, which will be updated five years after commissioning and every three years after that (URS, 2009). The study will include technology, environmental, monitoring and regulatory considerations. In addition, the study will also identify triggers required to "advance the CCS Implementation Project" and an assessment of feasibility of implementation of CCS. The OCC reiterates its recommendation in its submission on the Coolimba Power Station Project dated 23 June 2009 that the WA Environmental Protection Authority (EPA) take on a similar role to UK's Environment Agency in strategically assessing the economic and technical feasibility of CCS implementation in WA. It is proposed that the assessment be updated annually. When CCS is judged to be feasible, it is proposed that the EPA recommends to the State Government that CCS can be implemented across WA. If a fully functional emissions trading scheme (ETS) is not in place when CCS is judged feasible by the EPA, the proponent should be required to retrofit CCS to the project's full capacity within a set timeframe. If a fully functional ETS is in place, the proponent could use the EPA assessment for their information purposes. This will ensure a consistent approach to the implementation of CCS for carbon capture ready plants in WA. (Department of Environment and Conservation - Strategic Policy Division, *Draft PER*)	These issues are addressed in detail in Section 4.1.2. The Griffin Group is supporting the research work into carbon geosequestration options being undertaken by the Coal Futures Group.
83.	Conclusion The proponent should develop management measures in the event that the CPRS in its current form is not implemented. The CPRS Bill is still being debated in Parliament and there is still uncertainty over the final structure of the CPRS or even whether the CPRS will be implemented. The author(s) of the draft PER has not demonstrated adequate understanding of the IEA guidelines for the proposed carbon capture ready plant. The information provided in the draft PER document is also insufficient in relation to the proponent's intentions to construct a carbon capture ready plant. The OCC agrees that the use of IEA guidance is acceptable however it cannot be concluded from the draft PER if the proposal meets the guidance. As a minimum and in the interest of consistency, the proponent should be required to provide the same amount of information as in the Coolimba Power Station Project (URS, 2009) released for public environmental review on 28 April 2009. The proponent should also prepare feasibility studies for the implementation of carbon capture and storage. These studies should include technology, environmental, monitoring and regulatory considerations. In addition, the study should also identify triggers required to "advance the CCS Implementation Project" and an assessment of feasibility of implementation of CCS. (Department of Environment and Conservation - Strategic Policy Division, *Draft PER*)	These issues are addressed in detail in Section 4.1.2 and under Item 77 above. Griffin is not requiring that carbon capture readiness of the proposal be assessed.

Item	Submission	Response
84.	The proposal will significantly add to the State's greenhouse gas emissions. The State and Territory Greenhouse Gas Inventory 2007 (May 2009) states that total GHG emissions for WA in carbon dioxide-equivalent units (CO_2-e) were 76.3 million tonnes per annum (including emissions from land use, land use change and forestry). The PER estimates that the proposal is expected to emit 3.1 million tpa of CO_2-e, which is equivalent to 4.1% of the total WA GHG emissions in 2007. While the PER classes the significance level of the greenhouse gas emissions of the proposal as low, the OCC disagrees with that assessment, arguing that an increase in the State's emissions by 4.1% is significant. (Department of Environment and Conservation - Strategic Policy Division)	The significance level of the specific emissions by the Proposal are considered by Griffin to be low, as in isolation, their specific effects on any features of environmental value in Western Australia would be so small as to be immeasurable. However, as acknowledged in the Scoping Document, Griffin accepts that the overall issue of greenhouse gas emissions, is of high significance and has consequently addressed the issue in the PER.
85.	The PER document notes that the project will be fully liable for its GHG emissions under the proposed Carbon Pollution Reduction Scheme (CPRS). The proponent considers that its participation under the CPRS is an adequate means of management of the proposal's GHG emissions. The Senate voted against the Bills contained in the CPRS Legislative Package on 13 August 2009. Although the Federal Government has indicated that it intends to reintroduce the Bills to the Senate before the end of 2009, there are uncertainties on whether the CPRS in its current proposed form will be implemented or if the Bills will be passed. Therefore the proponent cannot assume that the CPRS in its current proposed form will be implemented. At this time and due to this uncertainty, the proponent should present in the Response to Submissions document a more comprehensive plan to manage GHG emissions. In the event that the CPRS is not implemented or is further delayed, the proponent should be required to implement the management plan, which should include benchmarking against and continuously monitoring international best practice in the industry, measures to continuously improve the power station's greenhouse gas intensity and a proposal to purchase greenhouse gas emission offsets that will be fungible with greenhouse credits under the CPRS. (Department of Environment and Conservation - Strategic Policy Division)	These issues are addressed in detail in Section 4.1.2 and under Item 77 above.

Item	Submission	Response
86.	One of the proposed measures to manage GHG emission is to design and plan the plant to be capable of carbon capture when such technology becomes technically and commercially viable. The information provided in the PER is insufficient to determine if the power plant is indeed designed to be carbon capture ready. The OCC supports the, proponent's decision to adopt the guidelines from the International Energy Agency (IEA) CO_2 Capture Ready Plants (2007). However, the information provided in the PER is insufficient to provide assurance that the proposal will meet the IEA guidelines. The following statement from the IEA document was quoted in the PER: "Developers of capture ready plants should take responsibility for ensuring that all known factors in their control that would prevent installation and operation of CO_2 capture have been identified and eliminated. This might include: A study of options for CO_2 capture retrofit and potential pre-investments. Inclusion of sufficient space and access for the additional facilities that would be required. Identification of reasonable route(s) to storage of CO_2." The EPA should also note that the IEA guidelines further states that "Competent authorities involved in permitting power plants should be provided with sufficient information to be able to judge whether the developer has met these criteria". (Department of Environment and Conservation - Strategic Policy Division)	See response to Submission Item 78 above.
87.	The technologies for capture and geological storage of carbon dioxide are all technically feasible. The integration of these and more particularly the capture of carbon dioxide from flue gases still requires further work to improve both technical aspects and commercial viability. The IEA guidance on CO_2 Capture Ready Plants, which the proponent has agreed to adopt, provides guidance on pre-investment options in Sections 7 to 10. Further technical and commercial viability studies should be undertaken by the proponent to select its preferred technology for carbon capture based on current best available information. The proponent should then assess its pre-investment options against the guidance provided in these sections. The section(s) relevant to the proponent's preferred technology for carbon capture should be used. Decisions on the adoption or otherwise of each pre-investment option are to be justified. In addition, the language used in the Conclusions section on page 3-140 ("some provisions can be made in the initial design to accommodate incorporation of carbon capture") suggests that provisions to the plan have yet to be made. The proponent should provide detailed information such as engineering drawings and diagrams to assure the EPA that these provisions have been made. (Department of Environment and Conservation - Strategic Policy Division)	These issues are addressed in detail in Section 4.1.2.
88.	The PER states that "space will be available on the land immediately adjacent to each of the new generator units to accommodate the measure" (page 3-140). It is unclear how much space will be available for facilities required for carbon capture. The proponent has not provided a diagram of the proposed layout of the coal-fired generation components and the carbon capture components. The IEA CO_2 Capture as a Factor in Power Station Investment Decisions and CO_2 Capture Ready Plants documents provide some guidance on the minimum plant footprint of various carbon capture plants. (Department of Environment and Conservation - Strategic Policy Division)	These issues are addressed in detail in Section 4.1.2.

Item	Submission	Response
89.	The executive summary of the IEA guidelines states that the first step in the identification of reasonable route(s) to storage location is the identification of these storage locations and further states that "The requirements for qualifying a storage reservoir for a capture ready plant will have to be defined by policy makers". The OCC considers that a plant that is carbon capture ready is pointless without the identification of a suitable geosequestration site capable of sequestering the captured carbon dioxide gas. The Lower Lesueur Formation has been identified by Varma et al (2007) (as quote in the PER) as a conceptually suitable site for geosequestration. However no information has been provided on the storage capacity of the Formation. The OCC is concerned that the proponent has yet to identify a site with the capacity to sequester the total captured carbon dioxide. The estimated carbon dioxide emission from the proposal is approximately 3 1 million tonnes per annum. If 90% of the carbon dioxide is captured, the total amount of carbon dioxide to be geosequestered is approximately 84 million tonnes over the project's lifetime of 30 years. The timeframe of 30 years used in this calculation results in the maximum amount of carbon dioxide to be geosequestered and represents the worst case scenario. The proponent should identify one site or a few sites each capable of sequestering the total amount of captured carbon dioxide for the lifespan of the power plant. Once the preferred site(s) is identified, the proponent's decision should be peer-reviewed by an independent third party. The proponent should also assess potential route(s) to preferred geosequestration site(s) and identify any potential barriers to using their preferred site(s). (Department of Environment and Conservation - Strategic Policy Division)	These issues are addressed in detail in Section 4.1.2

Item	Submission	Response
90.	A carbon capture ready plant offers the potential for greenhouse gas abatement sometime in the future. Actual greenhouse gas abatement occurs only when CCS is implemented. The Queensland Government published its new climate change ClimateQ: toward a greener Queensland, in July 2009. Part of the strategy includes the condition that all new strategy, coal-fired power stations should utilise world's best practice technology, be carbon capture ready and retrofit carbon capture and storage technology within 5 years of the technology being proven at a commercial scale (Queensland Government, 2009). The Queensland Government currently defines carbon capture ready as the requirement for proponents to demonstrate that new plants have been designed with plans and milestones for incorporation of operational CCS, and that there are no known barriers to installation once the technology has been proven on a commercial scale". This strategy is similar to an approach proposed by the United Kingdom (UK) Government. The UK is proposing that all new coal fired power stations be required to retrofit CCS to their full capacity within 5 years of the UK Environment Agency concluding that CCS is economically and technically proven (UK Department of Energy and Climate Change, April 2009). Current best practice in Australia, as defined by the Queensland Government, requires a carbon capture ready plant develop plans and milestones for the incorporation of CCS. The OCC recommends that the proponent be required to prepare a feasibility study for carbon capture and storage implementation similar to the study proposed by Coolimba Power Pty Ltd. Furthermore, the proponent should be required to submit the feasibility study and any updates to the EPA for approval. If a fully functional emissions trading scheme (ETS) is not in place when CCS is judged feasible, the proponent should be required to retrofit CCS to the project's, full capacity within a set timeframe. (Department of Environment and Conservation - Strategic Policy Division)	These issues are addressed in detail in Section 4.1.2
91.	The PER has not demonstrated sufficient understanding of the current state of greenhouse gas mitigation policies and proposed greenhouse gas abatement technologies and associated guidelines. The OCC considers that the information contained in the PER document is insufficient to determine if the greenhouse gas emissions of the proposal can be managed in an environmentally acceptable manner. The CPRS in its current form has yet to be supported by the Senate. The proponent should be required to develop a comprehensive greenhouse gas management plan in the event that the CPRS will not be implemented. A carbon capture ready plant has been proposed as a greenhouse gas management measure. The information provided in the PER is insufficient for the OCC to determine if best practice in designing a carbon capture ready plant has been adopted. The OCC considers that a plant that is carbon capture ready is pointless without the identification of a suitable geosequestration site capable of sequestering the captured carbon dioxide gas. A suitable geosequestration site capable of storing all of the capture carbon dioxide gas from the power plant has yet to be identified. (Department of Environment and Conservation - Strategic Policy Division)	These issues are addressed in detail in Section 4.1.2

7.2.5 Noise

Item	Submission	Response
92.	Table 3.16 Assigned levels for all premises The notes to this Table give definitions for the various noise metrics; these differ from the definitions in the regulations, and should be amended to be in accord with the definitions in regulation 8. (Department of Environment and Conservation, Noise Branch, *Draft PER*)	Noted. PER was approved for release prior to receipt of these comments.
93.	2.2.1 Previous investigations The PER rightly refers to the findings of the Collie Basin Management and Planning Working Group draft report of 2009 regarding the detailed noise propagation study carried out at this site by Herring Storer Acoustics in 2008, indicating that the 'noise shed' for the Coolangatta estate is effectively full with the Bluewaters 3 and 4 developments. However the PER should also refer (either here or in the later discussion about noise modeling results) to another finding of the report, namely that there is some risk that the SoundPlan model may underpredict noise emissions under worst case conditions in this area. Given that the results in s2.4.1 indicate that compliance with the noise requirements will be marginal (based on the SoundPlan model) there is a need for some discussion on this point in the PER. The CBMPWG report indicates that DEC is to produce a report (based on the findings of the noise propagation study) that identifies suitable noise model adjustments that should be applied to the standard noise models for the Collie Basin area, to account for sound propagation in this area. As DEC is yet to produce this report, it is not expected that the PER should outline any such model adjustments. However, the PER discussion should point out that there is some potential risk that noise immissions may be higher under worst case conditions for sound propagation than the levels indicated by the SoundPlan model, and outline the main factors involved. (Department of Environment and Conservation, Noise Branch, *Draft PER*)	Noted. PER was approved for release prior to receipt of these comments.
94.	2.4 Assessment of potential impact As far as the inputs and outputs of the noise model are concerned, I am satisfied that the PER is reasonably consistent with previous modelling for Bluewaters 1 and 2 and with my own analysis conducted in 2005. The discussion in s2.4.1 concentrates on the noise levels predicted at the SCA boundary, and while this may be a critical location, there should also be discussion about the implications of predicted noise levels at the eastern side of Collie and at residences to the north of the Bluewaters site, particularly in relation to cumulative noise levels. This would also be a good place to discuss the risk of higher noise levels and the factors involved, as mentioned above. (Department of Environment and Conservation, Noise Branch, *Draft PER*)	Noted. PER was approved for release prior to receipt of these comments.
95.	2.6.2 Operation The commitments here need to give a stronger process for ensuring that the sound power levels used in the model will be achieved in practice, along the lines of the Works Approval process for Bluewaters 1 and 2. (Department of Environment and Conservation, Noise Branch, *Draft PER*)	Noted. PER was approved for release prior to receipt of these comments. See Reponses to Submission Items 100,101 and 102 below.

Item	Submission	Response
96.	2.6 Environmental Outcome This section should give a succinct summary of the implications of the results for the eastern side of Collie and at residences to the north of the Bluewaters site, as well as for the SCA. The statement that 'noise levels will not significantly exceed 35dB(A) at the SCA boundary near the Collie-Williams Road' needs explanation in terms of the likely degree of exceedance and implications. (Department of Environment and Conservation, Noise Branch, *Draft PER*)	Noted. PER was approved for release prior to receipt of these comments. See Reponses to Submission Items 100,101 and 102 below.
97.	Ministerial Statements 685 and 724 These Statements refer to a specification in the Key Proposal Characteristics Table that requires each plant to achieve a noise level less than 60 dB(A) at 150 m from the plant and less than 29 dB(A) at the-nearest residence in Collie. The PER does not discuss whether compliance with these requirements is met, and the scale of the noise maps presented in the PER does not enable the noise level at 150 m to be evaluated. If one of the Phase III or IV power stations were to be treated as a point source of sound power 116 dB(A), a simple prediction would indicate a noise level at 150 m of about 68 dB(A). From this close distance the power stations are not well represented by a single source, and it is likely that the noise level at 150 m will be less than this value. The issue of noise levels at 150 m needs to be addressed in the Response to Submissions. (Department of Environment and Conservation, Noise Branch)	See Reponses to Submission Items 100,101 and 102 below.
98.	The cumulative noise scenario that is presented in the PER includes contributions of 30 dB(A) from Coolangatta Industrial Estate, 33 dB(A) from Ewington I mine, 26 dB(A) from Ewington II and 25 dB(A) from Collie Power Station, making a total of 35 dB(A) on the east side of Collie. These contributions can be accepted as a starting point. The predicted level from Bluewaters 1 to 4 is at 29 dB(A) in the PER; the 25 dB(A) contribution from Collie Power Station would rightly include both Collie A and B; and the predicted level of 26 dB(A) from Ewington II mine appears realistic. All of these contributions are reasonably consistent with previous predicted levels. The predicted level of 33 dB(A) from the Ewington I mine is considered to be the most difficult to achieve of these contributions, given that the operation will be relatively close to the Collie townsite. The implication of the Collie Basin Acoustic Study is that there may be some risk that worst case cumulative noise levels may be higher than the predicted levels generated by SoundPlan. In this case, it is noted that the various noise sources are distributed over a significant area, and it is unlikely that 'worst case' sound propagation conditions will apply to all sources at the one time. This was noted in the discussion regarding the application to real noise sources, where the implication from the 'uncontrolled' measurements was that worst case measured noise levels may be of the order of 3 dB(A) above the predicted levels. The sources most likely to be 'significantly contributing' to an exceedance of the assigned level of 35 dB(A) in such a case (i.e. contributing more than 30 dB(A)) would be the Ewington I mine and Bluewaters 1 to 4 power stations. Clearly, management of noise emissions from these two sources is critical if compliance with the noise regulations is to be maintained with regard to noise immissions in the Collie townsite (and at other locations). (Department of Environment and Conservation, Noise Branch)	See Reponses to Submission Items 100,101 and 102 below.

Item	Submission	Response
99.	Given the discussion above regarding the risk that worst case noise levels may be higher than the predicted levels in the PER, the design and implementation of monitoring program will be important in assessing the noise immissions under the range of meteorological conditions. The Response to Submissions should provide further detail on how this program is expected to be set up. Similarly, the implementation of best practicable noise reduction measures for Bluewaters III and IV will require a detailed procedure for specifying and verifying the various noise reduction measures. A more detailed description of how this procedure is envisaged to operate; in conjunction with the DEC licensing process, is requested as part of the Response to Submissions. (Department of Environment and Conservation, Noise Branch)	See Reponses to Submission Items 100,101 and 102 below.
100.	Technical response to the findings of the Collie Basin Acoustic Study that point to a significant risk that the predicted levels using SoundPlan (CONCAWE) will be below the EPA's 'worst case' scenario. (Department of Environment and Conservation, Noise Branch)	Griffin is aware that SoundPlan could under-predict the "worst case" propagation conditions, based on recent experience with projects around Collie, and the Collie Basin Acoustic Study. It is proposed to address the issue by "calibrating" the SoundPlan model for Bluewaters Phases III and IV using field measurements carried out for Bluewaters Phases II and II, under maximum propagation conditions within the Collie Basin. This information, coupled with Sound Power Level measurements of Bluewaters Phase I (possibly II) will be utilised to ensure that the SoundPlan modelling reflects the unique meteorological conditions that occur within the Collie Basin.
101.	Response to the above comments regarding compliance with noise criteria and the implications for cumulative noise emissions. (Department of Environment and Conservation, Noise Branch)	The SCA boundary, and the set criteria at this boundary, will remain the criteria for Bluewaters Phases III and IV. Compliance at these locations, will ensure noise emissions associated with Bluewaters Phases I to IV are such that the power stations, in locations where other sources could contribute to the overall noise level, that they will significantly contribute to noise emissions at noise sensitive premises.

Item	Submission	Response
102.	In relation to noise management, a response providing more detail as to how the noise monitoring program and the noise reduction design procedure are envisaged to operate. (Department of Environment and Conservation, Noise Branch)	As a part of the commissioning process of Bluewaters Phase I, noise level measurements both in the far and near fields were undertaken to determine both compliance with the set limits at the SCA boundary and to determine areas/sources within the power station that contribute to the far field noise levels. The areas/sources identification procedure were used to determine where noise reductions will be of most benefit to achieving compliance in the far field. It is proposed to continue with the above procedure, with further far field measurements and near field during the commissioning of Bluewaters Phases II, III and IV. Sufficient measurements will be undertaken in the near field during the commissioning of Bluewaters Phase II such that the contribution of Phase III will be able to be determined (i.e. the contribution to near field noise levels associated with Bluewaters Phase II will be available to ensure the contribution of Bluewaters Phase III can be fully resolved). A similar procedure is proposed with Bluewaters Phase IV.
103.	Noise emissions are often of concern to residents of the Shire of Collie. Unusual atmospheric conditions can lead to noise transmission different to that expected in models leading to complaints, so noise reduction at source is considered the most effective means to address this issue. The Griffin Group has stated that it would comply with Part V of the Environmental Protection Act 1986 and the associated noise regulations and has stated a target level below that required by the noise regulations, but has not provided a general commitment to tackling noise at source. The statement in the PER that "Noise reduction measures will be incorporated into the design of .Bluewaters Phases Ill and IV and retrofitted into Bluewaters Phase I and II" ..."with a view to achieving a target level of 28 dB(A)" (see page 3-120) should become a commitment. A clear commitment to achieving noise reduction at source should be provided. (Shire of Collie)	Noise levels at sensitive premises are regulated by Environmental Protection (Noise) Regulations 1997, and the proposal will be obligated to comply with those requirements. Planning approval will require demonstration that the required noise levels at the Special Control Boundary will be met. Griffin consequently believes that noise emission levels are adequately controlled under existing legislation without need for further regulation under Part IV of the *Environmental Protection Act 1986* as implied in the submission.

7.2.6 Surface and groundwater

Item	Submission	Response
104.	While general reference is made to sourcing water for the power station from mine dewatering (unless a water utility comes on line, possibly using Wellington Dam), no information was provided for the potable water supply treatment. Bluewaters will need to address the following: • Compliance with the Australian Drinking Water Guidelines 2004. • Establishment of drinking water quality reporting procedures with Department of Health. • Establishment of a Drinking Water Quality Management Plan. The model and ancillary documents attached. (Department of Health, *Draft PER*)	The comments are noted. Griffin is legally obliged to provide a safe working environment and conditions for its workforce, which would include the provision of safe drinking water.
105.	Assessment of leaching potential from coal combustion residues The proponents are likely to be correct in indicating that the proposed method of dry disposal of diluted coal combustion residues is an improvement on historical methods of disposing these materials in wet slurry dams where large amounts of leachate were generated and discharged to groundwater. However, it is also important to note that co-disposal with overburden may only reduce the rate of discharge of contaminants to groundwater, and may not reduce the mass of some contaminants by adsorption or chemical reactions in the vadose zone to the extent predicted in the proposal. This is because mine waste materials in the Collie Basin typically have a limited acid-base buffering capacity to neutralise leachate from coal combustion products which is predicted to be acidic. The proponents appear to have relied to a large extent on a study from the US to argue that there will be minimal long-term impacts on groundwater from the proposed disposal method, but insufficient information has been provided to indicate whether the cited case study is relevant for ash generated from the combustion of coal from the Ewington deposit. The US Department of Interior, Office of Surface Mining Regulation and Enforcement (OSMRE) generally recommends that the proposed method of ash disposal does not take place without lime treatment if the pH of leachate from these materials is less than 6 due to the enhanced risk of metals leaching to groundwater. Additionally, the US Board of Earth Sciences and Resources (2006) recommends that wherever possible, overburden materials should be compacted or treated with cements to ensure that the permeability of the overburden/coal combustion product fill is less than 10-7 cm/s. The following conclusion was drawn in this document: "Of the three methods currently available for the disposal of coal combustion residues (CCRs) – i.e. surface impoundments, land filling and mine filling – comparatively little is known about the potential for mine filling to degrade groundwater and/or surface water quality over longer time periods. Additionally, there are insufficient data on the contamination of water supplies by placement of CCRs in coal mines, making human risk assessments difficult. Thus the committee concludes that the presence of high contaminant levels in many CCRs may create human health and ecological concerns at or near some mines over the longer term". International best practice for managing coal combustion products is to reduce the volume of material disposed of to ground by utilising these materials to produce cement, road aggregate etc. (Department of Environment and Conservation, Environmental Management, *Draft PER*)	The co-disposal of ash with mine overburden has undergone extensive investigations with respect to the Bluewaters Phase I and II proposals, and further work has been undertaken in support of the Bluewaters Phase III and IV proposal (See Appendix 6 of the PER for a specific environmental impact assessment of the Bluewaters Phase III and IV ash disposal proposal). The approvals of the Ash Management Plans for Bluewaters Phase I and II were extensively discussed with the DEC and supported by a range of investigations. The Bluewaters Phase III and IV Ash Management Plan presented in the Operation Environmental Management Plan (see Appendix 2) is based on the approved Bluewaters Phase I and II plans and additional investigations and modelling of potential impacts on groundwater. See also response to Submission Item 109 below.

Item	Submission	Response
106.	Groundwater abstraction and acid mine drainage Cooling water for the power station is currently being obtained from mine dewatering and will continue to be in the proposed expansion. The proponents indicate that the mine dewatering has already been approved by government and is beyond the scope of the draft PER. Whether or not this is the case, it is likely that mine dewatering is the principal cause of widespread acidity and metal contamination of shallow groundwater in the area which has the potential to cause impacts on ecosystems in groundwater discharge areas. The issue of acid mine drainage has yet to be adequately addressed in the Collie region. (Department of Environment and Conservation, Environmental Management, *Draft PER*)	The issue is noted, but is outside the scope of the proposal and its assessment.
107.	Assessment of environmental hazards from ash leachate Leachate from coal combustion products often contains elevated concentrations of metals and metalloids that may cause environmental harm on discharge to aquatic environments. In particular, selenium and mercury can cause significant environmental problems due to the ability of these elements to be biomagnified in local food webs. The potential environmental risks of leachate in the current proposal have been inadequately characterised, partly because analytical detection limits of leachate testing were inappropriately high for key analytes like selenium, mercury and lead, and partly because exposure pathways for environmental receptors have not been adequately assessed. The proponents are assuming that leachate will be captured by pit lakes that will exist after mining has ceased, but the potential environmental exposure of wildlife that might use pit lakes as a food source have not been considered. In particular, "top predators" like bird populations are vulnerable to selenium teratogenic poisoning as a result of biomagnification of selenium in closed systems where there is a large component of evapotranspiration. For information on undertaking a risk assessment for selenium, the proponents should refer to Lemly (1985, 2002, 2007). For initial guidance on undertaking ecological risk assessments for other metals and metalloids, the proponents should utilise the risk assessment guideline available on the DEC Contaminated Sites web page. (Department of Environment and Conservation, Environmental Management, *Draft PER*)	The comment is largely speculative and not supported by evidence from the pit lakes that have been present in the Collie Basin for many decades. See response to Submission Item 105.

Item	Submission	Response
108.	The issues arising from the Bluewaters Power Station Phase III and IV (B/W 3/4) proposal that are relevant to the DoW can be categorised broadly under two headings: Water Supply - the supply of 6.5 GL per annum of fresh water to B/W 3/4 Water Source Protection - the management of potential impacts from B/W 3/4 on the water resources of the Upper Collie Catchment during construction and over the operational lifetime of the power station The DOW can confirm that the Draft PER document, in the main body of text and through specific appendices one, two and 13, contains adequate references to and consideration of water resources issues associated with the Bluewaters Power Station Expansion Phases III and IV proposal. It would appear that the necessary measures to develop construction and operational management plans for B/W 3/4 have been considered (Appendices one and two), and found acceptable. However, the issue of water supply and the risks associated with the power stations having an operational dependency on a supply of mine dewatering water are yet to be fully resolved. The proponent's position is that "water requirements for the proposal will be nominally supplied from dewatering at the Ewington Mining Operations, unless a water distribution and disposal utility commences operation in the Collie Basin as proposed by the DoW, in which case water would be taken from the utility under contract" (PER p. 3 - 145). The final position on a 'Collie Water Utility' has not been finalised and the PER should not be linking a "waste water disposal utility" as a pre-condition of the proponents water supply strategy as indicated here. The DoW's preferred position on the provision of water to B/W 3/4 is through the establishment of a 'Collie Water Utility', to which the Government will notionally assign all future dewatering water. The water utility, which would receive and distribute water sourced from within the Upper Collie catchment, has been proposed to provide equity between competing users by managing water supply and access through a central, integrated, coordinated market mechanism. Until the utility is formally established, water supply to the B/W 3/4 proposal would be assessed predominantly under existing circumstances. Whilst the DoW expects that the Water Utility will become operational in time for the commissioning of B/W 3/4 (if the power station gains EPA approval) it should be noted that in terms of the DoW's decision making process, any provision of dewatering water to the B/W 3/4 project, as a primary supply source, must be based on existing dewatering licenses, i.e., Ewington or Premier mines. Finally, water policy in Western Australia is driven to ensure the most efficient and highest value use of water resources. In view of the DoW's commitment to increasing accountability for water use, it is important to note that the B/W 3/4 proposal does not include any options for alternative cooling technologies, such as dry cooling, at the power stations. This may well be an issue when the PER is open for the public review period. In conclusion, the DoW is satisfied within the confines of its legislation and water policy in the Upper Collie Catchment, that issues relevant to the DoW have been adequately addressed in the PER document. The DoW will provide a major response to the PER when it is released for public review. (Department of Water, *Draft PER*)	The comments are noted. The proposal to utilise dewater from mining is a preferred position, but it is acknowledged that this will be subject to approval by the Department of Water though the licensing provisions of the *Rights in Water and Irrigation Act 1914*. Administration of these provisions is independent of the environmental approval of the proposal (except if the proposal is not approved) and this is explicitly acknowledged in Chapter 6 Section 2.2.1 (Table 6.2) of the PER. The requirement for the proposed water supply utility to provide a waste water disposal function is a view that has been expressed publicly by The Griffin Group on several occasions as the issues of managing and coordinating saline water disposal are considered to be as pressing as the need for a similar function for the provision of water supply. It is not expressed as a “pre-condition” of acceptance of any potential future requirement to utilise water from the proposed utility, it is simply expression of a proponent viewpoint.

Item	Submission	Response
109.	Appendix 6 - The South West Region is concerned with the proposed ash management and investigations undertaken to date. The proposed management appears consistent with Bluewaters I & II, in which the proponent outlined an overburden to ash ratio of between 100:1 and 10:1 (typically between 50:1 and 100:1). The South West Region understand that the current mixing ratio may be closer to the 10:1 due to the volume of overburden required (SWR has a letter from Griffin indicating they cannot meet the 100:1 ratio due to limited separation distance (>10 m) to groundwater levels and lack of overburden. For example at a mixing ration of 1:100 and given that Bluewater I & II will produce 364 000 tonnes of Ash per year then 36 400 000 tonnes of overburden is required to be mixed with Ash annually. It could be assumed this would double for Bluewater III & IV to 72 000 000 tonnes per year of overburden. Also, the proposed procedure for mixing may not result in a homogenous mix of ash and overburden and may result in the generation of sheets/pockets within the backfilled area. These pockets or sheets may result in significant concentration of metals leached into the environment. (Department of Environment and Conservation, South West Region, *Draft PER*)	Griffin is cognisant of the need to dispose of ash material from the existing Bluewaters Power Station (Phase I & II) and the proposed expansion (Phase III & IV) in an appropriate manner. As detailed in Griffin's letter to the DEC South West Region (dated 11 December 2008), Griffin aims to dispose of ash over live tip heads where the target co-disposal ratio of between 1:50 and 1:100 ash to overburden will be achieved. Alternative co-disposal methods may be adopted in the event of operational constraints such as the lack of live tip heads but these will meet the necessary separation distance from the water table (10 m) or dump height criteria (15 m of overburden above ash co-disposal areas). Griffin has received hydrogeological advice that indicates that as long as these co-disposal criteria are met, and that the duration of direct exposure to elements of co-disposed ash is minimised, risks from ash interaction with infiltrating rainfall would be limited. Regardless, ash disposal will be conducted in accordance with an Ash Management Plan similar to that developed and approved by the EPA for Bluewaters Phase I and II in February 2009. A copy of the plan is incorporated within the Operation Environmental Management Plan re-presented in Appendix 2 of this report). The plan includes contingency measures and corrective actions that will be implemented in the event that ongoing surface and groundwater monitoring indicates potential impacts are occurring. In addition, co-disposal practices will be reviewed on an ongoing basis to optimise the disposal methodology within the context of ongoing mining constraints and availability of overburden.
110.	While general reference is made to sourcing water for the power station from mine dewatering (unless a water utility comes on line, possibly using Wellington Dam), no information was provided for the potable water supply treatment. Bluewaters will need to address the following: Compliance with the Australian Drinking Water Guidelines 2004. Establishment of drinking water quality reporting procedures with Department of Health. Establishment of a Drinking Water Quality Management Plan. The model and ancillary documents attached. (Department of Health)	See response at Item 104 above.

Item	Submission	Response
111.	The Upper Collie River Basin (the Region) is a key component of the State's economy and will remain at the heart of industrial development in the South West for the foreseeable future. For current industry to remain operational and for planned developments to proceed, the management of water abstraction, quality and long term supply for industrial purposes are of paramount importance. (Department of State Development)	Noted and agreed. No response considered necessary.
112.	The Upper Collie Water Allocation Plan (2009) supersedes the CWAG policy on water management for the Region and provides new objectives and policies for allocating water in the Region. (Department of State Development)	Noted. No response considered necessary.
113.	In view of current water supply/demand forecasts for the Region, there is a very high risk associated with power stations having operational dependency on the supply of mine dewatering water in the medium to long term. Even if Griffin's Muja South coal mine is commissioned over the next five years, there could be significant water supply shortfalls during the latter years of the life of the Bluewaters Power Station Phase III and IV. (Department of State Development)	The issue is acknowledged through provision of a water supply strategy that provides for the development of contingency sources, if and when continuous monitoring and review of the future availability of mine dewater indicates that there will be a shortfall. This is set out in detail in Chapter 3 Section 4.4 and Appendix 13 of the PER.
114.	With water supply in the Region being such a crucial issue, it is imperative that Proponents of new power generation projects are required to consider alternative water optimisation measures, specifically innovative cooling technologies, including dry and hybrid cooling systems. As with all new industrial projects in the Region, Proponents should be encouraged to use new technologies to reduce use or remove the need for water use, particularly use of high quality water, in industrial cooling applications. (Department of State Development)	Griffin has considered a range of cooling technologies and has determined that water cooling as proposed is the best economically practicable means of achieving the required outcomes. Water in the cooling system is extensively recycled with treatment to minimise the feed water volume requirements and maximise water use efficiency.
115.	The Griffin Group has committed to preparation of an Ash Management Plan. The Executive Summary of the EIA for Ash Co-disposal for Bluewaters Ill and IV (the EIA) indicates that for overburden and ash a number of water quality parameters exceed drinking water quality standards for leachate from rainfall infiltration. It is common practice to identify "Environmental values" such as ecosystem health, or recreation and aesthetics, and then identify water quality criteria needed to maintain those environmental values. There are well established water quality criteria for a range of environmental values. The proposed Ash Management Plan should be required to assess the leachate concentrations in the context of explicitly stated environmental values that are likely to apply to groundwater in the region (e.g. recreational water quality guidelines should apply if groundwater fills mine voids that will be used for recreation). Based on that assessment, the Ash Management Plan should identify appropriate management measures (e.g. capping to prevent rainwater recharge, or no management if the relevant water quality criteria are not exceeded). Relying on dilution to achieve water quality criteria, as currently suggested in the EIA, is not supported. (Shire of Collie)	The comment is noted. However, dilution of potentially polluting discharges within an appropriately small dilution zone is generally accepted practice, based on the water quality requirements if downstream beneficial uses of the water are not being compromised. In this case, the dilution zone is sufficiently remote from any environmental or human uses of the water that would be compromised by the disposed material.

Item	Submission	Response
116.	There are no commitments to minimising water use and maximising water conservation. Minimising water use is a critical issue at this point in time. The Griffin Group should commit to continuous improvement (through research etc) to minimise water use at the Bluewaters Power Station, such as investigating dry cooling technology. (Shire of Collie)	See response at Item 114 above. Dry cooling is a substantially less efficient option than water cooling, and results in very high noise immission levels, which is a major issue in the vicinity of the Coolangatta Industrial Estate. The use of water available from dewatering of mines necessary to achieve safe mining is an opportunistic use of a readily available and suitable resource. The extent to which water demand can be minimised is directly related to the quality of the raw feed water, with less water being required if fresher raw feed water is available, through the opportunity for more recycling before salt concentrations reach critical levels (see Chapter 3 Section 4.3.1 of the PER for a more detailed explanation).
117.	The Upper Collie Water Allocation Plan (the water allocation plan) was released by the Department of Water during the public submission period for the PER. The water allocation plan states that water users should not rely on mine dewater as the only water source by any industry and that "they will need contingency water supplies" (p, 34). The Shire of Collie recognises that this is a difficult issue to address adequately in the PER, given that it appears that water needs are likely to exceed supply in the long term, and the feasibility of a water utility that could potentially supply industry's needs is still under investigation (see p. 30 of the Water Allocation Plan). (Shire of Collie)	Comment noted. No response considered necessary.
118.	Figure 3.33 Operational water balance — the-figures don't add up? (Shire of Collie)	The diagram represents a range of water flow paths, some of which are relatively fixed and some of which are highly variable, such as demineralisation plant overflow, fire fighting, washdown, etc. The diagram is intended to be indicative only.
119.	Site drainage will need to be addressed at the planning approval stage. (Shire of Collie)	Noted. No response considered necessary.

Item	Submission	Response
120.	It is a matter of primary importance to note that the PER has been prepared referencing water allocation principles established by the Collie Water Advisory Group (CWAG 1996 & 1999), particularly where the proponent assumes "that the primary use of groundwater resources (via mine dewatering) in the area is for power generation" (PER: p.3-144). The Upper Collie water allocation plan (2009) provides new objectives, positions and policies for allocating water in the Upper Collie catchment, including the Collie Coal Basin, and supersedes CWAG. The issues arising from the B/W 3&4 proposal, that are specific to the DoW, can be categorised broadly under two headings: Water Supply - the need to source 6.5 GL per annum of fresh water to meet the demands of B/W 3&4 over a design operating period of 30 years, Water Source Protection - the management of potential impacts from B/W 3&4 on the water resources of the Upper Collie catchment during construction and over the operational lifetime of the power station. (Department of Water)	The Upper Collie Water Allocation Plan was released after preparation and release of the PER. Prior to that time it is understood that the Cabinet endorsed Collie Water Advisory Group (CWAG) strategy applied to water management in the Collie Basin. It is not clear what process has been implemented to rescind the CWAG strategy in terms of Cabinet acknowledgment/acceptance as the Upper Collie Water Allocation Plan is understood to be a Departmental non-statutory plan. Nonetheless, Griffin understands that the Department of Water is responsible for managing water allocations in the region and intends to manage them in accordance with its plan.

Item	Submission	Response
121.	The PER document, in the main body of text and through appendix 13 (the DRAFT 'Bluewaters Water Supply Strategy', URS, June 2008) refers to and considers water resources issues associated with the B/W 3&4 proposal. This draft document states (p.7.1) that there are only three secure local water supply sources in the vicinity of the proposed power stations: Groundwater abstracted from the Collie Basin for the dewatering of coal-mining operations, Wellington Dam, and Water from mine voids. The DoW acknowledges that a secure water supply for B/W 3&4 is difficult to define at this stage of approvals however the DoW has developed a policy framework for managing and sharing water resources in the Collie basin through the Upper Collie Water Allocation Plan. The DoW recommends that water supply issues for this proposal are managed by the DoW through existing and emerging regulatory instruments. The Upper Collie water allocation plan clearly states that water users should not solely rely on mine dewater and the DoW will not permit additional abstraction entitlements to make up any shortfalls. In the case of B/W 3&4, the proponent's position is that "water requirements for the proposal will be nominally supplied from mine dewatering, unless a water distribution and disposal utility commences operation in the Collie Basin as proposed by the DoW, in which case water would be taken from the utility under contract" (PER: p.3-144). The DoW's preferred position on the provision of water to B/W 3&4 is through the establishment of a 'Collie Water Utility', to which the Government will notionally assign all future dewatering water. The water utility, which would receive and distribute water sourced from within the Upper Collie catchment, has been proposed to provide equity between competing users by managing water supply and access through a central, integrated, coordinated market mechanism. Accordingly, although the proponent has suggested that water from Ewington mines can satisfy all Bluewaters Power Station requirements for up to 20 years, it has also acknowledged that trigger points for alternative water supplies are necessary and these have been included in the water supply strategy to mitigate the risk of water supply failure. Trigger points in the proponent's supply strategy occur when monitoring reviews identify potential supply shortfalls in the availability of mine dewater outputs. (Department of Water)	The issue of the potential future unreliability/unavailability of mine dewater to the proposal is acknowledged through provision of a water supply strategy that provides for the development of contingency sources, if and when continuous monitoring and review of the future availability of mine dewater indicates that there will be a shortfall. This is set out in detail in Chapter 3 Section 4.4 and Appendix 13 of the PER. Griffin acknowledges that the Department of Water will manage water allocations to the proposal, as explicitly acknowledged in Chapter 6 Section 2.2.1 (Table 6.2) of the PER. It is not clear that the proposed water utility will be operational within the timeframe to provide the initial water supplies to the Bluewaters Phase III and IV expansion proposal and Griffin believes that sufficient mine dewatering product will be available to meet initial needs.
122.	With respect to water source protection it would appear that the necessary measures to develop construction and operational management plans for B/W 3&4 have been considered in the PER through Appendix 1 "Construction Environmental Management Plan" and Appendix 2 "Operation Environmental Management Plan". The DoW is satisfied that if the B/W 3&4 proposal is approved, construction and operation of the power station can be adequately regulated under part IV and part V of the Environmental Protection Act 1986 and will not result in impacts on the local water resources. (Department of Water)	Noted. No response considered necessary.

Item	Submission	Response
123.	In summarising, the Department of Water has no objections to the Bluewaters Power Station Phase III & IV. The DoW's position is consistent with the Upper Collie water allocation plan, which seeks to protect existing ecological, social and cultural values whilst protecting the security of supply for users and ensuring that water is used in the most efficient way to achieve the highest value use of water resources. Furthermore, how the energy industry manages water use is now a critical policy issue in Western Australia and a decisive one affecting the development of new power generating capacity. In the case of Collie, all of the current coal fired power stations have conventional wet-cooling systems that are water intensive. Elsewhere, coal fired power stations using dry-cooling technology, such as at Millmerran and Kogan Creek in Queensland, have been constructed enabling water demand to be reduced by as much as 90 per cent. The release of the Upper Collie water allocation plan has brought a new focus on the availability of water for conventional wet-cooled power stations in Collie. With water being such a crucial resource, it is imperative that energy policy drives new power generation proposals towards water optimisation measures, specifically innovative cooling technologies. In view of its overall commitment to increasing accountability for water use and its associated impacts, the DoW encourages the use of available technologies to reduce or remove the need for water, particularly high quality water, in industrial cooling operations. The DoW would recommend that all proposal for future coal fired power stations in the Collie district be designed with alternative cooling technologies, such as dry cooling. In the case of the Bluewaters proposal, the DoW strongly recommends that the proponents be required to investigate and report on the use of hybrid or dry cooling technologies in the project. Efficiency gains through technological advances would allow surplus dewater to be directed to other purposes and the highest benefit use, an integral position outlined in both the State Water Plan and the Upper Collie water allocation plan. (Department of Water)	Noted. The need to continually monitor the availability of improved water efficiency technologies and consequently employ them will be primarily driven by the economics and availability of water supply. As sources become scarcer, or more expensive to utilise, water use efficiency technologies provide a primary consideration. Dry cooling is a substantially less efficient option than water cooling, and results in very high noise immission levels, which is a major issue in the vicinity of the Coolangatta Industrial Estate. The proposed use of water available from dewatering of mines necessary to achieve safe mining is an opportunistic use of a readily available and suitable resource. As outlined in detail in Chapter 3 Section 4.3.1 of the PER, less water is required if fresher raw feed water is available, through the opportunity for more recycling before salt concentrations reach critical levels (see Chapter 3 Section 4.3.1 of the PER for a more detailed explanation). If lesser amounts of higher quality are available as feed water, the blowdown volumes requiring disposal are also substantially reduced.
124.	Cooling water for the Bluewaters power station is currently being obtained from mine dewatering and will continue to be in the proposed expansion. It is likely that mine dewatering is the principal cause of widespread acidity and metal contamination of the groundwater in the area. There is a significant risk of the contaminated groundwater causing environmental impacts to ecosystems in groundwater discharge areas, such as pools within the Collie River, The Department of Environment and Conservation (DEC) considers the risk has not been adequately addressed in the proposal and measures have not been considered to mitigate potential environmental impacts from this issue. (Department of Environment and Conservation)	The proposal will not cause any discharge of water to the environment within the Collie River Basin. The issue of groundwater contamination as a result of mine dewatering is outside the scope of the Bluewaters Phase III and IV expansion proposal. The mining and associated dewatering is being undertaken by a separate commercial entity (Griffin Coal) and has been subject to a separate environmental assessment and approval. Dewatering is managed through licensing under the *Rights in Water and Irrigation Act 1914* by the Department of Water.

7.2.7 Pipeline construction

Item	Submission	Response
125.	In section 4.4 of Chapter 6 the proponent suggests that the geotechnical investigations required to determine the method of construction for the marine component of the pipeline have not been undertaken. The proponent commits to no 'blasting' provided the geotechnical conditions don't require it. Blasting in the marine environment is a significant issue and the PER should be clear on whether it is required or not so that it can be considered appropriately through the environmental impact assessment. *Recommendation: The proponent should complete the investigations necessary to determine whether blasting is required or not and include this information in the PER along with any management plans for limiting potential impacts.* (Department of Environment and Conservation, EPA SU Marine Branch, *Draft PER*)	The Construction Environmental Management Plan (CEMP) has been prepared on the understanding that there is a possibility that blasting will be required, and an outline suite of management actions are proposed accordingly to mitigate any potential adverse impacts. Griffin has committed to the preparation of a detailed Blasting Management Plan if the marine outfall proceeds and subsequent investigations demonstrate the need for blasting. Field investigations related to the need for blasting will be undertaken once it is clear that the marine outfall will need to be constructed by the proponent. The CEMP is presented at Appendix 1 of this report (amended in response to other submission matters).
126.	Table 2 Saline wastewater disposal - Terrestrial Environment - This section notes the occurrence of dieback sensitive species adjacent to the pipeline route, yet states "The terrestrial impacts will be of a temporary nature". This statement only holds true with effective management, particularly where the introduction of dieback has ongoing impacts and requires targeted hygiene management along the pipeline route. (Department Of Environment and Conservation - Environmental Management Branch, *Draft PER*)	The CEMP presented at Appendix 1 of this report) includes a Weed and Dieback Management Plan, to minimise the risk of dieback being transferred into disease free areas, and into any DEC managed conservation estate. This is acknowledged by DEC comments on the released PER (see Submission Item 134).
127.	Summary: There is insufficient information detailing the environmental impacts and management of the construction of the saline pipeline, and the final route. The proponent should provide further detail on environmental impacts of the construction of the saline pipeline and provide the final alignment for assessment; this should include mitigation and management of impacts and issues. Particularly if the final route enters the Leschenault Peninsula Conservation Park (class A) as the case may be. (Department Of Environment and Conservation - Environmental Management Branch, *Draft PER*)	The CEMP appended to the PER has been substantially modified to address the construction requirements associated with traversing the Leschenault Peninsula Conservation Park (addition of a Wetland Crossing Management plan and a Conservation Area Management Plan). The amended plan is presented at Appendix 1 of this report.
128.	Table 6.3 – Vegetation disturbance Page 6-231 refers to clearing widths of 30 m and 20 m in an environmentally sensitive area (ESA). These figures are inconsistent with reference elsewhere to a 20 m or 15 m width within an ESA. DEC recommends consistent reference to 20 m and 15 m within the ESA. (Department Of Environment and Conservation - Environmental Management Branch, *Draft PER*)	An amended CEMP presented at Appendix 1 of this report presents consistent reference to limit the clearing width of native vegetation in the construction corridor to 20 m, and to 15 m in areas of conservation value, unless otherwise approved by the DEC.

Item	Submission	Response
129.	Table 6.3 – saline wastewater discharge Include on page 6-232 an "Action" to 'Consult DEC as to the preferred location of pipeline route within Leschenault Peninsula Conservation Park, and where the route deviates from the existing Collie Power station pipeline easement'. The "Timing" should be 'Prior to pipeline construction'. No consultation has taken place with DEC regarding access to Leschenault Peninsula Conservation Park (class A). (Department Of Environment and Conservation - Environmental Management Branch, *Draft PER*)	An amended CEMP presented at Appendix 1 of this report contains a Conservation Area Management Plan with reference to the need to consult with the DEC prior to pipeline construction in any area of conservation value. The specific management action is: "*No ground disturbing activities shall commence within areas of conservation value until the pre-construction field survey for that area is complete and an interim report submitted to DEC for review, in accordance with the Weed and Dieback Area Management Plan (Section 5) and the Flora and Vegetation Management Plan (Section 4).*" This action is required to be taken prior to ground disturbing activities. A revised *Summary of impacts and management measures* presented at Table 9.1 of this report reflects the requirement to consult with DEC as requested in the submission comment.
130.	Appendix 1 – CEMP Dieback management on pipeline - The draft dieback plan as it would apply to Leschenault Peninsula Conservation Park requires significant modification to be acceptable to DEC. DEC recommends that the proponent liaise with DEC to develop this plan to the DEC's requirements. (Department Of Environment and Conservation - Environmental Management Branch, *Draft PER*)	The Dieback and Weed Management Plan in the amended CEMP presented at Appendix 1 of this report contains an additional requirement: "*Prior to entering areas of conservation value, all vehicles and construction equipment/machinery shall be cleaned down in accordance with the Conservation Area Management Plan (see Section 13).*" The Conservation Area Management Plan also makes direct cross reference to the Dieback and Weed Management Plan. The specific actions related to disease management in areas of conservation value as presented in the amended CEMP are consistent with requirements on major other pipeline projects recently implemented in WA. The DEC comments on the Weed and Management Plan as presented in the released PER appear to accept the plan as being satisfactory (see Submission Item 134 below).

Item	Submission	Response
131.	Operational Environmental Management Plan. Monitoring - work on Leschenault Peninsula Conservation Park must have a monitoring regime to match the risks and not the 'daily' regime that is suggested. i.e. more focus on: High risk periods (high rainfall and Phytophthora dieback conducive conditions). Boundary approaches. At any new phases. Arrival or use of any new equipment. Arrival or use of any new components. Arrival of any new contractors. As a follow up to any breaches. (Department Of Environment and Conservation - Environmental Management Branch, *Draft PER*)	The Saline Wastewater Disposal Management Plan within the Operational Environmental Management Plan has been amended to include the following management action under *Pipeline maintenance*: "*Consult with DEC prior to entry into the Leschenault Inlet Conservation Park to determine access and management requirements and comply with those requirements.*" This will enable any work undertaken within the Park to be in accordance with specific requirements of the DEC that may be applicable to the particular form, location and time of work.
132.	The proposed pipeline route affects Wellington National Park and Leschenault Peninsula Conservation Park which comprise part of the State's formal conservation reserve system, and also traverses Harris River State Forest. I understand that no formal consultation with DEC has occurred to date with respect to management requirements for this aspect of the proposal. (Department Of Environment and Conservation)	An amended CEMP presented at Appendix 1 of this report contains a Conservation Area Management Plan that would apply to these Parks. The requirements as presented in the amended CEMP are consistent with requirements on several other major pipeline projects recently implemented in WA.
133.	Issue: Griffin Power proposes to directionally drill through coastal foredunes within the Leschenault Peninsula Conservation Park (class A) during construction of the pipeline for saline waste water disposal. *Recommendation 3: That the pipeline be located in more disturbed areas immediately north of Leschenault Peninsula Conservation Park to minimise associated clearing of native vegetation.* *Recommendation 4: Where avoidance of impact as proposed in Recommendation 3 is not practicable, it is recommended that the proponent adheres to its 'Marine Outfall Construction Management Plan' in conjunction with conditions to the same effect.* Discussion The marine outfall is planned to be constructed by using a horizontal directional drilling technique through the coastal dunes system between Leschenault Inlet and the ocean beach, and a temporary construction groyne across the beach to a 3.5 metre depth contour (using local limestone). The extent of impact on the sensitive foredune system and associated vegetation within Leschenault Peninsula Conservation Park is not clear. The PER indicates that some native vegetation is proposed to be cleared but does not yet demonstrate a commitment to avoidance, minimisation or mitigation measures for any impacts on the conservation park. The Marine Outfall Construction Management Plan provides for management measures to mitigate impacts primarily on marine flora and fauna. The horizontal drilling technique documented in that plan seems appropriate to minimise impacts on the foredune environment along with avoidance of the most sensitive sites. (Department Of Environment and Conservation)	The pipeline has been located to avoid two other marine outfall pipelines and their discharge zones immediately to the north. The proposal to construct the pipeline through the dune system via horizontal directional drilling is specifically designed to avoid native vegetation disturbance. The proponent commits to adhering to the Marine Outfall Construction Management Plan in the CEMP, and a requirement to do so is included in the proposed conditions of environmental approval set out in Section 8.2.1 of this report.

Item	Submission	Response
134.	Issue: It appears that the proponent has not consulted with DEC regarding access to, and impacts on, Wellington National Park, Leschenault Peninsula Conservation Park or Harris River State forest, which the proposed waste water pipeline route crosses. *Recommendation 5: That the proponent consults with DEC's Wellington District regarding hygiene management requirements (weeds and disease) in relation to works in Wellington National Park, Leschenault Peninsula Conservation Park or Harris River State forest, prior to ground-disturbing activities.* *Recommendation 6: That the proponent adheres to its Weed and Dieback Management Plan' in conjunction with any related conditions setting out required environmental outcomes and the process to achieve these outcomes.* *Recommendation 7: That the width of approved clearing of native vegetation within the corridor be limited to a maximum of 15 metres within gazetted Environmentally Sensitive Areas and the formal conservation reserve system, and 20 metres in other areas, as generally stated in the PER.* Discussion The proposed pipeline route for saline waste water disposal intersects Wellington National Park, Leschenault Peninsula Conservation Park and Harris River State forest. It appears that the proponent has not consulted with DEC's Wellington District. DEC recommends consultation with the Department's Wellington District regarding hygiene requirements prior to the start of any works within these areas. The PER acknowledges the potential for proposed works to spread Phytophthora cinnamoni (dieback), Perthida glyphopa (Jarrah leaf miner) and weeds to previously unaffected areas (pg 3-165). A 'Weed and Dieback Management Plan' has been developed and should be implemented in conjunction with appropriate conditions that specify the desired outcome in relation to weed and dieback management. The proponent has committed to a clearing width of 20 metres for construction of the pipeline with a limited clearing width of 15 metres in gazetted Environmentally Sensitive Areas. DEC recommends that clearing within the formal conservation reserve system should also be limited to a width of 15 metres. Page 6-231 of the PER document states that a width of 30 metres is proposed to be cleared and 20 metres within gazetted Environmentally Sensitive Areas. This appears to contradict references to widths of 20 and 15 metres throughout other sections of the PER and attached documents. (Department Of Environment and Conservation)	An amended CEMP presented at Appendix 1 of this report contains a Conservation Area Management Plan that would apply to these Parks. With respect to consultation, the plan specifically requires: "*Hygiene arrangements for entry to and within the Wellington National Park, Harris River State Forest and Leschenault Inlet Conservation Park will be made in consultation with the DEC (Environmental Management Branch)*." This requirement is repeated in the Weed and Dieback Management Plan within the CEMP. Griffin commits to implementation of the plan as a condition of environmental approval (see Section 8.2.1 of this report). The amended CEMP presented at Appendix 1 of this report presents consistent reference to limit the clearing width of native vegetation in the construction corridor to 20 m, and to 15 m in areas of conservation value, unless otherwise approved by the DEC. The plan specifies its applicability to construction activities in gazetted Environmentally Sensitive Areas, and all DEC managed land in the conservation estate.

7.2.8 Marine discharges

Item	Submission	Response
135.	The EPA's environmental quality management framework is discussed in Chapter 4, however, the environmental values that are to be protected around the proposed outfall have not been identified, apart from 'Ecosystem Health' (although not relevant to this specific area, Perth's Coastal Waters –Environmental Values and Objectives and Pilbara Coastal Water Quality Consultation Outcomes provide some useful guidance). To protect Ecosystem Health the proponent has proposed that a high level of ecological protection should apply generally in the vicinity of the outfall and that a low level of ecological protection should apply around the discharge zone. DEC agrees that a high level of protection should generally apply, but that for toxicants this means that the 99% species protection guideline trigger values apply, not the 95% species protection values that have been incorporated into Table 4.11. (Cockburn Sound is an exception, this is the only place where 95% species protection guidelines apply to a high level of ecological protection in WA marine waters.) With respect to the level of ecological protection that applies to the discharge zone, a low level of protection is not automatically applied to all discharges. The proponent is required to justify the need for a lower level of protection (low or moderate) and part of this argument would be the characterisation of the various constituents of the waste water – this has not been done. *Recommendations:* *i. The proponent needs to identify all the environmental values to be protected around the outfall and assess the quality of the outfall against protection of these values.* *ii. For toxicants the 99% species protection guideline trigger values from ANZECC & ARMCANZ (2000) apply in high ecological protection zones and the PER (and management plans) needs to be modified accordingly.* *ii. The waste water to be discharged needs to be characterised and justification provided for the level of ecological protection proposed for the discharge zone. If the proponent proposes an area where the level of ecological protection is to be reduced below 'High' then the area needs to be mapped in the PER and coordinates of the area provided* (Department of Environment and Conservation, EPA SU Marine Branch, *Draft PER*)	All environmental values are now included in an amended Saline Wastewater Disposal Management Plan within the Operation Environmental Management Plan presented in Appendix 2 of this report. The Oceanica report and memo presented in Appendices 17 and 18 of the PER have been have been updated with the ANZECC/ARMCANZ guideline values and are re-presented in Appendix 4 and Appendix 5 respectively of this report. A LEPA is required due to wastewater of a lower salinity being discharged into the ocean. Mixing will result in ambient salinity being achieved within 50 m of the diffuser and as such a 50 m LEPA is proposed. A figure showing the LEPA was provided as Figure 7.1 in the Oceanica report (see Appendix 4 of this report). Oceanica can provide a shapefile of the LEPA for the DEC if required.

Item	Submission	Response
136.	On page 4-195 and in Table 4.11 the proponent assesses conformance of the wastewater with EPA criteria and proposes licence conditions based on the minimum predicted dilutions. Because the wrong environmental quality guideline trigger values have been used (see comment 1 above) to determine the contaminant concentrations to be achieved after initial dilution, the proposed licence limits will need to be recalculated. The proponent should also note that for bio-accumulators the 80% species protection guideline needs to be met at the end-of-pipe, but the 99% species protection guideline also needs to be met after initial dilution. As discussed in comment 1 above and several of the comments below, the expected concentrations of all contaminants in the wastewater need to be provided, and in this section the proponent needs to show that the discharge can be managed to achieve the proposed licence limits. The proponent also needs to complete Table 4.11 by including TSS, chlorine and any other biocides, antiscalants and/or corrosion inhibitors that will be added to the discharge. The final concentrations for pH and salinity after initial dilution should also be provided. *Recommendations:* *i. The proposed licence limits in Table 4.11 should be re-calculated using the correct guideline trigger values and the table should be completed by including the additional parameters discussed above.* *ii. The proponent should provide a detailed breakdown of the concentrations of the various contaminants in the wastewater and indicate whether the proposed licence limits can be achieved.* (Department of Environment and Conservation, EPA SU Marine Branch, *Draft PER*)	The proposed licence limits table has been updated in the Oceanica report and memo presented in Appendix 4 and Appendix 5 respectively of this report. TSS has been added to the table. Chlorine, biocides, antiscalants and corrosion inhibitors have not been added as these will not be used. Salinity and pH after initial dilution were provided within the report. At this stage, Griffin cannot provide a detailed breakdown of the concentrations of the various contaminants in the wastewater. Griffin commits to treat the wastewater to meet the specified licence limits.
137.	The PER does not provide any information on the construction materials to be used for the cooling tower. This is important because experience has shown us that if the cooling tower is constructed from Copper Chrome Arsenate (CCA) treated timber then high levels of copper, chrome and arsenic are likely to leach into the cooling water (concentrations of 200 - 400 µg/L copper were measured consistently, and similar levels for chrome and arsenic, with peaks of >2000 µg/L copper). This is likely to have significant consequences for management of the discharge water and potentially for the adjacent marine environment. *Recommendation: The proponent needs to include in the PER what materials will be used in the construction of the cooling tower and, if CCA treated wood is to be used, then the PER will need to predict the likely cumulative concentrations of the three metals in the discharge water from all sources and show how these will be managed to ensure the identified environmental values are protected at the outfall.* (Department of Environment and Conservation, EPA SU Marine Branch, *Draft PER*)	CCA treated timber is likely to be used for construction of the cooling tower and the discharge water will be treated to ensure licence conditions are met.
138.	The proponent has only partly addressed the issue of whether the proposed Bluewaters outfall will impact on the ability of the neighbouring operators of adjacent diffusers to meet their environmental requirements. The discharge compliance zones for the other outfalls have not been considered in this assessment, but they need to be superimposed over the modelled discharge compliance zones for the Bluewaters outfall (Figures 4-11 and 4-12) to determine whether neighbouring operators will be impacted (Depending on diffuser design, neighbouring compliance zones may be significantly larger than the proposed zone of initial dilution for the Bluewaters discharge). Recommendation: Map the discharge compliance zones for the adjacent outfalls with the proposed Bluewaters outfall. (Department of Environment and Conservation, EPA SU Marine Branch, *Draft PER*)	There are no discharge compliance zones for the adjacent outfalls, however, interaction of the proposed discharge with other outfalls was investigated. This is further addressed in Section 5.2.1 of the Oceanica report presented in the PER and as amended in Appendix 4 of this report.

Item	Submission	Response
139.	The baseline water quality survey seems to have entailed profiles of dissolved oxygen, salinity, temperature, turbidity and pH at 8 sites along the proposed - pipeline alignment on a single occasion. This is vastly insufficient to characterise water quality at the site and to support the derivation of water quality criteria for the discharge if required. The waste water to be discharged needs to be characterised in the PER and the key contaminants of concern identified. Once this has been done the PER should determine whether there are suitable environmental quality criteria available for these parameters, or if not, then sufficient baseline sampling at an adjacent un-impacted reference site should be undertaken to calculate suitable environmental quality criteria (based on ANZECC & ARMCANZ (2000)) from the reference site data. This is essential for both the environmental impact assessment phase and for determining licence conditions. (Department of Environment and Conservation, EPA SU Marine Branch, *Draft PER*)	Baseline water quality data has been removed from the Oceanica report presented in Appendix 4 of this report. Suitable criteria have been defined by ANZECC/ARMCANZ so no further sampling is required. Characterisation of the wastewater cannot be undertaken at this stage, wastewater will be treated to meet licence limits as mentioned above.
140.	A number of statements are made in the 'Overview' for discharge modelling (Section 1.4.2 of Chapter 4) that relate to the quality of the waste water discharge, but which have not been substantiated in the PER with data. Statements such as '10 ML/d at 3 ppt' or 'discharge temperature is close to ambient and significant levels of contaminants are not expected to be present in the discharge water' need to be substantiated with data. The modelled scenario of 10 ML/d at 3 ppt is intended to represent a combined wastewater from multiple sources, each with unknown quality, at some point in the future. Either the proponent needs to be able to confirm the composition of the final discharge wastewater or it will need to show how it will manage the future inputs to the pipeline such that the environmental values of the marine environment are protected and the zone of influence of the discharge is contained and does not overlap with the other outfalls. (Department of Environment and Conservation, EPA SU Marine Branch, *Draft PER*)	Approval is being sought for construction of the proposal as defined in the PER, with the discharge of saline water from the Bluewaters Phase III and IV generator units being the only expected discharge in the short term (0.7 ML/d at 9170 mg/L TDS). The modelling has been based on discharge of substantially higher volumes and lower salinity than the expected Bluewaters discharge (10 ML/d at 3000 mg/L) to demonstrate a worst case, and to provide information to support construction of the pipeline capacity to enable future increases in the discharge if other industries in the Collie area require off-site discharge of saline water. Further details on dilution modelling at the expected flow of 0.7 ML/d has now been included in Section 5.2.1 of the amended Oceanica report presented in Appendix 4 of this report. Griffin has committed to treating the wastewater to meet licence limits imposed so, although the water quality is not precisely known at this stage, the EPA can be confident that water will not be discharged unless it meets the licence limits. Future inputs will be managed to meet the prevailing licensed discharge limits at the outfall, and will be a managed though contractual conditions if the pipeline is used for discharge by third parties.

Item	Submission	Response
141.	On page 4-187 the dimensions of the disturbance corridor for construction of the marine section of the pipeline are provided to calculate the area of predicted loss of BPPH. The predicted loss of BPPH should be based on a worst case scenario. It is therefore expected that the management plan for construction of the pipeline will limit impacts to within the given dimensions. It is noted in Section 1.5.1 of Chapter 4 that the proponent has only committed to limiting installation impacts to the "minimum width possible". If it is not feasible to contain impacts on BPPH to within the provided dimensions then the predicted loss of BPPH will need to be reviewed. *Recommendation: The proponent should review the size of the disturbance corridor associated with installation of the marine component of the pipeline and ensure that the commitments in the construction management plan are consistent with the area of predicted loss of BPPH.* (Department of Environment and Conservation, EPA SU Marine Branch, *Draft PER*)	Griffin confirms that impacts to BPPH will not occur outside the potential disturbance footprint shown in Figure 5.2 of the amended Oceanica report presented in Appendix 4 of this report and the "minimum width possible" referred to in the PER would be within this footprint.
142.	Predicted potential habitat (BPPH) losses, page 4-187. The text suggests that a maximum of 0.2% of any one habitat type (sand) will be lost within the mapped area. This appears to be an error since Table 4.6 suggests ~0.6% of reef habitat will be lost within the mapped area, although this will not change the conclusion that cumulative BPPH loss will be substantially below the cumulative loss guideline of 5%. *Recommendation: Modify the text to reflect the predicted loss of reef habitat.* (Department of Environment and Conservation, EPA SU Marine Branch, *Draft PER*)	The error has been corrected in the amended Oceanica report presented in Appendix 4 of this report.
143.	The Construction Environmental Management Plan and the Operational Environmental Management Plan provided in appendices 1 and 2 are both just general frameworks of a management plan and contain no detail. DEC advice is that these management plans are too general and deficient to indicate whether the proponent can manage the construction and operational aspects of the wastewater outfall to meet the EPA's objectives. An environmental management plan should include the following components: • the risks to the environment • the objective/goal for management • the actual performance indicators to be measured and how they will be measured (e.g. timing, location, frequency, measurement protocols) • the actual performance criteria that the indicators will be assessed against • how the measurement data will be compared against the performance criteria to determine whether they have been met • the management actions that will be triggered if the performance criteria have not been met • reporting (e.g. To whom, what information, timing, frequency, method) *Recommendation: It is noted that some of these components have been included in the two management plans, however, the proponent should revise and expand the plans to include all the components above.* (Department of Environment and Conservation, EPA SU Marine Branch, *Draft PER*)	The relevant plans have been substantially expanded in the amended versions of the Construction Environmental Management Plan and Operation Environmental Management Plan presented in Appendix 1 and Appendix 2 of this report, respectively.

7.2.9 Vegetation clearing

Item	Submission	Response
144.	Issue: Clearing of native vegetation (4.27 hectares) within the proposed power station site affects vegetation that provides foraging and potential breeding habitat for Carnaby's black-cockatoo, Baudin's black-cockatoo and forest red-tailed black-cockatoo. *Recommendation 1: That if the proposal is accepted in its current format, offsets be applied for the loss of foraging and potential breeding habitat of Carnaby's black-cockatoo, Baudin's black-cockatoo and forest red-tailed black-cockatoo.* *Recommendation 2: That if possible, native vegetation clearing should not occur during the breeding season for areas deemed to be active breeding sites (July to January, inclusive for all three species).* Discussion The clearing associated with the proposed power station site has been identified as likely to impact on 10 potential breeding hollows of either Carnaby's black-cockatoo (*Calyptorhynchus latirostris*) (threatened fauna under the Wildlife Conservation Act 1950, and listed as endangered under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act)), Baudin's black-cockatoo (*Calyptorhynchus baudinii*) (threatened fauna under the Wildlife Conservation Act and listed as vulnerable under the EPBC Act) and the Forest Red-tailed black-cockatoo (*Calyptorhynchus banksii naso*) (threatened fauna under the Wildlife Conservation Act). Additionally, the site has been identified as potential foraging habitat for black cockatoos. The area of loss of foraging and potential breeding habitat, while small in its own right, would contribute to ongoing reductions in the area of available habitat for these species. Griffin Power has committed to the establishment of 10 artificial nesting boxes in nearby vegetation, however this is not considered an adequate offset for the loss of 10 potential nest trees and the foraging habitat provided by the associated native vegetation. More suitable offsets, addressing both breeding and foraging requirements, should be applied if possible. (Department Of Environment and Conservation)	As presented in the PER, Griffin considers that the proposed clearing of trees on the power station site will not significantly affect the abundance or extent of Black Cockatoos in the area as vegetation will be retained locally (on site and in an area immediately to the south) and there are also large areas of potential habitat nearby within State Forest. Griffin reiterates the proposed management initiatives presented in the PER, and believes that these initiatives are commensurate with the potential environmental risks and impacts for the Project. The loss of breeding habitat is proposed to be offset by an extension of the Ewington 1 nesting box program. The loss of foraging habitat associated with the power station is small and considered to be insignificant in the context of the remaining surrounding local and regional habitat. The pipeline can be constructed without any loss of breeding habitat. Any loss of foraging habitat will be small in area comprising recent regrowth, and the disturbance will be temporary in nature. Regrowth of any disturbed foraging habitat will re-establish within a few years. The recommendation regarding vegetation clearing during the breeding season is noted. As detailed in the Construction Fauna Management Plan appended to the PER, a number of measures have been proposed in order to prevent or mitigate the potential impacts associated with vegetation clearing. Where possible, clearing will be avoided where there is a confirmed risk that the area is an active breeding site, except where they materially interfere with construction or are a safety concern. The Fauna Interaction Management Plan in the Construction Environmental Management Plan (presented in Appendix 1 of this report) has been amended accordingly to include the following: "*Where possible, native vegetation clearing should be avoided during the breeding season (July to January) where there is a confirmed risk that the area is an active breeding, except where they materially interfere with construction or are a safety concern.*"

Item	Submission	Response
145.	Issue: A number of the vegetation associations and complexes proposed to be cleared for the pipeline route have been depleted by previous clearing and development and impacts on these need to be more fully addressed. *Recommendation 10: That the proponent gives preference to one of the first two listed options of saline waste water disposal (existing Verve outfall or new water distribution and disposal facility).* *Recommendation 11: That, if the preferred two options for saline waste water disposal are not practicable and the proponent wishes to pursue the pipeline option, the proponent provides additional information on the nature and significance of impacts of clearing of vegetation associations and complexes that are under-represented in the bioregion.* *Recommendation 12: Where clearing of native vegetation for pipeline construction cannot be avoided, impacts on rare or depleted vegetation associations or complexes be appropriately evaluated and subject to mitigation/offset measures in accordance with EPA Position Statement No. 9.* Discussion The pipeline route for saline waste water disposal is proposed to be co-located within the easement utilised by Verve's ocean outfall pipeline, with the exception of a short deviation near the coast. It is noted that this is not the preferred option for cooling tower blowdown waste water disposal. However if this option is selected, approximately 22 hectares of clearing is proposed (of previously cleared areas) within a 118 hectare footprint. DEC acknowledges that clearing a previously disturbed area is preferential to clearing an undisturbed area, but a better option would be to avoid or minimise clearing. Vegetation associations and complexes within the easement that are located on the Swan Coastal Plain are under-represented in the State (i.e. there is less than 30 per cent representation of the pre-clearing extent within the bioregion). These impacts appear to have not been evaluated or their mitigation addressed in the PER. If the co-located pipeline route is selected, it is recommended the proponent offsets the impacts of clearing these units (which fall under the definition of critical assets as identified in EPA Position Statement No. 9). (Department Of Environment and Conservation)	The Griffin clear preference is access to the existing Verve outfall, if such access can be negotiated. While a wastewater disposal utility would provide an alternative preferred option, it is unlikely to be operational within the required timeframe, and the pipeline option provides the only viable alternative to use of the Verve outfall. Mattiske (2008) (copy presented in Appendix 5 of the PER) describes the vegetation associations and complexes along the proposed pipeline alignment, based on a field survey. The plant communities occurring within the survey area are described in detail and their distribution mapped using aerial photographs. At each site the tree species were recorded in a 20 m radius area and the understorey species were recorded in a 5 m radius from the central point of the site. Therefore the minimum radius of 5 m from the central point is equivalent to the 10 m x 10 m quadrats as used in the regional floristic studies. Mattiske (2008) notes that: "*The mapping types within the Collie Basin and the Darling Plateau are represented within the nearby State Forest areas, whilst those on the Swan Coastal Plain are less well represented in reserves. … … The majority of the communities on the Swan Coastal Plain along the proposed alignment are degraded. The exceptions include the Banksia woodlands (B1) and the near coastal stands of Agonis flexuosa (AF1 and AF2). In the latter cases the impacts is very minimal as the pipeline follows an established clearing within the AF1 and AF2 communities and within the B1 community the proposed clearing follows the fringes of the main coastal highway*." Mattiske (2008) concluded that "*Therefore, on the basis of the restricted size and the degree of modification, no plant communities listed as threatened ecological communities by the Department of Environment and Conservation [2008d] or the Environment Protection and Biodiversity Conservation Act 1999 [Commonwealth] are considered to be present within the survey area*." On the basis of the limited impact on critical assets, no offsets are considered justified.

7.2.10 Fauna

Item	Submission	Response
146.	The following conclusion is not supported by substantiated scientific literature; Chuditch numbers have increased in the area following an effective fox control program (p.xv). DEC report that the opposite has been observed with numbers declining in areas monitored. (Department Of Environment and Conservation - Environmental Management Branch, *Draft PER*)	The DEWHA website (http://www.environment.gov.au/cgi-bin/sprat/public/publicspecies.pl?taxon_id=330) referenced in the main body of the PER makes the following comment: "*Prior to the initiation of the European Red Fox (Vulpes vulpes) control program, highest densities of Chuditch were found in riparian (areas adjacent to lakes, rivers and wetlands) vegetation where food supply is better or more reliable, and the dense undergrowth may provide protection from predators (Orell & Morris 1994). With the implementation of the European Red Fox control, high densities of Chuditch have been observes in upland eucalypt woodland.*" DEC survey data on the website shows an increase in the numbers of mature individuals in the Jarrah Forest between 2001 and 2006. No change appears to have been measured in the Wheatbelt/Goldfields.
147.	Issue: Construction of the proposed pipeline may impact on native vegetation that supports Carnaby's black-cockatoo, Baudin's black-cockatoo and forest red-tailed black-cockatoo foraging and breeding habitat. *Recommendation 13: That the pipeline route is located to avoid loss of potential nesting habitat trees for threatened cockatoo species.* *Recommendation 14: If the proponent cannot avoid potential cockatoo nesting habitat trees, mitigation offsets be required.* Discussion The proponent has identified 44 large trees with potential hollows on the edge of, or immediately adjacent to, the 20 metre wide indicative pipeline route. The proponent has stated that most, if not all of these trees can be avoided in the pipeline design and construction. As the proposed pipeline is within an existing easement that has had prior disturbance, the clearing of potential habitat trees should not be required. (Department Of Environment and Conservation)	Mattiske (2008) (copy presented in Appendix 5 of the PER) notes the following: "*There were no significant trees within the alignment that were large enough or with hollows along the alignment as proposed. The latter is not surprising as the majority of the alignment is largely already cleared for other infrastructure facilities.*" A survey by Strategen (2009) of the power station site and pipeline route specifically for Black Cockatoo habitat (copy presented in Appendix 5 of the PER) concludes the following with respect to the pipeline: "*There are large trees with potential hollows on the edge of, or immediately adjacent to, the 20 m wide indicative pipeline route. Most if not all of these trees can be avoided in the detailed pipeline design and construction.*" It, therefore, is not expected that there will be any need to impact habitat trees along the pipeline route. The Fauna Interaction Plan within the Construction Environmental Management Plan (presented in Appendix 1 of this report) promotes avoidance of habitat trees.

Item	Submission	Response
148.	Issue: Impacts on fauna during the trench construction of the proposed pipeline route. *Recommendation 15: That approval of the pipeline is subject to the proponent adhering to the submitted 'Fauna Management Plan'.* Discussion Construction of the trench associated with the proposed pipeline route for saline waste water disposal may result in capture and mortality of native fauna. It is recommended that the proponent adheres to its 'Fauna Management Plan' and that this be required through appropriate conditions. (Department Of Environment and Conservation)	It is expected that implementation of the Construction Environmental Management Plan (presented in Appendix 1 of this report) will be a condition of environmental approval. The Fauna Interaction Plan is contained within that plan.
149.	Environmental Offsets - There is no evidence provided to verify that artificial cockatoo nesting boxes are an effective offset for removal of habitat trees. If artificial nesting boxes are the main strategy, this should be supported by detailed information. (Department Of Environment and Conservation - Environmental Management Branch, Draft PER)	Artificial cockatoo nesting boxes have been accepted as an offset for the Ewington I mine proposal. It is not clear why additional information as to their efficacy is required in this situation, as the proposal is to extend the approved Ewington I offset program to include the Bluewaters Phase III and IV offset.
150.	Clearing of native vegetation associated with the power station and pipeline may impact on foraging and possible breeding habitat for Carnaby's black-cockatoo, Baudin's black-cockatoo and the forest red-tailed black-cockatoo. If potential impacts on black cockatoos cannot be satisfactorily mitigated, offsets for residual impacts on these critical assets are considered to be warranted. (Department of Environment and Conservation)	See response at Item 144 above.

7.2.11 Pest control

Item	Submission	Response
151.	The proposed development, although not immediately adjacent to major natural mosquito breeding habitat, is situated in a region which can experience some nuisance problems and an increased risk of mosquito-borne disease such as Ross River virus (RRV) in some years. For example, in 200304 there were 15 cases of RRV disease notified from the Collie locality. Therefore it is important that the proponents have a mosquito management plan for the site to reduce the impact of biting mosquitoes and risk of mosquito-borne disease for employees. Any alterations of topography that result from the construction and installation of infrastructure (including pipelines etc.) and enhance retention or impoundment of rainwater and runoff, or that promote scouring, should be undertaken so as to minimise creating opportunities for mosquitoes to breed, Constructed water bodies (e.g. constructed wetlands, storm water management etc) can become prolific mosquito breeding habitat. All constructed water bodies installed or already existing as part of the previous phases of the project must be designed and regularly maintained consistent with the Chironomid midge and mosquito risk assessment guide for constructed water bodies (http://vvww public. health.wa.gov.au/3/695/2/mosquito management. pm). All existing water bodies should be regularly monitored for mosquito breeding and the presence of invasive vegetation, with control measures implemented where necessary to minimise the potential for mosquito-breeding. Information on developing mosquito management plans and on the management of wastewater and stormwater to minimise mosquito breeding is available from the Mosquito-Borne Disease Control Branch of the Department of Health or on the Department's website. (Department of Health, *Draft PER*)	There are no aspects of the proposal that involve construction and installation of infrastructure (including pipelines etc.) that might enhance retention or impoundment of rainwater and runoff, or that promote scouring. The open water storages in the water supply system to be used by the Bluewaters Phase III and IV units are part of the Bluewaters Phase I and II proposal, and are outside the scope of this assessment.
152.	The proposed development, although not immediately adjacent to major natural mosquito breeding habitat, is situated in a region which can experience some nuisance problems and an increased risk of mosquito-borne disease such as Ross River virus (RRV) in some years. For example, in 2003-04 there were 15 cases of RRV disease notified from the Collie locality. Therefore it is important that the proponents have a mosquito management plan for the site to reduce the impact of biting mosquitoes and risk of mosquito-borne disease for employees. Any alterations of topography that result from the construction and installation of infrastructure (including pipelines etc.) and enhance retention or impoundment of rainwater and runoff, or that promote scouring, should be undertaken so as to minimise creating opportunities for mosquitoes to breed, Constructed water bodies (e.g. constructed wetlands, storm water management etc) can become prolific mosquito breeding habitat. All constructed water bodies installed or already existing as part of the previous phases of the project must be designed and regularly maintained consistent with the Chironomid midge and mosquito risk assessment guide for constructed water bodies (http://vvww public. health.wagov.au/3/695/2/mosquito management. pm). All existing water bodies should be regularly monitored for mosquito breeding and the presence of invasive vegetation, with control measures implemented where necessary to minimise the potential for mosquito-breeding. Information on developing mosquito management plans and on the management of wastewater and stormwater to minimise mosquito breeding is available from the Mosquito-Borne Disease Control Branch of the Department of Health or on the Department's website. (Department of Health)	See response at Item 151 above.

7.2.12 Wetlands

Item	Submission	Response
153.	Wetlands on pipeline route – There is no reference to impacts on wetlands along the pipeline route, nor is mapping of these provided (e.g. not found in Appendix 5 - Mattiske vegetation mapping), despite proposed dewatering and intersection of wetlands along the route (e.g. northern extension of Leschenault Estuary Conservation Category wetland). Although acid sulphate soil is addressed, there is no reference to the impact of potential dewatering on wetlands either via lowering of groundwater table or groundwater disposal into the adjacent environment. There should be some reference to this issue within the PER, even if discounting its significance. (Department Of Environment and Conservation - Environmental Management Branch, *Draft PER*)	A Wetland Crossing Management Plan and a Conservation Area Management Plan have been added to the Construction Environmental Management Plan (presented in Appendix 1 of this report). These plans address management of dewatering, etc., in all areas of conservation value, which would include wetlands such as the Leschenault Estuary Conservation Category wetland.
154.	Issue: There is potential for acid sulphate soils (ASS) and the impacts of dewatering associated with pipeline trench construction to affect significant wetlands. *Recommendation 17: That approval for the pipeline is conditional on the proponent adhering to the submitted 'Acid Sulphate Management Plan' and providing records of areas where active acid sulphate soil management occurs.* *Recommendation 18: That there is a requirement for no significant impacts on the Leschenault Inlet wetland. The construction of the pipeline should occur wholly within the Buffalo road reserve.* Discussion: Construction of the marine outfall pipeline will result in the excavation and dewatering of soils that could potentially result in the oxidation of ASS along portions of the length of the pipeline. There is potential for impacts on sensitive wetlands that the proposed pipeline traverses via clearing of native vegetation and dewatering and lowering the groundwater table or groundwater disposal into the adjacent environment. While many of the wetlands along the pipeline route are multiple use wetlands that have been disturbed, the pipeline does traverse the Leschenault Inlet, a significant conservation category wetland. It is recommended that the construction of the pipeline occurs wholly within the Buffalo road reserve to avoid impacts on Leschenault Inlet. (Department of Environment and Conservation)	It is expected that implementation of the Construction Environmental Management Plan (presented in Appendix 1 of this report) will be a condition of environmental approval. The Acid Sulphate Soil Management Plan is contained within that plan. The Construction Environmental Management Plan limits the construction width through the Leschenault Inlet Conservation Park to a width of 15 m. It is expected that this area of disturbance can be contained wholly within or immediately adjacent to the Buffalo Rd reserve for the section of alignment that follows the road. The road reserve contains vegetation, the clearing of which should be avoided, and the potential for acid sulphate soil generation can be readily managed. The alignment deviates from the road at the western end to enable traversing of the coastal dune system through installation of the pipeline using via horizontal directional drilling techniques.

7.2.13 Fire

Item	Submission	Response
155.	Appendix 1 – CEMP Fire management plan - the fire management plan does not have a stated purpose. The fire management plan should specifically address the pipeline work on Leschenault Peninsula Conservation Park and be developed to DEC's requirements. (Department Of Environment and Conservation - Environmental Management Branch, *Draft PER*)	The Fire Management Plan in the Construction Environmental Management Plan (copy at Appendix 1 of this report) contains a stated objective: "*To prevent fires occurring as a result of construction activities*". The Fire Management Plan in the Construction Environmental Management Plan (copy at Appendix 1 of this report) has been modified with inclusion of the following management action: "*Liaison will be undertaken with the local DEC regional office regarding fire management requirements in any DEC managed land, and those requirements implemented to the satisfaction of the DEC. The local DEC regional office will be advised of any planned construction activities within that land immediately prior to entry*."
156.	Appendix 1 and 2 Bushfire Smoke Impacts - The plan does not refer to the possible impact of smoke accumulation on construction or operation. The operational plan should include a fire management plan to manage fires with respect to preparation, response, recovery, resources and evacuations. The plan should address the issue of smoke accumulation and possible impacts on construction. The Department's major strategy in the management of wildfires is the use of prescribed burning (burning off). Bluewaters Power Station is situated in close proximity to forest that is an extreme bushfire hazard as is routinely burnt by the Department. Biannually, DEC burns over 10 000 ha in the Shire of Collie alone. DEC recommends that all construction and operations, including rail, transmission lines, pipelines, roads and power station, are designed to be built and to operate with the accumulation of smoke from prescribed burning (and wildfire). (Department Of Environment and Conservation - Environmental Management Branch, *Draft PER*)	See response to Submission Item 155 above. The Bluewaters Phase III and IV site is contiguous with the existing Bluewaters Phase I and II site and impact of smoke accumulation would be managed jointly. The marine outfall pipeline will be buried and will not be affected by either fire or smoke accumulation. It is, however, expected, that in the event of DEC undertaking prescribed burning that may create smoke affecting either the construction or operation of the proposal, that DEC would consult with Griffin Power prior to commencement of the burn with a view to minimising disruption to the proposal. Lack of notice of potential smoke impacts on both construction and operation of the power station can cause severe disruption that may be able to be avoided with forewarning of and negotiation on the need to implement contingency plans.

Item	Submission	Response
157.	Issue: The proponent has not developed a fire management plan that provides for contingency measures in the event of wildfire and bushfire smoke. *Recommendation 8: That the proponent develops a fire management plan that addresses the inherent risks associated with the operation of the power station site in an area that will be subject to prescribed burning, and prone to wildfires and smoke. This plan should be developed in conjunction with DEC (Wellington District).* *Recommendation 9: That the construction and operation of the proposal be undertaken in a way that accommodates anticipated smoke levels from prescribed burning (and wildfire).* Discussion Wildfires have implications for public safety as well as conservation of biodiversity. One of DEC's primary strategies for management of wildfires is the use of prescribed burning. Bluewaters Power Station is situated in close proximity to forest that is a bushfire hazard and is routinely burnt under management prescriptions by DEC. The PER does not refer to the possible impact of smoke from occasional wildfires and periodic prescribed burning on construction or operation or the potential for pressure on DEC to modify or curtail prescribed burning or other land management activities to maintain continued power station operations. It is recommended the plan address the issue of smoke from adjacent DEC-managed lands and possible impacts on construction operation and management of adjacent land, and detail the preparation, response, recovery, resource and evacuation measures in the event of wildfire or smoke. (Department Of Environment and Conservation)	See response to Submission Items 155 and 156 above.

7.2.14 Culture and heritage

Item	Submission	Response
158.	I refer you to my reply of 20 August 2008 on this matter. The email provides current advice. I would add to the previous statement that the proponent has an adequate heritage management plan (PER Appendix 1 p61). (Department of Indigenous Affairs)	Noted. No response required.
159.	Examination of the Aboriginal sites register shows that there are no sites intersecting with this proposal. Please be aware that the register is not a complete list and represents information for areas previously examined by heritage specialists. (Department of Indigenous Affairs, Comments on the ESD, 20 August 2008)	Noted. No response required.

Item	Submission	Response
160.	I recommend that should any impact within 30 metres of any Aboriginal site arising from the proposed works that a consultative ethnographic survey and an archaeological survey is undertaken and a section 18 Notice lodged in accord with the provisions of the *Aboriginal Heritage Act 1972*. Ideally the best way to proceed is to avoid any impact to heritage values. (Department of Indigenous Affairs, Comments on the ESD, 20 August 2008)	The Aboriginal Heritage Site Management Plan in the Construction Environmental Management Plan (copy at Appendix 1 of this report) has been amended to provide the following additional management action: "*If any construction activity is required within 30 m of any Aboriginal site, a consultative ethnographic survey and an archaeological survey is to be undertaken and a section 18 Notice lodged in accord with the provisions of the Aboriginal Heritage Act 1972*."
161.	Examination of the Register of Aboriginal sites also shows that many sites are recorded in areas subjected to heritage surveys. Water is an important locational factor for Aboriginal sites as water was then, as now, a crucial survival factor for people living traditional lifestyles. Additionally this importance is reflected in the place that water holds in the spiritual and mythological realm for Aboriginal people over the past 50,000 years. Many important sites are centred on rivers, pools, wells, soaks and estuaries. (Department of Indigenous Affairs, Comments on the ESD, 20 August 2008)	Noted. No response required.
162.	This proposal may have a direct effect on an Aboriginal site, actions arising from the plan, such as excavation, the installation of access roads, water and power supply, fencing or flood protection earthworks may breach section 17 of the *Aboriginal Heritage Act 1972*. This provision describes a breach as being any action that excavates, destroys, damages, conceals or in any way alters an Aboriginal site. (Department of Indigenous Affairs, Comments on the ESD, 20 August 2008)	Noted. See response to Submission Item 160 above.

7.2.15 Visual amenity

Item	Submission	Response
163.	What will be the visual impact the pipeline bridges over watercourses (see p. 1-29)? (Shire of Collie)	It is expected pipeline bridges will only be constructed at locations where the existing pipeline crosses watercourses using that same methodology, and the ability to utilise the existing pipe bridge will be investigated. This will substantially limit the potential visual impact.

7.2.16 Liquid and solid waste disposal

Item	Submission	Response
164.	With regard to sewage and effluent, comment was made about augmenting the existing Waste Water treatment Plant (WWTP). The submission also notes that effluent is to be disposed of in accordance with the relevant Regulations. However, the proponent should be aware that alterations ('augmentation') to already existing WWTP are also subject to the Health (Treatment of Sewage and Disposal of Effluent and Liquid Waste) Regulations. Large additional staff numbers may require substantial amendment to storage and treatment tanks and effluent disposal areas. Reference is also made to recycling water. Proposals for the recycling of sewage effluent require separate approval and submissions should be made to the Department of Health, Water Unit, with regard to the National Water Quality Management Strategy Australian Guidelines for Water Recycling: Managing Health and Environmental Risks (Phase 1) 2006. Where the document refers to marine wastewater discharge/disposal, it is important that this applies to discharge of saline water produced by the .power plant and does not include human sewage flows. Further information on drinking water or wastewater is available from the Water Unit of the Department of Health. Supplementary documents for the proponent will be directly emailed to John Guld at the DEC. (Department of Health, *Draft PER*)	Noted. Any alterations to the existing wastewater treatment plant on the Bluewaters site will be referred to the Department of Health for assessment. Wastewater treatment plants over a specified size are a "prescribed premise" under Part V of the *Environmental Protection Act 1986* and subject to requirements for a Works Approval and licensing of the discharges. The marine outfall will not be utilised for disposal of sewage flows.
165.	Coal ash disposal The proposed method of coal ash disposal has the potential to cause soil and groundwater contamination. The issue was previously discussed in advice given to you in November 2008 (attached). Background The proponents wish to dispose of about 364 000 tonnes per annum of ash from the Bluewaters Power Station. It is proposed to dilute the ash oil a 1:100 basis with overburden and backfill mine voids with the material while maintaining the ash above the water table. This proposal should be seen in context of: Continuing power generation in the region and an ongoing need to manage combustion residues; A long-term view by government of utilising groundwater resources from the Collie Basin; Department of Water data that indicate that there is widespread shallow groundwater contamination by metals and acidity due to current and historical coal mining activities in the region; Ongoing discharge of acidic, metal-laden groundwater from abandoned mine adits into the Collie River with likely downstream impacts on aquatic biodiversity. Given these issues, the EPA should consider whether both existing and the proposed methods of coal residue disposal from power generation are compatible with either long-term environmental or groundwater resource protection objectives for the Collie Basin. (Department of Environment and Conservation, Environmental Management, *Draft PER*)	See response to Submission Item 105 above.

Item	Submission	Response
166.	With regard to sewage and effluent, comment was made about augmenting the existing Waste Water treatment Plant (WWTP). The submission also notes that effluent is to be disposed of in accordance with the relevant Regulations. However, the proponent should be aware that alterations ('augmentation') to already existing WWTP are also subject to the Health (Treatment of Sewage and Disposal of Effluent and Liquid Waste) Regulations. Large additional staff numbers may require substantial amendment to storage and treatment tanks and effluent disposal areas. Reference is also made to recycling water. Proposals for the recycling of sewage effluent require separate approval and submissions should be made to the Department of Health, Water Unit, with regard to the National Water Quality Management Strategy Australian Guidelines for Water Recycling: Managing Health and Environmental Risks (Phase 1) 2006. Where the document refers to marine wastewater discharge/disposal, it is important that this applies to discharge of saline water produced by the .power plant and does not include human sewage flows. Further information on drinking water or wastewater is available from the Water Unit of the Department of Health. Supplementary documents for the proponent will be directly emailed to John Guld at the DEC. (Department of Health)	See response to Submission Item 164 above.

Item	Submission	Response
167.	The proponents wish to dispose of about 364,000 tonnes per annum of ash from the Bluewaters Power Station. It is proposed to dilute the ash on a 1:100 basis with overburden and backfill mine voids with the material while maintaining the ash above the water table. This proposal should be seen in the context of: Continuing power generation in the region and an ongoing need to manage combustion residues. A long-term view by government of utilising groundwater resources from the Collie Basin. Department of Water data that indicate that there is widespread shallow groundwater contamination by metals and acidity due to current and historical coal mining activities in the region. Ongoing discharge of acidic, metal-laden groundwater from abandoned mine shafts into the Collie River with likely downstream impacts on aquatic biodiversity. Given these issues, DEC recommends that further consideration should be given as to whether both the existing and proposed methods of coal residue disposal from power generation are compatible with either long-term environmental or groundwater resource protection objectives for the Collie Basin. The proponents may be correct in indicating that the proposed method of dry disposal of diluted coal combustion residues is an improvement on historical methods of disposing these materials in wet slurry dams, where large amounts of leachate were generated and discharged to groundwater. However, it is important to note that co-disposal with overburden may only reduce the rate of discharge of contaminants to groundwater, and may not reduce the mass of some contaminants by adsorption or chemical reactions in the vadose zone to the extent predicted in the proposal. This is because mine waste materials in the Collie Basin typically have a limited acid-base buffering capacity to neutralise leachate from coal combustion products which is predicted to be acidic. The proponents appear to have relied to a large extent on a study from the United States to argue that there will be minimal long-term impacts on groundwater from the proposed disposal method. However, insufficient information has been provided to indicate whether the cited case study is relevant for ash generated from the combustion of coal from the Ewington deposit. The US Department of Interior, Office of Surface Mining Regulation and Enforcement (OSMRE), generally recommends that the proposed method of ash disposal does not take place without lime treatment, if the pH of leachate from these materials is less than 6 due to the enhanced risk of metals leaching to groundwater. Additionally, the US Board of Earth Sciences and Resources (2006) recommends that, wherever possible, overburden materials should be compacted or treated with cements to ensure that the permeability of the overburden/coal combustion product fill is less than 107cm/s. The following conclusion was drawn in this document: "Of the three methods currently available for the disposal of coal combustion residues (CCRs) —i.e. surface impoundments, landfilling and minefilling — comparatively little is known about the potential for minefilling to degrade groundwater and/or surface water quality over longer time periods. Additionally, there are insufficient data on the contamination of water supplies by placement of CCRs in coal mines, making human risk assessments difficult. Thus the committee concludes that the presence of high contaminant levels in many CCRs may create human health and ecological concerns at or near some mines over the longer term". (Department of Environment and Conservation)	See response to Submission Item 105 above.

Item	Submission	Response
168.	International best practice for managing coal combustion products is to reduce the volume of material disposed of to ground by utilising these materials to produce cement additives, road aggregate and other construction materials. Leachate from coal combustion products often contains elevated concentrations of metals and metalloids that may cause environmental harm on discharge to aquatic environments. In particular, selenium and mercury can cause significant environmental problems due to the ability of these elements to be biomagnified in local food webs. Selenium and mercury are also readily leached under neutral to alkaline conditions and, therefore, may not be immobilised through the use of soil neutralisation agents. The potential environmental risks of leachate in the current proposal have been inadequately characterised, partly because analytical detection limits of leachate testing were inappropriately high for key analytes like selenium, mercury and lead, and partly because exposure pathways for environmental receptors have not been adequately assessed. The proponents are assuming that leachate will be captured by pit lakes that will exist after mining has ceased, but the potential environmental exposure of wildlife that might use pit lakes as a food source have not been considered. In particular, "top predators" like bird populations are vulnerable to selenium teratogenic poisoning as a result of biomagnification of selenium in closed systems, where there is a large component of evapotranspiration. (Department of Environment and Conservation)	See response to Submission Item 105 above.

7.3 OTHER ISSUES

7.3.1 Proposed technology

Item	Submission	Response
169.	The Shire expects that the Environmental Protection Authority will confirm that the most efficient technology has been applied for the total generating capacity proposed. (Shire of Collie)	Noted. This issue is discussed in detail in Chapter 3 Section 3.4 of the PER and in Section 4.1.1 of this report.

7.3.2 Viability and security of coal industry

Item	Submission	Response
170.	Griffin Power has not identified whether additional environmental approvals will be needed for mining of the coal resource required to support the proposed power station expansion. The status of current and future environmental approvals that are likely to be associated with the coal supply to support this proposal need to be identified. This would provide additional clarity in relation to potential flow-on impacts on native vegetation and other environmental values. (Department of Environment and Conservation)	The coal mines proposed to supply coal to the Bluewaters Power Station have been subjected to separate environmental assessment and approval and are outside the scope of this assessment. No additional approvals are required with respect to the scope of the Bluewaters Phase III and IV proposal.
171.	Issue: The PER does not identify whether additional environmental approvals will be needed for mining of the coal resource required to support the proposed power station expansion. *Recommendation 16: That any environmental approvals required for the coal mining associated with this expansion be identified, and where approvals have not been secured, the process by which the proponent will be seeking these approvals be stated.* Discussion The status and applicable processes for current and future environmental approvals that are likely to be associated with the coal supply to support this proposal should be identified to provide clarity in relation to potential flow-on impacts on native vegetation and other environmental values. (Department of Environment and Conservation)	See response to Submission Item 170 above.

8. CHANGE TO PROPOSAL

8.1 KEY CHARACTERISTICS

The key characteristics of the proposal are shown in Table 8.1. The project characteristics have not changed from those presented in the PER, with the exception of the Vegetation Clearing now being stated as maximum values, rather than an absolute.

Table 8.1 Key characteristics of the proposal

Aspect	Description
General	
Proponent	Griffin Power 3 Pty Ltd
Proposal Description	Construct and operate two 229 MW pulverised coal power base load units, and marine outfall and pipeline as part of planned expansion of the Bluewater Power Station project.
Proposal Location	Coolangatta Industrial Estate, Collie (adjacent to Bluewaters phases I and II)
Construction period	3 years (approx)
Life of Proposal	30 years (nominal)
Plant Operating Hours	24 hours 7 days (8000 hours [92% Availability over life of project])
Power Generation	1 676 314 MWh (1 667 932 to 1 661 227 MWh sent out)
Facility Footprint	27.1 ha (power station) plus 118 ha (marine outfall and pipeline)
Vegetation Clearing	Approximately 26.3 ha (maximum of 4.27 ha for power station, maximum of 22 ha for pipeline [regrowth])
Inputs	
Fuel Usage	
Coal	1 666 224 tpa (approx).
Water Supply	6.5 GL/yr (annual average based on 92% operating availability)
Outputs	
Liquid Wastes	
• Saline Cooling Water	Estimated 0.25 GL/yr (Disposal: Collie A or independent ocean outfall pipeline or Department of Water utility)
• Wastewater	Up to 15 kL/day during construction and up to 0.3 kL/day during operation)
Solid Wastes	Estimated 300 000 tpa of ash assuming an average ash content of 18% in feed coal. (Disposal: Co-disposal with Ewington Mining Operations mine waste)
Gaseous Emissions	• carbon dioxide • oxides of nitrogen • sulphur dioxide • particulate matter • carbon monoxide • polycyclic aromatic hydrocarbons • volatile organic compounds

Aspect	Description
Saline wastewater disposal marine outfall and pipeline (if required)	
Quantity and Quality	Up to 10 ML/d <3000 mg/L TDS (worst case with other contributors to discharge) Expected discharge from Bluewaters Phase III and IV alone: 0.7 ML/d at 9200 mg/L TDS
Pipe (terrestrial, from Bluewaters Power Station to beach crossing)	Approx. 63 km long (below ground except at selected watercourse crossings) and constructed using open cut/trench and horizontal directional drilling in coastal dunes and selected watercourse crossings depending on geotechnical conditions and cultural heritage issues
Outlet Pipe and Diffuser (marine)	Approx. 650 m long pipe including a 110 m long diffuser and constructed using open cut trenching on the sea bed
Outlet Diffuser	Approx 110 m long
Marine Habitat Loss	0.72 ha (temporary during construction)

8.2 PROPOSED APPROVAL CONDITIONS

Chapter 6 of the PER presented proposed management framework for the proposal based on a range of Key Management Actions and proposed conditions of environmental approval to address the key environmental aspects of the proposed development. These were proposed so as not to duplicate management requirements of other regulatory controls (e.g. EP Act Environmental Licence for prescribed premises). It is proposed that these Key Management Actions be incorporated as environmental conditions into the approval instruments to apply to Bluewaters Phases III and IV Project. The resulting proposed conditions associated with the EP Act Part IV Ministerial Statement and the EPBC Act Decision to Approve Taking of an Action are re-presented in Section 8.2.1 and Section 8.2.2 respectively. They are similar to those presented in the PER, but with minor amendments to reflect the responses to public submissions discussed in the previous sections of this report.

8.2.1 Environmental Conditions and Key Management Actions proposed under Part IV of the EP Act

Griffin proposes the Environmental Conditions presented in Table 8.2 for the management of Bluewaters Phases III and IV Project for inclusion in the Ministerial Statement issued under the EP Act. These conditions incorporate the Key Management Actions.

Table 8.2 Proposed environmental conditions – EP Act Ministerial Statement

Factor	Objective	Action	Timing
Overall proposal			
Compliance reporting	To report environmental compliance and performance	A compliance report shall be submitted to the CEO of the Department of Environment and Conservation prior to 1 December each year, that identifies compliance with each Ministerial Condition (including monitoring data collected under any condition) of the Statement for the preceding period of 1 July to 30 June. The compliance report shall address: • the status of implementation of the proposal as defined in Schedule 1 of this statement • evidence of compliance with the conditions • performance of the Construction and Operational Environmental Management Plans. The compliance report shall be made public in a manner acceptable to the CEO.	Annually following issue of the Ministerial Statement
Preliminary Decommissioning Plan	To minimise environmental impacts from decommissioning	Within six months following commencement of construction, the proponent shall prepare a Preliminary Decommissioning Plan, which provides the framework to ensure that the site is left in an environmentally acceptable condition to the requirements of the Minister for the Environment on advice of the Environmental Protection Authority. The Preliminary Decommissioning Plan shall address: • conceptual plans for the removal or, if appropriate, retention of plant and infrastructure • the long-term management of ground and surface water systems and marine systems affected by the power station generating units, waste disposal areas and associated infrastructure • a conceptual rehabilitation plan for all disturbed areas and a description of a process to agree on the end land use(s) with all stakeholders • a conceptual plan for a care and maintenance phase • management of potentially polluting materials to avoid the creation of contaminated areas. The Preliminary Decommissioning Plan shall be made public in a manner acceptable to the CEO.	Within six months following commencement of construction

Factor	Objective	Action	Timing
Final Decommissioning Plan	To minimise environmental impacts from decommissioning	At least 12 months prior to the anticipated date of decommissioning, or at a time agreed with the Environmental Protection Authority, the proponent shall prepare a Final Decommissioning Plan designed to ensure that the site is left in an environmentally acceptable condition to the requirements of the Minister for the Environment on advice of the Environmental Protection Authority. The Final Decommissioning Plan shall address: • removal, or if appropriate, retention of plant and infrastructure in consultation with relevant stakeholders • the long-term management of ground and surface water systems and marine systems affected by the power station generating units, waste disposal areas and associated infrastructure • rehabilitation of all disturbed areas to a standard suitable for the agreed new land use(s) • identification of contaminated areas, including provision of evidence of notification and proposed management measures to relevant statutory authorities.	At least 12 months prior to the anticipated date of decommissioning
		The proponent shall implement the Final Decommissioning Plan until such time as the Minster for the Environment determines, on advice of the Environmental Protection Authority, that the proponent's decommissioning responsibilities have been fulfilled.	During decommissioning
		The proponent shall make the Final Decommissioning Plan publicly available in a manner acceptable to the CEO.	During decommissioning
Power Station Generating Units			
General	To minimise environmental impacts from construction activities	The following management plans contained within the Construction Environmental Management Plan shall be implemented: • Flora and Vegetation Management Plan • Weed and Dieback Management Plan • Fauna Management Plan • Waste Management Plan • Water Management Plan • Hazardous Materials Management Plan • Fire Management Plan • Noise Management Plan.	During construction

Factor	Objective	Action	Timing
	To minimise environmental impacts from operational activities	The following management plans within the Operation Environmental Management Plan shall be implemented: • Air Quality Management Plan • Noise Management Plan • Water Supply Management Plan • Water Resource Protection Management Plan • Hazardous Materials Management Plan • Waste Management Plan • Ash Management Plan • Saline Wastewater Disposal Management Plan.	During operation
Public availability	To inform the public of the management of construction and operational activities	The Construction Environmental Management Plan shall be made publicly available on The Griffin Group website.	Prior to and during construction
		The Operation Environmental Management Plan shall be made publicly available on The Griffin Group website.	Prior to operation commencing and during operation
Greenhouse gas emissions	To reduce greenhouse gas emissions to as low a level as practicable.	Design and implement thermal efficiency design and operating goals consistent with the Australian Greenhouse Office Technical Efficiency Guidelines.	During design, construction, and operation
		Design the power station units to facilitate future capture of greenhouse gases, to the extent practicable, given the developing state of the technology.	During final design
		The Greenhouse Gas Management Plan shall be implemented.	During operation
		Report annually on consideration of available practicable technologies to reduce greenhouse gas emissions that could be implemented, any measures actually implemented, together with expected and measured associated changes in greenhouse gas emission levels.	During operation
		Support research associated with carbon capture and/or storage options.	During operation

Factor	Objective	Action	Timing
Air emissions	To ensure that air emissions from the ongoing operation of the power station are minimised to as low a level as is practicable.	Use a combination of best practicable technology appropriate to the size of the plant to minimise the production and release of atmospheric pollutants from the plant and include the following emission controls: • low NOx burners • fabric filters • desulphurisation of the fuel and/or the flue gas.	During construction
		Maintain and operate the above emission controls.	During operation
	To ensure that high quality data are available to model and verify ambient air quality	Undertake a quarterly stack monitoring program for particulates, nitrous oxides, sulphur dioxide and carbon monoxide, volatile organic compounds, volumetric flow rate and stack temperature to verify emission rates.	During operation
		Undertake an annual stack monitoring program for metals, for National Pollution Inventory reporting.	During operation
		Make the stack monitoring results publicly available.	Within one month
Noise	To avoid unacceptable environmental impacts from noise	The proposal shall be designed and operated to meet the requirements of the Environmental Protection (Noise) Regulations 1997 (WA).	Prior to and during construction
Vegetation disturbance	To avoid unacceptable environmental impacts on vegetation and flora	Vegetation clearing shall be kept to the minimum necessary for safe operations. Clearing limits shall be marked on all design drawings and pegged in the field prior to any clearing works commencing.	Prior to and during construction
	To ensure that dieback and weed species are not spread as a result of construction activities	Hygiene measures shall be implemented in accordance with the Weed and Dieback Management Plan contained in the Construction Environmental Management Plan.	During construction
Fauna	To minimise impact on rare or endangered fauna	No habitat trees, or parts of habitat trees, other than those that materially interfere with construction are to be removed.	During construction
		All identified habitat trees required to be removed are replaced by approved artificial nesting boxes in consultation with the Department of Environment and Conservation.	During construction
Saline wastewater discharge	To ensure that the discharge of saline wastewater does not cause unauthorised pollution	Saline wastewater shall be disposed of to a marine discharge pipeline operated either by the proponent, or by a third party, in accordance with the requirements of the relevant Environmental Licence(s).	During operation

Factor	Objective	Action	Timing
Saline wastewater disposal facility			
General	To minimise environmental impacts from construction activities	The following management plans contained within the Construction Environmental Management Plan shall be implemented: • Flora and Vegetation Management Plan • Conservation Area Management Plan • Weed and Dieback Management Plan • Fauna Management Plan • Waste Management Plan • Fire Management Plan • Noise Management Plan • Wetland Management Plan • Soil Management Plan • Acid Sulphate Soil Management Plan • Marine Outfall Construction Management Plan (if facility constructed by proponent) • Rehabilitation Management Plan.	During construction
	To minimise environmental impacts from operational activities	The Saline Wastewater Disposal Management Plan contained within the Operation Environmental Management Plan shall be implemented.	During operation

Factor	Objective	Action	Timing
Terrestrial fauna (if saline wastewater disposed of via a facility operated by the proponent)	To minimise impact on rare or endangered fauna	Fauna trapped within open trenches shall be cleared and recorded by a suitably trained fauna clearing person(s) no later than three hours after sunrise.	During pipeline construction
		The open trenches shall also be cleared and recorded by a suitably trained fauna clearing person(s) within one hour prior to backfilling of the trench.	During pipeline construction
		The fauna clearing person(s) shall be experienced in the following: • fauna identification, capture and handling (including venomous snakes) • identification of tracks, scats, burrows and nests of conservation significant species • assessing injured fauna for suitability for release, rehabilitation or euthanasia • fauna vouchering • familiarity with the ecology of the species that may be encountered in order to be able to appropriately translocate the fauna encountered • performing euthanasia.	During pipeline construction
		Open trench lengths shall not exceed a length capable of being inspected and cleared by the fauna clearing person(s) within the required times.	During pipeline construction
		The proponent shall monitor weather forecasts through the Bureau of Meteorology and in the event of a weather forecast indicating rainfall sufficient to cause flooding of trenches or drowning of fauna trapped in trenches, the proponent shall, in consultation with the Department of Environment and Conservation, backfill all lengths of open trench with a potential to be flooded or cause drowning of fauna.	During pipeline construction
		The proponent shall produce a report on fauna management associated with construction of the saltwater disposal pipeline within one month of completion of construction. The report shall include, but not necessarily be limited to the following: • details of all fauna inspections • number and species of fauna cleared from trenches • fauna interactions • fauna mortalities • all actions taken.	Within one month of completion of construction
		The fauna management report shall be made publicly available in a manner approved by the CEO of the Department of Environment and Conservation.	Within one month of completion of construction

Factor	Objective	Action	Timing
Vegetation disturbance	To avoid unacceptable environmental impacts on vegetation and flora	Prior to ground disturbing activities, the boundaries of the pipeline easement shall be clearly delineated on the ground, together with any areas of disturbance outside the easements.	Prior and during construction
		There shall not be any disturbance of vegetation outside the delineated areas of disturbance unless authorised by the Minister for the Environment.	During construction
		Clearing of native vegetation within the pipeline construction corridor shall be limited to a width of 20 m, except where it passes through environmentally sensitive areas where it shall not exceed 15 m without the authorisation of the Minister for the Environment.	During construction
	To ensure that dieback and weed species are not spread as a result of construction activities	Hygiene measures shall be implemented in accordance with the Weed and Dieback Management Plan contained in the Construction Environmental Management Plan.	During pipeline construction
Acid sulphate soils (if saline wastewater disposed of via a facility operated by the proponent)	To minimise the potential for acid generation as a result of pipeline trench excavation	Prior to commencement of soil disturbance or dewatering associated with construction of the saline wastewater pipeline, the proponent shall identify areas of low, medium and high risk of acid sulphate soil occurrence along the pipeline alignment.	During pipeline construction
		Prior to commencement of soil disturbance or dewatering associated with construction of the saline wastewater pipeline, the proponent shall undertake field investigations within areas identified as being of medium or higher risk of acid sulphate soil occurrence along the pipeline alignment.	During pipeline construction
		Prior to commencement of soil disturbance or dewatering associated with construction of the saline wastewater pipeline, the proponent shall prepare an acid sulphate soil and dewatering treatment program for the areas of medium or higher risk of acid sulphate soil occurrence, based on the results of the field investigations, to the satisfaction of the Department of Environment and Conservation.	During pipeline construction
		The proponent shall implement the acid sulphate soil and dewatering treatment program for the areas of medium or higher risk of acid sulphate soil occurrence.	During pipeline construction
		Soils in the medium-low risk areas shall be in-field tested at the time of excavation for field pH (pH_F) and field pH after oxidation with hydrogen peroxide (pH_{FOX}) at a rate of 1 sample per 200 m^3 of soil excavated.	During pipeline construction
		Soils excavated from the medium-low areas do not require active treatment or management unless in-field testing indicates that $pH_F<4$ and $pH_{FOX}<3$. If $pH_F<4$ and $pH_{FOX}<3$ then the soils shall be: • underlain by a 0.1 m guard layer of AgLime or equivalent before being re-emplaced in the trench, or • uniformly treated with sufficient neutralising agent using an alternative method approved by the Department of Environment and Conservation.	During pipeline construction
		Note: Acid sulphate soil treatment is only required if the soils are excavated from below the watertable, or if dewatering is undertaken to create a dry trench.	

Factor	Objective	Action	Timing
Rehabilitation	To re-establish vegetation and associated habitat areas to the condition that it was in prior to disturbance or better, and to control sediment and erosion	The proponent shall implement a rehabilitation program as prescribed in the Rehabilitation Management Plan contained in the Construction Environmental Management Plan, including implementation of relevant aspects of the Weed and Dieback Management Plan and the Soil Management Plan.	Immediately following pipeline construction
		The proponent shall manage rehabilitation of the pipeline construction corridor until the rehabilitation criteria in the Rehabilitation Management Plan contained in the Construction Environmental Management Plan have been achieved.	Following pipeline construction
Saline wastewater discharge (if disposed of via a facility operated by the proponent)	To minimise the environmental impacts of construction of the marine outfall	Construction of the marine outfall shall not occur during the autumn or winter months to minimise shading impacts on seagrass and will not occur during the spring months to minimise impacts to migrating and calving whales.	During outfall construction
		Disturbance to the seabed shall be restricted to the minimum width required for trenching and temporary storage of trench spoil.	During outfall construction
		Trench spoil is to be replaced in the trench following laying of the outfall pipeline.	During outfall construction
		Turbidity is to be continuously monitored during construction of the marine outfall, at sites to be determined in consultation with the Department of Environment and Conservation.	During outfall construction
		If geotechnical investigations indicate that hard material is present that requires blasting, a Blast Management Plan shall be developed in consultation with the Department of Environment and Conservation and local government authority. The Blast Management Plan shall include a prescribed distance beyond which no significant effect would be experienced by marine mammals or sharks, if present.	During outfall construction
		The proponent shall monitor the presence of marine mammals or sharks if the blasting is to be carried out and shall cease blasting if mammals or sharks are present within the prescribed distance of the blast site, either immediately prior to or during blasting operations.	During outfall construction

Factor	Objective	Action	Timing
	To ensure that the discharge of saline wastewater does not cause unauthorised pollution	Saline wastewater shall be disposed of in accordance with the requirements of the relevant Environmental Licence(s).	During operation
	To ensure that any pipeline leaks are identified and remedied	Pressure in the saline wastewater pipeline shall be continuously monitored at the power station with alarms set to alert the operator if pressure drops below a threshold value indicating a leak.	During operation
		If pipeline pressure indicates a leak, the proponent shall implement the contingency actions set out in the Saline Water Disposal Management Plan contained within the Operation Environmental Management Plan.	During operation
	To ensure that high quality data are available to assess marine impacts	The proponent shall undertake the monitoring program set out in the Saline Water Disposal Management Plan contained within the Operation Environmental Management Plan.	During operation

8.2.2 Environmental Conditions and Key Management Actions proposed under the EPBC Act

Griffin proposes the Environmental Conditions presented in Table 8.3 for the management of Bluewaters Phases III and IV Project to address the matters of National Environmental Significance and are proposed for incorporation into the Decision to Approve the Taking of an Action under the EPBC Act. The proposed Key Management Actions do not duplicate management requirements imposed through other regulatory controls (e.g. WA EP Act Part V Environmental Licence for prescribed premises). These Key Management Actions are presented in Table 8.3.

Table 8.3 Proposed environmental conditions – EPBC Act Decision to Approve the Taking of an Action

Factor	Objective	Action	Timing
Listed threatened species and communities	To minimise the impacts of clearing remnant vegetation that is potential breeding habitat for the Baudin's and Carnaby's Black Cockatoos	Vegetation clearing will be kept to the minimum necessary for safe operations. Clearing limits will be marked on all design drawings and pegged in the field prior to any clearing works commencing.	During construction
		No habitat trees, or parts of habitat trees, other than those that materially interfere with construction are to be removed.	During construction
		All identified habitat trees required to be removed are replaced by approved artificial nesting boxes in consultation with the Department of the Environment, Water, Heritage and the Arts.	During construction
Listed migratory species	To minimise the impact of construction of the marine saline wastewater outfall on migratory marine species, particularly cetaceans	If geotechnical investigations indicate that hard material is present that requires blasting then a Blast Management Plan will be developed in consultation with the Department of the Environment, Water, Heritage and the Arts. The Blast Management Plan will include a prescribed distance beyond which no significant effect would be experienced by marine mammals or sharks, if present.	During construction
		The proponent shall monitor the presence of marine mammals or sharks if blasting is to be carried out and shall cease blasting if mammals or sharks are present within the prescribed distance of the blast site, either immediately prior to or during blasting operations.	During construction
Compliance auditing and reporting	To report environmental compliance	By September 30 each year after the commencement of construction, the person taking the action must provide a report addressing compliance with each of the conditions in the Decision to Approve Taking of an Action.	Annually following issue of the Decision to Approve Taking of an Action
	To audit environmental compliance	Upon the direction of the Minister, the person taking the action must ensure that an independent audit of compliance with the conditions of approval is conducted and a report submitted to the Minister. The independent auditor must be approved by the Minister prior to the commencement of the audit. Audit criteria must be agreed to by the Minister and the audit report must address the criteria to the satisfaction of the Minister.	When so directed
Proposal implementation	To ensure proposal is implemented within reasonable period following approval	If, at any time after five years from the date of this approval, the Minister notifies the person taking the action in writing that the Minister is not satisfied that there has been substantial commencement of the Bluewaters Phase III and IV expansion, the expansion must not thereafter be commenced without the written agreement of the Minister.	After five years of date of approval

9. SUMMARY OF IMPACTS AND MANAGEMENT MEASURES

Table 9.1 presents a summary of impacts and proposed management measures applicable to the key environmental factors considered in this environmental impact assessment. These are as presented in the PER, with relevant modifications made in response to the public submissions.

Table 9.1 Summary of impacts and management measures

Key Environmental Factor	Management Objectives	Potential Impacts	Key Management Measures	Expected Outcome
Generator Units				
Air Quality	Ensure that gaseous emissions from this Proposal in isolation and in combination with emissions from neighbouring sources and background concentrations meet acceptable criteria for ambient ground level concentrations, and ensure that all reasonable and practicable measures are taken to minimise emissions.	Atmospheric emissions from the proposed power station are oxides of nitrogen (NOx), sulphur dioxide (SO_2), carbon monoxide (CO), particulate matter and minor emissions of metals and organics. Increased coal and flyash throughput could also create additional dust. Other significant sources of NOx, CO, SO_2 and particulate matter in the Collie region are: ▪ Collie Power Station ▪ Muja Power Stations ▪ Worsley Alumina Refinery ▪ open-cut mines in the area, being a source of particulates. NOTE: CO_2 emissions are considered under the Greenhouse Gas Factor.	Measures such as incorporation of desulphurisation technologies and preparedness for incorporating carbon capture technology will be implemented to minimise discharges of atmospheric pollutants. This will be undertaken in accordance with the requirements of EPA Guidance No. 55 on "Best Practice". An Air Quality Management Plan has been included as part of the Operational environmental Management Plan. Emission monitoring would be undertaken following the commissioning of the power station to verify the assumptions made in the modelling assessment. Monitoring of NOx, SO_2 and particulate emissions from the stacks would be undertaken as a minimum on a routine basis. Dust management strategies are included as part of the site Construction Environmental Management Plan.	Based on the results of modelling and a screening health assessment, emissions to air from the proposal will not lead to an increase in the ambient concentration of air contaminants that will breach NEPM guidelines at sensitive premises. Rather, the proposal will produce lower ground level concentrations of emitted material than Bluewaters Phases I and II alone as the stack configurations have been changed and the Phase III and IV generating units will be fitted with desulphurisation technology. There will not be any adverse effects on native vegetation from SO_2 and NOx emissions from the proposal. With respect to health impacts, the proposal will likely have no impact on the existing status quo.

Key Environmental Factor	Management Objectives	Potential Impacts	Key Management Measures	Expected Outcome
Noise	Ensure that noise impacts emanating from the proposed plant comply with statutory requirements specified in the Environmental Protection (Noise) Regulations 1997.	Noise emissions in the Collie area are relatively high as a consequence of existing industries in the region. Currently approved, but currently non-operational facilities will add to the noise levels. A Special Control area has been promulgated in the area, around the Coolangatta Industrial Estate, based on 35 dB(A) sound levels. Noise will be generated during the construction and operational phases of the project.	Noise attenuation measures will be incorporated into the design and implemented to ensure the regulated levels are met at the boundaries of the 35 dB(A) Special Control Area. This may require further noise attenuation facilities to be fitted to the Bluewaters Phase I and II units currently under construction. Noise monitoring will be undertaken following the commissioning of the project to ensure compliance with the noise regulations is achieved. Noise impacts will be managed to ensure compliance with the 35 dBA boundary set for the site. A Noise Management Plan has been included in the Operational Environment Management Plan.	Noise levels from operation of the proposal will comply with the target 30 dB(A) at residential locations as per the Environmental Protection (Noise) Regulations 1997 under all conditions. Noise attenuation measures will ensure that the noise levels will not significantly exceed 35 dB(A) at the SCA boundary near the Collie – Williams Road.
Greenhouse Gas Emissions	Ensure that potential greenhouse gas emissions are adequately addressed in the planning/design and operation of the proposed power station.	Global greenhouse gas emissions are accepted as contributing to global warming, with consequential environmental impacts. The Proposal (coal fuel only) will emit approx 3 087 000 tonnes CO_2e/yr. This is equivalent to about 0.55% of the Australian total. The Proposal will add about 0.006% of the total global emissions.	The following management strategies will be implemented: ▪ implement best practicable thermal efficiency design and operating goals ▪ design of the facility to enable carbon capture technology to be retrofitted when it becomes viable ▪ participate in the Emissions Trading Scheme under the national Carbon Pollution Reduction Scheme. A Greenhouse Gas Management Plan has been prepared.	The proposed power station is the optimum configuration presently available to meet the SWIS requirements with minimum GHG emission potential. The incorporation of carbon capture readiness will ensure that the proposal can contribute appropriately to the national abatement of GHG emissions, in line with the overall aspirational State Government GHG reduction targets, as and when the technologies become commercially applicable.

Key Environmental Factor	Management Objectives	Potential Impacts	Key Management Measures	Expected Outcome
Water Resources	Minimise the impact on natural water resources by minimising water consumption and reusing wastewater where feasible.	The availability of water in the Collie Basin has been the subject of several reviews over recent years. Groundwater provides the major source of water to the coalmines, power stations, domestic and stock watering, and maintains the river pools and associated environment. All the mines extend below the water table and dewatering of the aquifers has taken place for many decades. Groundwater currently serves as the water supply to power stations from both mine dewatering operations and water supply wellfields. The proposed power station expansion requires an average 6.5 GL/yr (depending on the water quality, and plant availability). It is proposed to utilise mine dewatering water that will be available to meet the full demand of the plant during the initial phase of the project life. The potential environmental impacts of use of this water are negligible. The longer term prognosis for availability of dewater product is uncertain and contingency plans will be necessary to ensure security of supply. If a water supply utility (as proposed by the Department of Water) begins operation in the Collie Basin, the Proposal would source water from that utility as an alternative to mine dewatering, if required.	The water requirements for the proposal will be nominally supplied from mine dewatering, unless a water distribution and disposal utility commences operation in the Collie Basin as proposed by the DoW, in which case water would be taken from that utility under contract. Infrastructure such as pipelines and storage ponds in place for Bluewaters Phases I and II will be shared and do not form part of this proposal. Power stations in the Collie region currently operate under the WA Cabinet approved principle that the primary use of groundwater resources (via mine dewatering) in the area is for power generation (CWAG 1996, 1999). However, as there is some uncertainty on the part of the Department of Water as to the ability of mine dewatering to provide a reliable supply for the life of the project, particularly in the out years, a water supply strategy has been developed to address this issue. Griffin would comply with future alternative management strategies adopted by Government.	The water supply strategy for the expansion is in accordance with the EPA objective for this factor. The environmental outcome is expected to be within the outcomes currently approved for the mining operations as the source of water supply to the project. The water resource pollution potential of the project is limited and management of potentially polluting substances will be undertaken to prevent discharge of contaminated water to the environment and to maximise the potential for reuse.

Key Environmental Factor	Management Objectives	Potential Impacts	Key Management Measures	Expected Outcome
Terrestrial Environment	Maintain the abundance, diversity and geographic distribution of terrestrial fauna. Protect Specially Protected (Threatened) Fauna, consistent with provisions of *Wildlife Conservation Act 1950*. Maintain the abundance, species diversity, geographic distribution and productivity of vegetation communities. Protect Declared Rare and Priority Flora, consistent with the provisions of the *Wildlife Conservation Act 1950*.	No significant impacts on terrestrial fauna are expected at the plant site as it is largely cleared. The vegetation contains several potential habitat trees for two listed threatened species: Baudin's Black Cockatoo and Carnaby's Black Cockatoo. Ten potential habitat trees will be removed from the plant site as a consequence of the Proposal. There may also be indirect impacts on fauna in habitat adjacent to the site from factors such as noise.	The remnant vegetation has been surveyed to confirm the presence of the habitat trees, and replacement artificial nesting boxes will be constructed and placed within nearby suitably vegetated areas, in consultation with the Department of Environment and Conservation and the Department of the Environment, Water, Heritage and the Arts.	Due to the relatively small area of vegetation to be cleared, its degraded condition, proximity to State Forest and that a nesting box program can be implemented using the principles outlined for the Ewington I mine, the proposal will not adversely affect the abundance, diversity, geographic distribution and productivity of native flora and fauna.
Saline Wastewater Disposal;				
Marine Environment	Maintain the marine ecological integrity and biodiversity. Ensure that any impacts on locally significant marine communities are avoided.	The volume of saline wastewater generated from the proposed expansion would depend on the quality of supply water. It is anticipated about 700 kL/d (0.25 GL/yr) of wastewater of salinity less than 20 000 mg/L would be discharged as a direct discharge from the proposal. Modelling and subsequent monitoring of the effects of wastewater discharged into the marine environment has demonstrated that adequate dilution can be achieved to meet environmental guidelines based on a 99% level of protection. Construction impacts on the shoreline and seabed will be temporary and managed to ensure minimal to zero impact on sensitive marine species.	The marine outfall location and diffuser will be designed to ensure environmental guidelines will be met, based on a 99% level of protection. Discharges will comply with any required environmental licences. A Marine Outfall Construction Management Plan has been developed as part of the Construction Environmental Management Plan to ensure mitigation of construction impacts. A Saline Wastewater Management Plan has been developed as part of the Operational Environmental Management Plan. This includes design strategies for the pipeline and various monitoring strategies for the saline discharge line.	The construction activities will result in zero to minimal impact on the marine or shoreline environmental values. Based on the results of the near-field and far-field modelling, the disturbance to the BPPH within guideline parameters and the proposed management actions; saline wastewater disposal via an ocean outfall from Bluewaters will not adversely affect environmental values or the health, welfare and amenity of people and land uses.

Key Environmental Factor	Management Objectives	Potential Impacts	Key Management Measures	Expected Outcome
Terrestrial Environment	Maintain the abundance, diversity and geographic distribution of terrestrial fauna. Protect Specially Protected (Threatened) Fauna, consistent with provisions of *Wildlife Conservation Act 1950*. Maintain the abundance, species diversity, geographic distribution and productivity of vegetation communities. Protect Declared Rare and Priority Flora, consistent with the provisions of the *Wildlife Conservation Act 1950*.	The terrestrial impacts of the pipeline will be of a temporary nature, in an area previously disturbed for the construction of the Collie A saline wastewater discharge pipeline. There were no trees within the proposed alignment with nesting hollows or were large enough or old enough to form significant habitat hollows in the near future. Marri and Banksia tree species adjacent to the route are used by the Black Cockatoo species for foraging and will be avoided by the pipeline alignment.	Strict management procedures for the construction of the pipeline are outlined in the Construction Environmental Management Plan. These include the following specific management plans: ▪ Flora and Vegetation Management Plan ▪ Conservation Area Management Plan ▪ Wetland Management Plan ▪ Weed and Dieback Management Plan ▪ Fauna Management Plan ▪ Soil Management Plan ▪ Acid Sulphate Soil Management Plan ▪ Rehabilitation Management Plan Prior to construction in areas of conservation value, the proponent will consult with the DEC.	Due to the relatively small area of vegetation to be cleared, its degraded condition and that most of the proposed route is within an existing easement, and with management as prescribed, the proposal will not adversely affect the abundance, diversity, geographic distribution and productivity of native flora and fauna.

10. REFERENCES

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