

Collie B Power Station

Griffin Electricity Pty Ltd

**Report and recommendations
of the Environmental Protection Authority**

**Environmental Protection Authority
Perth, Western Australia
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Environmental Impact Assessment Process Timelines

Date	Progress stages	Time (weeks)
17/11/04	Level of Assessment set (following any appeals upheld)	2
24/01/05	Proponent Document Released for Public Comment	10
21/03/05	Public Comment Period Closed	8
20/05/05	Final Proponent response to the issues raised	8
13/06/05	EPA report to the Minister for the Environment	3

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Summary and recommendations

Griffin Electricity Pty Ltd proposes to construct and operate a 330MW advanced sub-critical coal-fired power station (known as Collie B) at the Collie Power Station Site, immediately adjacent to the existing 'Collie A' Power Station. This report provides the Environmental Protection Authority's (EPA's) advice and recommendations to the Minister for the Environment on the environmental factors relevant to the proposal.

Section 44 of the *Environmental Protection Act 1986* requires the EPA to report to the Minister for the Environment on the environmental factors relevant to the proposal and on the conditions and procedures to which the proposal should be subject, if implemented. In addition, the EPA may make recommendations as it sees fit.

Relevant environmental factors

The EPA decided that the following environmental factors relevant to the proposal required detailed evaluation in the report:

- (a) Greenhouse gas emissions;
- (b) Atmospheric emissions;
- (c) Liquid and solid waste disposal;
- (d) Surface water and groundwater; and
- (e) Noise.

There were a number of other factors that were relevant to the proposal, but the EPA is of the view that the information set out in Appendix 3 provides sufficient evaluation.

Conclusion

The EPA has considered the proposal by Griffin Electricity Pty Ltd to construct and operate a 330MW advanced sub-critical coal-fired power station (known as Collie B) at the Collie Power Station Site, immediately adjacent to the existing 'Collie A' Power Station.

The EPA acknowledges that the demand for electricity in Western Australia will continue to grow. The rate of this growth can be reduced somewhat through demand management. However, there will be a continuing need for additional electricity generating facilities as the population grows and usage per person increases. Additional demand should be satisfied through electricity generating facilities that minimise environmental impacts including the production of greenhouse gases.

The EPA has previously advised (EPA 1990) that its preference from an environmental perspective in relation to electricity demand is, in declining order of rank:

- conservation and energy improvements;

- renewable energy sources such as wind and solar energy;
- gas, including combined cycle turbines;
- new technology coal plants;
- old technology coal plants; and
- petroleum fuel plants.

The EPA considers that combined cycle gas turbine (CCGT) generation represents best practicable technology for base-load power generation at this time. The proposed 330MW coal-fired plant will produce an extra 1,000,000 tonnes of carbon dioxide per year compared to a CCGT power station of equivalent capacity. The EPA has previously advised that it expects proponents to mitigate all or a significant part of the extra greenhouse gases produced.

The EPA notes that the proponent has investigated mitigation actions and that the apportioned quantity of greenhouse gases to be directly offset for the Collie B Power Station is about 125,000 tonnes per annum. While the proponent has met the intent of the EPA's requirement to consider the issue of offsets, the apportioned direct offsets for Collie B Power Station still leaves an excess of about 875,000tpa of greenhouse gas emissions above a CCGT power station of equivalent capacity. The EPA notes that the level of greenhouse emissions is considerable and that the level of offsets is about one eighth of the excess.

If a decision is made so that the proposal can be implemented, the EPA considers that the offsets offered by the proponent should be made legally enforceable and tied to this proposal for the life of the proposal. The EPA recognises that the issue of greenhouse gas management is a matter for judgment and that decisions about this proposal will include consideration of broader economic, regional development and strategic issues which are outside the scope of the EPA. From an environmental perspective, the EPA advises that a coal fired power station without full offsets and best practicable technology will not deliver the best environmental outcome.

The EPA welcomes and strongly supports recent announcements by Government of a Greenhouse and Energy Taskforce and a strategic air quality management framework for Collie to manage emissions from existing and proposed industries in the region. Air quality is an emerging issue in Collie. Sulphur dioxide levels may begin to approach ambient standards designed to protect human health with the current array of proposals and this issue deserves the close attention that a strategic management framework can provide.

In determining appeals on the EPA's report on the Bluewaters proposal (Bluewaters I) the Minister for the Environment determined that "it is considered appropriate that the development of emission limits for both the Bluewaters proposal and other existing and proposed power generation and industrial facilities within the Collie region occur as part of a strategic air quality management framework. Such an approach would not necessarily preclude the emission limits suggested by the EPA, or in fact other limits, being required at a later date."

It is evident that the proposed Collie B Power Station does not employ world's best practice for SO₂ management. The EPA considers that European Directive 2001/80/EC represents best practice for SO₂ emission limits.

In considering Principle 5 "waste minimisation" of the *Environmental Protection Act, 1986*, the EPA believes that proponents should implement best practicable measures for the prevention or minimisation of environmental impacts. In the view of appeal decision on Bluewaters power station, this may require retrofitting of sulphur control equipment if the air quality management framework indicates that sulfur dioxide is an issue.

Consistent with this, the EPA considers that the proposed strategic air quality management framework is an appropriate mechanism for determining emission limits for this and other power stations and other industries at Collie.

Overall, the EPA's assessment has concluded that the best environmental outcome would not be achieved for greenhouse gas management if full offsets are not implemented. Best practice SO₂ management would be achieved if European Directive 2001/80/EC were applied. The EPA has concluded that further work on a strategic air quality management framework for Collie is an appropriate mechanism for determining the limits required to manage emissions from both existing and proposed new plants such as Collie B in an effective and equitable way.

A key issue is the effect of saline wastewater discharge on marine water quality and the potential impact on marine biota. It is desirable that the monitoring and management of marine water quality should be consistent with the Environmental Quality Management Framework described in the Government's *State Water Quality Management Strategy Report 6* that the EPA is applying to Western Australia's marine environment (EPA 2004a, EPA 2004b). This framework has been adopted since the existing outfall was assessed and licensed. Accordingly, any update of the pipeline licence which may be required as a result of a new discharge from the pipeline should recognise, protect and achieve the following environmental values and all their associated environmental quality objectives:

- ecosystem health;
- recreation and aesthetics;
- fishing and aquaculture; and
- industrial water supply.

It is the EPA's opinion that the proposal can be managed to meet the EPA's environmental objective for noise, provided that additional best practice noise attenuation measures are employed in the proposed power station such that its noise emissions meet a level that is consistent with cumulative noise emissions that comply with the night time L_{A10} assigned level under the noise regulations at all existing and potential future noise-sensitive areas.

For other environmental factors the EPA has concluded that it is unlikely that the EPA's objectives would be compromised, provided there is satisfactory

implementation by the proponent of their commitments and the recommended conditions set out in Appendix 4, and summarised in Section 4.

The EPA also wishes to draw attention to the advice provided in Section 5 of this report in relation to an industrial buffer, air quality, offsets and the equitable internalisation of full environmental costs when considering proposals of this nature.

Recommendations

The EPA submits the following recommendations to the Minister for the Environment:

1. That the Minister notes that the proposal being assessed is for the construction and operation of a 330MW advanced sub-critical coal-fired power station (known as Collie B) at the Collie Power Station Site, immediately adjacent to the existing 'Collie A' Power Station.
2. That the Minister considers the report on the relevant environmental factors as set out in Section 3.
3. That the Minister notes that the EPA has concluded that the best environmental outcome would not be achieved for greenhouse gas management if full offsets are not implemented.
4. That best practice SO₂ management would be achieved if European Directive 2001/80/EC were applied.
5. That further work on a strategic air quality management framework for Collie is an appropriate mechanism for determining the limits required to manage emissions from both existing and proposed new plants such as Collie B in an effective and equitable way.
6. That for other environmental factors, it is unlikely that the EPA's objectives would be compromised, provided there is satisfactory implementation by the proponent of their commitments and the recommended conditions set out in Appendix 4, and summarised in Section 4.
7. That the Minister imposes the conditions and procedures recommended in Appendix 4 of this report.

Conditions

Having considered the proponent's commitments and the information provided in this report, the EPA has developed a set of conditions that the EPA recommends is imposed if the proposal by Griffin Electricity Pty Ltd to construct and operate a 330MW advanced sub-critical coal-fired power station (known as Collie B) at the Collie Power Station Site, immediately adjacent to the existing 'Collie A' Power Station, is approved for implementation. These conditions are presented in Appendix 4. Matters addressed in the conditions include the following:

- (a) That the proponent shall fulfil the commitments in the Consolidated Commitments statement set out as an attachment to the recommended conditions in Appendix 4;
- (b) Preparation and implementation of a greenhouse gas Emissions management plan;

- (c) Preparation and implementation of a stack emissions management and ambient air quality monitoring plan;
- (d) Preparation and implementation of a saline water discharge quality plan that protects the environmental values identified by the EPA for the marine environment; and
- (e) Compliance audit and performance reviews and a decommissioning plan.

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1. Introduction and background

This report provides the advice and recommendations of the Environmental Protection Authority (EPA) to the Minister for the Environment on the environmental factors relevant to the proposal by Griffin Electricity Pty Ltd, to construct and operate a 330MW capacity advanced sub-critical coal-fired power station (known as Collie B) at the Collie Power Station Site, immediately adjacent to the existing 'Collie A' Power Station.

The proposal was referred to the EPA on 1 November 2004, and on 17 November 2004 the level of assessment was set at Public Environmental Review (PER) under Section 38 of the *Environmental Protection Act, 1986*. The PER document was made available for a public review period of 8 weeks commencing on 24 January 2005 and ending on 21 March 2005.

The EPA's decision to assess the proposal at the level of PER was based on five main factors, namely greenhouse gas emissions, atmospheric emissions, noise, liquid and solid waste disposal and surface water and groundwater.

Further details of the proposal are presented in Section 2 of this report. Section 3 discusses the environmental factors relevant to the proposal. The Conditions and Commitments to which the proposal should be subject, if the Minister determines that it may be implemented, are set out in Section 4. Section 5 provides Other Advice by the EPA, Section 6 presents the EPA's conclusions and Section 7, the EPA's Recommendations. Appendix 5 contains a summary of submissions and the proponent's response to submissions. It is included as a matter of information only and does not form part of the EPA's report and recommendations. Issues arising from this process, and which the EPA has taken into account, appear in the report itself.

2. The proposal

Griffin Electricity Pty Ltd proposes to construct and operate a 330MW capacity advanced sub-critical coal-fired power station (known as Collie B) at the Collie Power Station Site, immediately adjacent to the existing 'Collie A' Power Station. It will be an advanced sub-critical coal fired base-load generation facility with a nominal generating capacity of up to 330MW. The Collie B Power Station will supply electricity to Western Power for the South West Interconnected System (SWIS) under the SWIS Power Procurement Process (PPP).

The proposed Collie B Power Station will comprise the following components:

- boiler and turbine power block;
- mechanical draft cooling tower;
- flue gas cleaning equipment;
- generator transformer;
- water cooling plant;

- a 170m stack;
- water treatment plant;
- transmission line for grid connection;
- buildings for administration, stores, water, sewage treatment, and chemical storage;
- liquid fuel storage facilities (typically for start-up purposes);
- communications and control systems;
- electrical supplies;
- drainage systems;
- roads and fencing; and
- saline wastewater discharge via the existing Collie Power Station ocean outfall.

The plant layout of the Collie B Power Station is shown in Figure 2. A diagram that illustrates the input and output flows for the Collie B Power Station is shown in Figure 3. The main characteristics of the proposal are summarised in Table 1 below. A detailed description of the proposal is provided in Section 3 of the PER document (Griffin Electricity Pty Ltd, 2005).

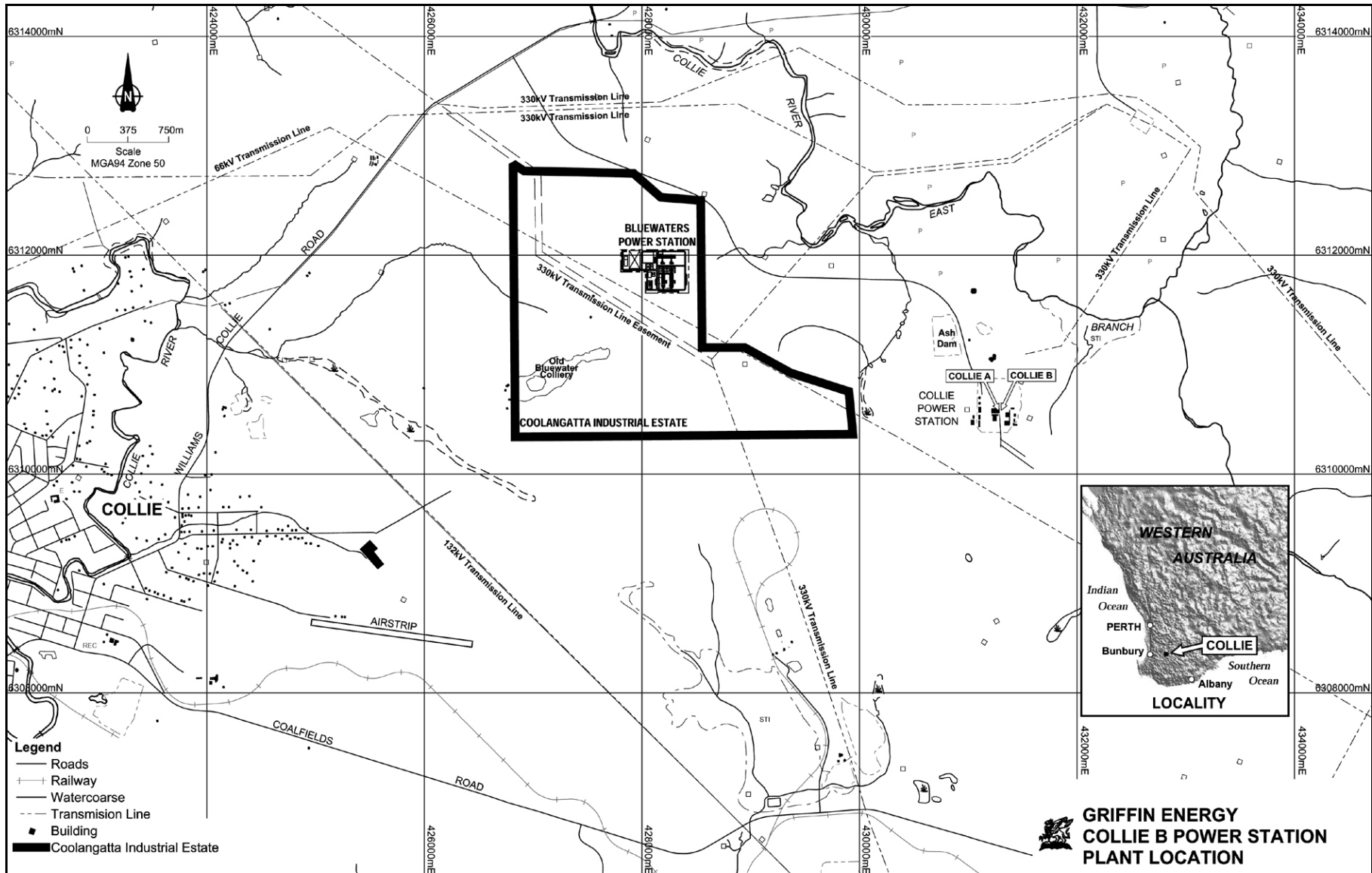


Figure 1: Regional location (Source: Figure 3 from Griffin Electricity Pty Ltd 2005)

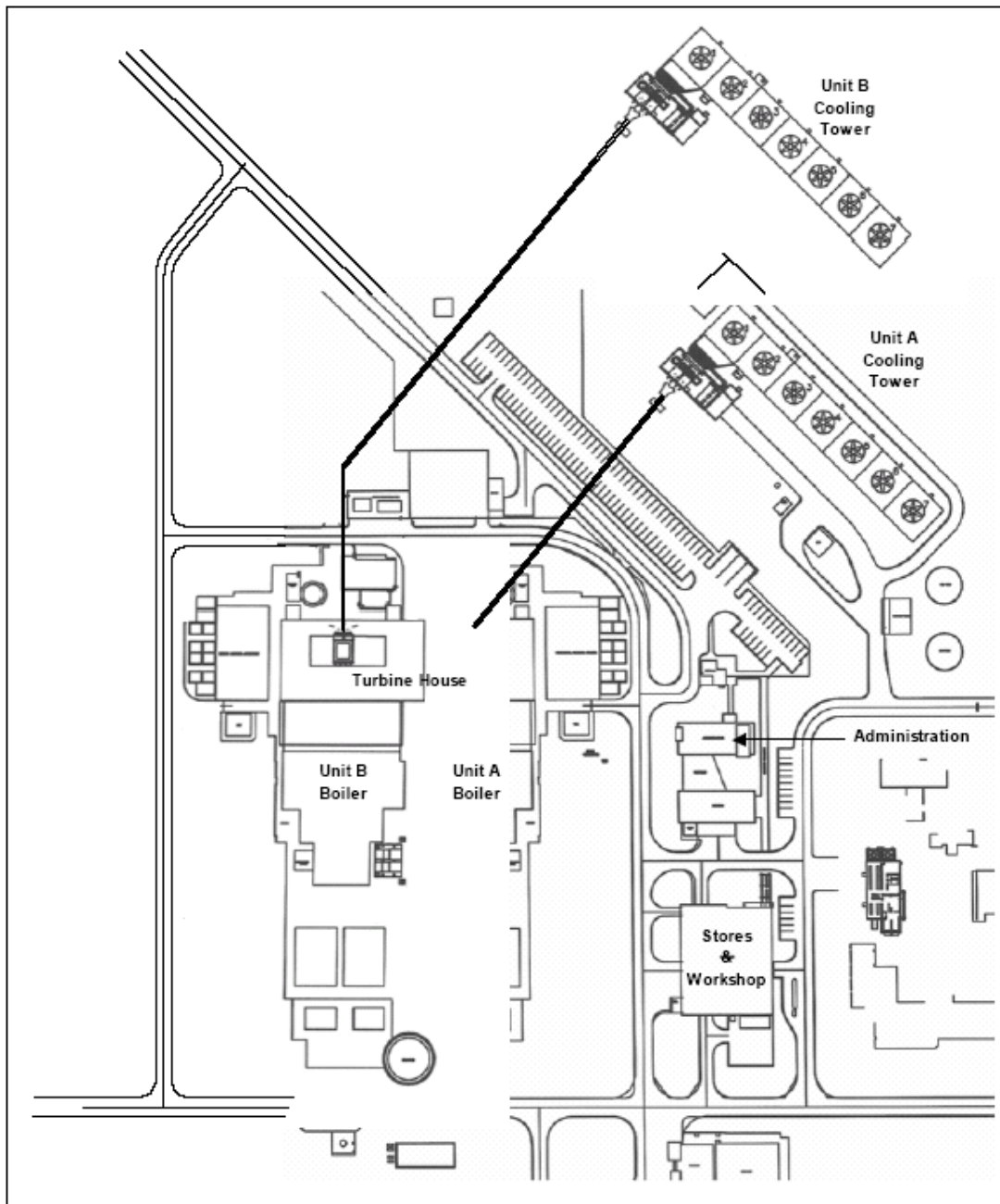


Figure 2: Plant layout (Source: Figure 4 from Griffin Electricity Pty Ltd, 2005)

Table 1: Key proposal characteristics

ELEMENT	DESCRIPTION
General	
<ul style="list-style-type: none"> Project Purpose: Construction Period: Project Life: Project Value: Power Plant Type: Power Generating Capacity: Plant Thermal Efficiency: Plant Operation: Shutdown Time: Maximum Facility Footprint: Maximum Total Area: 	<p>To produce electricity to supply to the SWIS grid or direct to customers</p> <p>30 months to commercial operation</p> <p>30 years</p> <p>Approximately A\$400 Million</p> <p>Advanced subcritical coal fired power station</p> <p>330 MW_{net}</p> <p>HHV 38% - LHV 40.4%</p> <p>Base load operation 24 hours per day, 365 days per year</p> <p>Plant maintenance shutdowns may be scheduled annually</p> <p>200 m x 100 m area</p> <p>1.7 hectares</p>
Plant Facilities	
<ul style="list-style-type: none"> Stacks: Height of Stack: Diameter of Stack: Cooling Towers: Liquid Fuel Storage Tanks: Boiler: Steam Turbine: Wastewater collection 	<p>1 (shared with Collie A)</p> <p>170 m</p> <p>4.8 m</p> <p>1 set</p> <p>Existing fuel storage is sufficient (750 kL)</p> <p>Balanced draft pulverised coal steam generator matched to steam turbine capacity</p> <p>Tandem compound reheat steam turbine with synchronous alternator – 330 MW_e</p> <p>Package treatment plant</p>
Utilities	
<ul style="list-style-type: none"> Water Supply: Coal Supply: Transmission Line Length: 	<p>Dependant on water quality, 3.6-7.4 GL/yr</p> <p>Nominal 1.4 million tpa (dependant on coal quality)</p> <p>Minimal additional transmission lines required</p>
Emissions	
<ul style="list-style-type: none"> Noise: Flue Dust: Nitrogen Oxides: Sulphur Oxides: Greenhouse Gases: Carbon Monoxide: Volatile Organic Compounds: PAH: Arsenic Cadmium Chromium compounds Lead compounds Mercury: Fluorides: POPs inc Dioxins and Furans: 	<p>Noise levels predicted to be at or below assigned levels <65 dB(A) under the noise regulations at the power station boundary. Noise levels at nearest residential premises predicted to meet assigned noise levels.</p> <p>47 mg/Nm³ at 7% O₂ dry basis; 18 g/s; 340 tpa</p> <p>606 mg/Nm³ at 7% O₂ dry basis; 132g/s; 4570 tpa</p> <p>1152 mg/Nm³ at 7% O₂ dry basis; 370g/s; 9,000 tpa</p> <p>2,100,000 tpa CO₂ e</p> <p>500 mg/Nm³ at 7% O₂ dry basis 126g/s; 3,500 tpa</p> <p>48 kg/yr</p> <p>9 kg/yr</p> <p>10 kg/yr</p> <p>12.7 kg/yr</p> <p>2.2 kg/yr</p> <p>46kg/yr</p> <p>46 kg/yr</p> <p>22,500 kg/yr (instantaneous rate estimated to be 880 mg/s)</p> <p>Less than 0.8 grams per year</p>
Waste	
<ul style="list-style-type: none"> Ash: Sewage: Saline Water: design rate of 36 L/s) 	<p>Dependant on quality of coal. Approx. 270,000 tpa to be returned to adjacent mines</p> <p><10 tpa</p> <p>Dependant on quality of water supply – estimated discharge volume of 20 L/s (maximum)</p>
Workforce	
<ul style="list-style-type: none"> Construction: Operations 	<p>Approximately 400 personnel at the peak of construction</p> <p>Up to 25 full time operations and maintenance personnel</p>

Abbreviations used in Table

CO ₂ e	Carbon dioxide equivalents
dB(A)	decibels A weighted
g/s	grams per second
GL/yr	Gigalitres per year
HHV	Higher Heating Value
kg	Kilograms
kg/yr	Kilograms per year
m	metre
mg/Nm ³	milligrams per normal cubic metre, at 1 atm, 0°C

Mtpa	Million tonnes per annum
MW	Megawatt
O ₂	Oxygen
pa	per annum
PAH	Polycyclic Aromatic Hydrocarbons
POPs	Persistent Organic Pollutants
SWIS	South West Interconnected System
tpa	tonnes per annum at 0.8 capacity factor
%	percent

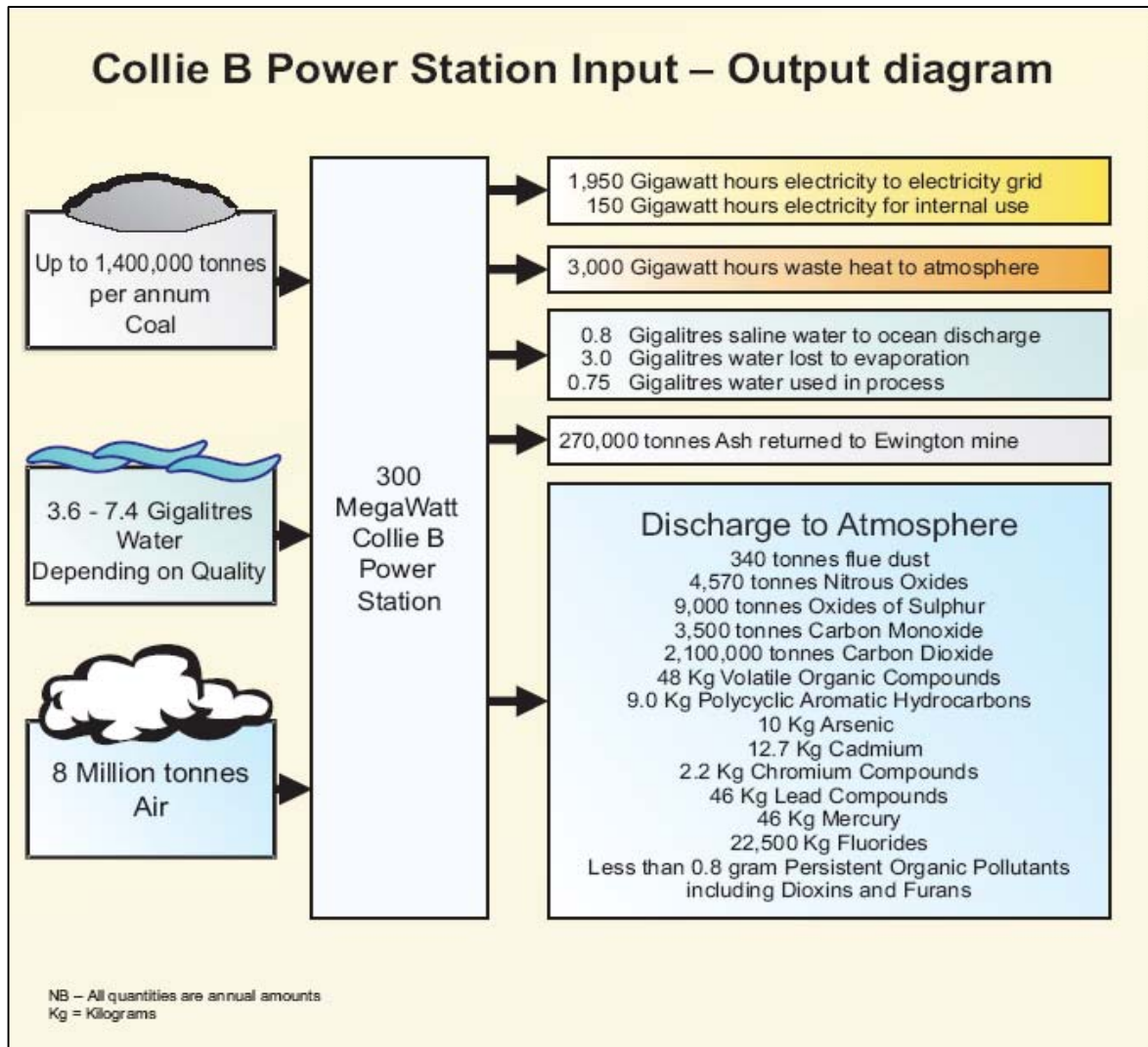


Figure 3: Input - Output flow diagram
(Source: Modified Version of Figure 6 from Griffin Electricity Pty Ltd, 2005)

3. Relevant environmental factors

Section 44 of the *Environmental Protection Act 1986* requires the EPA to report to the Minister for the Environment on the environmental factors relevant to the proposal and the conditions and procedures, if any, to which the proposal should be subject. In addition, the EPA may make recommendations as it sees fit.

The identification process for the relevant factors selected for detailed evaluation in this report is summarised in Appendix 3. The reader is referred to Appendix 3 for the evaluation of factors not discussed below. A number of these factors, such as terrestrial flora, terrestrial fauna, Aboriginal culture and heritage, and risk and hazards, are relevant to the proposal, but the EPA is of the view that the information set out in Appendix 3 provides sufficient evaluation.

It is the EPA's opinion that the following environmental factors relevant to the proposal require detailed evaluation in this report:

- (a) Greenhouse gas emissions;
- (b) Atmospheric emissions;
- (c) Liquid and solid waste disposal;
- (d) Surface water and groundwater; and
- (e) Noise.

The above relevant factors were identified from the EPA's consideration and review of all environmental factors generated from the PER document and the submissions received, in conjunction with the proposal characteristics.

Details on the relevant environmental factors and their assessment are contained in Sections 3.1 - 3.5. The description of each factor shows why it is relevant to the proposal and how it will be affected by the proposal. The assessment of each factor is where the EPA decides whether or not a proposal meets the environmental objective set for that factor.

The EPA considered all of the principles listed in Section 4A of the *Environmental Protection Act, 1986*. The following principles were considered to be particularly relevant by the EPA in relation to this proposal:

- a. Principle 4b - The polluter pays principle - those who generate pollution and waste should bear the cost of containment, avoidance, and abatement; and
- b. Principle 5 - All reasonable and practicable measures should be taken to minimise the generation of waste and its discharge into the environment.

3.1 Greenhouse gas emissions

Description

Operation of the proposed Collie B Power Station would generate a significant quantity of greenhouse gas emissions, predominantly in the form of 2,100,000 tonnes of carbon dioxide (CO₂) per annum.

Submissions

The main issues raised in the submissions in relation to greenhouse gas emissions included:

- Information is required on the greenhouse gas intensity and thermal efficiency of the proposed plant, and the level of offsets that would be applied against the project;
- There is limited discussion on whether a sub-critical or super-critical power station will be built.
- The health risks to the Collie community must be assessed on a cumulative as well as incremental basis.
- The proponent should provide a comprehensive Greenhouse Gas Emission Management Plan as part of the approvals process;
- It is difficult to see how the Collie B Power Station would significantly reduce the sent-out carbon intensity of electricity generation of the South West Interconnected System (SWIS).

Assessment

The EPA notes that operation of the proposed Collie B Power Station will generate approximately 2,100,000 tonnes of CO₂ per annum which represents 0.48% of Australia's 1990 baseline level for greenhouse gases and 4.3% of Western Australia's 1995 emissions (Australian Greenhouse Office, 1998). This amount is also well over the trigger level of 500,000 tonnes per annum (tpa) in EPA Guidance Statement No. 12 titled, "Guidance Statement for Minimising Greenhouse Gas Emissions" (EPA 2002a). The EPA understands that it is currently a contender in the Power Procurement Process to supply Western Power with power for retail sale in Western Australia.

The EPA considers this proposal to be a significant contributor to Western Australia's greenhouse gas emissions. The EPA's objectives in regard to this environmental factor from both a global and Australian context, consistent with the State and National Greenhouse Strategies, are to:

- Minimise greenhouse gas emissions in absolute terms and reduce emissions per unit of product to as low as reasonably practicable; and
- Mitigate greenhouse gas emissions, mindful of relevant Commonwealth and State environmental policies, including EPA Guidance Statement No. 12.

The EPA is aware that the Australian Government has committed to limit Australia's increase in greenhouse emissions in 2008-2012 to no more than 8% above 1990 levels. Accordingly, the EPA considers it necessary for greenhouse gas minimization to be kept firmly in mind when considering new development proposals that are likely to significantly add to emissions.

To achieve this, the EPA expects that potential greenhouse gas emissions from proposed projects be adequately addressed in the planning, design and operation of projects, and that:

- Best practicable measures are applied to maximise energy efficiency and minimise emissions;
- Comprehensive analysis is undertaken, where residual impacts occur, to identify and implement appropriate offsets; and
- Proponents undertake an on-going programme to monitor and report emissions and periodically assess opportunities to further reduce greenhouse gas emissions over time.

The EPA acknowledges that the demand for electricity in Western Australia will continue to grow. The rate of this growth can be reduced somewhat through demand management. However, there will be a continuing need for additional electricity generating facilities as the population grows and usage per person increases. Ideally, additional demand should be satisfied through electricity generating facilities which minimise the production of greenhouse gases.

The EPA has previously advised (EPA 1990) that its preference from an environmental perspective in relation to electricity demand is, in declining order of rank:

- conservation and energy improvements;
- renewable energy sources such as wind and solar energy;
- gas, including combined cycle turbines;
- new technology coal plants;
- old technology coal plants; and
- petroleum fuel plants.

The proposed power station would be a subcritical coal-fired generating facility with a nominal generating capacity of 330MW. The EPA notes that with respect to currently available and proven coal-fired power generation technologies in Australia, super-critical technology is considered to be best practice for coal-fired power stations with a generating capacity of greater than 250MW according to the Australian Greenhouse Office's Generator (AGO) Efficiency Standards (Australian Greenhouse Office 2001). However, the EPA is aware from the Generator Efficiency Standards that an emerging coal-fired technology known as integrated gasification combined cycle (IGCC) is significantly more thermally efficient than subcritical technology. The proposed power station may not represent best practise for greenhouse gas emissions as defined by the AGO as it does not utilise super-critical technology.

In relation to best practice, maximising energy efficiency and minimising greenhouse gas emissions, the EPA considers that combined cycle gas turbine (CCGT) generation represents best practicable technology for base-load power generation, and hence represents the benchmark against which other technologies should be compared from an environmental point of view.

The EPA notes that the proposed plant would result in greenhouse gas emission of approximately 1,000,000 tpa greater than a CCGT plant of similar capacity. This would amount to approximately 30 million tonnes of extra greenhouse gases over a nominal 30-year life for the proposed plant.

The EPA has provided strategic environmental advice (EPA 2003a) on its expectations for future power station proposals in relation to the mitigation of greenhouse gas emissions. The EPA indicated that if power stations are proposed which do not result in the least greenhouse gas intensity, the EPA expects that mitigation actions would be proposed, investigated during the Section 38 environmental impact assessment process, and adopted as appropriate.

The EPA also indicated that specific measures relevant to the reduction and mitigation of greenhouse gas emissions could include:

- Renewable energy generation (wind and biomass);
- Advanced, high efficiency coal fired generation technology;
- Sequestration via forestry; and
- Desalination as part of a regional water management strategy.

The EPA also stated that it considered that such a package of mitigating measures presents a responsible way of addressing the environmental impacts associated with higher greenhouse gas emissions from coal fired power stations. In view of the above, the EPA considers that if coal is used for base-load power generation it requires greenhouse gas offset measures to be considered to account for the additional greenhouse gas emissions produced by the proposed coal fired power station in comparison to a CCGT base-load power station of equivalent nominal generating capacity.

The EPA notes that the proponent has made a commitment (Commitment No. 12 in Appendix 4) in regard to greenhouse gas emissions which includes direct greenhouse gas emission offsets of about 201,000tpa arising from tree planting activities on former mined areas and rural properties, and the proponent's 50% interest in an 80MW wind farm near Cervantes.

In addition to the above direct offsets, the proponent has also undertaken to provide support and access to Griffin owned land and facilities to enable the diversion by others of the East Collie River, to facilitate the diversion of first flush salt water away from Wellington Weir. The proponent anticipates that this project could lead to the return of 80 GL of water in Wellington Weir to potable standard within a three-year time frame. The proponent calculated a benefit of up to 480,000 tpa of greenhouse gases avoided by not having to desalinate an equivalent volume of seawater.

The calculation above assumes Wellington Weir water can replace water that would otherwise be produced by desalination of seawater, using power from the state grid. The calculated benefit would be less if gas fired power were used, rather than power from the existing grid. This is in fact the likely scenario at Kwinana Power Station where coal firing is to be replaced with gas, which has less than 40% of the greenhouse intensity of current coal fired operations (EPA 2004a). The calculated benefit could thus be down to 151,000tpa if gas was used to provide electricity for seawater desalination at Kwinana. This is reduced to zero if renewable power, as committed to by the Water Corporation, is used.

The EPA notes that the proponent has made the above-mentioned commitment to partially offset the additional greenhouse gas emissions produced by the coal-fired Collie B Power Station in comparison to the EPA's benchmark CCGT base-load power station of equivalent nominal generating capacity. The EPA also notes that the same package of offsets would apply to all three of the proponent's power station proposals in the Collie region. However, the EPA is aware that not all of the proposals may eventuate following the outcomes of Western Power Corporation's Stage 2 Power Procurement Process (PPP).

The EPA's position in relation to greenhouse gas emission offsets is consistent with the relevant Principles in Section 4 of the *Environmental Protection Act, 1986*. Principle 4 states in part that, "those who generate ... waste should bear the cost of containment, avoidance or abatement", "environmental factors should be included in the valuation of assets and services", and "the users of goods and services should pay prices based on the full life cycle costs of providing goods and services, including the use of natural resources and assets and the ultimate disposal of any wastes". Principle 5 states in part that "all reasonable and practicable measures should be taken to minimise the generation of waste and its discharge into the environment".

The EPA's position is also consistent with EPA Guidance Statement No.55 titled, "Implementing Best Practice in Proposals Submitted to the Environmental Impact Assessment Process" (EPA 2003b), which indicates that "there is a responsibility for proponents not only to minimise adverse impacts, but also to consider improving the environment through rehabilitation and offsets where practicable". In view of the above, the EPA expects proponents of development proposals that generate a larger quantity of waste (e.g. CO₂) in comparison to other means of generating the same quantity of electrical power, to provide an appropriate package of offset measures.

The EPA notes that gas is becoming a premium fuel internationally because of its capacity to result in lower emissions, including greenhouse gases, per unit of energy produced. While some submitters stated that Collie coal was not preferred for electricity generation, others argued that one fuel (coal) should not be penalised with offsets that impose environmental management costs that another fuel (gas) does not incur. The EPA considers that projects should be subject to management that protects the environment to the same, consistent standards. In the EPA's view, there is inherent equity in internalising environmental costs. Coal, without greenhouse gas offsets, could be considered to have an unfair advantage if the additional environmental costs of greenhouse gas emissions were borne by the community and not internalised to the project.

During its assessment of the Bluewaters I proposal (EPA, 2005), the EPA previously considered the proponents offer of support and access to land to facilitate improvements to the water quality in Wellington Dam. While the EPA supports proposals which assist such improvements in water quality, it formed the view that the actions and the resources to be committed by the proponent are currently insufficiently defined or quantified for the EPA to be able to clearly allocate offset credits for these particular actions.

The EPA notes that:

- The proposed power station may not represent best practise for greenhouse gas emissions as defined by the AGO as it does not utilise super-critical technology. It will, however, be more efficient than older coal-fired power stations in Western Australia.
- The proposal will generate about 1,000,000 tpa more greenhouse gases than an equivalent gas powered station;
- the proponent has offered to counter these extra emissions in part by direct offsets it can clearly control and account for, amounting to about 201,000tpa from its interest in a wind farm and tree planting;
- the same package of offsets will apply to all three of the proponent's power station proposals in the Collie region, although not all of the proposals may eventuate following the outcomes of Western Power Corporation's Stage 2 PPP;
- if the 201,000tpa of direct offsets offered is apportioned to likely scenarios for combinations of each of the proponent's power station proposals in the Collie region in terms of their respective nominal generating capacities, the apportioned offset for Collie B Power Station would be 125,000tpa, which equates to about 12% of the additional emissions above the EPA's CCGT benchmark assuming that Bluewaters I and Collie B Power Stations are built; and
- the proponent has offered support for some other offsetting actions which are positive and potentially useful, but are considered by the EPA to be presently less tangible and quantifiable, and accordingly, have not been included in the calculations above.

The EPA considers that:

- whilst the proponent has met the intent of the EPA's requirement to consider the issue of offsets, the apportioned direct offsets for Collie B Power Station still leaves an excess of about 875,000tpa of greenhouse gas emissions above the CCGT benchmark should the combination of Bluewaters I Power Station and Collie B Power Station be constructed; and
- the other offsets offered by the proponent may be positive and useful in the future but the EPA is unable to ascertain the extent of the proponent's direct interest in them at this point in time. However, the EPA is prepared to consider their contribution to offsetting additional emissions from the proponent's three power station proposals when the proponent's interest in them can be more clearly defined.

The EPA considers that the proponent's response to other matters raised in submissions in relation to this factor (Appendix 5) adequately addresses those matters.

Summary

Having particular regard to the:

- (a) significant quantity of greenhouse gas emissions that will be produced by the proposed coal-fired power station;
- (b) the commitments made by the proponent; and
- (c) EPA's view above about greenhouse gas emission offsets;

it is the EPA's opinion that CCGT power stations represent best practicable technology for large scale base-load power generation, and hence represent the benchmark against which other base-load power generation technologies should be compared. While the objective of considering offsets has been met by the proponent, the apportioned direct offset for Collie B Power Station still leaves a significant excess of emissions, and hence best environmental practice for limiting greenhouse gas emissions has not been met. If Government approves the proposal, the package of offsets should be made legally binding so that they can be implemented and bound to this proposal.

3.2 Atmospheric emissions

Description

Construction and operation of the proposed Collie B Power Station would generate a variety of atmospheric emissions that have the potential to affect human health and the environment if not properly managed.

Submissions

The main issues raised in the submissions in relation to atmospheric emissions included:

- The impact of cumulative air emissions from both existing and proposed industrial developments in the Collie region (i.e. existing and proposed power stations, existing domestic emissions, existing and proposed coal mines, and future industries within the Coolangatta Industrial Estate);
- The impact of air emissions on public health; especially from acidic gases, heavy metals, volatile organic compounds, polycyclic aromatic hydrocarbons, and particulates;
- The applicability of European Directive 2001/80/EC for SO₂ emissions;
- The establishment of a specific Environmental Protection Policy for SO₂; and
- The proponent should contribute to an expanded air monitoring program to provide both baseline data, and to allow confirmation of actual air emission outcomes with modelled predictions.

Assessment

The area considered for assessment of this factor is the Collie B Power Station site and surrounding areas, including residences in and around the town of Collie.

The EPA's environmental objective for this factor is to ensure that:

- Atmospheric emissions do not adversely affect the environment or health, welfare and amenity of nearby land users by meeting statutory requirements (including Section 51 of the *Environmental Protection Act, 1986*) and acceptable standards;
- Atmospheric emissions, both individually and cumulatively, meet appropriate criteria and do not cause an environmental or human health problem; and
- All reasonable and practicable measures are used to minimise the discharge of atmospheric emissions.

The EPA notes that the proposed Collie B Power Station will emit a range of atmospheric emissions as set out in Table 1, which have the potential to affect human health and the environment if not properly managed.

The EPA considers that the main issues relate to sulphur dioxide (SO₂) and particulate (PM₁₀ and PM_{2.5}) emissions.

Sulphur Dioxide

The EPA notes from the air quality modelling report (Sinclair Knight Merz, 2005a) prepared for the proponent of the Collie B Power Station proposal, that for the likely potential development scenario (Scenario 5) that was modelled which includes emissions from Collie A, Muja Power Station Stages C and D, the upgraded Worsley Alumina Refinery, the proposed Collie B Power Station, and the proposed Bluewaters I Power Station:

- The predicted 1-hour SO₂ ground level concentration:
 - in Collie is 348µg/m³ which is 61% of the National Environmental Protection Measure (NEPM) standard of 570µg/m³; and
 - at the caretaker's residence at the Collie Motorplex is 579µg/m³ which is 102% of the NEPM standard;
- The predicted 10-minute SO₂ ground level concentration:
 - in Collie is 592µg/m³ which is 118% of the World Health Organisation (WHO) guideline of 500µg/m³;
 - at the caretaker's residence at the Collie Motorplex is 984µg/m³ which is 197% of the WHO guideline; and
 - at 18 residences in the Collie region exceeds the WHO guideline;
- The predicted 24-hour PM₁₀ ground level concentrations in Collie is 20.66 µg/m³ (with background PM₁₀ levels included) which is 41% of the NEPM standard;
- The predicted 24-hour PM_{2.5} ground level concentrations in Collie is 11.37 µg/m³ (with background PM_{2.5} levels included) which is 45% of the NEPM standard; and

- The predicted annual PM_{2.5} ground level concentrations in Collie is 10.44 µg/m³ (with background PM_{2.5} levels included) which is 130% of the NEPM standard.

The EPA also notes that for Scenario 5:

- Predicted ground level concentrations of nitrogen oxides (NO_x) and carbon monoxide (CO) both in Collie and the surrounding region are all below NEPM standards; and
- Predicted concentrations of polycyclic aromatic hydrocarbons (PAHs), heavy metals, dioxins and furans, and hydrogen fluoride both in Collie and the surrounding region are all below relevant standards.

Nitrogen oxides, particulates and other air emissions

The EPA notes from the PER document that low NO_x burners will be installed in the proposed Collie B power station to minimise NO_x emissions. The EPA also notes from the PER document that dust (particulate) emissions from the proposed power station will be controlled through the installation of electrostatic precipitators.

The EPA considers that the use of low NO_x burners and electrostatic precipitators in the proposed power station would adequately demonstrate the implementation of best practice technology by the proponent in relation to minimising NO_x and particulate emissions.

The EPA notes that the proponent has made a commitment (Commitment No. 11 in Appendix 4) in regard to managing atmospheric emissions from the proposed power station.

There is a requirement for additional data on ambient air quality to verify actual conditions in the Collie area. Accordingly, the EPA recommends that the proponent be required to undertake ongoing ambient air quality monitoring.

Health impact assessment

The EPA notes from the Health Impact Statement (HIS) document prepared for the Collie B Power Station proposal (Sinclair Knight Merz, 2005b) that health impacts are unlikely based on the outcomes of the cumulative air quality modelling that has been undertaken, and an evaluation of predicted ground levels concentrations against relevant ambient air quality criteria. The EPA notes that the above assessment was based on the understanding that the Colle Motorplex was a non-residential site. However, it was recently determined that there is a caretaker's residence on the site.

The EPA notes from the PER document that at locations where the WHO guideline is exceeded, sensitive individuals in the community, such as asthmatics and those with chronic obstructive lung disease may show small reductions in ventilatory capacity. The EPA notes, however, that SO₂ is known to be associated with triggering and exacerbating breathing difficulties, and the modelled concentrations are considered potentially problematic. The EPA also notes from the PER document that should a caretaker be present on-site at the Collie Motorplex, they would also be exposed to these health effects.

However, given that predicted SO₂ ground level concentrations exceed both the WHO 10-minute guideline and the NEPM 1-hour standard at the caretakers residence at the Collie Motorplex, and the WHO 10-minute guideline in Collie when emissions from Collie A, Muja Power Station Stages C and D, the upgraded Worsley Alumina Refinery, the proposed Collie B Power Station, and the proposed Bluewaters I Power Station are considered, the potential exists for health impacts from SO₂ emissions to occur. The EPA understands that the Department of Health considers that the WHO 10 minute guideline for SO₂ of 500µg/m³ is a more appropriate limit for vulnerable groups than the National Health and Medical Research Council (NHMRC) goal of 700µg/m³.

The EPA understands from the HIS document that a telephone survey of 350 households in the Shire of Collie was undertaken in order to gauge community attitudes and beliefs in regard to the establishment of a new coal-fired power station in the Collie area. The EPA notes from the full copy of the survey that was provided (Sinclair Knight Merz 2005b) that, when questioned about their beliefs about the future health risks from a new power station in the Collie area, 32% of the respondents felt that there was a minor or slight health risk, and 4% felt that there was a high or moderate health risk.

It is evident that the proposed Collie B Power Station does not employ world's best practice for SO₂ management. The EPA considers that European Directive 2001/80/EC represents best practice for SO₂ emission limits.

The EPA notes from the proponent's response to submissions that it does not support the application of European Directive 2001/80/EC for SO₂ emissions to the proposal as it will effectively require flue gas desulphurisation (FGD) technology to be used in the proposed power station.

The EPA has assessed additional information related to the effect of applying the European Directive to new coal-fired power stations at Bluewaters and Collie B (see Section 5.2). The EPA notes that modelling the effect of the European Directive 2001/80/EC limit on air quality (Sinclair Knight Merz 2005c) indicates improvements in SO₂ ground level concentrations at receptors close to the new plants if FGD is used at those plants to meet EC Directive limits of either 200 or 400mg/m³. At the Collie township these improvements range from 45% for the 10 minute and 1-hour averaging periods to 18% for the 24-hour averaging period, and 26% for the annual average.

In considering Principle 5 "waste minimisation" of the *Environmental Protection Act, 1986*, the EPA believes that proponents should implement best practicable measures for the prevention or minimisation of environmental impacts.

Consistent with this, the EPA considers that the proposed strategic air quality management framework is an appropriate mechanism for determining emission limits for this and other power stations and other industries at Collie.

Summary

Having particular regard to the:

- (a) Level of air emissions from current and proposed future coal-fired power plants in the Collie area;
- (b) The results of air emissions modelling undertaken for the PER document and the advice of the Department of Health on health effects;
- (c) The significant improvement in SO₂ ground level concentrations that could be achieved through the incorporation of FGD into new coal-fired power stations in the Collie area; and
- (d) Commitments made by the proponent;

It is the EPA's opinion that the proposal should be included in the studies for a strategic air quality framework announced by Government, and subject to limits protective of the environment and public health determined from those studies.

3.3 Liquid and solid waste disposal

Description

Construction and operation of the proposed Collie B Power Station would generate liquid and solid wastes that will require disposal.

Submissions

The issues raised in the submissions in relation to liquid and solid waste disposal were centred on:

- Ash disposal and composition;
- Ocean discharge of saline wastewater and the expected discharge rates (minimum, average and maximum);
- The capacity of the pipeline and quality of the water;
- Characterisation of the source waters; and
- Potential marine impacts.

Assessment

The area considered for assessment of this factor is the Collie B Power Station site and surrounding areas, including the Ewington 1 mine, Ewington 2 mine and the marine environment in the vicinity of the existing Collie A Power Station saline wastewater pipeline ocean outfall.

The EPA's environmental objective for this factor is to ensure that:

- Where possible, waste is minimised, reused or recycled to levels which are as low as reasonably practicable; and

- Liquid and solid wastes do not affect surface water and groundwater quality, the marine environment, nor lead to soil contamination.

Saline wastewater

The EPA notes from the PER document that the proposed power station will generate an average of about 0.8GL of saline wastewater per year and about 270,000 tonnes of ash per annum during operation. The EPA also notes that the saline wastewater is proposed to be disposed of via the existing Collie Power Station saline wastewater pipeline and ocean outfall system, and that the ash will be disposed of in the nearby Ewington 1 mine.

The pipeline is owned by Western Power Corporation. It has been previously assessed by the EPA and is subject to Ministerial and DoE license conditions. The EPA understands from the proponent's briefings that the pipeline currently operates considerably below capacity. The EPA also understands that any additional discharge through the pipeline will trigger a review of the DoE licence and its conditions.

The disposal of saline wastewater has the potential to impact on the marine environment if there is an increase beyond the current license limits in discharge volume, the mixing zone or the total load of contaminants released into the sea. The EPA understands that the saline wastewater is likely to contain biocides such as hypochlorite and hydrobromide, as well as corrosion and scale inhibitors.

The key issue is the effect of saline wastewater discharge on marine water quality and the potential impact on marine biota. It is desirable that the monitoring and management of marine water quality should be consistent with the Environmental Quality Management Framework described in the Government's *State Water Quality Management Strategy Report 6* that the EPA is applying to Western Australia's marine environment (EPA 2004a, EPA 2004b). This framework has been adopted since the existing outfall was assessed and licensed. Accordingly, any update of the pipeline licence which may be required as a result of a new discharge from the pipeline should recognise, protect and achieve the following environmental values and all their associated environmental quality objectives:

- ecosystem health;
- recreation and aesthetics;
- fishing and aquaculture; and
- industrial water supply.

The level of ecological protection to be achieved for maintaining ecosystem health in the vicinity of outfalls has previously been established by the EPA as 'high', requiring the 99% level of species protection guideline trigger values for toxicants in marine waters (ANZECC & ARMCANZ 2000) to be met outside the zone of initial dilution. A moderate level of ecological protection should be met within the zone of initial dilution unless the proponent can demonstrate that this level cannot be met and that a low level of protection is more appropriate.

The EPA considers that the quality of the saline water discharged into the pipeline should be controlled at the pipe inlet to ensure that compliance with the licence discharge conditions is maintained. The EPA recommends that a condition be set to ensure a plan to monitor and control saline water discharge quality will be implemented. The parameters of the plan should include monitoring of environmental contaminants and discharge temperature. If monitoring identifies unacceptable impacts, modifications would need to be made to address adverse effects.

While it is open to the existing pipeline licensee to enter into contractual arrangements with other users, the EPA expects that the licensee will retain responsibility for discharges from the pipeline to the ocean. Management of discharges from the Collie B proposal into the pipeline can be managed by a DoE discharge license on the Collie B operation. Such a license should ensure that the currently licensed discharge from the ocean outfall is either not exceeded or is subject to further appropriate assessment. Any such assessment should ensure that end of pipe combined effluent toxicant concentrations protect the identified environmental values and meet a moderate level of ecological protection, and a high level of ecological protection at the edge of the zone of initial dilution (except for cobalt, which should meet 95% species protection guidelines).

It would be advisable for the DoE license to require that whole of effluent toxicity testing be required annually for the combined effluent and that the combined effluent quality be consistent with the requirements of the Environmental Quality Criteria Reference Document for Cockburn Sound (EPA 2004b) for a moderate level of ecological protection. License conditions should ensure that 100 fold dilutions will be maintained to the edge of that zone.

The EPA notes that there are concerns that the capacity of the pipeline may not be able to accommodate all other inputs from proposed power stations and the existing users, particularly during periods of increased power production. Discharges to the existing pipeline will be required to meet the existing licence limits. If additional discharge means the licence limits need to be increased or another pipeline constructed then that proposal will require separate environmental assessment.

The EPA notes from the PER document that in the event that saline wastewater cannot be discharged via the Collie Power Station saline wastewater pipeline, it will be disposed of in an evaporation pond system.

The EPA notes from the proponent's response to submissions (see Appendix 5) that an evaporation pond option will be considered only if the existing Collie Power Station saline wastewater pipeline is not available. The EPA understands that the evaporation pond option will be built with volume reduction facilities upstream of the evaporation pond. Should the evaporation pond option be implemented, it is recommended that further advice be sought from the Land and Water Quality Branch of the Department of Environment. The EPA notes that if meteorological conditions make the evaporation pond option impractical, crystallisation of the brine slurry to solid brine salt will be considered.

Ash disposal

The EPA notes from the PER document that the co-disposal of ash and mine overburden into mine voids will have a significant dilution effect, and the clays in the overburden are expected to reduce the release of metals from the ash. The EPA understands that the use and disposal of fly ash in mine voids is common in coal mining areas in the United States, although there are strict controls on the manner in which the material is used. The EPA also notes from the PER document that this method of disposal is currently being used at the Bayswater Power Station in New South Wales. The EPA is aware that the disposal of ash into mine voids has the potential to increase groundwater salinity, and may lead to the contamination of groundwater by some of the trace elements found in the ash.

The EPA notes that the proponent has made two commitments (Commitment Nos. 7 and 9 in Appendix 4) in regard to liquid and solid waste disposal.

The EPA notes from the PER document that fly ash management will be a component of the operational phase waste management plan referred to in Commitment No. 9. The EPA understands that the plan will include a groundwater monitoring program which will be agreed in consultation with the operator of the mine operator, the DoE, and other stakeholders. Nevertheless, the EPA recommends that the above-mentioned management plan should include details which indicate how surface water run-off and infiltration through the ash and overburden material will be managed to prevent groundwater contamination from occurring.

The EPA considers that the management measures described on pages 50 and 95 of the PER document to minimise potential impacts from liquid and solid waste disposal are environmentally acceptable. The EPA considers that the proponent's response to the above-mentioned submissions (Appendix 5) adequately addresses the concerns that were raised in relation to liquid and solid waste disposal.

The EPA considers that provisions for the monitoring of leachates from the discarded ash should be included in the appropriate DoE licence.

Summary

Having particular regard to the:

- (a) Necessity of the proposal to fit within the licensed capacity of the marine discharge pipeline;
- (b) Necessity of the quality of the discharge of saline water into the pipeline to be controlled from the pipe inlet to ensure that compliance with the licence is maintained;
- (c) Commitments made by the proponent; and
- (d) Management measures that will be used to minimise potential impacts from liquid and solid waste disposal;

It is the EPA's opinion that the proposal can be managed to meet the EPA's environmental objective for this factor.

3.4 Surface water and groundwater

Description

Construction and operation of the proposed Collie B Power Station has the potential to affect surface water and groundwater quality.

Submissions

The issues raised in the submissions in regard to surface water and groundwater included:

- Given there is concern regarding the difficulty of establishing the exact amount of water available from dewatering in the medium and long terms, it would be prudent to develop an alternative water supply, rather than depend on dewatering for a secure long-term supply.
- How will potential water quality risks, under normal and abnormal conditions, from hazardous material storage, washdown waters, fallout of air emissions to soil, saline water leakage from storage ponds, fly ash disposal in mine overburden, spills and leakage from the packaged treatment plant be minimised?
- The proposed method of disposal of fly ash.
- What management practices are proposed to maintain the integrity of the wetland to the west of the plant?

Assessment

The area considered for assessment of this factor is the Collie B Power Station site and surrounding areas and the route of the saline wastewater discharge pipeline.

The EPA's environmental objectives for this factor are to maintain the quality of surface water and the quality, quantity and distribution of groundwater so that existing and potential uses, including ecosystem maintenance, are protected.

Construction activities may increase surface water and sediment run-off to nearby wetlands. Furthermore, there is a possibility that saline wastewater or water contaminated with coal sediments, fly ash or on-site chemicals could flow off-site and enter the local surface drainage. Wastewater discharges from Collie B along with hazardous or contaminating materials used during its construction or operation could represent a potential threat to the quality of the local surface water resources. Indirect loss of vegetation may occur due to an interruption of existing surface water flows.

The proponent advises that the power station will require 3.6-7.4GL of water per year, depending on water quality (salinity), which will be sourced from mine dewatering at the Ewington 1 and Ewington 2 Mines. Based on the available information, the EPA understands that mine dewatering is expected to provide a secure supply source, at least for the short and intermediate periods of the power station operation. The EPA understands that no additional groundwater or other water will be required to supplement the water obtained from dewatering.

The proponent will need to consider new sources of water about five years before a new source is required. Any proposal to obtain water from an alternative supply will require referral to the EPA for additional assessment.

The operation of the proposed power station has the potential to affect the quality of groundwater due to run-off from plant hard stand and storage areas, flyash disposal, saline wastewater leakage from storage ponds, and contamination from hydrocarbons and other chemicals used on site. The EPA considers that there is also potential for surface and ground water quality to be affected by leaks and/or ruptures in the saline wastewater discharge pipeline.

The EPA notes that the proponent has made two commitments (Commitment Nos. 4 and 5) in regard to surface water and groundwater.

The EPA considers that the management measures described on pages 73 and 76 of the PER document that will be used to minimise potential impacts on surface water and groundwater, are environmentally acceptable. The EPA considers that the proponent's response to the above-mentioned submissions (Appendix 5) adequately addresses the concerns that were raised in relation to surface water and groundwater.

Summary

Having particular regard to the:

- (a) Need to secure and separately assess a long term water supply for Collie B;
- (b) Proponent's undertakings that no additional groundwater will be required to supplement the water obtained from dewatering at the Ewington 1 and Ewington 2 mines;
- (c) Commitments made by the proponent; and
- (d) Management measures that will be used to minimise potential impacts on surface water and groundwater;

It is the EPA's opinion that the proposal can be managed to meet the EPA's environmental objective for this factor.

3.5 Noise

Description

Construction and operation of the proposed Collie B Power Station has the potential to affect existing noise levels.

Submissions

The main issues raised in the submissions in relation to noise included:

- The community is concerned about the impact of cumulative noise emissions;

- The noise modelling contour lines for the power station did not extend to the Collie townsite;
- Different noise modelling programs have been used in the two Collie B Power Station proposals and the results obtained in each case differ significantly;
- Additional cumulative noise modelling needs to be undertaken to include all existing and proposed power stations and existing and proposed industrial and mining developments in the area, and to clarify an apparent discrepancy between the different noise modelling programs that were used in the two Collie B Power Station proposals;
- The proposed Coolangatta Industrial Estate has not been included in the cumulative noise modelling. The results of this modelling would provide the basis for an appropriate buffer zone being recognised and incorporated into the Shire Town Planning Scheme; and
- The noise modelling report in the PER document has the Bluewaters Power Station located incorrectly which has resulted in incorrect noise contours being published in the PER document.

Assessment

The area considered for assessment of this factor is the Collie B Power Station site and surrounding areas, including residences in and around the town of Collie.

The EPA's environmental objective for this factor is to ensure that:

- noise levels from construction activities comply with the requirements of Australian Standard 2436-1981 "*Guide to Noise Control on Construction, Maintenance and Demolition Sites*"; and
- noise levels from the proposed power station comply with the *Environmental Protection (Noise) Regulations, 1997*.

In order to address the concerns that were raised in the submissions regarding cumulative noise emissions the Department of Environment (DoE) requested further noise modelling information for each proposed power station. Using this data and the information in the relevant PER documents, the DoE undertook an analysis to determine cumulative noise levels at four different receiving locations in the Collie area.

The DoE's analysis utilised currently available noise modelling related information pertaining to both existing and proposed power stations, mining operations, and notional industries within the proposed Coolangatta Industrial Estate in the Collie area. Table 2 below provides a summary of the outcomes of the DoE's analysis (Department of Environment 2005).

Table 2: Assessment of cumulative noise levels in the Collie area

	Estimated sound level - dB(A)			
	Receiving location 1 - North-east corner of Collie townsite	Receiving location 2 - Collie-Williams Rd, corner of Boys Home Rd	Receiving location 3 - Collie-Williams Rd, north of Bluewaters 1 & 2	Receiving location 4 - Collie-Williams Rd, north of Collie A & B
Assigned L _{A 10} night time noise level	35	35	35	35
Total estimated cumulative sound level range using SoundPlan and ENM models ^{1,2}	42-45	39-42	37-40	36-39
Estimated sound level range due to Bluewaters II ^{2,3}	24-27	30-33	24-27	22-25
Estimated sound level range due to Collie B ²	22-25	24-27	24-27	28-31

Note 1: Includes noise emissions from Bluewaters 1 & 2, Collie A & B, Ewington 1 mine, Ewington 2 mine, and Coolangatta Industrial Estate with 3 notional industries.

Note 2: The SoundPlan model produced the lower value in the range and the ENM model produced the higher value.

Note 3: Noise emissions from Bluewaters II assessed at correct current source location.

Source: Modified version of Table 1 from Department of Environment 2005.

The results in Table 2 indicate that the cumulative noise level from all sources is likely to exceed the night time L_{A 10} assigned level at all four receiving locations under worst case meteorological conditions, using either the SoundPlan or ENM acoustic model. Under noise regulation 7(2), a noise emission is taken to “significantly contribute to” an exceedance of the assigned level if the noise emission exceeds a value which is 5dB below the assigned level at the point of reception, that is, 30dB(A).

The EPA notes that the predicted noise emission level for the Collie B Power Station alone would meet the “non-contributing” level of 30dB(A) at all four receiving locations under the SoundPlan model, while under the ENM model it would be slightly above this level at 31dB(A) at one location (receiving location 4).

Given that the sound power levels are possibly conservative (leaving scope for some noise reduction), and that the proposal is “significantly contributing” under only one of the models (ENM), the noise emissions should be capable of complying with the noise regulations when taken in isolation, and using best practice noise control in the design stage.

However, the EPA notes that the requirement of noise regulation 7(2) for “non-contributing” noise is relevant for up to three noise sources, but fails to protect the overall noise level when there are more than three noise sources present (this is because three sources, at 30dB(A), when added logarithmically, would total 35dB(A), while 10 sources at 30dB(A) would total 40dB(A)).

In the area of interest, there may be up to eight noise sources if three of Collie A and B and Bluewaters I and II Power Stations were developed, along with (say) three

industries in the Coolangatta Industrial Estate and the Ewington I and II coal mines. If all these sources were to cumulatively meet 35dB(A), then each source would need to meet a level of 26dB(A), which is 4dB(A) more stringent than the 30dB(A) value required by noise regulation 7(2) (some sources could be above 26dB(A) provided others were below this value).

The EPA views this as a more comprehensive way of approaching the noise assessment, to be preferred over the approach of achieving only compliance with the 30dB(A) required under noise regulation 7(2).

Analysis of the noise reductions required for each noise source to achieve 26dB(A) show that the proposed Collie B Power Station would need to achieve a noise reduction of 2-5dB(A) at receiving location 4, if the cumulative noise criterion is to be met (DoE, 2005). As the higher values in these ranges represent the ENM model, achieving these noise reductions would be significantly more difficult if this model is used as the assessment tool, when compared with SoundPlan.

Of greater significance are the cumulative results for receiving locations 1 and 2. Receiving location 1 (north-eastern corner of Collie townsite) is likely to be substantially affected by mining noise when Ewington I commences. The EPA assessed this project in 1994, against the (then) anticipated noise regulations, which included a night time assigned level of 40dB(A). While most of the other sources appear to be manageable from the point of view of the Collie townsite, it would appear that the noise emissions from Ewington I mine will require further consideration prior to commencement (DoE, 2005).

For the two residences to the north of the study area (receiving locations 3 and 4), the degree of noise reduction is not great, and there may be a range of options to achieve compliance with the 35dB(A) assigned level.

The EPA notes that the proponent has made two commitments (Commitments 9 and 10) in regard to managing noise emissions from the proposed power station.

The EPA considers that approval of the proposal should require consideration during the DoE licensing process of cumulative issues beyond simple compliance with the noise regulations by requiring implementation of best practice noise reduction measures, with a view to achieving individual noise emission levels (for example 26dB(A)) that are consistent with the objective of cumulative noise emissions being in compliance with the night time $L_{A 10}$ assigned level at all existing and potential future noise-sensitive locations.

As noted above, it is evident from the results in Table 2 that the total estimated cumulative noise level ranges at all four receiving locations exceed the assigned $L_{A 10}$ night time noise level. The implications of this are that the establishment of other proposed power stations, mining operations and future industries in the Coolangatta Industrial Estate would be constrained unless best practice noise attenuation measures are employed in each case, and/or increased buffer zones are established.

It is the EPA's view that a process should be established to ensure that the noise emissions of this proposal are modelled, assessed and monitored in accordance with a

standardised methodology with the objective of cumulative noise emissions being in compliance with the night time L_{A10} assigned level.

Summary

Having particular regard to the:

- (a) Results of noise modelling which indicate that the proposed plant should be able to comply with the requirements of the *Environmental Protection (Noise) Regulations, 1997*;
- (b) Results obtained from the cumulative noise analysis undertaken by the DoE; and
- (c) The commitments made by the proponent;

It is the EPA's opinion that the proposal can be managed to meet the EPA's environmental objective for this factor provided that additional best practice noise attenuation measures are employed in the proposed power station such that its noise emissions meet a level that is consistent with cumulative noise emissions that comply with the night time L_{A10} assigned level under the noise regulations at all existing and potential future noise-sensitive areas. This should be done as part of the Part V licensing process.

3.6 Relevant environmental principles

In preparing this report and recommendations, the EPA has had regard for the object and principles contained in Section 4A of the *Environmental Protection Act, 1986*. Table 4 in Appendix 3 contains a summary of the EPA's consideration of the principles, particularly Principles 4b and 5, which are most relevant to this proposal.

4. Conditions and Commitments

Section 44 of the *Environmental Protection Act 1986* requires the EPA to report to the Minister for the Environment on the environmental factors relevant to the proposal and on the conditions and procedures to which the proposal should be subject, if implemented. In addition, the EPA may make recommendations as it sees fit.

In developing recommended conditions for each project, the EPA's preferred course of action is to have the proponent provide an array of commitments to ameliorate the impacts of the proposal on the environment. The commitments are considered by the EPA as part of its assessment of the proposal and, following discussion with the proponent, the EPA may seek additional commitments.

The EPA recognises that not all of the commitments are written in a form which makes them readily enforceable, but they do provide a clear statement of the action to be taken as part of the proponent's responsibility for, and commitment to, continuous improvement in environmental performance. The commitments, modified if necessary to ensure enforceability, then form part of the conditions to which the proposal should be subject, if it is to be implemented.

4.1 Proponent's commitments

The proponent's commitments as set in the PER and subsequently modified, as shown in Appendix 4, should be made enforceable. These include:

1. Biodiversity;
2. Terrestrial Flora;
3. Terrestrial Fauna;
4. Surface Water Quality;
5. Groundwater Quality;
6. Water Supply;
7. Marine Water Quality;
8. Contamination (oil and chemical spills);
9. Solid and Liquid Wastes;
10. Noise and Vibration;
11. Air Emissions;
12. Greenhouse Gas Emissions;
13. Recreational Activity;
14. Visual Amenity;
15. Aboriginal Culture and Heritage;
16. Public Risk;
17. Sustainability; and
18. Other Greenhouse Gas Initiatives

4.2 Recommended conditions

Having considered the proponent's commitments and the information provided in this report, the EPA has developed a set of conditions that the EPA recommends is imposed if the proposal by Griffin Electricity Pty Ltd to construct Collie B Power Station, is approved for implementation.

These conditions are presented in Appendix 4. Matters addressed in the conditions include the following:

- (a) That the proponent shall fulfil the commitments in the Consolidated Commitments statement set out as an attachment to the recommended conditions in Appendix 4;
- (b) Preparation and implementation of a greenhouse gas emissions management plan;
- (c) Preparation and implementation of a stack emissions management plan and ambient air quality monitoring plan;
- (d) Preparation and implementation of a Saline Water Discharge Quality Plan that protects the environmental values identified by the EPA for the marine environment; and

(e) Compliance audit and performance reviews and a decommissioning plan.

It should be noted that other regulatory mechanisms relevant to the proposal include:

- Department of Environment Works Approval and license.
- Department of Industry and Resources regulations.

5. Other Advice

5.1 Industrial buffer

The EPA considers that State government planning agencies and the Shire of Collie should coordinate the establishment of a suitable designated buffer zone around the proposed Bluewaters I and II Power Stations, as well as the development of appropriate measures to protect the buffer zone from the encroachment of incompatible land uses so that adequate separation distances are maintained.

The creation of such a buffer will be particularly valuable to controlling cumulative noise emissions from existing and future proposals in the area. It is the EPA's view that a procedure should be established to ensure that the noise emissions of all existing and future proposals are modelled, assessed and monitored with a standard methodology with the objective of cumulative noise emissions being in compliance with the night time $L_{A 10}$ assigned level. This will require a management framework involving the relevant stakeholders. A standard approach could be implemented through Part V licensing conditions on the relevant premises.

5.2 Air quality management in the Collie region

The Bluewaters I, Bluewaters II, and Collie B power station proposals are expected to emit about 7,000, 7,000, and from 9,000 to 15,000 tonnes of sulphur dioxide per annum respectively. Proper management of this level of emissions is an issue for the EPA to consider.

Cumulative air emissions modelling

The EPA is aware that additional modelling has been performed as part of the assessment of the coal fired power proposals now before it (Griffin Energy Pty Ltd 2005a, Strategen 2005a, Sinclair Knight Merz 2005a).

The EPA understands that ground level concentrations of sulphur dioxide may be around 100% of the NEPM limit at a receptor at the Collie Motorplex with the likely combination of existing and proposed plants if the fourth grid level of modelling is considered. While some modellers consider the fourth grid to over-predict concentrations and the third grid provides a realistic representation of measured values in the area, other advice, including from the author of the TAPM model, indicates that justification for use of the third grid has not been verified. Ground level concentrations of sulphur dioxide could reach 68% of the NEPM value at Collie Motorplex and 60% of the NEPM in Collie using modelling of the third grid.

The EPA has assessed additional information related to the impact of closing Muja A and B and the effect of applying the European Directive to new coal-fired power stations at Bluewaters and Collie B.

Modelling of the effect that the 2001/80/EC limit would have on air quality (Sinclair Knight Merz 2005c) indicates improvements in SO₂ ground level concentrations at receptors close to the new plants if FGD is used at those plants to meet EC Directive limits of either 200 or 400mg/m³. At the Collie township these improvements range from 45% for the 10 minute and 1-hour averaging periods to 18% for the 24-hour averaging period, and 26% for the annual average.

Considerable discussion has focused on the air quality benefits that would accrue if Muja A and B power stations were closed. The effect on ambient SO₂ levels of closing Muja A and B can be assessed by examining the tables and contour maps in the Griffin Energy Pty Ltd Collie B Power Station PER document (Griffin Energy Pty Ltd 2005b) and a letter report to Western Power by Sinclair Knight Merz (Sinclair Knight Merz 2005c). The inclusion of a Scenario (5A), which assumes Muja A and B are retained in the longer term, provides valuable information, as discussed below.

Short-term (10 minute and 1-hour average) concentrations of SO₂ are the most significant with respect to potential health effects. Considering only 1-hour average concentrations of SO₂ for simplicity, the following information and conclusions can be drawn from the two reports.

Under all scenarios the most highly impacted receptor is receptor 22 (the Collie Motorplex which includes a caretaker's residence) to the north-west of Muja, with or without Muja A and B. The fact that 1-hour SO₂ concentrations at this receptor do not increase with the addition of other power stations in the Collie/Bluewaters area is to be expected due to the proximity of receptor 22 to the largest localised source, Muja, and the orientation of the Collie and Bluewaters sites with respect to this receptor. The wind would not blow towards this receptor from both Muja and Collie/Bluewaters at the same time. The effect on receptor 22 says nothing about the likelihood or significance of new power stations increasing the highest 1-hour SO₂ concentrations at other locations in the region.

Modelling of the existing situation (Scenario 1) shows that the highest 1-hour SO₂ concentration in Collie township due to existing sources is caused by Muja A, B, C, and D (273µg/m³ from Table 8-4 in Griffin Energy Pty Ltd 2005b). Table 3 in Sinclair Knight Merz 2005c includes emissions from proposed power stations, with their emissions controlled by FGD to the European Directive limits. Table 3 shows that retiring Muja A and B reduces the highest 1-hour SO₂ concentration in Collie Township to 193µg/m³. This level of impact is caused by the remaining Muja C and D power stations because the new stations are assumed to have their emissions controlled to the EC Directive limits of either 200 or 400mg/m³. It is clear from that table that Muja C and D is the source of this reduced highest event because varying the EC limit on the proposed power stations does not vary the 193µg/m³ value at all.

Table 8.4 in the Griffin Energy Pty Ltd Collie B Power Station PER document (Griffin Energy Pty Ltd 2005b) shows that for a realistic combination of existing and proposed plants (Scenario 5), without EC limits applied to proposed power stations,

yields a highest 1-hour SO₂ concentration in Collie township of 348µg/m³. Ignoring the background contribution of the Worsley expansion to this 1-hour concentration event, it is clear that the event was caused by plumes from the Collie/Bluewaters area with, presumably, extremely small if any background contribution from Muja C and D. If this were not the case then the 348µg/m³ (or 347µg/m³ from Scenario 4) SO₂ ground level concentration would not reduce dramatically (to 193µg/m³ caused by Muja C and D, or to 273µg/m³ if Muja A and B were retained) due to the modelled application of EC limits on proposed power stations. It is therefore concluded that, if EC limits are not applied to proposed power stations, the highest 1-hour SO₂ concentrations in Collie will be dominated by power stations at the Collie/Bluewaters sites irrespective of whether Muja A and B are closed. This is consistent with conclusions in Sinclair Knight Merz 2005c which indicate that application of EC limits would reduce 1-hour SO₂ concentrations in Collie by 45%.

In support of the above conclusion, Sinclair Knight Merz has presented results for Scenario 5A (Table A-5 in Griffin Energy Pty Ltd 2005b) showing that retaining Muja A and B causes the highest 1-hour SO₂ concentration to change from 348 to 349µg/m³. It follows (in support of the above presumption) that the contribution of Muja C and D would also be small. Without detailed model results it is not possible to see what caused this tiny change, however it is likely to be due to modelled recirculation of Muja emission from previous hours. However, the result is clear – retiring Muja A and B makes essentially no change to the highest 1-hour SO₂ concentration in Collie if the proposed power stations are built without applying EC limits.

Accepting that Muja A and B will be retired, the significant difference between 348µg/m³, being the highest 1-hour SO₂ ground level concentration which could be caused by Collie/Bluewaters power stations with no EC limits, and 193µg/m³, being the highest SO₂ ground level concentration which could be caused by Muja C and D under conducive meteorological conditions, suggests that the Collie/Bluewaters power stations, apart from being responsible for the highest 1-hour event, may also cause the highest several 1-hour events per year in the Collie Township (i.e. hours with concentrations in the range 193 to 348µg/m³).

Taken together, the modelling now available indicates that there is likely to be an emerging air quality issue in Collie and surroundings if more power stations are built without flue gas desulphurisation to meet best practice European Commission limits. While NEPM standards may not be widely exceeded under currently modelled scenarios, three points are particularly relevant;

- action should be taken before NEPM levels are reached, particularly in light of Department of Health advice that lower WHO guidelines may be more relevant to sensitive groups;
- new plant without FGD to the north and east of Collie will increase sulphur dioxide concentrations in Collie significantly, independently of effect from Muja, because emissions from the new plants will affect Collie under different wind conditions than plants at Muja will; and
- closure of Muja A and B alone will not materially change the highest 1-hour SO₂ concentrations in Collie if new plants are built without FGD. Notwithstanding this point, closure of Muja A and B will improve air quality closer to Muja,

especially with respect to particulates. Accordingly, the EPA reiterates that it supports the closure of Muja A and B.

Practicability of flue gas desulphurisation

Given concerns from appellants on the EPA’s assessment report on the Bluewaters Power Station about the effectiveness and practicability of FGD, the EPA has considered further analyses which have examined the other environmental effects and practicability of using flue gas desulphurisation to reduce sulphur dioxide emissions, should tighter limits need to be met (Sinclair Knight Merz 2005d).

Table 3 below sets out estimates of the other environmental effects of implementing flue gas desulphurisation as a means of meeting tighter emission limits. These data indicate that there are increased, although not great, effects on some other aspects of the environment which occur together with the positive effects on air quality that accrue from implementing FGD.

Table 3: Other environmental effects of implementing FGD

Component	Annual change with FGD*
Water input	+ 0.6GL
Lime input	+ 14,000 to 53,000t
Lime trucks	+ 365 to 1420
Energy use	+ 5MW
Efficiency	- 0.5%
Gypsum by-product output	+ ~ 36,000t

*estimates ± 50%

Source: Sinclair Knight Merz 2005d

Figures from (Sinclair Knight Merz 2005d) assume capital costs of \$86 million to \$124 million and operating costs of \$6.5 million to \$8.7 million per year to implement FGD. Other advice to the EPA indicates capital costs of \$30 million and operating costs of \$1 million per year. It is clear that there is a wide range of possible costs for FGD.

These figures indicate the range of costs that would need to be internalised to the energy sale price to achieve the environmental improvements set out above if FGD were implemented.

The EPA recommends that, as part of the development of the strategic air quality management framework, further evaluation should be undertaken of the practicability of alternative technologies for reducing sulphur dioxide emissions, so that this can be taken into consideration when setting best practicable emission limits.

Proponents should be aware that any decision not to fit equipment for reducing SO₂ emissions up front may result in a need to retro-fit such equipment if the results of the strategic air quality framework determine that this is necessary.

Implications of cumulative air emissions and FGD

In its report and recommendations on the Bluewaters coal-fired power station proposal (EPA 2005), the EPA came to the conclusion that “on balance, action should

be taken to ensure that new power stations meet world's best practice for air emissions management. Accordingly, the EPA recommends that the Department of Environment (DoE) ensures that any Part V License for the proposal requires best practicable technology, consistent with current industry standards and considers the adoption of the limits in 2001/80/EC for "outer most regions", at least. The EPA also strongly supports the closure of the Muja A & B plants as soon as possible."

This recommendation was made based on air quality modelling available which at the time indicated no significant contribution to exceedances of the NEPM from the proposed 200MW Bluewaters I Power Station, despite this plant emitting about 7000tpa of sulphur dioxide. Taken together with emissions from existing and proposed plants, a significant fraction of the NEPM limit would be taken up by a realistic combination of Bluewaters and the other existing and future plants.

On the information available at the time, the EPA concluded that action should be taken to ensure that new power stations meet world's best practice and cited European Directive 2001/80/EC for outer regions as best practice.

The EPA is aware that the Minister for Environment has recently determined appeals on the EPA's report on the Bluewaters Power Station, concluding that "The EPA's assessment of the proposal has clearly identified the need for the development of a strategic air quality management framework for Collie given the range of potential power generation and industrial development scenarios for the region. Key elements of a framework would include additional air quality monitoring to better understand the air shed, determination of ambient air quality criteria, the development of a strategic regulatory approach to emissions management and air shed allocation and complementary land use planning controls."

The EPA welcomes and strongly supports the proposed development of a strategic air quality management framework for Collie that would manage emissions from both existing and proposed new plants in an effective and equitable way.

The Minister further determined that "it is considered appropriate that the development of emission limits for both the Bluewaters proposal and other existing and proposed power generation and industrial facilities within the Collie region occur as part of a strategic air quality management framework. Such an approach would not necessarily preclude the emission limits suggested by the EPA, or in fact other limits, being required at a later date."

Given the proposed development of a strategic air quality management framework, the EPA agrees that this should be used to develop appropriate emission limits for the power stations and any other large emitters in the region. Recognising that it will be about two to three years before new plants would come into operation, there is some time available to undertake the necessary studies to formulate a future air quality management framework.

As part of the strategic framework, the EPA advises that it would be appropriate for an examination of the implications of any proposed limits to be understood in the context of the Collie environment. Consideration of what fraction of the NEPM should constitute an investigation trigger level and what (higher) fraction should

require action to be taken to ensure the NEPM limit is not breached will, in the EPA's opinion, be an important aspect of work towards development of a strategic framework.

The EPA also notes advice from the Department of Health that the more conservative WHO limit may be more appropriate to protect sensitive groups in the community. This issue should also be considered when developing the strategic framework. The EPA welcomes the opportunity to contribute to this important work.

There are major existing and proposed industrial sources of air pollution in the Collie region, primarily related to coal-fired power generation. Other pollution sources include the use of solid fuel (coal and wood) for domestic heating, mining activities and bushfire/controlled burning.

The EPA recommends an Air Quality Management Plan be developed by the DoE for the region over the next two years to ensure that air quality is maintained at acceptable levels. The proposed approach is similar to the recent Pilbara Air Quality Study, which provides the knowledge base and assessment tools for sustainable industry development into the future.

It is recommended that the Air Quality Management Plan developed by the DoE include detailed planning for development of airshed management strategies.

5.3 Greenhouse gas emission differential between fuel sources

The EPA has become aware of a view that opposes the application of a penalty or offset for coal to bring its greenhouse gas emissions into line with other energy sources. While some may see this as an economic penalty which discriminates between fuel sources (particularly coal or oil and gas) this is clearly not the case from the environmental perspective. The EPA is required by Section 15 of the *Environmental Protection Act, 1986* to use its best endeavours to protect the environment. Section 4A of the *Environmental Protection Act, 1986* also requires regard to be paid to principles relating to improved valuation, pricing and incentive mechanisms to protect the environment.

Arguments have been put that any requirement to offset the greater greenhouse gas emissions of coal would distort the market between fuel sources. The EPA considers this argument ignores the full array of environmental costs (and their associated environmental effects) involved in power production and is not valid. Any suggestion that alternative means of producing the same product (electrical power) should not be subject to measures to ensure they are limited to the same level of emissions is clearly not based on the application of a level environmental playing field. Further, it assumes that some fuel sources (coal or oil) should be allowed to externalise their environmental costs, providing those sources with an unfair capacity to generate more emissions than other sources (gas or renewables) and shift the cost of those emissions to the community.

While an argument could be put that the benchmark for emissions should be set at the levels achievable by renewables, the EPA has previously accepted that issues of size, technical capability and strategic matters will need consideration (EPA 2002b).

While the EPA encourages the use of renewables wherever possible (EPA 1990, 2002b) it accepts that they will need further encouragement, development and time to become practicable at the scale required to supply a major fraction of Western Australia's power needs. The EPA also accepts that there may be sound reasons for other decision makers to decide to diversify the fuel sources for electrical power generation in Western Australia. In fulfilling its environmental role, however, the EPA considers that a transparent approach requires that the full environmental consequences of alternatives be made clear.

Offsets are a flexible means for coal fired power stations to address the increased greenhouse gas emissions that they produce, now. If additional costs are incurred to provide these offsets, then an equitable approach is to ensure that those costs are internalised to ensure that coal does not generate higher environmental costs for the whole community. If users of coal fired electrical power paid the full cost of abating or offsetting the higher level of emissions, then coal would not be free riding by imposing its environmental costs on the wider community.

As an example of internalised costs, the EPA notes that retail users of power in remote parts of Western Australia are charged the same tariff as users on the South West Interconnected System, where economies of scale make power production costs lower. By spreading the cost to supply remote users across the whole community, disadvantageous costs are not imposed on one, remote sector of the community. The EPA considers that it would be equitable, defensible and environmentally sound to require that environmental costs were fully internalised during power production. Such costs could be spread across all users, as is the case with power generation costs for remote communities. The EPA does not support the view that environmental comparisons should not be made between fuels.

The EPA notes the recent announcement by Government of the formation of a Greenhouse and Energy Taskforce to build on the State's Greenhouse Strategy and develop a more detailed energy and greenhouse policy framework to reduce greenhouse gas emissions. The EPA welcomes and supports this initiative which will provide valuable support for a policy position across government.

Having a whole of government policy offers the prospect of adding considerably more weight to this important issue in support of the EPA's existing Guidance Statement No. 12.

6. Conclusions

The EPA has considered the proposal by Griffin Electricity Pty Ltd to construct and operate a 330MW advanced sub-critical coal-fired power station (known as Collie B) at the Collie Power Station Site, immediately adjacent to the existing 'Collie A' Power Station.

The EPA acknowledges that the demand for electricity in Western Australia will continue to grow. The rate of this growth can be reduced somewhat through demand management. However, there will be a continuing need for additional electricity generating facilities as the population grows and usage per person increases.

Additional demand should be satisfied through electricity generating facilities that minimise environmental impacts including the production of greenhouse gases.

The EPA has previously advised (EPA 1990) that its preference from an environmental perspective in relation to electricity demand is, in declining order of rank:

- conservation and energy improvements;
- renewable energy sources such as wind and solar energy;
- gas, including combined cycle turbines;
- new technology coal plants;
- old technology coal plants; and
- petroleum fuel plants.

The EPA considers that combined cycle gas turbine (CCGT) generation represents best practicable technology for base-load power generation at this time. The proposed 330MW coal-fired plant will produce an extra 1,000,000 tonnes of carbon dioxide per year compared to a CCGT power station of equivalent capacity. The EPA has previously advised that it expects proponents to mitigate all or a significant part of the extra greenhouse gases produced.

The EPA notes that the proponent has investigated mitigation actions and that the apportioned quantity of greenhouse gases to be directly offset for the Collie B Power Station is about 125,000 tonnes per annum. While the proponent has met the intent of the EPA's requirement to consider the issue of offsets, the apportioned direct offsets for Collie B Power Station still leaves an excess of about 875,000tpa of greenhouse gas emissions above a CCGT power station of equivalent capacity. The EPA notes that the level of greenhouse emissions is considerable and that the level of offsets is about one eighth of the excess.

If a decision is made so that the proposal can be implemented, the EPA considers that the offsets offered by the proponent should be made legally enforceable and tied to this proposal for the life of the proposal. The EPA recognises that the issue of greenhouse gas management is a matter for judgment and that decisions about this proposal will include consideration of broader economic, regional development and strategic issues which are outside the scope of the EPA. From an environmental perspective, the EPA advises that a coal fired power station without full offsets will not deliver the best environmental outcome.

The EPA welcomes and strongly supports recent announcements by Government of a Greenhouse and Energy Taskforce and a strategic air quality management framework for Collie to manage emissions from existing and proposed industries in the region. Air quality is an emerging issue in Collie. Sulphur dioxide levels may begin to approach ambient standards designed to protect human health with the current array of proposals and this issue deserves the close attention that a strategic management framework can provide.

In determining appeals on the EPA's report on the Bluewaters proposal (Bluewaters I) the Minister for the Environment determined that "it is considered appropriate that the development of emission limits for both the Bluewaters proposal and other existing and proposed power generation and industrial facilities within the Collie region occur as part of a strategic air quality management framework. Such an approach would not necessarily preclude the emission limits suggested by the EPA, or in fact other limits, being required at a later date."

It is evident that the proposed Collie B Power Station does not employ world's best practice for SO₂ management. The EPA considers that European Directive 2001/80/EC represents best practice for SO₂ emission limits. In view of the appeal decision on Bluewaters Power Station, this may require retro-fitting of sulphur control equipment if the air quality management framework indicated that SO₂ is an issue.

In considering Principle 5 "waste minimisation" of the *Environmental Protection Act, 1986*, the EPA believes that proponents should implement best practicable measures for the prevention or minimisation of environmental impacts.

Consistent with this, the EPA considers that the proposed strategic air quality management framework is an appropriate mechanism for determining emission limits for this and other power stations and other industries at Collie.

Overall, the EPA's assessment has concluded that the best environmental outcome would not be achieved for greenhouse gas management if full offsets are not implemented. Best practice SO₂ management would be achieved if European Directive 2001/80/EC were applied. The EPA has concluded that further work on a strategic air quality management framework for Collie is an appropriate mechanism for determining the limits required to manage emissions from both existing and proposed new plants such as Collie B in an effective and equitable way.

A key issue is the effect of saline wastewater discharge on marine water quality and the potential impact on marine biota. It is desirable that the monitoring and management of marine water quality should be consistent with the Environmental Quality Management Framework described in the Government's *State Water Quality Management Strategy Report 6* that the EPA is applying to Western Australia's marine environment (EPA 2004a, EPA 2004b). This framework has been adopted since the existing outfall was assessed and licensed. Accordingly, any update of the pipeline licence which may be required as a result of a new discharge from the pipeline should recognise, protect and achieve the following environmental values and all their associated environmental quality objectives:

- ecosystem health;
- recreation and aesthetics;
- fishing and aquaculture; and
- industrial water supply.

It is the EPA's opinion that the proposal can be managed to meet the EPA's environmental objective for noise, provided that additional best practice noise attenuation measures are employed in the proposed power station such that its noise

emissions meet a level that is consistent with cumulative noise emissions that comply with the night time L_{A10} assigned level under the noise regulations at all existing and potential future noise-sensitive areas.

For other environmental factors the EPA has concluded that it is unlikely that the EPA's objectives would be compromised, provided there is satisfactory implementation by the proponent of their commitments and the recommended conditions set out in Appendix 4, and summarised in Section 4.

The EPA also wishes to draw attention to the advice provided in Section 5 of this report in relation to an industrial buffer, air quality, offsets and the equitable internalisation of full environmental costs when considering proposals of this nature.

7. Recommendations

The EPA submits the following recommendations to the Minister for the Environment:

1. That the Minister notes that the proposal being assessed is for the construction and operation of a 330MW advanced sub-critical coal-fired power station (known as Collie B) at the Collie Power Station Site, immediately adjacent to the existing 'Collie A' Power Station.
2. That the Minister considers the report on the relevant environmental factors as set out in Section 3.
3. That the Minister notes that the EPA has concluded that the best environmental outcome would not be achieved for greenhouse gas management if full offsets are not implemented.
4. That best practice SO_2 management would be achieved if European Directive 2001/80/EC were applied.
5. That further work on a strategic air quality management framework for Collie is an appropriate mechanism for determining the limits required to manage emissions from both existing and proposed new plants such as Collie B in an effective and equitable way.
6. That for other environmental factors, it is unlikely that the EPA's objectives would be compromised, provided there is satisfactory implementation by the proponent of their commitments and the recommended conditions set out in Appendix 4, and summarised in Section 4.
7. That the Minister imposes the conditions and procedures recommended in Appendix 4 of this report.

Appendix 1

List of submitters

Organisations:

1. CALM
2. Department of Health.
3. Department of Indigenous Affairs
4. Department of Industry and Resources.
5. Department of Planning and Infrastructure.
6. Environmental Protection Authority Service Unit.
7. Griffin Electricity Pty Ltd.
8. Heritage Council of Western Australia.
9. Joint submission from Conservation Council of WA, Australian Conservation Foundation, WWF Australia, and Climate Action Network Australia.
10. Men of the Trees
11. Shire of Collie.
12. Western Power Corporation.

Individuals:

Colin Tonkin and Margaret Tonkin
Glyn Yates
Paul Llewellyn MLC
3 Private Citizens

Appendix 2

References

Australian Greenhouse Office (AGO), 1998. *Australia's State and Territory Greenhouse Gas Inventory. 1990 and 1995: Western Australia*. National Greenhouse Gas Inventory Committee, Australian Greenhouse Office, Commonwealth of Australia, Canberra ACT. Available:

< <http://www.greenhouse.gov.au/inventory/stateinv/pubs/wa/wa95.pdf> >

Accessed on 25/05/025

Australian Greenhouse Office (AGO), 2001. *Technical Guidelines: Generator Efficiency standards*, Australian Greenhouse Office, Commonwealth of Australia, Jan 2001, Canberra, ACT.

Department of Environment – Environmental Management Division 2005. *Proposed Collie B and Bluewaters II Power Stations, Collie – Advice on Noise Assessments*, Report No. EN01/05, May 2005, DoE, Perth.

Department of Premier and Cabinet, 2004. *Western Australian Greenhouse Task Force. Thematic Summary: Responses to the “Draft Western Australian Greenhouse Strategy” December 2003*. DPC, Perth

http://www.greenhouse.wa.gov.au/view/home/documents/DGHSSummaryofSubmissions-WebVersion_000.pdf

Accessed 23/05/05

Environmental Protection Authority 1990. *Proposed Collie Power Station*. Environmental Protection Authority, Western Australia, Bulletin 472, November 1990. EPA, Perth

Environmental Protection Authority 2000. *Waste to Energy and Water Plant; Lot 15 Mason Road, Kwinana*. Environmental Protection Authority, Western Australia, Bulletin 1004, December 2000. EPA, Perth

Environmental Protection Authority 2002a. *Guidance Statement for Minimising Greenhouse Gas Emissions. Guidance Statement No. 12*. Environmental Protection Authority, October 2002. EPA, Perth

Environmental Protection Authority 2002b. *Poultry Litter Fired Power Station, Muchea*. Environmental Protection Authority, Western Australia, Bulletin 1083, December 2002. EPA, Perth

Environmental Protection Authority 2002c. *Strategic Planning for Future Power Generation. Pinjar Power Station Expansion, Kwinana/ East Rockingham Power Station, Kemerton Power Station, New Bunbury Power Station, Collie Power Station Expansion*. Environmental Protection Authority, Western Australia, Bulletin 1067, September 2002. EPA, Perth

Environmental Protection Authority 2003a. *South West Power Project, Collie*. Environmental Protection Authority, Western Australia, Bulletin 1090, February 2003. Perth.

- Environmental Protection Authority 2003b. *Implementing Best Practice in Proposals Submitted to the Environmental Impact Assessment Process. Guidance Statement No. 55*. Environmental Protection Authority, December 2003. EPA, Perth
- Environmental Protection Authority 2004a. *Perth Metropolitan Desalination Proposal, Amendment of Implementation Conditions by Inquiry*. Environmental Protection Authority, Western Australia, Bulletin 1137, May 2004. EPA, Perth
- Environmental Protection Authority (2004b). *Environmental Quality Criteria Reference Document for Cockburn Sound (2003-2004) – A Supporting Document to the Draft State Environmental (Cockburn Sound) Policy 2005*. Environmental Protection Authority, Western Australia, Report 20. EPA, Perth
- Environmental Protection Authority 2005. *Bluewaters Power Station*. Environmental Protection Authority, Western Australia, Bulletin 1160, Feb 2005. EPA, Perth
- Griffin Electricity Pty Ltd 2005. *Collie B Power Station Public Environmental Review*. Griffin Electricity Pty Ltd, January 2005. Griffin, Perth.
- Sinclair Knight Merz, 2005a. *Collie Power Station Expansion Air Quality Assessment. Air Quality Modelling and Screening Air Quality Health Risk Assessment*. Report prepared for Western Power, Griffin Energy and Collie Power Consortium. Rev 3, January 2005. SKM, Perth
- Sinclair Knight Merz, 2005b. *Proposed Expansion of Coal-Fired Power Generating Capacity in Collie: Health Impact Statement*. Report prepared for Western Power, Griffin Energy and Collie Power Consortium. Apr 2005. SKM, Perth
- Sinclair Knight Merz, 2005c. *Preliminary Review of Flue Gas Desulphurisation Technologies: Proposed Collie B Power Station*. Report prepared for Western Power. May 2005. SKM, Perth
- Strategen 2005a. *Collie Power Station Expansion Public Environmental Review*. Prepared for Wesfarmers Energy Limited and Electric Power Development Co. Ltd (J-Power), Jan 2005. Strategen, Perth.
- Victorian Government, 2004. *Energy and Greenhouse Policy*. Dec 2004. Brunswick, Victoria
http://www.greenhouse.vic.gov.au/files/challenge_for_energy/2168_Greenhouse_Challenge_Position_Paper.pdf
Accessed 23/05/05

Appendix 3

Summary of identification of relevant environmental factors

Table 4: Identification of relevant environmental factors and principles

Preliminary Environmental Factors	Proposal Characteristics	Government Agency and Public Comments	Identification of Relevant Environmental Factors
BIOPHYSICAL			
Terrestrial flora	The site has already been cleared. It is likely that there will be minimal impact on terrestrial flora.	<p>Department of Conservation and Land Management</p> <p>The likely downstream impacts of the proposal regarding the clearing of forest for mining and power transmission to support the project should be clearly identified.</p>	The EPA considers that the concern raised has been adequately addressed by the response provided by the proponent. In view of the above, and given that the power station site has already been largely cleared, the EPA considers that this environmental factor does not require further evaluation.
Terrestrial fauna	The site has already been cleared. It is likely that there will be minimal impact on terrestrial fauna.	No specific concerns were raised in the submissions that were received.	This environmental factor does not require further evaluation by the EPA.
POLLUTION			
Greenhouse gas emissions	The Collie B Power Station will generate up to 2.1 million tonnes of CO ₂ per year.	<p>Conservation Council of WA, Australian Conservation Foundation, WWF Australia, and Climate Action Network Australia</p> <p>The Greenhouse emissions from this project are unacceptably high and no effective greenhouse reduction options are proposed. There is no evidence to suggest that the proponent has examined a range of lower emission technologies that could improve the environmental performance of the power station. The proponent also states that there are no specific offsets applied to this project.</p> <p>The Proponent has not provided a comprehensive Greenhouse Gas Emission Management Plan.</p> <p>The PER did not fulfil the requirements of the Environmental Protection Authority (EPA) Guidance Statement for Minimising Greenhouse Gas Emissions (No. 12).</p> <p>The Proponent should provide evidence that a critical assessment of options and plant optimisation has been conducted prior to the selection of the fuel and final plant configuration.</p> <p>Research from overseas clearly indicates a link between coal-fired generation and increased occurrences of asthma and respiratory disease.</p> <p>Although individual projects may not on their own contribute significantly to health risks, the cumulative impacts of the coal mining and power generation industry must be taken into account when assessing individual projects.</p>	In view of the significant quantity of greenhouse gas emissions that will be emitted by the proposed power station and the nature of the concerns raised in the comments that were received, the EPA considers that greenhouse gas emissions is a relevant environmental factor.

Preliminary Environmental Factors	Proposal Characteristics	Government Agency and Public Comments	Identification of Relevant Environmental Factors
POLLUTION			
<p>Greenhouse gas emissions (Continued)</p>	<p>The Collie B Power Station will generate up to 2 million tonnes of CO₂ per year.</p>	<p>Conservation Council of WA, Australian Conservation Foundation, WWF Australia, and Climate Action Network Australia (Continued)</p> <p>It is clear from the results of the workshop process undertaken for the Bluewaters I project that the cumulative health impacts of the coal industry, with respect to both mining and power generation, have been insufficiently investigated in the Collie region. The community desires a far greater level of knowledge regarding the impacts of these industries and their associated pollutants. The health risks to the community must be assessed on a cumulative as well as incremental basis.</p> <p>As Australia has ratified the United Nations Framework Convention on Climate Change (UNFCCC) and it has come into force, Western Australia is arguably obliged under International Law to contribute towards the objective of the treaty.</p> <p>It is difficult to see how the plant would significantly reduce the sent-out carbon intensity of electricity generation of the SWIS.</p> <p>Conservation Council of WA, Australian Conservation Foundation, WWF Australia, Climate Action Network Australia and Department of Health</p> <p>There is limited discussion on whether a sub-critical or super-critical Power Station will be built.</p> <p>Conservation Council of WA, Australian Conservation Foundation, WWF Australia, Climate Action Network Australia; CR & MA Tonkin and G & RE Yates.</p> <p>The proponent has not provided sufficient information on the level of offsets that will be applied against the project or on the planned Greenhouse Gas Management Plan for the project.</p> <p>Conservation Council of WA, Australian Conservation Foundation, WWF Australia, Climate Action Network Australia, Men of the Trees and two private citizens.</p> <p>Research shows that Western Australia's current additional energy needs – up to 500MW can be utilised using a mix of energy efficiency and renewable energy. Therefore, there is no justification for this project to proceed.</p> <p>G & RE Yates</p> <p>I do not think that the inclusion of offsets should be undertaken if they undermine the economic viability of the project. However it is worth noting that there are a number of significant publicly listed companies growing trees on a commercial basis. Therefore why could it not be possible for the proponent to investigate and invest in the establishment of plantation forestry to offset some of these emissions?</p> <p>Given that the proponent is proposing to burn coal to produce electricity instead of cleaner and more efficient natural gas, I thought that they would consider making a commitment to implement some form of greenhouse gas reduction strategy such as tree planting.</p>	<p>In view of the significant quantity of greenhouse gas emissions that will be emitted by the proposed power station and the nature of the concerns raised in the comments that were received, the EPA considers that greenhouse gas emissions is a relevant environmental factor.</p>

Preliminary Environmental Factors	Proposal Characteristics	Government Agency and Public Comments	Identification of Relevant Environmental Factors
POLLUTION			
Greenhouse gas emissions (Continued)	The Collie B Power Station will generate up to 2 million tonnes of CO ₂ per year.	<p>Department of Industry and Resources.</p> <p>The EPA should develop a final Environmental Position Statement on environmental offsets and that an accompanying State Environment Policy be prepared on a whole of government basis for endorsement by Cabinet</p> <p>Department of Environment</p> <p>It is noted that the proposed power station will have a thermal efficiency of 38%. Why is this figure less than the AGO Generator Efficiency Standards for a black coal fired super-critical power station (41.7%).</p>	In view of the significant quantity of greenhouse gas emissions that will be emitted by the proposed power station and the nature of the concerns raised in the comments that were received, the EPA considers that greenhouse gas emissions is a relevant environmental factor.
Liquid and solid waste disposal	The Collie B Power Station will generate 0.8GL/yr of saline wastewater and 270,000tpa of ash during operation. The saline wastewater will be disposed of via the existing Collie Power Station saline wastewater pipeline and ocean outfall system. Ash will be disposed of in the nearby Ewington 1 mine.	<p>Department of Environment</p> <p>The PER does not discuss this proposal in the context of Bluewaters I and II. At present different documents suggest different discharge rates into the Collie A pipeline. This issue needs to be resolved.</p> <p>No alternatives to ocean disposal of the cooling water effluent have been considered.</p> <p>The water supply source is based on the assumption that the mine dewatering yield from Ewington I will be sufficient. The assumption needs to be justified.</p> <p>There is no information on the expected discharge rates (minimum, average and maximum).</p> <p>The 80% species protection EQO for the bioaccumulants Cd and Hg appear to be met at end of pipe. The 99% species protection EQO are generally met at the edge of the mixing zone (conservatively assuming 100 dilutions), with the following qualifications:</p> <ul style="list-style-type: none"> • For copper, the predicted concentration is close to the EQO. It would be useful to determine the fraction of copper concentration that is bioavailable; and • There is uncertainty about the form of Chromium in the effluent. The predicted concentration of chromium at the edge of the mixing zone is well below 99% species protection guideline for Cr(3) and is only marginally above the corresponding Cr(6) guideline. It is recommended that the speciation of chromium in the effluent be further investigated. <p>Groundwater/leachate monitoring will be required in order to gauge the effect of disposing of fly ash by mixing it with overburden and returning it to the Ewington mine.</p> <p>There should be some discussion on the design capacity of the discharge pipeline and the ocean outfall as well as its location with respect to depth and distance offshore.</p> <p>A map of the benthic habitats surrounding the ocean discharge point is required.</p>	In view of the significant quantity of liquid and solid wastes that will be emitted by the proposed power station and the nature of the concerns raised in the comments that were received, the EPA considers that atmospheric emissions is a relevant environmental factor.

Preliminary Environmental Factors	Proposal Characteristics	Government Agency and Public Comments	Identification of Relevant Environmental Factors
POLLUTION			
Liquid and solid waste disposal (continued)	<p>The Collie B Power Station will generate 0.8GL/yr of saline wastewater and 270,000tpa of ash during operation. The saline wastewater will be disposed of via the existing Collie Power Station saline wastewater pipeline and ocean outfall system. Ash will be disposed of in the nearby Ewington 1 mine.</p>	<p>Department of Environment</p> <p>The licence discharge limits provided in Section 5.1.7 of the PER are cause for some concern. If the diffuser does provide 100-fold dilution of the effluent then ambient water quality outside the mixing zone may not be protected.</p> <p>There is some confusion in the discussion under the headings “Environmental Values and Objectives” and “Water Quality Criteria’ about the level of ecological protection that would apply to the mixing zone.</p> <p>A baseline survey of the spatial distribution, density and health of the benthic producer habitats is required using quantitative measures so that any future changes potentially caused by the outfall can be ascertained from quantitative data.</p> <p>In section 6.1 (Table 8) for the Environmental Factor ‘Marine Environment’ the toxicant water quality guidelines to be achieved at the edge of the Zone of Initial Dilution are described as the 95-99% species protection guidelines (ANZECC & ARMCANZ,2000). The level of ecological protection to be achieved for the region has already been set through previous precedents by the EPA and DoE and is represented by the 99% species protection guidelines for toxicants.</p> <p>There is no discussion of potential marine impacts.</p> <p>In Section 7.1.3.1: EPA (2000) applies to Perth waters. The EVs and EQOs and the level of ecological protection to be applied in the marine environment for this proposal should be listed in the PER.</p> <p>The effluent volumes provided are for average conditions. The PER suggests that Collie B effluent will be similar to current quality of Collie A. As the source water may not be the same, effluent quality could be different. The discussion under ‘Dilution and Dispersion Characteristics’ does not provide the modelled dilution rates expected from the diffuser at the anticipated discharge rate or at full capacity.</p>	<p>In view of the significant quantity of liquid and solid wastes that will be emitted by the proposed power station and the nature of the concerns raised in the comments that were received, the EPA considers that atmospheric emissions is a relevant environmental factor.</p>

Preliminary Environmental Factors	Proposal Characteristics	Government Agency and Public Comments	Identification of Relevant Environmental Factors
POLLUTION			
<p>Liquid and solid waste disposal (continued)</p>	<p>The Collie B Power Station will generate 0.8GL/yr of saline wastewater and 270,000tpa of ash during operation. The saline wastewater will be disposed of via the existing Collie Power Station saline wastewater pipeline and ocean outfall system. Ash will be disposed of in the nearby Ewington 1 mine.</p>	<p>Department of Environment</p> <p>Three metals (Cr, CO, and Cu) may be a problem:</p> <ul style="list-style-type: none"> • The expected concentration for cobalt does not meet the 99% species protection guideline value of 0.005ug/L • Copper is predicted to be at concentrations very close to the 99% species protection guidelines at the edge of the zone of initial dilution • There is uncertainty about the form of the Chromium in the effluent <p>No detailed characterisation of the source waters has been provided.</p> <p>Details of actual biocides and scale inhibitors to be used in the plant, their expected concentrations in the saline discharge and information on their environmental effects and environmental fate need to be provided.</p> <p>A key management objective will be to protect the environmental values for the area by achieving the environmental objectives and levels of ecological protection ascribed to the discharge area.</p> <p>Conservation Council of WA, the Australian Conservation Foundation, WWF Australia, and Climate Action Network Australia</p> <p>More information must be provided about the composition of the saline effluent and if it exceeds EPS standards the proponent must be required to dilute it or treat it.</p> <p>There is no mention of the composition of the fly ash.</p> <p>Previous analysis of fly ash from Australian coal have shown a significant thorium and uranium content.</p> <p>Australians have the highest level of greenhouse gas emissions in the world. Western Australia produces approximately 12% of the nations greenhouse gas emissions, despite having only 10% of the country's population. In 1997 Western Australians had the highest per capita greenhouse gas emissions of the states at 19Mt per person per year.</p> <p>Shire of Collie</p> <p>The only acceptable discharge method is via the saline pipeline to the ocean and licensing conditions must ensure there is no accumulation at the power station or discharge into ground water aquifers.</p>	<p>In view of the significant quantity of liquid and solid wastes that will be emitted by the proposed power station and the nature of the concerns raised in the comments that were received, the EPA considers that atmospheric emissions is a relevant environmental factor.</p>

Preliminary Environmental Factors	Proposal Characteristics	Government Agency and Public Comments	Identification of Relevant Environmental Factors
POLLUTION			
Atmospheric emissions	<p>The Collie B Power Station will emit the following estimated quantities of atmospheric emissions:</p> <ul style="list-style-type: none"> • Nitrogen oxides (NO_x) - 4,570tpa; • Sulphur oxides (SO_x) – 9,000tpa; • Flue dust - 340tpa; • Carbon monoxide (CO) – 3,500tpa; • Fluorides – 22.5tpa; • Volatile organic compounds (VOCs) - 48kg/yr; • Polycyclic aromatic hydrocarbons (PAHs) – 9.0kg/yr; • Persistent organic pollutants (POPs), including dioxins and furans - less than 0.8g/yr; • Mercury - 46kg/yr; • Arsenic - 10kg/yr; • Cadmium – 12.7kg/yr; • Chromium compounds – 2.2kg/yr; and • Lead compounds - 46kg/yr. 	<p>Department of Environment</p> <p>It is difficult to fully assess the expected PM₁₀ impacts because the contribution of surface source such as home heating and mining operations in the region has not been addressed.</p> <p>The combination of increased SO₂ concentrations and inhalable particulate matter is of concern due to the possibility of synergistic health impacts. Air quality monitoring should be carried out to determine public health impacts due to SO₂ and PM₁₀ at locations determined in consultation with the DoE and the Department of Health.</p> <p>An ongoing and expanded meteorological monitoring program will assist in the ongoing refinement of air dispersion models for the region.</p> <p>Department of Industry and Resources</p> <p>The nomination of the European Directive 2001/80/EC as the emission standard to be met for Bluewaters and hence the need for flue gas desulphurisation technology to be used in new coal-fired power stations is not supported.</p> <p>The EPA should process the assessment of the environmental impact of Griffin Electricity's power station projects as a priority, using the nationally endorsed NEPM standards for management of SO₂ emissions and not benchmarking greenhouse gas offsets outside of an agreed whole of government approach.</p> <p>The EPA should consider development of an Environmental Protection Policy (SO₂) for Collie based on nationally endorsed NEPM ambient standards.</p> <p>Conservation Council of WA, the Australian Conservation Foundation, WWF Australia, and Climate Action Network Australia</p> <p>The proposal has not adequately addressed the question of mercury pollution.</p> <p>Sulphur dioxide emissions are very high. Considering the possible health impacts of SO₂, NO_x and particulates – we agree with the EPA Report and Recommendations on the Bluewaters I proposal that the proponents should meet European Commission limits as set in Directive 2001/80/EC rather than the NEPM standard.</p> <p>The main air pollutants of concern to human and ecosystem health are SO₂, CO₂, CO, NO_x, dioxins and furans and particulates. Collie B will contribute significantly to the emissions of all these pollutants into the Collie airshed. Exceedances of the NEPM are likely for SO₂, NO_x and possibly PM₁₀ as a result of Collie B.</p>	<p>In view of the significant quantity of atmospheric emissions that will be emitted by the proposed power station and the nature of the concerns raised in the comments that were received, the EPA considers that atmospheric emissions is a relevant environmental factor.</p>

Preliminary Environmental Factors	Proposal Characteristics	Government Agency and Public Comments	Identification of Relevant Environmental Factors
POLLUTION			
Atmospheric Emissions (continued)	<p>The Collie B Power Station will emit the following estimated quantities of atmospheric emissions:</p> <ul style="list-style-type: none"> • Nitrogen oxides (NO_x) - 4,570tpa; • Sulphur oxides (SO_x) – 9,000tpa; • Flue dust - 340tpa; • Carbon monoxide (CO) – 3,500tpa; • Fluorides – 22.5tpa; • Volatile organic compounds (VOCs) - 48kg/yr; • Polycyclic aromatic hydrocarbons (PAHs) – 9.0kg/yr; • Persistent organic pollutants (POPs), including dioxins and furans - less than 0.8g/yr; • Mercury - 46kg/yr; • Arsenic - 10kg/yr; • Cadmium – 12.7kg/yr; • Chromium compounds – 2.2kg/yr; and, • Lead compounds - 46kg/yr. 	<p>G & RE Yates.</p> <p>In the Bulletin issued for Bluewaters I there was a reference to a European Standard regarding Sulphur Dioxide levels. This community does not want to have European Standards implemented for impacts we have not felt and don't see when it involves using an additional 3.5 Gigalitres of water and creates extra waste. This community sees water as a vital resource, which should not be wasted in such pursuits.</p> <p>The modelling for air emissions shows all aspects within acceptable limits. I am concerned that the emissions are only within acceptable limits if Muja A & B are decommissioned.</p> <p>Shire of Collie.</p> <p>It is vital that proposed management plans for air emissions are established and maintained.</p> <p>Department of Health</p> <p>The suitability of NPI data for use in modelling is not adequately addressed. Accurate characterisation of emission is necessary to provide confidence in modelling results.</p> <p>The report does not currently consider potential health impacts to workers. This is particularly pertinent for short-term exposures to emission components such as SO₂ and PM₁₀ that may exert significant acute effects.</p> <p>Modelling does not incorporate emissions from current or proposed mining sources, thereby creating uncertainty in the accuracy of subsequent exposure assessment. It is noted that surveys with residents have indicated that they suspect health impacts arising from exposure to mining related dusts.</p> <p>Discussion should be provided regarding why the proposed adoption of 1000 ug/m³ as a compliance limit for dust control is considered appropriate</p>	<p>In view of the significant quantity of atmospheric emissions that will be emitted by the proposed power station and the nature of the concerns raised in the comments that were received, the EPA considers that atmospheric emissions is a relevant environmental factor.</p>

Preliminary Environmental Factors	Proposal Characteristics	Government Agency and Public Comments	Identification of Relevant Environmental Factors
POLLUTION			
Atmospheric Emissions (continued)	<p>The Collie B Power Station will emit the following estimated quantities of atmospheric emissions:</p> <ul style="list-style-type: none"> • Nitrogen oxides (NO_x) - 4,570tpa; • Sulphur oxides (SO_x) – 9,000tpa; • Flue dust - 340tpa; • Carbon monoxide (CO) – 3,500tpa; • Fluorides – 22.5tpa; • Volatile organic compounds (VOCs) - 48kg/yr; • Polycyclic aromatic hydrocarbons (PAHs) – 9.0kg/yr; • Persistent organic pollutants (POPs), including dioxins and furans - less than 0.8g/yr; • Mercury - 46kg/yr; • Arsenic - 10kg/yr; • Cadmium – 12.7kg/yr; • Chromium compounds – 2.2kg/yr; and, • Lead compounds - 46kg/yr. 	<p>Department of Health</p> <p>The health risk assessment is inconsistent in the provision of sample calculations. Those sample calculations that are provided are poorly presented and discussed. Justifications regarding calculation assumptions were typically absent and many calculated values could not be verified.</p> <p>Consistent with a holistic approach to health risk assessment, a synopsis of the major health issues identified as confronting future development in the Collie region is considered appropriate. The Department of health identifies the following key issues:</p> <ol style="list-style-type: none"> 1. Recent air quality monitoring data and modelling results indicate that levels of sulphur dioxide and particulate matter in the Collie area are problematic. Any strategy that reduces community exposure to sulphur dioxide or particulate matter may provide measurable health benefits for the Collie region. 2. The nature of ‘background’ particulate matter in the Collie region is ill-defined. 3. Consideration of indicative emission scenarios is necessary to better characterise probable future health impacts. 4. Exposure assessments currently conducted for the Collie area are limited. The limitations of exposure assessment must be acknowledged and taken into consideration during the development of the Collie area. <p>The basis or appropriate justification for many statements in the Air Quality Modelling and Screening Air Quality Health Risk Assessment (AQHRA) is lacking. Similarly, there is a failure to discuss the health implications of many findings (e.g. comments regarding wood heaters in Collie).</p> <p>In the AQHRA the discussion of the health risk assessment methods does not incorporate issue identification. Although some consideration is given to upset conditions, other aspects of issue identification are not clearly presented.</p> <p>Discussion of upset conditions in the AQHRA was limited to potential electrostatic precipitator failures. This is not considered comprehensive. Information presented by the report suggests that potential upset conditions might also include:</p> <ol style="list-style-type: none"> 1. Unusual meteorological conditions: 2. Bush fires: and, 3. Incomplete combustion: <p>It is likely that a comprehensive issue identification process would identify further concerns.</p> <p>Modelling in the AQHRA does not examine the potential use of super-critical technology for Collie B. This would be beneficial for comparison between different proposals.</p> <p>Hazard quotients in the AQHRA are only calculated for 1-hr averaged concentrations. Discussion should be provided why hazard quotients for other averaging periods were not calculated (e.g. 10-minute averages)..</p>	<p>In view of the significant quantity of atmospheric emissions that will be emitted by the proposed power station and the nature of the concerns raised in the comments that were received, the EPA considers that atmospheric emissions is a relevant environmental factor.</p>

Preliminary Environmental Factors	Proposal Characteristics	Government Agency and Public Comments	Identification of Relevant Environmental Factors
POLLUTION			
Atmospheric Emissions (continued)	<p>The Collie B Power Station will emit the following estimated quantities of atmospheric emissions:</p> <ul style="list-style-type: none"> • Nitrogen oxides (NO_x) - 4,570tpa; • Sulphur oxides (SO_x) – 9,000tpa; • Flue dust - 340tpa; • Carbon monoxide (CO) – 3,500tpa; • Fluorides – 22.5tpa; • Volatile organic compounds (VOCs) - 48kg/yr; • Polycyclic aromatic hydrocarbons (PAHs) – 9.0kg/yr; • Persistent organic pollutants (POPs), including dioxins and furans - less than 0.8g/yr; • Mercury - 46kg/yr; • Arsenic - 10kg/yr; • Cadmium – 12.7kg/yr; • Chromium compounds – 2.2kg/yr; and, • Lead compounds - 46kg/yr. 	<p>Department of Health</p> <p>Only carcinogenic metals were included in calculations of cumulative cancer risk in the AQHRA. Clear discussion should be provided why it was considered appropriate to ignore other carcinogens such as polyaromatic hydrocarbons.</p> <p>The AQHRA adopts the NHMRC 700 µg/m³ guidance value, rather than the WHO value of 500 µg/ m³. This contrary to previous DoH advice.</p> <p>The AQHRA states that ‘maximum or relatively high emission rates of each substance have been used to provide conservative estimates’. There is no comprehensive treatment of when or why ‘relatively high’ emission rates were considered more appropriate than maximum emission rates.</p> <p>The AQHRA states that “the data was used as provided, except in a few cases where the data gaps were filled in, or some manipulation was performed to create consistency across data from different sources”. However, the AQHRA fails to clearly identify when this may have occurred</p> <p>Based upon the assumption that trace metal concentrations in particulate are generally very low, background levels of trace metals in particulates were not calculated. Given that contribution to dusts from mining sources may be significant, it would be beneficial to characterise background PM composition.</p> <p>2001 operational data for Collie A includes a 20-day shutdown period. Given this limitation, it should be discussed why 2001 data was considered appropriate for use in the AQHRA.</p> <p>Discussion of incomplete combustion occurring at Collie A is considered inadequate in the AQHRA. Given that modelling inputs for both Collie A and Collie B are based upon Collie A emission data, the potential effect on modelling results should be clarified.</p> <p>Discussion regarding why only 3rd grid results were presented for 10-minute average SO₂ concentrations at the Collie town-site is required in the AQHRA. Failure to report on the more conservative 4th grid values is notable by omission and, since the raw data has not been provided, these values cannot be otherwise assessed.</p> <p>In the AQHRA discussion of the maximum hazard quotients at receptors 17 and 19 fails to identify that they are residences, indicating only that these locations are ‘north east of Collie’ and south east of Muja’. This is not considered to accurately reflect the appropriate health context for these results.</p> <p>The DoH raised a number of issues relating to interpretation of data in the PER and the discussions of cumulative pollutant effects.</p>	<p>In view of the significant quantity of atmospheric emissions that will be emitted by the proposed power station and the nature of the concerns raised in the comments that were received, the EPA considers that atmospheric emissions is a relevant environmental factor.</p>

Preliminary Environmental Factors	Proposal Characteristics	Government Agency and Public Comments	Identification of Relevant Environmental Factors
POLLUTION			
<p>Surface water and groundwater</p>	<p>The Collie B Power Station will require about 3.6-7.4GL/yr of water, depending on water quality, that will be sourced from mine dewatering activities at Ewington 1 mine and Ewington 2 mine.</p>	<p>Department of Environment</p> <p>The proposed power station lies within the Wellington Dam Catchment Area. The potential for using the Dam as a public drinking supply is being investigated by Government. A Priority classification is currently not assigned to this area but the potential exists for it to be classified P3. Heavy or energy industries are not compatible in P3 areas according to the Land Use Classification Table. The PER does not take into account the proclaimed catchment area in the text.</p> <p>Wellington is a CAWS Act clearing control area so any proposed clearing will need to be considered by the Department of Environment. The extent of any clearing must be determined and an application for a CAWSA Licence to Clear submitted to DoE</p> <p>There are potential water quality risks from hazardous material storage, washdown waters, fallout of air emissions to soil, saline water leakage from storage ponds, fly ash disposal in mine overburden, spills and leakage from the packaged treatment plant.</p> <p>The proponent should demonstrate that, under both normal and potentially abnormal operating conditions, water contaminants in use or produced at the power station are fully contained.</p> <p>The site is situated approximately 1km to the south of the Collie River East Branch, which joins the Collie River and eventually feeds into Wellington Dam. The close proximity of the site to the River means that accidental discharge of contaminants can potentially impact on the Dam and its water quality and should be managed carefully.</p> <p>The proposed site for Collie B is separated from the eastern wetland by the existing Collie A and a buffer of approximately 150-200 metres. However the proposed expansion is situated between the exiting power station and the western wetland. Good management strategies are required to maintain the integrity of the wetland.</p> <p>Development should be consistent with specific Water Quality Protection Notes (WQPNs):</p> <p>The discussion on potential impacts on surface water features requires further development, in particular how construction activities may increase surface water and sediment runoff. An understanding of mechanisms for potential impacts is necessary for management of potential impacts.</p> <p>There are concerns regarding the difficulty of establishing the exact amount of water available from dewatering in the medium and long terms. It would be prudent to develop an alternative water supply, rather than depend on dewatering water, for a secure long-term supply. The DoE has taken the position that it will not issue any new groundwater licences to Energy Groups for power station operations.</p> <p>Wetland information is only discussed briefly in the PER and there is no information of wetland buffers. Comprehensive wetland information will be required in the projects Environmental Management Plans.</p>	<p>In view of the significant quantity of groundwater that will be required by the proposed power station, and the potential for stored fuel and hazardous materials and plant construction and maintenance activities to impact upon surface water and groundwater quality, the EPA considers that surface water and groundwater is a relevant environmental factor.</p>

Preliminary Environmental Factors	Proposal Characteristics	Government Agency and Public Comments	Identification of Relevant Environmental Factors
POLLUTION			
Surface water and groundwater (continued)	The Collie B Power Station will require about 3.6-7.4GL/yr of water, depending on water quality, that will be sourced from mine dewatering activities at Ewington 1 mine and Ewington 2 mine.	<p>Conservation Council of WA, the Australian Conservation Foundation, WWF Australia, Climate Action Network Australia and Shire of Collie</p> <p>A significant concern relates to the proposed method of disposal of fly ash.</p> <p>Shire of Collie</p> <p>It is essential that water for operating the power plant is accessed from Ewington I mine dewatering activities.</p> <p>G & RE Yates</p> <p>The Collie region like all of Western Australia has had a significant reduction in rainfall over recent years and this is clearly likely to continue based on modelling undertaken by the Water Corporation. The impact of mine dewatering and water use in industrial development needs to be carefully balanced with the other needs in our community.</p>	In view of the significant quantity of groundwater that will be required by the proposed power station, and the potential for stored fuel and hazardous materials and plant construction and maintenance activities to impact upon surface water and groundwater quality, the EPA considers that surface water and groundwater is a relevant environmental factor.
Noise	Construction and operation of the Collie B Power Station has the potential to affect existing noise levels.	<p>Department of Environment</p> <p>The DoE has concerns that the three PER documents in respect of coalfired power station proposals are not providing standardised modelling information for noise. This makes it difficult to establish whether modelling will reflect actual impacts if constructed. In addition, the PER modelling does not appear to include any impacts from noise from existing and proposed Ewington mining operations.</p> <p>Shire of Collie, CR & MA Tonkin and G & RE Yates</p> <p>The noise modelling is inconsistent between PERs.</p> <p>Western Power Corporation</p> <p>The noise modelling did not extend the noise contours to the town of Collie.</p>	The proponent has made a commitment to install appropriate noise abatement technology to ensure that the proposed power station meets relevant noise criteria. However, given the nature of the concerns raised in the comments that were received, the EPA considers that noise is a relevant environmental factor.
SOCIAL SURROUNDINGS			
Risk and hazards	Operation of the Collie B Power Station will not lead to any significant increase in risk levels. Hazardous materials will be stored and handled according to Department of Industry and Resources (DoIR) regulations.	No specific concerns were raised in the submissions that were received.	In view of the very low increase in risk levels due to the operation of the proposed power station, and that hazardous materials will be stored and handled according to DoIR regulations, the EPA considers that this environmental factor does not require further evaluation.

Preliminary Environmental Factors	Proposal Characteristics	Government Agency and Public Comments	Identification of Relevant Environmental Factors
SOCIAL SURROUNDINGS			
Aboriginal culture and heritage	Construction activities within the project area have the potential to disturb Aboriginal heritage sites. Aboriginal heritage surveys have been undertaken and the results indicate that it is unlikely that any Aboriginal sites are located within the project area.	Department of Indigenous Affairs The proponent should fully explore Indigenous and Archaeological issues associated with the development and will be required to seek approval from the Minister for Indigenous Affairs should any Aboriginal sites be discovered during construction.	The EPA considers that the concerns raised have been adequately addressed by the response provided by the proponent. The proponent has made a commitment to submit an application to the Minister for Indigenous Affairs to clear under Section 18 of the <i>Aboriginal Heritage Act, 1972</i> before disturbance, if sites of aboriginal significance are found during construction. This environmental factor does not require further evaluation by the EPA.
European heritage	There are no known European heritage sites located within the project area.	No specific concerns were raised in the submissions that were received.	This environmental factor does not require further evaluation by the EPA.
Visual amenity	The most significant visual impact from the Collie B Power Station will be its 170m tall stack. The surrounding land is used for coal mining operations. Collie is located about 8km to the west south west of the Collie B site.	G & RE Yates The proponent has made no effort to address the visual impacts of the power station. There is no reference in the PER on the light impact from the power station (light shed).	The proponent has made a commitment to minimise potential impacts on visual amenity through planning design and screening strategies (eg. natural barriers), and by developing appropriate vegetation management and landscape strategies. This environmental factor does not require further evaluation by the EPA.
Recreational activities	The Collie B Power Station is unlikely to have an impact on recreational activities in the general area.	No specific concerns were raised in the submissions that were received.	The proponent has made a commitment to minimise impacts on recreational activities through planning design and screening strategies (eg. noise bunds and natural barriers), and by ensuring that access to adjoining bush will not be affected. This environmental factor does not require further evaluation by the EPA.

PRINCIPLES		
Principle	Relevant Yes/No	If yes, Consideration
<p>1. The precautionary principle <i>Where there are threats of serious or irreversible damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation.</i> <i>In application of this precautionary principle, decisions should be guided by –</i> <i>(a) careful evaluation to avoid, where practicable, serious or irreversible damage to the environment; and</i> <i>(b) an assessment of the risk-weighted consequences of various options.</i></p>	NO	
<p>2. The principle of intergenerational equity <i>The present generation should ensure that the health, diversity and productivity of the environment is maintained and enhanced for the benefit of future generations.</i></p>	NO	
<p>3. The principle of the conservation of biological diversity and ecological integrity <i>Conservation of biological diversity and ecological integrity should be a fundamental consideration.</i></p>	NO	
<p>4. Principles relating to improved valuation, pricing and incentive mechanisms <i>(a) Environmental factors should be included in the valuation of assets and services.</i> <i>(b) The polluter pays principles – those who generate pollution and waste should bear the cost of containment, avoidance and abatement.</i> <i>(c) The users of goods and services should pay prices based on the full life-cycle costs of providing goods and services, including the use of natural resources and assets and the ultimate disposal of any waste.</i> <i>(d) Environmental goals, having been established, should be pursued in the most cost effective way, by establishing incentive structure, including market mechanisms, which enable those best placed to maximize benefits and/or minimize costs to develop their own solution and responses to environmental problems.</i></p>	YES	Principle 4b was considered in the assessment of greenhouse gas emissions
<p>5. The principle of waste minimisation <i>All reasonable and practicable measures should be taken to minimize the generation of waste and its discharge into the environment.</i></p>	YES	Principle 5 was considered in the assessment of greenhouse gas emissions and atmospheric emissions

Appendix 4

Recommended Environmental Conditions and Proponent's Consolidated Commitments

RECOMMENDED CONDITIONS AND PROCEDURES

STATEMENT THAT A PROPOSAL MAY BE IMPLEMENTED (PURSUANT TO THE PROVISIONS OF THE ENVIRONMENTAL PROTECTION ACT, 1986)

COLLIE B POWER STATION SHIRE OF COLLIE

Proposal: The construction and operation of the Collie B Power Station, a sub-critical coal fired base load power generating facility with a nominal generating capacity of 330 megawatts on a site located adjacent to the existing Collie power station (Collie A), situated 8 kilometres east north east of the Collie townsite, as documented in schedule 1 of this statement.

Proponent: Griffin Electricity Pty Ltd

Proponent Address: 15th Floor, 28 The Esplanade, PERTH WA 6000

Assessment Number: 1544

Report of the Environmental Protection Authority: 1176

The proposal referred to above may be implemented by the proponent subject to the following conditions and procedures:

1 Implementation

1-1 The proponent shall implement the proposal as documented in schedule 1 of this statement subject to the conditions of this statement.

2 Proponent Commitments

2-1 The proponent shall implement the environmental management commitments documented in schedule 2 of this statement.

3 Proponent Nomination and Contact Details

3-1 The proponent for the time being nominated by the Minister for the Environment under section 38(6) or (7) of the *Environmental Protection Act, 1986* is responsible for the implementation of the proposal until such time as the Minister for the Environment has exercised the Minister's power under section 38(7) of the Act to revoke the nomination of that proponent and nominate another person as the proponent for the proposal.

3-2 If the proponent wishes to relinquish the nomination, the proponent shall apply for the transfer of proponent and provide a letter with a copy of this statement endorsed by the proposed replacement proponent that the proposal will be

carried out in accordance with this statement. Contact details and appropriate documentation on the capability of the proposed replacement proponent to carry out the proposal shall also be provided.

- 3-3 The nominated proponent shall notify the Department of Environment of any change of contact name and address within 60 days of such change.

4 Commencement and Time Limit of Approval

- 4-1 The proponent shall substantially commence the proposal within five years of the date of this statement or the approval granted in this statement shall lapse and be void.

Note: The Minister for the Environment will determine any dispute as to whether the proposal has been substantially commenced.

- 4-2 The proponent shall make application for any extension of approval for the substantial commencement of the proposal beyond five years from the date of this statement to the Minister for the Environment, prior to the expiration of the five-year period referred to in condition 4-1.

The application shall demonstrate that:

1. the environmental factors of the proposal have not changed significantly;
2. new, significant, environmental issues have not arisen; and
3. all relevant government authorities have been consulted.

Note: The Minister for the Environment may consider the grant of an extension of the time limit of approval not exceeding five years for the substantial commencement of the proposal.

5 Compliance Audit and Performance Review

- 5-1 The proponent shall prepare an audit program and submit compliance reports to the Department of Environment which address:

1. the status of implementation of the proposal as defined in schedule 1 of this statement;
2. evidence of compliance with the conditions and commitments; and
3. the performance of the environmental management plans and programs.

Note: Under sections 48(1) and 47(2) of the *Environmental Protection Act 1986*, the Chief Executive Officer of the Department of Environment is empowered to monitor the compliance of the proponent with the statement and should directly receive the compliance documentation, including environmental

management plans, related to the conditions, procedures and commitments contained in this statement.

5-2 The proponent shall submit a performance review report every five years after the start of operations, to the requirements of the Minister for the Environment on advice of the Environmental Protection Authority, which addresses:

1. the major environmental issues associated with the project; the targets for those issues; the methodologies used to achieve these; and the key indicators of environmental performance measured against those targets;
2. the level of progress in the achievement of sound environmental performance, including industry benchmarking, and the use of best available technology where practicable;
3. significant improvements gained in environmental management, including the use of external peer reviews;
4. stakeholder and community consultation about environmental performance and the outcomes of that consultation, including a report of any on-going concerns being expressed; and
5. the proposed environmental targets over the next five years, including improvements in technology and management processes.

5-3 The proponent may submit a report prepared by an auditor approved by the Department of Environment under the “Compliance Auditor Accreditation Scheme” to the Chief Executive Office of the Department of Environment on each condition/commitment of this statement which requires the preparation of a management plan, programme, strategy or system, stating whether the requirements of each condition/commitment have been fulfilled within the timeframe stated within each condition/commitment.

6 Greenhouse Gas Emissions

6-1 Prior to commencement of construction, the proponent shall prepare a Greenhouse Gas Emissions Management Plan to:

- ensure that through the use of best practice, the total net “greenhouse gas” emissions and/or “greenhouse gas” emissions per unit of product from the project are minimised; and
- manage “greenhouse gas” emissions in accordance with the *Framework Convention on Climate Change 1992*, and consistent with the National Greenhouse Strategy;

to the requirements of the Minister for the Environment on advice of the Environmental Protection Authority.

This Plan shall include:

- 1 calculation of the “greenhouse gas” emissions associated with the proposal, as advised by the Environmental Protection Authority;

Note: The current requirements of the Environmental Protection Authority are set out in: *Minimising Greenhouse Gas Emissions, Guidance for the Assessment of Environmental Factors, No. 12* published by the Environmental Protection Authority (October 2002). This document may be updated or replaced from time to time.

- 2 specific measures to minimise the total net “greenhouse gas” emissions and/or the “greenhouse gas” emissions per unit of product associated with the proposal using a combination of “no regrets” and “beyond no regrets” measures;
- 3 estimation of the “greenhouse gas” efficiency of the project (per unit of product and/or other agreed performance indicators) and comparison with the efficiencies of other comparable projects producing a similar product, both within Australia and overseas;
- 4 implementation of thermal efficiency guidelines and operating goals consistent with the Australian Greenhouse Office Technical Efficiency guidelines in design and operational management;
- 5 actions for the monitoring and annual reporting of “greenhouse gas” emissions and emission reduction strategies;
- 6 a target set by the proponent for the reduction of total net “greenhouse gas” emissions and/or “greenhouse gas” emissions per unit of product and as a percentage of total emissions over time, and annual reporting of progress made in achieving this target. Consideration should be given to the use of renewable energy sources such as solar, wind or hydro power; and
- 7 entry, whether on a project-specific basis, company-wide arrangement or within an industrial grouping, as appropriate, into the Commonwealth Government’s “Greenhouse Challenge” voluntary cooperative agreement program.

Components of the agreement program include:

1. an inventory of emissions;
2. opportunities for abating “greenhouse gas” emissions in the organisation;
3. a “greenhouse gas” mitigation action plan;
4. regular monitoring and reporting of performance; and
5. independent performance verification.

Note: In (2) above, the following definitions apply:

1. “no regrets” measures are those which can be implemented by a proponent and which are effectively cost-neutral.
2. “beyond no regrets” measures are those which can be implemented by a proponent and which involve additional costs that are not expected to be recovered.

6-2 The proponent shall implement the Greenhouse Gas Emissions Management Plan required by condition 6-1, to the requirements of the Minister for the Environment on advice of the Environmental Protection Authority.

6-3 Prior to construction, the proponent shall make the Greenhouse Gas Emissions Management Plan required by condition 6-1 publicly available, to the requirements of the Minister for the Environment on advice of the Environmental Protection Authority.

7 Stack Emissions and Ambient Air Quality Monitoring

7-1 Prior to commencement of construction, the proponent shall prepare a Stack Emissions Management Plan and Ambient Air Quality Monitoring, to the requirements of the Minister for the Environment on advice of the Environmental Protection Authority.

The objective of the plan is:

- To ensure that best available practicable and efficient technologies are used to minimise total air emissions from the power station; and
- To ensure that high quality data are available to model and verify ambient air quality.

This Plan shall address:

- 1 specific measures to minimise total air emissions from the power station to meet emission limits consistent with best practicable technology, current industry standards and ambient air quality standards;
- 2 monitoring of air emissions;
- 3 monitoring of ambient air quality; and
- 4 public reporting of air emissions and any complaints about air emissions.

7-2 The proponent shall implement the Stack Emissions Management and Ambient Air Quality Monitoring Plan required by condition 7-1.

7-3 The proponent shall make the Stack Emissions Management and Ambient Air Quality Monitoring Plan, required by condition 7-1 publicly available.

8 Saline Wastewater Discharge

8-1 The proponent shall not discharge saline wastewater from the power station into the existing Collie Power Station saline wastewater

pipeline other than in accordance with a Saline Water Discharge Quality Plan prepared to the requirements of the Minister for the Environment on advice of the Environmental Protection Authority.

This Plan shall address the following:

1. Continuous on-line monitoring of flowrate, temperature, conductivity, and turbidity;
 2. Appropriate additional monitoring, with adequate analytical limits of reporting, to control discharge levels of any process additives and other environmental contaminants necessary to:
 - protect the environmental values of ecosystem health, recreation and aesthetics, fishing and aquaculture, and industrial water supply;
 - protect the high level of ecological protection outside the zone of initial dilution for the marine outfall; and
 - meet the discharge licence for the pipeline into the marine environment.
 3. The concentration of oxidising biocides and antiscalants in the brine discharge necessary to:
 - protect the environmental values of ecosystem health, recreation and aesthetics, fishing and aquaculture, and industrial water supply;
 - protect the high level of ecological protection outside the zone of initial dilution for the marine outfall; and
 - meet the discharge licence for the pipeline into the marine environment.
- 8-2 The proponent shall implement the Saline Water Discharge Quality Plan required by condition 8-1.
- 8-3 In the event that monitoring identifies unacceptable impacts, the proponent shall as soon as practicable undertake modifications to the method of saline wastewater discharge to mitigate these impacts.
- 8-4 The proponent shall make the Saline Water Discharge Quality Plan required by condition 8-1 publicly available.

9 Decommissioning Plans

- 9-1 Prior to 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:

- 1 the rationale for the siting and design of plant and infrastructure as relevant to environmental protection, and conceptual plans for the removal or, if appropriate, retention of plant and infrastructure;
 - 2 the long-term management of ground and surface water systems affected by the power station, coal stockpiles, waste disposal areas and associated infrastructure;
 - 3 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;
 - 4 a conceptual plan for a care and maintenance phase; and
 - 5 management of potentially polluting materials to avoid the creation of contaminated areas.
- 9-2 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:

- 1 the removal or, if appropriate, retention of plant and infrastructure in consultation with relevant stakeholders;
 - 2 the long-term management of ground and surface water systems affected by the power station, coal stockpiles, waste disposal areas and associated infrastructure;
 - 3 rehabilitation of all disturbed areas to a standard suitable for the agreed new land use(s); and
 - 4 identification of contaminated areas, including provision of evidence of notification and proposed management measures to relevant statutory authorities.
- 9-3 The proponent shall implement the Final Decommissioning Plan required by condition 9-2 until such time as the Minister for the Environment determines, on advice of the Environmental Protection Authority, that the proponent's decommissioning responsibilities have been fulfilled.

- 9-4 The proponent shall make the Final Decommissioning Plan required by condition 9-2 publicly available.

Procedures

- 1 Where a condition states “to the requirements of the Minister for the Environment on advice of the Environmental Protection Authority”, the Environmental Protection Authority will provide that advice to the Department of Environment for the preparation of written notice to the proponent.
- 2 The Environmental Protection Authority may seek advice from other agencies or organisations, as required, in order to provide its advice to the Department of Environment.
- 3 Where a condition lists advisory bodies, it is expected that the proponent will obtain the advice of those listed as part of its compliance reporting to the Department of Environment.

Notes

- 1 The Minister for the Environment will determine any dispute between the proponent and the Environmental Protection Authority or the Department of Environment over the fulfilment of the requirements of the conditions.
- 2 The proponent is required to apply for a Works Approval, Licence and Registration for this project under the provisions of Part V of the *Environmental Protection Act 1986*.
- 3 Within this statement, to “have in place” means to “prepare, document, implement and maintain for the duration of the proposal”.

Schedule 1

Collie B Power Station (Assessment No. 1544)

The proposal is to construct and operate a 330 megawatt capacity advanced sub-critical coal-fired power station (known as Collie B) at the Collie Power Station Site, immediately adjacent to the existing 'Collie A' Power Station. It will be an advanced sub-critical coal-fired base-load generation facility with a nominal generating capacity of up to 330MW. The Collie B Power Station will supply electricity to Western Power for the South West Interconnected System (SWIS) under the SWIS Power Procurement Process (PPP).

The power station will comprise the following components:

- boiler and turbine power block;
- mechanical draft cooling tower;
- flue gas cleaning equipment;
- generator transformer;
- water cooling plant;
- a 170 meter stack;
- water treatment plant;
- transmission line for grid connection;
- buildings for administration, stores, water, sewage treatment, and chemical storage;
- liquid fuel storage facilities (typically for start-up purposes);
- communications and control systems;
- electrical supplies;
- drainage systems;
- roads and fencing; and
- saline wastewater discharge through the existing Collie Power Station ocean outfall.

The plant layout is shown in Figure 2. A diagram illustrating the input and output flows for the power station is shown in Figure 3. The main characteristics of the proposal are summarised in Table 1 below.

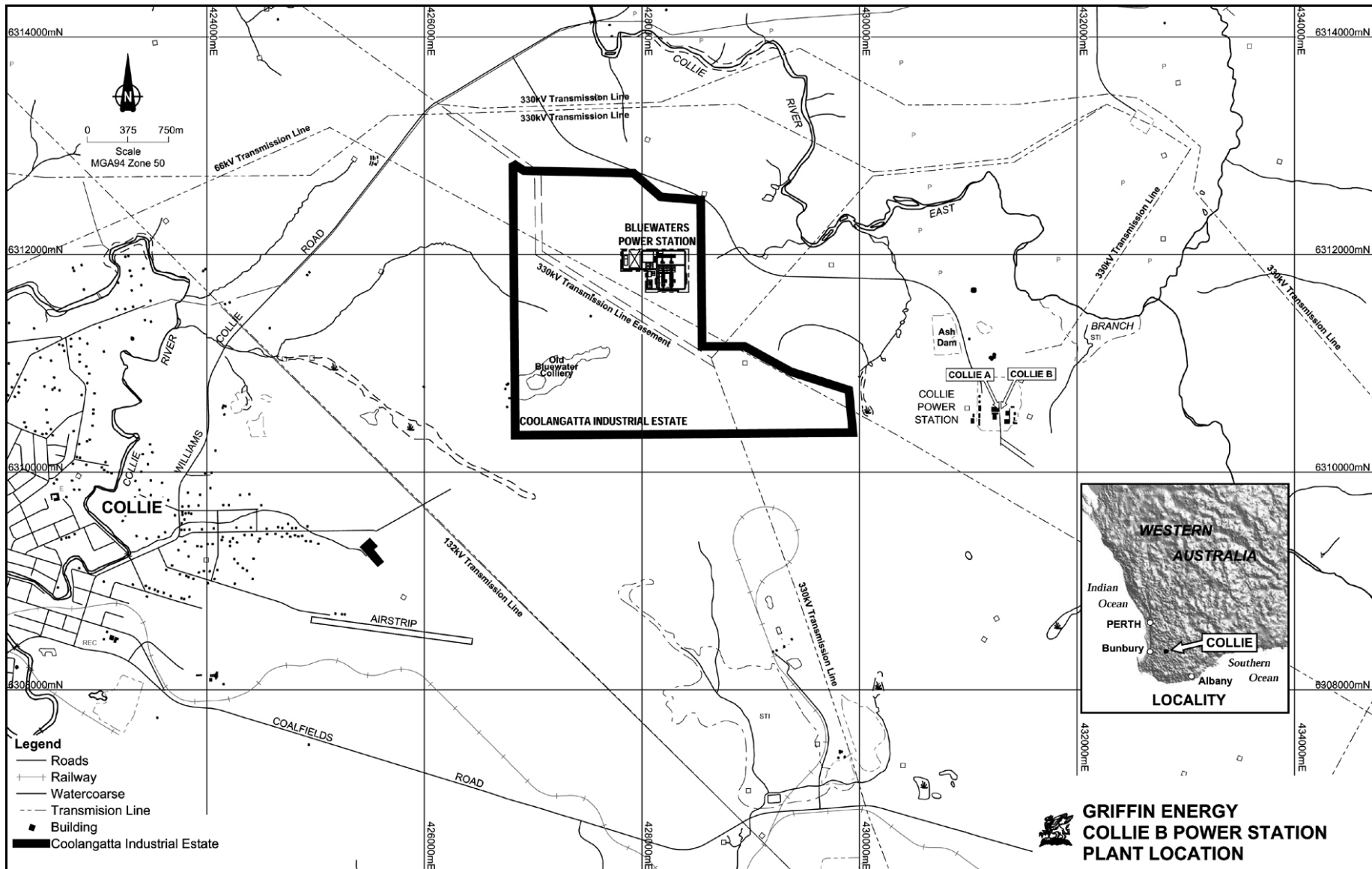


Figure 1: Regional location (Source: Figure 3 from Griffin Electricity Pty Ltd 2005)

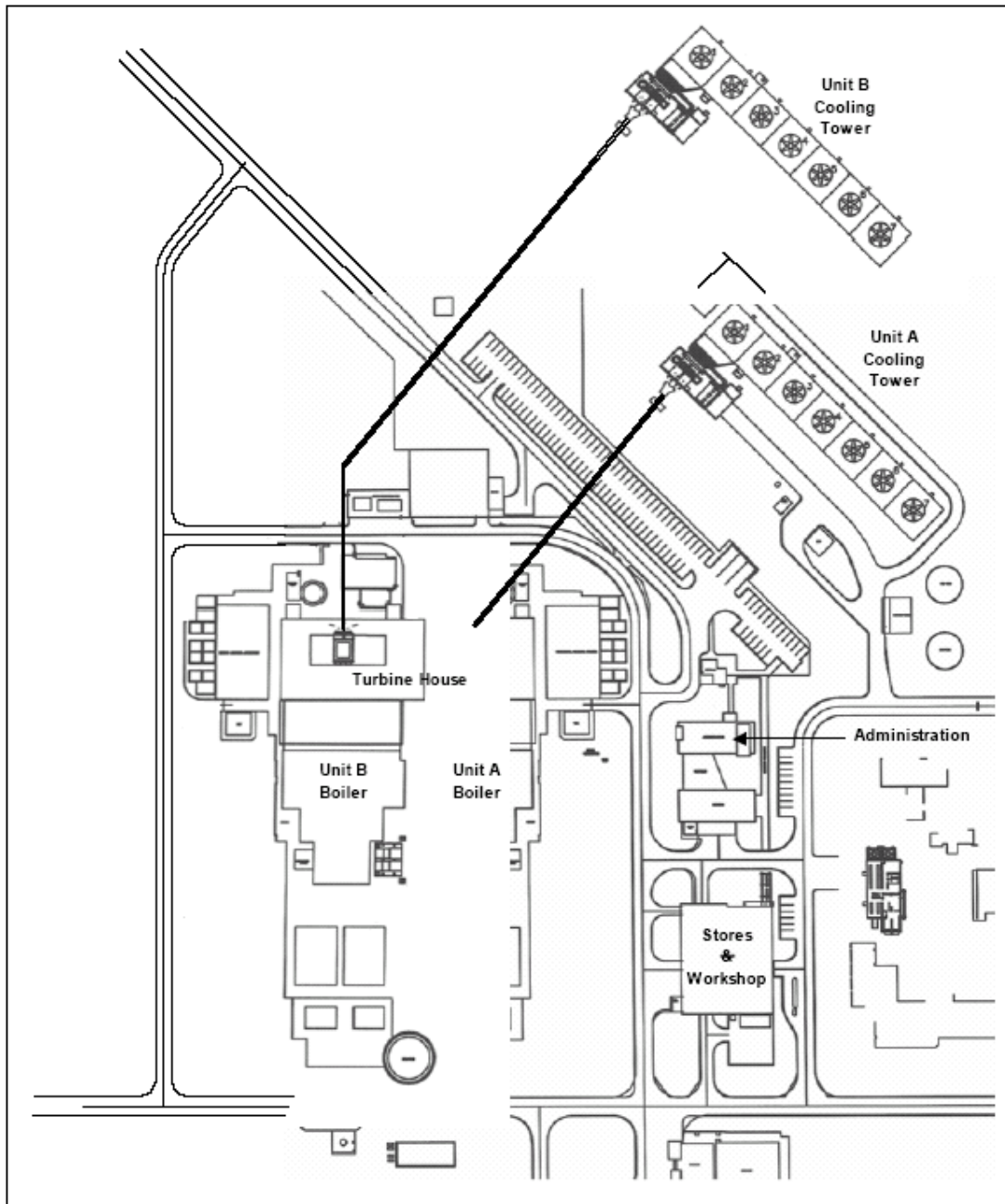


Figure 2: Plant layout (Source: Figure 4 from Griffin Electricity Pty Ltd, 2005)

Table 1: Key proposal characteristics

ELEMENT	DESCRIPTION
General	
<ul style="list-style-type: none"> Project Purpose: Construction Period: Project Life: Project Value: Power Plant Type: Power Generating Capacity: Plant Thermal Efficiency: Plant Operation: Shutdown Time: Maximum Facility Footprint: Maximum Total Area: 	<p>To produce electricity to supply to the SWIS grid or direct to customers</p> <p>30 months to commercial operation</p> <p>30 years</p> <p>Approximately A\$400 Million</p> <p>Advanced subcritical coal fired power station</p> <p>330 MW_{net}</p> <p>HHV 38% - LHV 40.4%</p> <p>Base load operation 24 hours per day, 365 days per year</p> <p>Plant maintenance shutdowns may be scheduled annually</p> <p>200 m x 100 m area</p> <p>1.7 hectares</p>
Plant Facilities	
<ul style="list-style-type: none"> Stacks: Height of Stack: Diameter of Stack: Cooling Towers: Liquid Fuel Storage Tanks: Boiler: Steam Turbine: Wastewater collection 	<p>1 (shared with Collie A)</p> <p>170 m</p> <p>4.8 m</p> <p>1 set</p> <p>Existing fuel storage is sufficient (750 kL)</p> <p>Balanced draft pulverised coal steam generator matched to steam turbine capacity</p> <p>Tandem compound reheat steam turbine with synchronous alternator – 330 MW_e</p> <p>Package treatment plant</p>
Utilities	
<ul style="list-style-type: none"> Water Supply: Coal Supply: Transmission Line Length: 	<p>Dependant on water quality, 3.6-7.4 GL/yr</p> <p>Nominal 1.4 million tpa (dependant on coal quality)</p> <p>Minimal additional transmission lines required</p>
Emissions	
<ul style="list-style-type: none"> Noise: Flue Dust: Nitrogen Oxides: Sulphur Oxides: Greenhouse Gases: Carbon Monoxide: Volatile Organic Compounds: PAH: Arsenic Cadmium Chromium compounds Lead compounds Mercury: Fluorides: POPs inc Dioxins and Furans: 	<p>Noise levels predicted to be at or below assigned levels <65 dB(A) under the noise regulations at the power station boundary. Noise levels at nearest residential premises predicted to meet assigned noise levels.</p> <p>47 mg/Nm³ at 7% O₂ dry basis; 18 g/s; 340 tpa</p> <p>606 mg/Nm³ at 7% O₂ dry basis; 132g/s; 4570 tpa</p> <p>1152 mg/Nm³ at 7% O₂ dry basis; 370g/s; 9,000 tpa</p> <p>2,100,000 tpa CO₂ e</p> <p>500 mg/Nm³ at 7% O₂ dry basis 126g/s; 3,500 tpa</p> <p>48 kg/yr</p> <p>9 kg/yr</p> <p>10 kg/yr</p> <p>12.7 kg/yr</p> <p>2.2 kg/yr</p> <p>46kg/yr</p> <p>46 kg/yr</p> <p>22,500 kg/yr (instantaneous rate estimated to be 880 mg/s)</p> <p>Less than 0.8 grams per year</p>
Waste	
<ul style="list-style-type: none"> Ash: Sewage: Saline Water: 	<p>Dependant on quality of coal. Approx. 270,000 tpa to be returned to adjacent mines</p> <p><10 tpa</p> <p>Dependant on quality of water supply – estimated discharge volume of 20 L/s (maximum design rate of 36 L/s)</p>
Workforce	
<ul style="list-style-type: none"> Construction: Operations 	<p>Approximately 400 personnel at the peak of construction</p> <p>Up to 25 full time operations and maintenance personnel</p>

Abbreviations used in Table

CO ₂ e	Carbon dioxide equivalents
dB(A)	decibels A weighted
g/s	grams per second
GL/yr	Gigalitres per year
HHV	Higher Heating Value
kg	Kilograms
kg/yr	Kilograms per year
m	metre
mg/Nm ³	milligrams per normal cubic metre, at 1 atm, 0°C

Mtpa	Million tonnes per annum
MW	Megawatt
O ₂	Oxygen
pa	per annum
PAH	Polycyclic Aromatic Hydrocarbons
POPs	Persistent Organic Pollutants
SWIS	South West Interconnected System
tpa	tonnes per annum at 0.8 capacity factor
%	percent

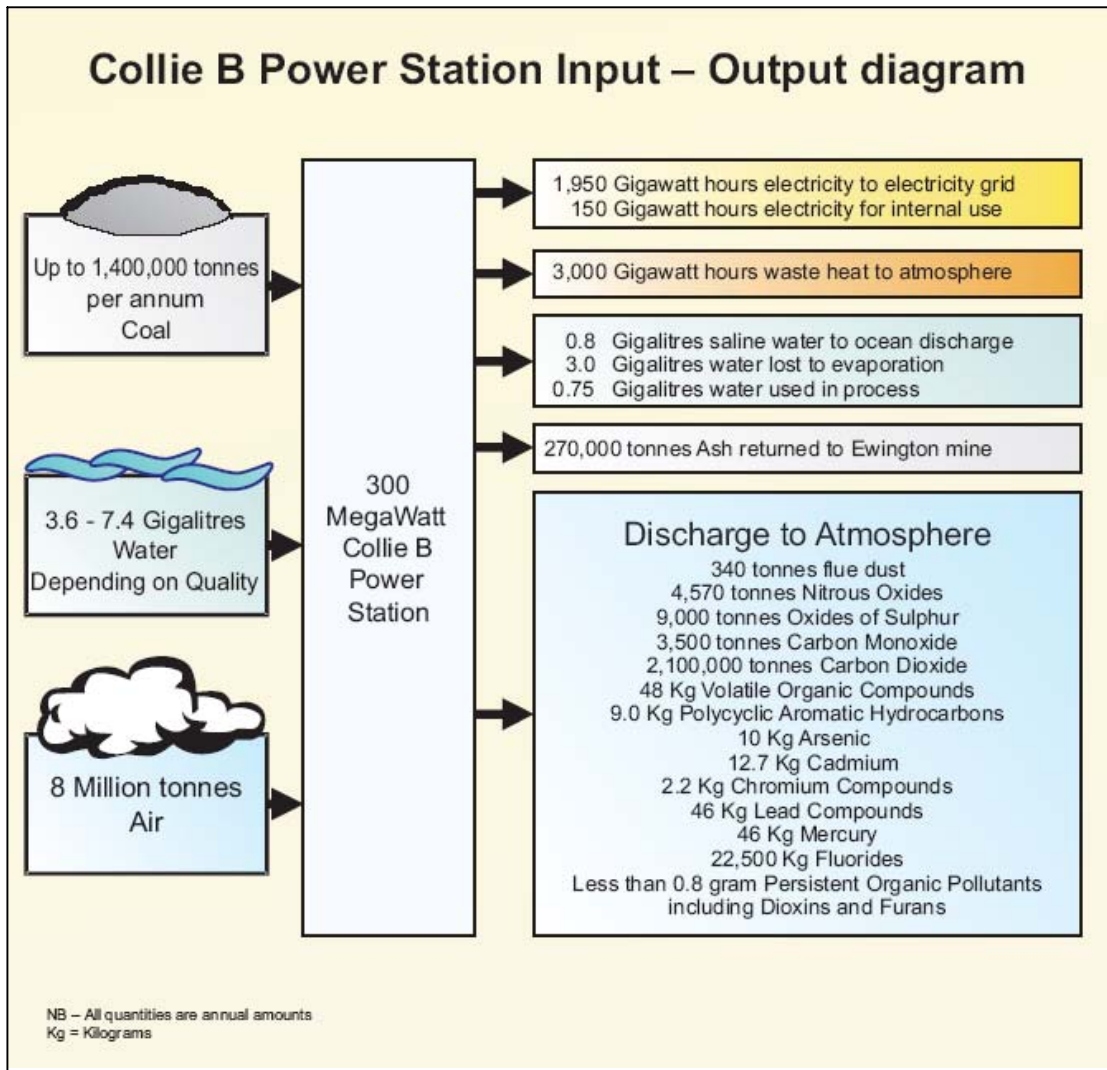


Figure 3: Amended Input - Output flow diagram (Source: Modified Version of Figure 6 from Griffin Electricity Pty Ltd, 2005)

Proponent's Environmental Management Commitments

June 2005

COLLIE B POWER STATION
(Assessment No. 1544)

Griffin Electricity Pty Ltd

Proponent's Environmental Management Commitments – January 2005

COLLIE B POWER STATION (Assessment No. 1544)

Note: The term “commitment” as used in this schedule includes the entire row of the table and its six separate parts as follows:

- a commitment number;
- a commitment topic;
- the objective of the commitment;
- the ‘action’ to be undertaken by the proponent;
- the timing requirements of the commitment; and
- the body/agency to provide technical advice to the Department of Environment.

Commitment Number	Environmental Factor	Management Objective	Action	Timing	Advice From
One	Biodiversity	Minimise clearing to establish power station. Examine all environmental factors and implementation of mitigation plans and activities.	Develop and implement an EMS for Collie B that meets AS/NZS ISO 14001:1996. The EMS will cover all elements in the standard as a minimum as well as the action items listed in this table: 1.1 Develop and implement a construction phase EMP. 1.2 Develop and implement an operational phase EMP.	Prior to construction and ongoing. Prior to construction. Prior to commissioning and ongoing.	Various stakeholders as indicated below. Various stakeholders as indicated below. Various stakeholders as indicated below.
Two	Terrestrial Flora: <ul style="list-style-type: none"> • Vegetation Communities • Declared Rare Flora and Priority Flora • Flora of Conservation Significance 	Removal of vegetation will be minimised where possible through appropriate location of the power station and associated infrastructure. The project will maximise the use of existing cleared land. Manage construction works to minimise disturbance to significant vegetation communities and priority flora. Maintain the abundance, species diversity, geographic distribution and productivity of vegetation communities.	2.1 Preparation and implementation of a Vegetation and Flora Management Plan addressing identification of areas not to be disturbed, site clearance procedures to manage construction works so as to avoid disturbance to native vegetation, and weed management practices. 2.2 If any clearing of native vegetation is determined to be required, the area will be surveyed and mapped prior to the commencement of construction, and the significance of impacted vegetation will be detailed.	Prior to construction. Prior to construction.	CALM. CALM.

Commitment Number	Environmental Factor	Management Objective	Action	Timing	Advice From
Three	Terrestrial Fauna: <ul style="list-style-type: none"> All Fauna Specially Protected (Threatened) Fauna 	<p>Maintain the abundance, species diversity, geographic distribution of terrestrial fauna.</p> <p>Protect Specially Protected (Threatened) Fauna, consistent with the provisions of the <i>Wildlife Conservation Act</i>.</p>	<p>3.1 Preparation and implementation of a Fauna Management Plan to ensure off-site and indirect fauna impacts are minimised. This may include: - ensuring physical disturbance is kept within designated areas,</p> <ul style="list-style-type: none"> - establishment of procedures, monitoring requirements, workforce training and responsibilities to minimise disturbance of significant terrestrial fauna, - regular liaison with local CALM office to maintain acceptable management practices, - development and implementation of fire prevention and contingency measures. 	Prior to construction.	CALM.
Four	Surface Water Quality	To minimise erosion and impacts on local surface water or downstream environments.	<p>4.1 Cooling water discharge will not be directed to the surface water system.</p> <p>4.2 The plant will be designed to ensure that contaminants are not released to the environment.</p> <p>4.3 Contamination of surface water will be minimised by methods such as:</p> <ul style="list-style-type: none"> - suitably designed drainage areas and settling basins; - appropriate design of areas to contain hazardous material such as hydrocarbons; - washdown water will be collected in drains and passed through sediment traps and oil separation systems prior to transfer to settling ponds. <p>4.4 Develop and implement construction phase surface water management plan as part of construction phase EMP.</p> <p>4.5 Develop and implement operational phase surface water management plan as part of operational phase EMP.</p> <p>4.6 Document the existing surface water quality in the project area.</p>	<p>Prior to construction.</p> <p>Prior to commissioning and ongoing.</p> <p>Prior to construction.</p> <p>Prior to construction.</p> <p>Prior to commissioning</p> <p>Prior to construction.</p>	<p>DoE – Water & Rivers Commission.</p> <p>DoE – Water & Rivers Commission.</p> <p>DoE – Water & Rivers Commission.</p> <p>DoE – Water & Rivers Commission.</p> <p>DoE – Water & Rivers Commission.</p> <p>DoE – Water & Rivers Commission.</p>
Five	Groundwater Quality	Maintain the quality of local and regional groundwater to ensure that existing and potential uses, including ecosystem maintenance, are protected.	<p>5.1 The plant will be designed to ensure that contaminants are not released into the environment.</p> <p>5.2 All potentially hazardous materials will be stored in accordance with relevant legislation and regulations.</p> <p>5.3 Develop and implement construction phase groundwater management plan as part of construction phase EMP.</p> <p>5.4 5.4 Develop and implement operational phase groundwater management plan as part of operational phase EMP.</p>	<p>Prior to construction.</p> <p>Prior to commissioning and ongoing.</p> <p>Prior to construction.</p> <p>Prior to commissioning</p>	<p>DoE – Water & Rivers Commission.</p> <p>DoE – Water & Rivers Commission.</p> <p>DoE – Water & Rivers Commission.</p> <p>DoE – Water & Rivers Commission.</p>

Commitment Number	Environmental Factor	Management Objective	Action	Timing	Advice From
Six	Water Supply		<p>6.1 Develop and implement an appropriate water supply and management strategy that will satisfy requirements during both the construction and operation phases of the project.</p> <p>6.2 Develop and implement construction phase water management plan as part of Construction EMP.</p> <p>6.3 Develop and implement operational phase water management plan as part of operational EMP.</p>	<p>Prior to construction</p> <p>Prior to construction.</p> <p>Prior to commissioning and ongoing</p>	<p>DoE – Water & Rivers Commission.</p> <p>DoE – Water & Rivers Commission.</p> <p>DoE – Water & Rivers Commission.</p>
Seven	Marine Water Quality	Maintain marine ecological integrity and biodiversity and ensure that any impacts on locally significant marine communities are avoided.	<p>7.1 Cooperate with operator of Collie A disposal line to ensure that effluent water meets discharge license conditions prior to introduction into line.</p> <p>7.2 Determine final details of the wastewater quality and quantity and conduct a detailed modelling assessment of the ocean outfall discharge (with the existing operator of Collie A) to demonstrate the dilution criteria that can be achieved with the additional saline water discharge. An assessment of the levels of other contaminants (such as biocides) discharged into the ocean will be included to ensure that they meet the ANZECC/ARMCANZ 2000 Water Quality Guidelines at the edge of the mixing zone.</p> <p>7.3 Design and implement a Saline Water Management Plan incorporating a saline wastewater monitoring programme and wastewater management contingency plan, as part of the Operations EMP.</p>	<p>Prior to commissioning and ongoing.</p> <p>Prior to commissioning</p> <p>Prior to commissioning</p>	<p>DoE South West Region Office and operator of Collie A discharge line.</p> <p>DoE South West Region Office and operator of Collie A discharge line.</p> <p>DoE South West Region Office and operator of Collie A discharge line.</p>
Eight	Contamination (Oil and chemical spills)	To minimise potential adverse effects, risk and liability associated with management of oils and chemicals.	<p>8.1 During the construction phase, potentially contaminating materials and activities will be stored and managed in accordance with regulatory requirements and good practice. Containment of any spillages or leakage will be a priority.</p> <p>8.2 The plant will be designed to ensure spillages of chemicals or hydrocarbons are contained and collected.</p> <p>8.3 During operation of the plant, all potentially contaminating or hazardous materials will be stored in accordance with relevant legislation and regulations</p> <p>8.4 Develop and implement construction phase contamination management (spills) plan as part of construction phase EMP.</p> <p>8.5 Develop and implement operational phase contamination management (spills) plan as part of operational phase EMP.</p>	<p>Prior to construction.</p> <p>Prior to commissioning and ongoing.</p> <p>Ongoing</p> <p>Prior to construction.</p> <p>Prior to commissioning</p>	<p>DoE – Land and Water Quality Branch.</p> <p>DoE – Land and Water Quality Branch.</p> <p>DoE, DoIR</p> <p>DoE</p> <p>DoE</p>

Commitment Number	Environmental Factor	Management Objective	Action	Timing	Advice From
Nine	Solid and Liquid Wastes	To minimise potential contamination to the receiving environment.	<p>9.1 During both the construction and operation phases of the project, solid and liquid wastes will be minimised through resource recovery, reuse and recycling programmes.</p> <p>9.2 All materials requiring disposal will be managed in accordance with the requirements of the relevant authorities and regulations.</p> <p>9.3 Waste hydrocarbons will be contained, collected and disposed off-site by an approved method.</p> <p>9.4 Domestic wastewater will be managed on site via a packaged treatment plant.</p> <p>9.5 Develop and implement a flyash management plan as part of the operational phase EMP.</p> <p>9.6 Cooling water discharge will be directed to Western Power's saline Water Pipeline Develop construction phase waste management plan as part of the construction phase EMP.</p> <p>9.7 Develop and implement construction phase waste management plan</p> <p>9.8 Develop and implement operational phase waste management plan as part of the operational phase EMP.</p>	<p>Prior to construction and ongoing.</p> <p>Prior to commissioning and ongoing.</p> <p>Prior to construction</p> <p>Prior to commissioning and ongoing</p> <p>Prior to commissioning and ongoing</p> <p>Prior to construction and ongoing</p> <p>Prior to construction</p> <p>Prior to commissioning</p>	<p>Shire of Collie.</p> <p>Shire of Collie.</p> <p>DoE</p> <p>DoE</p> <p>DoE, CALM</p> <p>DoE</p> <p>DoE</p> <p>DoE</p>
Ten	Noise and Vibration: <ul style="list-style-type: none"> Construction Phase Operations Phase 	To minimise noise emissions and comply with Noise Regulations during construction and operations.	<p>10.1 Appropriate noise abatement technology will be installed to ensure the power station meets relevant noise criteria.</p> <p>10.2 Develop and implement construction phase Noise management plan as part of the construction phase EMP.</p> <p>10.3 Develop and implement operational phase Noise management plan as part of the operational phase EMP, including periodic monitoring to ensure compliance with Noise Regulations.</p>	<p>Prior to construction.</p> <p>Prior to construction</p> <p>Prior to commissioning and ongoing.</p>	<p>DoE – Noise Branch.</p> <p>DoE – Noise Branch</p> <p>DoE – Noise Branch</p>
Eleven	Air Emissions: <ul style="list-style-type: none"> Construction Phase (Particulate / Dust) Operations Phase (Particulate / Dust (PM₁₀), Oxides of Sulphur (SO₂), Oxides of Nitrogen (NO_x), VOC's, etc.) 	To minimise environmental or human health effects or significantly impact on amenity.	<p>11.1 Dust levels will be managed by minimising vegetation clearing, the use of dust suppression equipment and appropriate site management.</p> <p>11.2 Best practice management will be used in the design and construction of coal handling.</p> <p>11.3 Develop and implement construction phase dust management plan as part of construction phase EMP.</p> <p>11.4 Develop and implement operational phase dust management plan as part of operational phase EMP.</p> <p>11.5 Develop and implement an operational emissions monitoring and management plan.</p> <p>11.6 Use EPA Guidance note Number 55 to assist design.</p>	<p>Prior to construction.</p> <p>Prior to commissioning and ongoing.</p> <p>Prior to construction</p> <p>Prior to commissioning and ongoing.</p> <p>Prior to commissioning and ongoing.</p> <p>Design phase</p>	<p>Shire of Collie. DoE</p> <p>Shire of Collie. DoE</p> <p>DoE – South West Region office.</p> <p>DoE.</p> <p>DoE</p> <p>DoE</p>

Commitment Number	Environmental Factor	Management Objective	Action	Timing	Advice From
Twelve	Greenhouse Gas Emissions	To minimise atmospheric emissions where practicable and comply with relevant guidelines.	<p>12.1 Management of emissions will comply with the EPA guidance for the assessment of environmental factors No. 12, Minimising Greenhouse Gas Emissions.</p> <p>12.2 Thermal efficiency design and operating goals will be implemented. Use AGO Technical Efficiency guidelines in design and operational management.</p> <p>12.3 Sign on to the Greenhouse Challenge which will involve the following:</p> <ul style="list-style-type: none"> ➤ provide an estimate of greenhouse gas emissions over the lifetime of the project, and using annual CO₂ equivalent quantities, provide a comparison with other electricity generation plants/technology in WA as required by the Greenhouse Challenge; ➤ provide information on mechanisms to reduce greenhouse gas emissions to best practicable levels in terms of energy efficiency and tonnes of greenhouse gas per unit of product during the design, construction and operation of the plant; and ➤ provide recommendations & suggestions on the implementation of measures to offset greenhouse gas emission. <p>12.4 Based on outcomes from the above, a framework for a greenhouse gas management plan for the proposed power station will be developed and agreed with the relevant regulatory authorities. Once agreement on this framework has been reached, the plan will be prepared and implemented as part of the operational phase EMP for the plant.</p>	<p>Prior to construction and ongoing.</p> <p>Prior to construction and ongoing.</p> <p>Prior to commissioning</p> <p>Prior to construction and ongoing.</p>	<p>Australian Greenhouse Office. DoE</p> <p>Australian Greenhouse Office. DoE</p> <p>Australian Greenhouse Office. DoE</p> <p>Australian Greenhouse Office. DoE</p>

Commitment Number	Environmental Factor	Management Objective	Action	Timing	Advice From
Twelve (continued)	Greenhouse Gas Emissions	To minimise atmospheric emissions where practicable and comply with relevant guidelines.	<p>12.5 Continued planting of eucalypt trees on former mined areas owned freehold by Griffin Coal and WRCA to sequester 1,000 tpa of GHG.</p> <p>12.6 Plant 2000 hectares of trees on rural properties owned by WRCA to sequester 90,000 tpa of GHG.</p> <p>12.7 Construct an 80MW wind farm (40MWnet interest) near Cevantes, resulting in GHG savings of 220,000 tpa across the SWIS.</p> <p>12.8 Contribute financial and in kind support valued at \$140,000pa to the CRC for Coal in Sustainable Development for further investigation into clean coal technologies.</p> <p>12.9 Initiation and development of other research and development projects to the point where they can be included as offsets in the GHG program.</p> <p>12.10 Establish and implement an internal GHG trading system within the Griffin group of companies to maximise benefits from the Greenhouse Gas Management Program</p>	<p>Commenced in 1999, with 5,000 tonnes sequestered to date. 10 hectare per year to be planted for next five years.</p> <p>Three years commencing during construction of the power plant.</p> <p>2005.</p> <p>Ongoing.</p> <p>Ongoing.</p> <p>Upon signing the commitment to the Greenhouse Challenge.</p>	<p>AGO. DoE</p> <p>AGO. DoE</p> <p>AGO. DoE</p> <p>CCSD.</p> <p>CSIRO, AGO, OOE, DoE, CALM, WA Department of Agriculture and other relevant stakeholders. AGO.</p>
Thirteen	Recreational Activity	Maintain recreational values for the local community as far as practicable.	<p>13.1 Visual and noise impact will be minimised through planning design and screening strategies (eg. noise bunds and natural barriers).</p> <p>13.2 Access to adjoining bush will not be affected.</p> <p>13.3 Liaise with local community, produce and implement landscape and access management plan to reduce impact.</p>	<p>Prior to construction and ongoing.</p> <p>Prior to construction and ongoing</p> <p>Prior to construction and ongoing</p>	<p>Shire of Collie. Local community</p> <p>Shire of Collie. Local community</p> <p>Shire of Collie. Local community DoE</p>
Fourteen	Visual Amenity	To maintain visual amenity	<p>14.1 Potential impacts on visual amenity will be minimised through planning design and screening strategies (eg. natural barriers).</p> <p>14.2 Vegetation management and landscape strategies will be developed as appropriate.</p> <p>14.3 Liaise with local community, produce and implement landscape and access management plan to reduce impact.</p>	<p>Prior to construction and ongoing.</p> <p>Prior to construction and ongoing.</p> <p>Prior to construction and ongoing.</p>	<p>Shire of Collie. Local community</p> <p>Shire of Collie. Local community</p> <p>Shire of Collie. Local community DoE</p>

Commitment Number	Environmental Factor	Management Objective	Action	Timing	Advice From
Fifteen	Aboriginal Culture and Heritage	To minimise disturbance to areas of Aboriginal and cultural significance.	15.1 Develop and implement Heritage and Culture awareness program for employees. 15.2 If sites of aboriginal significance are found during construction, application for clearance under Section 18 of the <i>Aboriginal Heritage Act</i> 1972 will be sought from the Minister for Indigenous Affairs before disturbance.	Prior to construction. During construction and ongoing	Local Indigenous community. DIA Shire of collie. Department of Indigenous Affairs.
Sixteen	Public Risk	To ensure that the risk to public safety is as low as reasonably practicable (ALARP) and to minimise the potential creation of hazardous working environments.	16.1 Develop and implement local community liaison program. 16.2 Hazardous materials will be stored and handled according to DoIR regulations. 16.3 Develop and implement hazardous materials management plan	Prior to construction. During construction and ongoing. Prior to construction.	Shire of Collie. Local community. DoIR DoIR DoE
Seventeen	Sustainability	Integration of environmental management objectives within an overarching set of sustainable management objectives into project development objectives.	Develop a policy and strategic framework of sustainability management objectives and programs linked directly to Collie B.	Prior to construction and ongoing.	All stakeholders.
Eighteen	Other GHG Initiatives	Contribution to the overall reduction of GHG in the State and enhancement of Environmental values of the Collie River whilst assisting in the rehabilitation of the Wellington Weir water source.	In addition to those commitments outlined above (Commitment 13), Griffin will continue to support and provide access to Griffin owned land and facilities to enable the diversion of the East Collie River. This will facilitate the diversion of each season's first flush flows of salt water away from Wellington Weir. This project is anticipated to lead to the return of Wellington Weir to a potable condition within a three year time frame. The GHG credit from this project is calculated to be 480,000 tonnes per annum.	Ongoing	DoE – Water & Rivers Commission.

Appendix 5

This Appendix is on the CD pasted to the back page of this Bulletin

The attached CD contains the following information:

- 1) Proponent's response to submissions document; and**
- 2) Public Environmental Review document.**