Collie Power Station Expansion

Wesfarmers Energy Limited

Report and recommendations
of the Environmental Protection Authority

Environmental Protection Authority
Perth, Western Australia
Bulletin 1178
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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**
10/05/05	**Final proponent response to the issues raised**	**7**
13/06/05	**EPA report to the Minister for the Environment**	**5**

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Summary and recommendations

Wesfarmers Energy Limited proposes to construct and operate a 300MW coal-fired power station (known as Collie B) as an expansion of the existing Collie Power Station (known as Collie A). The Collie Power Station site is located approximately 10km east-north-east of Collie, Western Australia. 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 this 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 which 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 the Wesfarmers Energy Limited to construct and operate the 300MW coal-fired Collie B Power Station on a site directly adjacent to the existing Collie A Power Station and located approximately 10km east-north-east of Collie.

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 which 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 represent best practice for large scale base-load electricity generation. The proposed 300MW coal-fired power station will produce, on average, an extra 846,000 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 quantity of greenhouse gases to be directly offset by the proponent is 44,376 tonnes per annum. This offset quantity represents 5.25% of the additional greenhouse gases produced by the proposed power station compared to a CCGT power station of equivalent generating capacity. The EPA notes that the level of greenhouse emissions is considerable and that the level of offsets is small.

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 SO_2 management. The EPA considers that European Directive 2001/80/EC represents best practice for SO_2 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 view of the appeal decision on Bluewaters Power Station, this may require retrofitting of sulphur control equipment if the air quality management framework indicates that SO_2 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 SO_2 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 $L_{A\ 10}$ 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 the 300MW coal-fired Collie B Power Station on a site directly adjacent to the existing Collie A Power Station and located approximately 10km east-north-east of Collie;
2. That the Minister considers the report on the relevant environmental factors and principles 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.

Conditions

Having considered the proponent's commitments and information provided in this report, the EPA has developed a set of conditions that the EPA recommends be imposed if the proposal by the Wesfarmers Energy Limited to construct and operate the 300MW coal-fired Collie B Power Station on a site directly adjacent to the existing Collie A Power Station and located approximately 10km east-north-east of Collie, 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 Wesfarmers Energy Limited to construct and operate a 300MW coal-fired power station (known as Collie B) as an expansion of the existing Collie Power Station (known as Collie A). The Collie Power Station site is located approximately 10km east-north-east of Collie, Western Australia.

The proposal was referred to the EPA on 27 October 2004, and on 1 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, liquid and solid waste disposal, surface water and groundwater, and noise.

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, which have been taken into account by the EPA, appear in the report itself.

2. The proposal

Wesfarmers Energy Limited proposes to construct and operate the 300MW Collie B Power Station on a site directly adjacent to the existing Collie A Power Station and located approximately 10km east-north-east of Collie (Figure 1). It will be a supercritical coal-fired base-load generation facility with a nominal generating capacity of approximately 300MW. The Collie B Power Station will supply electricity to the South West Interconnected System (SWIS).

Existing facilities at the Collie A Power Station site include:

- 300MW power generating unit, comprising boiler and turbo generator;
- a 170 metre stack;
- on-site coal receival, crushing, storage and handling facilities;
- off-site water supply and on-site water storage facilities;
- wastewater management and disposal system;

- cooling water system;
- ash handling, storage and transport facilities;
- site substation;
- water treatment plant; and
- workshop and offices.

The construction of the Collie B Power Station would require the following additional facilities:

- boiler and turbo-generator;
- cooling tower with cooling water pump station and side filter;
- electrostatic precipitators;
- workshop;
- administration building (includes laboratory);
- electrostatic precipitator and ash handling electrical room;
- warehouse;
- electrical control panel room;
- fuel oil storage facility;
- make-up water tank;
- unit transformers;
- gas cylinder store; and
- emergency diesel generator and auxiliary steam boiler.

The plant layout of the Collie B Power Station is shown in Figure 2. A mass balance diagram 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 (Strategen 2005a).

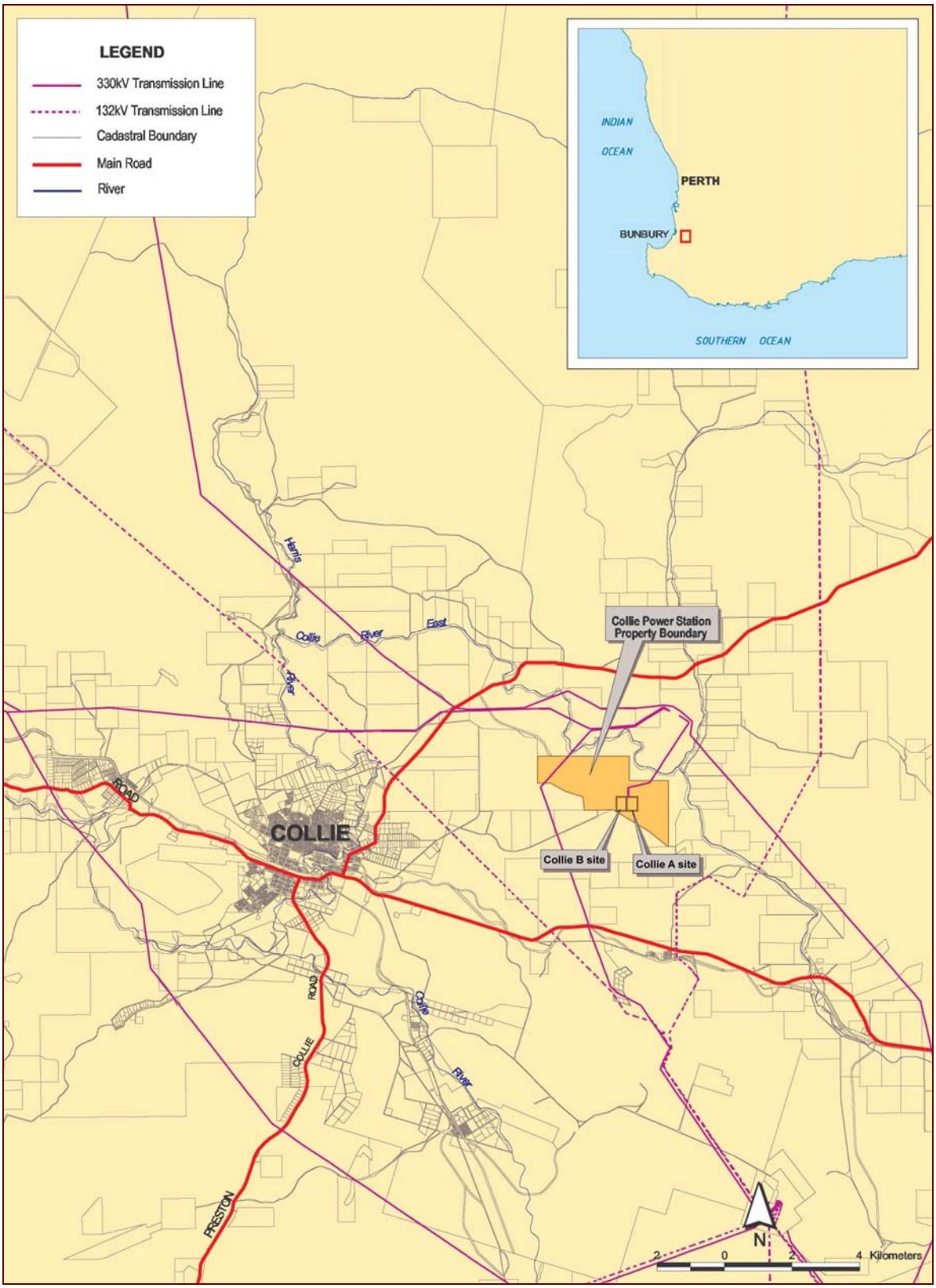

Figure 1: Regional location (Source: Figure 1 from Strategen 2005a)

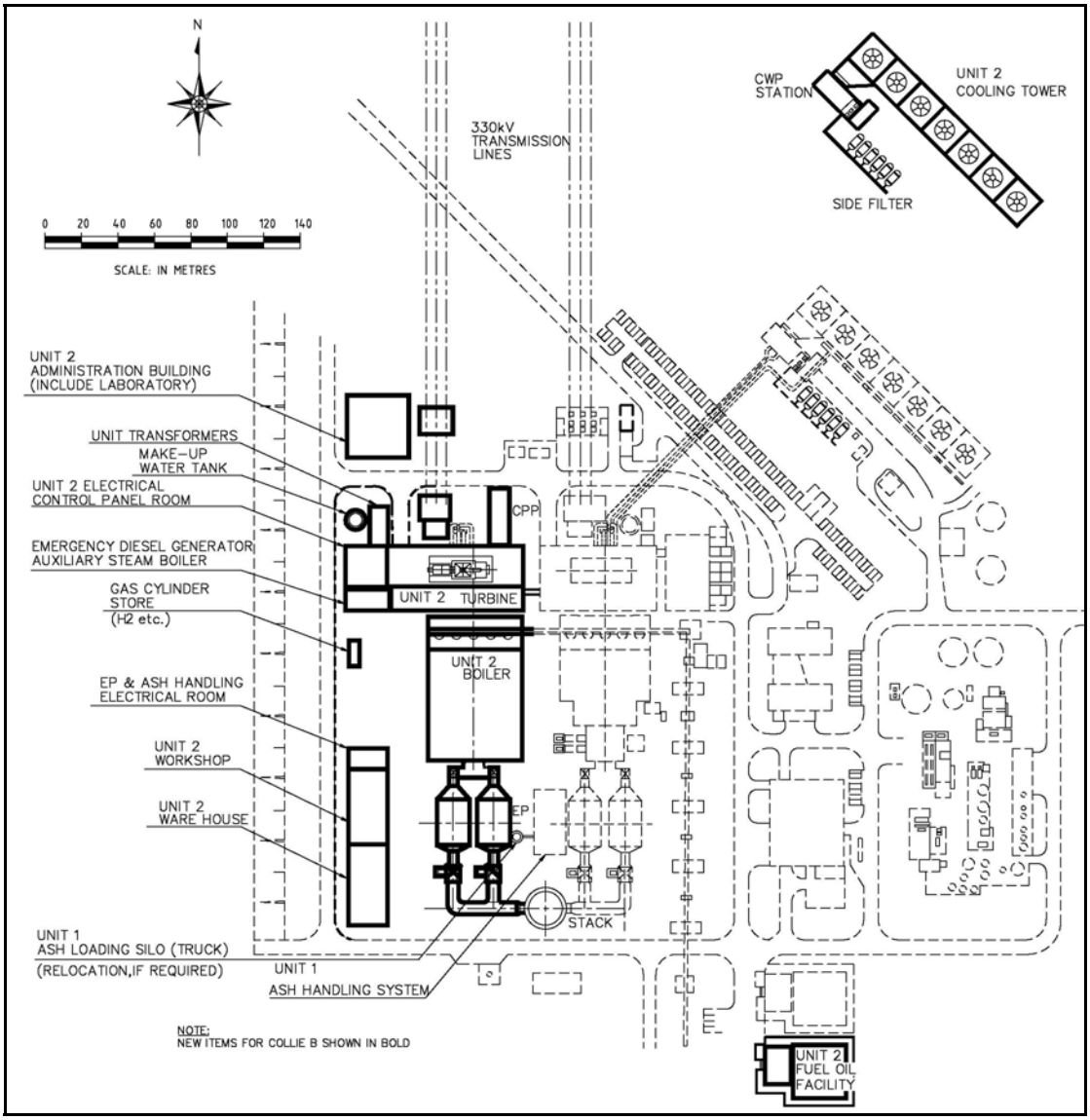

Figure 2: Plant layout (Source: Modified version of Figure 3 from Strategen 2005a)

Wesfarmers Energy Limited
Collie B Power Station
Mass Balance Diagram

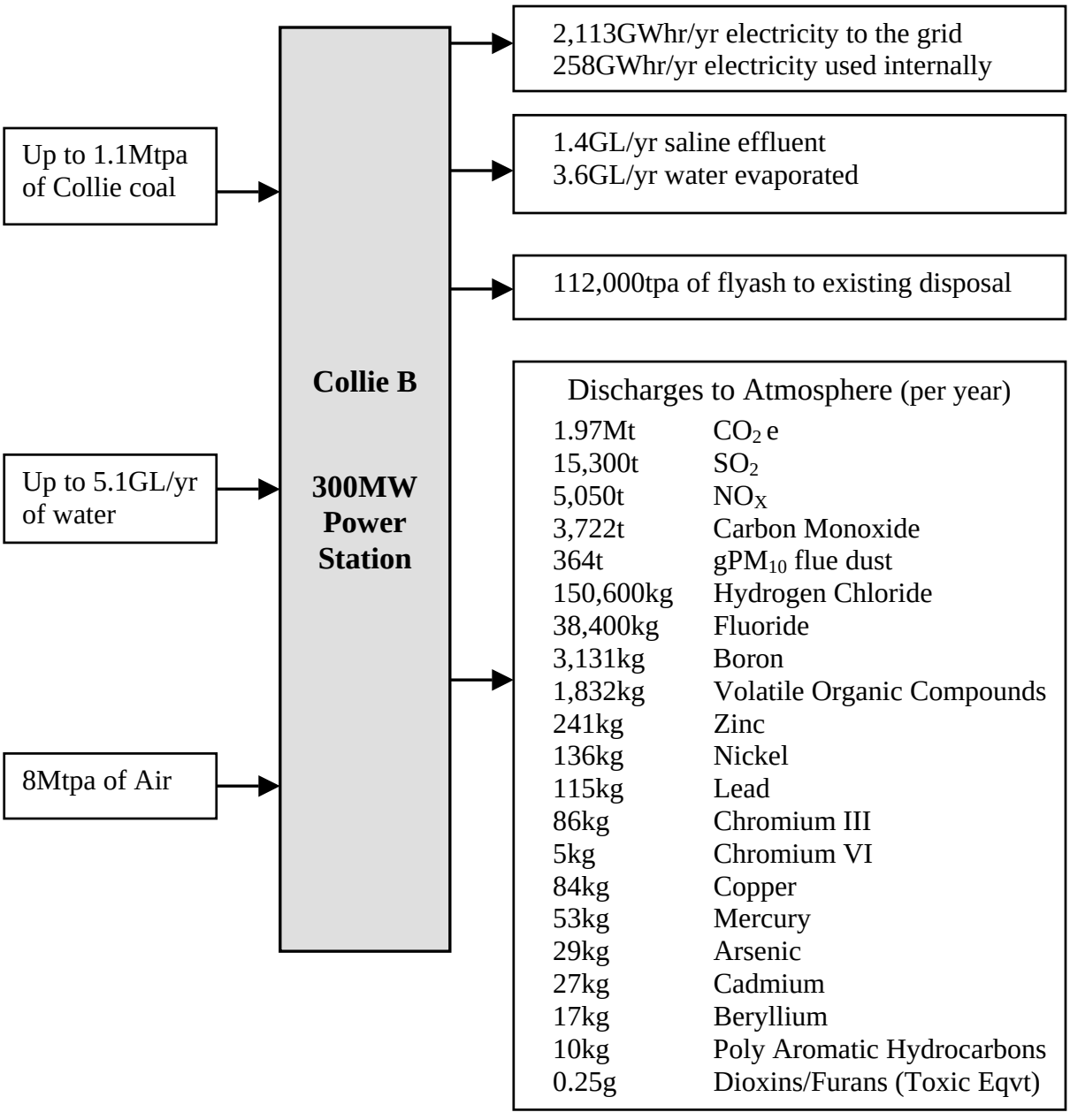

Figure 3: ***Mass balance diagram (Source: Modified version of Mass Balance Diagram from Wesfarmers Energy Limited 2005)***

Table 1: Summary of key proposal characteristics

ELEMENT	DESCRIPTION
General	
• Facility Description:	Construction & operation of a supercritical, pulverised coal-fired steam generation power plant matching the existing Collie A Power Station output.
• Location:	Collie Power Station Site, 10km east-north-east of Collie Townsite, Western Australia.
• Footprint:	Area approximately 30,000m^2 at Collie Power Station Site.
• Project Purpose:	To produce electricity for the Western Power, Power Procurement Process and other customers in a base load 24 hour per day, 365 days per year operation.
• Generating Capacity:	335MW Gross Output, 303MW Sent Out Capacity.
• Thermal Efficiency:	38.08% full load, sent out, HHV (Coal as tested). 40.81% full load, sent out, LHV (Coal in accordance with AS1038.16-1996).
• Construction Period:	38.5 months from Commencement to Contract Completion.
• Project Life:	30 years.
Plant Facilities	
• Coal Facility:	Upgraded existing Collie A coal storage and transport system.
• Water Supply System:	Duplicated existing water supply.
• Stack:	Existing shared with Collie A, 170 metres high. Two x 4.8 metre ID flues. (designed for 2 units).
• Boiler:	Balanced draft, pulverised coal fuel, supercritical, similar to Collie A.
• Pollution Control Equipment:	Low NO_X burners, 3-field Electrostatic Precipitators.
• Steam Turbine:	Tandem compound, fully condensing, reheat, supercritical with 335MW synchronous generator.
• Cooling Towers:	Evaporative type, matching Collie A.
• Water Treatment Plant:	Upgraded existing Collie A unit.
• Waste Water Treatment Plant:	Existing shared with Collie A. (designed for 2 units).
• Waste Water Collection & Treatment:	Existing shared with Collie A (designed for 2 units) plus compliant interceptors, and licensed contractor disposal of items not suitable for the water treatment plant.
• Saline Water Pipe:	Existing shared with Collie A. (designed for 2 units).
• Ash Disposal:	Existing shared with Collie A. (designed for 2 units).
• Diesel Storage:	New bunded tank 1000kL adjacent to Collie A.
• Lubricant & Cleaning Agents:	Small quantities of greases, oils and cleaning agents in compliant bunded workshop storage.
Utilities	
• Water Use:	Up to 5.1GL/yr.
• Coal Supply:	1,095,430tpa.
• Electricity:	330kV capacity 3.5km from Collie B site to existing Shotts substation.
Emissions	
• PM_{10} Flue Dust:	50mg/Nm^3 at 7% O_2, 101.3kPa, 0 deg C, 12.5g/s, 364tpa.
• Nitrogen Oxides NO_X:	500mg/Nm^3 at 7% O_2, 101.3kPa, 0 deg C, 134g/s, 5050tpa.
• Sulphur Dioxide SO_2:	2159mg/Nm^3 at 7% O_2, 101.3kPa, 0 deg C, 579g/s, 15,300tpa.
• Carbon Monoxide CO:	552mg/Nm^3 at 7% O_2, 101.3kPa, 0 deg C, 148g/s, 3722tpa.
• Greenhouse Gases:	1,971,475tpa CO_2 e.
• Volatile Organic Compounds (VOCs):	Estimated 1832kg/yr in accordance with NPI VOC Definition & Information Ver 2.4, 23 Mar 2003.
• PAHs:	10kg/yr.
• Fluorides:	38,398kg/yr.
• Hydrogen Chloride HCl:	150,637kg/yr.
• Lead:	115kg/yr.
• Zinc:	241kg/yr.
• Mercury:	53kg/yr.
• Cadmium:	27kg/yr.
• Chromium (III):	86kg/yr.
• Chromium (VI):	5kg/yr.
• Arsenic:	29kg/yr.
• Beryllium:	17kg/yr.
• Copper:	84kg/yr.
• Nickel:	136kg/yr.
• Boron:	3131kg/yr.
• POPs excluding Dioxins & Furans:	Nil.
• Dioxins & Furans:	1.10g/yr.
• Dioxins & Furans (TEQ):	0.25g/yr.
• Noise: predicted worst-case noise level at site boundary:	64dB(A).
• Noise: predicted worst-case noise level at buffer boundary:	37dB(A).
• Noise: predicted worst-case noise level at nearest sensitive receptor:	35dB(A).

ELEMENT	DESCRIPTION
Waste	
• Ash:	112,000tpa.
• Sewage:	1,200tpa.
• Saline Water:	Up to 1.4GL/yr.
Workforce	
• Construction Period:	Approximately 600 persons (peak number).
• Operations:	Up to 50 full time personnel.

Notes:

Items with measurement units of /year, /yr, and tpa are estimates based on a power requirement of 80% of the capacity of the power station per year of operation.

Abbreviations

AS1038.16-1996	Australian Standard 1038.16-1996	LHV	lower heating value
CO_2 e	carbon dioxide equivalents	m^2	square metres
dB(A)	decibels A weighted	mg/Nm^3	milligrams per normal cubic metre at 1 atmosphere, O deg C
deg C	degrees Celsius	MW	megawatts
g/s	grams per second	O_2	oxygen
g/yr	grams per year	pa	per annum
GL/yr	gigalitres per year	PAHs	polycyclic aromatic hydrocarbons
ID	internal diameter	POPs	persistent organic pollutants
HHV	higher heating value	PM_{10}	particulate matter with an aerodynamic diameter of less than 10 micrometres
kg	kilograms		
kg/yr	kilograms per year	TEQ	toxic equivalent
kL	kilolitres	tpa	tonnes per annum
kPa	kilopascals	Ver	version
kV	kilovolts	%	percent

Source: Modified version of Table 2 from Strategen 2005b

3. Relevant environmental factors and principles

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 visual amenity, 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 1.97 million tonnes of carbon dioxide (CO_2) per annum.

Submissions

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

- greenhouse gas emissions from the proposed power station have not been demonstrated to be as low as practicable;
- the potential to use emerging coal combustion technologies has not been assessed;
- the potential to use Biomass Co-firing, and Combined Heat and Power (CHP) has not been assessed;
- the quantity of greenhouse gas emission offsets proposed by the proponent is considered to be insufficient;
- the impact of greenhouse gas emissions on global climate change, as well as the need for a global effort to combat it;
- the proposed power station is considerably more greenhouse intensive than best practice gas-fired power generation; and
- additional energy needs can be met through the use of renewable energy and energy efficiency measures.

Assessment

The EPA notes that operation of the proposed Collie B Power Station would generate approximately 1.97 million tonnes of CO_2 per annum which represents 0.45% of Australia's 1990 baseline level for greenhouse gases and 4% 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 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 minimisation to be kept firmly in mind when considering new development proposals which are likely to generate significant emissions.

To achieve this, the EPA expects that potential greenhouse gas emissions from proposed projects are 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. 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 will be a supercritical coal-fired generating facility with a nominal generating capacity of 300MW. The EPA notes that with respect to currently available and proven coal-fired power generation technologies in Australia, supercritical technology is considered to be best practice for coal-fired power stations with a generating capacity greater than 250MW according to the Australian Greenhouse Office's Generator 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 supercritical technology.

In relation to best practice, maximising energy efficiency and minimising greenhouse gas emissions, the EPA considers that combined cycle gas turbine (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 from an environmental point of view.

The EPA notes that the proposed plant would produce an additional 846,000 tonnes of greenhouse gas emissions per annum compared to a CCGT power station of equivalent generating capacity. This would amount to approximately 25.4 million tonnes of extra greenhouse gases over a nominal 30 year life for the proposed power station.

The EPA has provided strategic environmental advice to Western Power Corporation (EPA 2002b) 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 and developed during the Section 38 environmental impact assessment process, and adopted as appropriate.

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 four commitments (Commitments 5, 6, 7, and 8 in Appendix 4) in regard to greenhouse gas emissions which include a direct greenhouse emission offset of 44,376tpa arising from the identification and implementation of carbon sink projects, including an environmental tree planting program in Western Australia.

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 (eg. CO_2) 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.

The EPA notes that:

- the use of supercritical technology within the proposed Collie B Power Station would enable it to produce approximately 80,000tpa less greenhouse gas emissions than the equivalently sized existing Collie A Power Station which employs subcritical technology with a lower thermal efficiency;
- the proposed power station will generate about 846,000tpa more greenhouse gas emissions than an equivalent CCGT power 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 44,376tpa through the identification and implementation of carbon sink projects, including an environmental tree planting program; and
- these direct offsets amount to 5.25% of the additional emissions that the proposed power station would produce compared to an equivalent CCGT power station.

The EPA considers that whilst the proponent has met the intent of the EPA's requirement to consider the issue of offsets, and has offered direct offsets, these direct offsets form a small package that still leaves an excess of more than 801,000tpa of greenhouse gas emissions above an equivalent CCGT power station.

The EPA also 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, a small package has been offered, leaving 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 which 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 SO_2 emissions;
- the establishment of a specific Environmental Protection Policy for SO_2; 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, do not cause environmental or human health impacts; 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 (SO_2) and particulate (PM_{10} 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 Power Station, 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 SO_2 ground level concentration:
  - in Collie is 348µg/m^3 which is 61% of the National Environmental Protection Measure (NEPM) standard of 570µg/m^3; and
  - at the caretaker's residence at the Collie Motorplex is 579µg/m^3 which is 102% of the NEPM standard;
- the predicted 10 minute SO_2 ground level concentration:
  - in Collie is 592µg/m^3 which is 118% of the World Health Organisation (WHO) guideline of 500µg/m^3;
  - at the caretaker's residence at the Collie Motorplex is 984µg/m^3 which is 197% of the WHO guideline; and
  - at 18 residences in the Collie region exceeds the WHO guideline;
- the predicted 24-hour PM_{10} ground level concentration in Collie is 20.66µg/m^3 (with background PM_{10} levels included) which is 41% of the NEPM standard;
- the predicted 24-hour $PM_{2.5}$ ground level concentration in Collie is 11.37µg/m^3 (with background $PM_{2.5}$ levels included) which is 45% of the NEPM standard; and
- the predicted annual $PM_{2.5}$ ground level concentration in Collie is 10.44µg/m^3 (with background $PM_{2.5}$ levels included) which is 130% of the NEPM standard.

The EPA also notes that for the above modelled scenario:

- the 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
- the predicted ground level 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 emissions

The EPA notes from the PER document that low NO_X burners will be installed and operated in the proposed Collie B Power Station to minimise NO_X emissions. The EPA also notes from the PER document that the proposed power station will be fitted with three or four stages of electrostatic precipitators to minimise particulate emissions.

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 three commitments (Commitments 2, 3, and 4 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 level concentrations against relevant ambient air quality criteria. The EPA notes that the above assessment was based on the understanding that the Collie 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 such as asthmatics and those with chronic obstructive lung disease may show small reductions in ventilatory capacity. The EPA notes, however, that SO_2 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 SO_2 ground level concentrations exceed both the WHO 10 minute guideline and the NEPM 1-hour standard at the caretaker's 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 SO_2 emissions to occur. The EPA understands that the Department of Health considers that the WHO 10 minute guideline of 500µg/m^3 for SO_2 is a more appropriate limit for vulnerable groups than the National Health and Medical Research Council (NHMRC) goal of 700µg/m^3.

The EPA notes from the HIS document that the results of a telephone survey of 350 households in the Shire of Collie indicated 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 SO_2 management. The EPA considers that European Directive 2001/80/EC represents best practice for SO_2 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 SO_2 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 SO_2 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/m^3. 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 SO_2 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 would require disposal.

Submissions

The main issues raised in the submissions in relation to liquid and solid waste disposal included:

- saline wastewater should only be discharged into the ocean via the existing pipeline, and licensing conditions must ensure that there is no accumulation at the power station site or discharge into groundwater aquifers;
- the ability of the existing Collie Power Station saline wastewater pipeline and outfall system to accommodate additional saline wastewater from the Collie B Power Station, other proposed power stations, and another industrial facility in the area;
- no alternatives to the ocean disposal of the cooling water effluent have been considered;
- the need for environmental management plans to be provided to the EPA for the environmental impact assessment process;
- the need to specify levels of protection for the marine environment;
- the impacts of saline wastewater discharge on the marine environment;
- the provision of baseline information on the marine environment around the ocean outfall;
- the provision of information on the characteristics of the saline wastewater that will be discharged from the proposed power station;
- monitoring and management requirements for the disposal of saline wastewater;
- information on the environmental values (EVs), environmental quality objectives (EQOs), and the level of ecological protection to be applied to the marine environment in the vicinity of the ocean outfall (including the mixing zone) needs to be provided;
- information is required on the size of the mixing zone for the ocean outfall and the number of dilutions that will obtained at the edge of the mixing zone;

- the lack of information in relation to the disposal of flyash;
- the impact of flyash disposal on groundwater; and
- the need to consider the disposal of sewage from the contractor's construction site facilities.

Assessment

The area considered for assessment of this factor is the Collie B Power Station site and surrounding areas including the existing Collie Power Station ash disposal facilities, and the marine environment in the vicinity of the existing Collie 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 about 1.46GL of saline wastewater per year and about 112,000 tonnes of ash per year 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 existing Collie Power Station ash disposal facilities.

The EPA notes from the PER document that Western Power Corporation owns the Collie Power Station saline wastewater pipeline and will provide access to it should the proponent's tender for the Collie B Power Station be successful. The pipeline has been previously assessed by the EPA and is subject to Ministerial and DoE license conditions. The EPA understands from the PER document that the saline wastewater will be treated to allow Western Power Corporation to meet all the environmental licence requirements, and 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 Bluewaters proposal into the pipeline can be managed by a DoE discharge license on the Bluewaters 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 licence 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. Licence 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.

Ash disposal

The EPA notes from the proponent's response to submissions (see Appendix 5) that flyash will be disposed of in the existing Western Power Corporation flyash disposal facilities at the Collie Power Station site. The EPA understands that this will be undertaken utilising the same management techniques as for the existing Collie Power Station. The EPA notes that Western Power Corporation holds a current approval to operate a flyash disposal facility on the Collie Power Station site, and that the site was designed to cater for two power stations. The EPA notes that the disposal site:

- is clay lined with a leachate collection system underneath it, and
- has regularly monitored groundwater bores external to the flyash facility to enable the detection of any leachate leaking from the system into the groundwater.

The EPA also notes from the proponent's response to submissions that the proponent will conform to all the requirements for the existing facility.

The EPA notes from the PER document that the existing ash disposal facilities at the Collie Power Station will be expanded and that the expansion is being dealt with via a separate environmental assessment with Western Power Corporation as the proponent.

The EPA notes that the proponent has made two commitments (Commitments 9 and 10 in Appendix 4) in regard to liquid and solid waste disposal.

The EPA considers that the management measures described in Section 6.2.3 and Section 7.7.3 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.

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 main issues raised in the submissions in relation to surface water and groundwater included:

- all water for the proposed power station should be sourced from mine dewatering, and water from deep aquifers or potable supplies should not be considered;
- more work needs to be done to address the concerns of landowners regarding both groundwater and surface water availability and contamination;
- insufficient certainty exists regarding the required water supply over the entire life of the power station, and operation of the power station in the latter years of its life could compromise water supply and quality in the Collie Basin;
- there are concerns regarding the difficulty of establishing the exact amount of water available from dewatering. An alternative water supply should be developed rather than relying on dewatering water for a secure long term supply;
- the PER document did not discuss the environmental values, environmental quality objectives, and levels of ecological protection for surface waters (rivers, creeks, wetlands, and estuaries);
- there are potential water quality risks from chemical and hazardous material storage, hydrocarbon storage, washdown areas, fallout of air emissions to soil, leakage from storage ponds, flyash disposal, and the domestic wastewater treatment plant;
- the proponent should demonstrate that under both normal and abnormal operating conditions water contaminants in use or produced at the power station are fully contained;
- the proximity of the site to the Collie River East Branch means that accidental discharge of contaminants can potentially impact on the water quality in Wellington Dam; and
- environmental management plans (both construction and operational) should be prepared and submitted as information for the environmental impact assessment process.

Assessment

The area considered for assessment of this factor is the Collie B Power Station site and surrounding areas including the existing Collie Power Station ash disposal facilities, and the route of the existing Collie Power Station 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.

The EPA notes from the PER document that the Collie B Power Station site is located within the drainage basin of the Collie River East Branch which joins the Collie River and eventually ends up in the Wellington Dam. The EPA understands that the Collie River East Branch has fluctuating flows and high salinity levels. The EPA notes that the site has two wetlands, and that superficial aquifers may recharge the deeper aquifers which are heavily utilised.

The EPA also notes from the PER document that the existing Collie A Power Station infrastructure is located approximately 1km south of the Collie River East Branch, and that the stormwater drainage system is designed to minimise storm water run-off from the site. The EPA understands that as much good quality storm water as possible is routed into the service water dam and any potentially contaminated storm water is treated on-site. The EPA also understands that a zero discharge to the river policy has been in place for several years.

The proponent advises that the proposed power station will require approximately 5.1GL of water per year. The primary source of water for the first 15 to 20 years of the project will be from the dewatering of nearby coal pits at Wesfarmers Premier Coal mine. The EPA understands that a water supply development and management strategy will be developed in consultation with the DoE and the Water Corporation if the need for alternative sources to mine dewatering water becomes apparent from annual reviews of performance of this source. The EPA notes that this strategy will explore all potential opportunities to maximise water reuse and will be in accordance with the Collie Water Advisory Group (CWAG) principles and any subsequent amendments. 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 proposed power station has the potential to increase surface water run-off volumes due to the creation of additional hard surfaces, soil deposition down gradient of the site, and discharge of high sediment run-off to nearby wetlands. Construction and operation of the proposed power station has the potential to affect the quality of surface water and groundwater due to contamination from:

- hydrocarbon storage, handling, and disposal;
- chemical and hazardous material storage, handling, and disposal;
- domestic wastewater treatment and disposal;
- saline wastewater disposal;
- solid waste disposal;
- flyash handling and storage;
- coal handling and stockpiling; and
- sediment from cleared areas.

The EPA notes that the proponent has made a commitment (Commitment 11 in Appendix 4) in regard to surface water and groundwater.

The EPA considers that the management measures described in Section 7.3.3 and Section 7.4.3 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) proponent's undertaking that a water supply development and management strategy will be developed in consultation with the DoE and the Water Corporation if the need for alternative sources to mine dewatering water from the Wesfarmers Premier Coal mine becomes apparent from annual reviews of performance of this source;

(b) commitments made by the proponent; and

(c) 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 emissions from construction and operation of the proposed power station comply with the *Environmental Protection (Noise) Regulations, 1997*; and
- cumulative noise emissions from existing and proposed industrial and mining activities in the area meet acceptable standards.

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 I & II	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 I & II, 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 5 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 management of each source to 26dB(A) 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 (Department of Environment 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 1 commences. This project was assessed by the EPA 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 1 mine will require further consideration prior to commencement (Department of Environment 2005).

For the two residences to the north of the study area (receiving locations 3 and 4), the degree of noise reduction required 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 Appendix 4) 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 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 $L_{A\ 10}$ assigned level. This should be done as part of the Part V licensing process.

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 analysis undertaken by the DoE; and

(c) 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 $L_{A\ 10}$ assigned level under the noise regulations at all existing and potential future noise-sensitive areas.

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 out in the PER and subsequently modified, as shown in Appendix 4, should be made enforceable. These include commitments which relate to the following environmental factors:

1. Air emissions;
2. Greenhouse gas emissions;
3. Flora;
4. Fauna;
5. Dust;
6. Noise;
7. Liquid and solid waste disposal;
8. Traffic;

9. Culture and heritage;
10. Water supply;
11. Marine water quality;
12. Hydrocarbons, hazardous materials and dangerous goods;
13. Surface water;
14. Groundwater; and
15. Visual amenity.

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 be imposed if the proposal by the Wesfarmers Energy Limited, to construct and operate the 300MW coal-fired Collie B Power Station on a site directly adjacent to the existing Collie A Power Station and located approximately 10km east-north-east of Collie, 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.

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 2005, 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 SO_2 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/m^3. 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 SO_2 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 SO_2 are the most significant with respect to potential health effects. Considering only 1-hour average concentrations of SO_2 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 SO_2 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 SO_2 concentrations at other locations in the region.

Modelling of the existing situation (Scenario 1) shows that the highest 1-hour SO_2 concentration in Collie township due to existing sources is caused by Muja A, B, C, and D (273µg/m^3 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 SO_2 concentration in Collie Township to 193µg/m^3. 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/m^3. 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/m^3 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 SO_2 concentration in Collie township of 348µg/m^3. 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/m^3 (or 347µg/m^3 from Scenario 4) SO_2 ground level concentration would not reduce dramatically (to 193µg/m^3 caused by Muja C and D, or to 273µg/m^3 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 SO_2 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 SO_2 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 SO_2 concentration to change from 348 to 349µg/m^3. 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 SO_2 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/m^3, being the highest 1-hour SO_2 ground level concentration which could be caused by Collie/Bluewaters power stations with no EC limits, and 193µg/m^3, being the highest SO_2 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/m^3).

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 SO_2 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 SO_2 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 the Wesfarmers Energy Limited to construct and operate the 300MW coal-fired Collie B Power Station on a site directly adjacent to the existing Collie A Power Station and located approximately 10km east-north-east of Collie.

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 which 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 represent best practice for large scale base-load electricity generation. The proposed 300MW coal-fired power station will produce, on average, an extra 846,000 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 quantity of greenhouse gases to be directly offset by the proponent is 44,376 tonnes per annum. This offset quantity represents 5.25% of the additional greenhouse gases produced by the proposed power station compared to a CCGT power station of equivalent generating capacity. The EPA notes that the level of greenhouse emissions is considerable and that the level of offsets is small.

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 SO_2 management. The EPA considers that European Directive 2001/80/EC represents best practice for SO_2 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 view of the appeal decision on Bluewaters Power Station, this may require retrofitting of sulphur control equipment if the air quality management framework indicates that SO_2 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 SO_2 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 the 300MW coal-fired Collie B Power Station on a site directly adjacent to the existing Collie A Power Station and located approximately 10km east-north-east of Collie;
2. That the Minister considers the report on the relevant environmental factors and principles 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. Conservation Council of Western Australia Inc.
2. Department of Conservation and Land Management.
3. Department of Environment.
4. Department of Health.
5. Department of Indigenous Affairs.
6. Department of Industry and Resources.
7. Department of Planning and Infrastructure.
8. Griffin Energy Pty Ltd.
9. Heritage Council of Western Australia.
10. Shire of Collie.
11. Smart Burn Pty Ltd.
12. Western Power Corporation.

Individuals:

1. Angela Tillier.
2. CR & MA Tonkin.
3. Ginny Stubbs.
4. Glyn Yates.
5. Mark Harris.
6. Michael Britten.
7. Paul Llewellyn MLC.

Appendix 2

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Appendix 3

Summary of identification of relevant environmental factors and principles

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	No clearing of the plant site is required as the site is completely cleared. There may be some minor clearing associated with infrastructure corridors. It is likely that there will be minimal impact on terrestrial flora.	**Department of Conservation and Land Management** A consequence of any approval for further coal fired power generation capacity will be the resultant clearing of forest to provide the coal resource. In this case the coal will be sourced from the Ewington 1 mine which is primarily in State forest. While it is acknowledged that the Ewington 1 mine already has environmental approval the link between this proposal and the loss of forest habitat and values should be taken into account. The PER fails to identify this link or identify the scale of clearing that is likely to result from the development. This is a relevant factor for the community and Government to consider in respect of the proposed project. CALM is aware that Western Power is considering options for additional power transmission capacity in the event that replacement and additional generating capacity to supply the metropolitan area is sourced from the south west. Options under investigation include catering for new private power generation capacity at Collie. The extent to which this proposal will add to demands for additional transmission capacity and hence clearing of State forest and existing and proposed conservation reserves is unclear. Such downstream impacts cannot be separated from consideration of this proposal.	The EPA considers that the concerns that were raised have been adequately addressed by the responses provided by the proponent. In view of the above, and given that the power station site has already been cleared, the EPA considers that this environmental factor does not require further evaluation.
Terrestrial fauna	No clearing of the plant site is required as the site is completely cleared. There may be some minor clearing associated with infrastructure corridors. It is likely that there will be minimal impact on terrestrial fauna. There may be indirect impacts on fauna in habitats adjacent to the site from factors such as noise.	No specific concerns were raised in the submissions that were received.	This environmental factor does not require further evaluation by the EPA.
Wetlands	There are two wetlands located on the Collie Power Station site. The western wetland is located adjacent to the existing flyash ponds and the eastern wetland is located east of the water storage ponds.	**Department of Environment** The proposed expansion site of the Collie Power Station is separated from the eastern wetland by existing development and a buffer of approximately 150-200 metres. However, the proposed expansion is situated between the existing power station and the western wetland. The PER identifies that the western wetland is of high conservation significance with approximately 30ha of surrounding land revegetated and fenced off. In consideration of the existing management of the western wetland for conservation purposes it is recommended that a wetland management plan be completed. Future ash storage facilities are proposed adjacent to the western wetland however, the potential impacts on the wetland. are not discussed. It is understood that flyash disposal will be considered as a separate proposal. Assuming that the 'Future Ash Storage' site is not part of this proposal, aerial photography suggests an approximate buffer between the western wetland and the expansion site of 1000 metres. It is expected that this buffer will be sufficient to reduce potential adverse impacts on the wetland. It should be noted that the boundary of each wetland and the potential impacts of the expanded power station have not been adequately discussed in the PER to enable more comprehensive analysis. Can the proponent provide this information?	The EPA considers that the concerns that were raised have been adequately addressed by the responses provided by the proponent. In view of the above, the EPA considers that this environmental factor does not require further evaluation.

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			
Wetlands (Continued)	There are two wetlands located on the Collie Power Station site. The western wetland is located adjacent to the existing flyash ponds and the eastern wetland is located east of the water storage ponds.	**Department of Environment (Continued)** It is understood that the Collie Power Station Expansion proposal will be utilising groundwater from mine dewatering, with approval assessed independently of the PER. The Wetlands Program is concerned about the impacts of groundwater drawdown on wetlands in the vicinity of the mine and power station. It is recommended that additional information be provided on the water requirements of the expanded power station to ascertain the potential groundwater drawdown and associated impacts on wetlands.	The EPA considers that the concerns raised have been adequately addressed by the responses provided by the proponent. In view of the above, the EPA considers that this environmental factor does not require further evaluation.
POLLUTION			
Greenhouse gas emissions	The proposed power station will generate up to 1,971,475 tonnes of CO_2 per year.	**Collie Shire Council** The requirement to consider greenhouse gas issues is noted and the proponents of Collie 'B' are factoring the use of new supercritical technology as one such consideration. The imminent retirement of Muja units A and B (which removes less efficient technology) together with carbon sequestration off sets are positive indicators and demonstrate a willingness to realistically address greenhouse gas concerns. **Department of Industry and Resources** In Bulletin 1160, the EPA has adopted an equivalent sized power station using combined cycle gas turbine (CCGT) technology as the benchmark for best practice in power generation, maximizing energy efficiency and minimising greenhouse gas emissions. As a result a new set of conditions or directives are being proposed. Elsewhere in the Bulletin (4th paragraph, page 26), the EPA recognises: “That the issue of greenhouse gas management is a matter for judgement and that decisions about this proposal (Bluewaters l) will include consideration of broader economic, regional development and strategic issues which are outside the scope of the EPA." In an Environmental Position Statement on environmental offsets in July 2004, the EPA recommended the development of a State Environmental Policy to implement an environmental offsets approach. The EPA subsequently wrote in November 2004: “There is a need for an environmental policy instrument which is developed through public consultation and ends in consideration by the Cabinet for adoption on a whole of Government basis. It is proposed that this function be filled through the establishment of a policy instrument to be known as a State Environmental Policy (SEP)". In light of this evolving approach to the management of greenhouse gas emissions and the use of offsets, the Department believes it is premature to introduce new directives to enforce compliance with offset commitments made not only in the case with Wesfarmers Energy J Power's Collie B proposal, but with all new proposals.	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 that were raised in the comments that were received, the EPA considers that greenhouse gas emissions is a relevant environmental factor.

Table 4: Identification of relevant environmental factors and principles

Preliminary Environmental Factors	Proposal Characteristics	Government Agency and Public Comments	Identification of Relevant Environmental Factors
POLLUTION			
Greenhouse gas emissions	The proposed power station will generate up to 1,971,475 tonnes of CO_2 per year.	**Department of Industry and Resources (Continued)** The EPA should process the assessment of the environmental impact of Wesfarmers Energy J Power's Collie B proposal (and any other coal or gas based power station proposals) as a priority, using the nationally endorsed NEPM standards for management of $S0_2$ emissions, and not benchmarking greenhouse gas offsets outside of an agreed whole of government approach. The EPA should develop a final Environmental Position Statement on environmental offsets and an accompanying State Environmental Policy should be prepared on a whole of government basis for endorsement by Cabinet as soon as possible. **Department of Environment** Table 4 in the Australian Greenhouse Office's (AGO's) Generator Efficiency Standards indicates that the Australian best practice sent out thermal efficiency (HHV) for a black coal fired supercritical power station is 41.7%. It is noted that the PER document indicates that the proposed power station will have a thermal efficiency of 38% HHV. Can the proponent please explain the reasons why the two figures are different and clarify whether the plant has been designed in a manner that is consistent with the AGO's Generator Efficiency Standards, particularly in relation to maximising the sent out thermal efficiency of the plant. Can the proponent also clarify the methodology that was used to calculate the efficiency figure that was provided in the PER? **Men of the Trees** WA needs to join the global effort to combat climate change. Climate change is already having major effects on water supplies in the South West and the changes in temperature, rainfall and sea level caused by climate change will impact heavily on WA's health, tourism and agricultural sectors, biodiversity and infrastructure. Generating electricity from coal fired power stations is the biggest single source of human made $C0_2$ emissions worldwide, accounting for 37% of emissions. Coal is the most carbon intensive fossil fuel, producing 70% more $C0_2$ emissions from the same energy output as natural gas. Collie coal, being 'sub bituminous' coal is particularly greenhouse intensive, with only Victoria's brown coal being worse.	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 that were raised in the comments that were received, the EPA considers that greenhouse gas emissions is a relevant environmental factor.

Table 4: Identification of relevant environmental factors and principles

Preliminary Environmental Factors	Proposal Characteristics	Government Agency and Public Comments	Identification of Relevant Environmental Factors
POLLUTION			
Greenhouse gas emissions (Continued)	The proposed power station will generate up to 1,971,475 tonnes of CO_2 per year.	**Conservation Council of Western Australia** We note that the proponent proposes to use supercritical technology, which is superior to subcritical technology. However, CCWA considers that more advanced coal combustion techniques which are currently available should have been utilized in this proposal. This is discussed further under 'evaluation of Alternatives'. Western Power Corporation have committed to retiring Muja A & B irrespective of whether or not a new coal fired generating facility is commissioned. Therefore to claim that the Collie Power Station expansion is 'replacing' Muja A & B is misleading. The EPA has committed to ensuring that projects reduce greenhouse gas emissions to the extent practicable. The Collie Power Station Expansion proposal fails to prove that emissions from this station will be as low as practicable. The proposed Collie Power Station expansion will emit 1,900,000 tonnes of $C0_2$ equivalent annually. This represents 3.5% of Western Australia's 1990 baseline greenhouse gas emissions and more than 0.35% of Australia's 1990 baseline emissions. Given the urgent requirement for industrialised countries to reduce greenhouse gas emissions by at least 60% of 1990 levels, CCWA consider that this project represents an unjustifiable and substantial contribution to Western Australia, and Australia's greenhouse footprint. CCWA consider that the information required under EPA Guidance No 12 must be part of the approvals process, not a subsequent process after approval has been granted. CCWA consider that the Collie Power Station Expansion project should not be approved due to the nature of the fuel utilised and the contribution that it will make to greenhouse gas emissions. However we recognise the limitations of the EPA in this regard. CCWA notes that, according to Intergovernmental Panel on Climate Change (IPCC) projections, if greenhouse gas emissions in the atmosphere are not stabilized, global surface temperatures will rise by 2-6 degrees by the end of this century. Australians have the highest level of greenhouse gas emissions in the world. Western Australia produces approximately 12% of the nation's greenhouse gas emissions, despite having only 10% of the country's population. It is difficult to access recent reliable per capita greenhouse gas emission figures for Western Australians. In 1997, the NSW EPA showed that Western Australians had the highest per capita greenhouse gas emissions of the states at 19Mt per person per year. There are many options to meet Western Australia's energy requirements that would not result in an additional 1,900,000 tonnes of C02 emissions being created every year. Recent research has shown that Western Australia's current additional energy needs up to 500MW could be met through the use of renewable energy and energy efficiency measures. Overall, the proponent's justification for the construction of Collie Power Station Expansion is not sufficiently robust to justify the environmental compromise that would be required.	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 that were raised in the comments that were received, the EPA considers that greenhouse gas emissions is a relevant environmental factor.

Table 4: Identification of relevant environmental factors and principles

Preliminary Environmental Factors	Proposal Characteristics	Government Agency and Public Comments	Identification of Relevant Environmental Factors
POLLUTION			
Greenhouse gas emissions (Continued)	The proposed power station will generate up to 1,971,475 tonnes of CO_2 per year.	**Conservation Council of Western Australia (Continued)** This section implies that the Collie Power Station Expansion project will reduce the carbon intensity of the SWIS, despite Western Power's concerns in the Bluewaters 1 process that the claim in Sections 2.5 and 3.2 of the PER document that the proposed power station would reduce the carbon intensity of electricity generated within the South West Interconnected System (SWIS) appears to be erroneous because: It apparently considers only WPC's electricity generation and does not take into account electricity production into the SWIS from other non WPC sources. It apparently considers WPC's total electricity generation and fuel use instead of only relating specifically to the SWIS itself. It apparently combines generated carbon intensifies with sent out carbon intensities, the latter which takes into account the electricity consumed within the generating facilities themselves which is not available to the SWIS. New generating facilities such as the proposed power station generating electricity into the SWIS would not exclusively displace the electricity generated by the older plant at Muja Power Station. The proponent responded to these concerns by stating that: "The results presented in the Bluewaters PER were determined using data in Western Power's Annual Report. It would appear that the above concern was generated using data not available to Griffin Energy when preparing the PER." Yet Wesfarmers has repeated Griffin's claims in this PER. The fact that the introduction of new technology will prevent marginal benefits in the carbon intensity of the grid is not surprising. This is only due to technological advancement and not due to any particular greenhouse management strategy of the proponent. This is not any way sufficient to suggest that the proposed greenhouse management of this project satisfactory. Furthermore, this project will result in a substantial net increase in the greenhouse emissions of Western Australia, irrespective of its marginal effect on the carbon intensity of the SWIS. The proponent's own information shows that the proposal is considerably more greenhouse intensive than the best gas fired power generation option. CCWA however consider that the differential is greater than presented and are currently undertaking further investigation into this matter. CCWA do not necessarily support the concept of offsetting carbon emissions. However, the current situation in which the EPA proposes offsets as a compromise position rather than rejecting proposals, we consider that a level of 5.25% of the difference between this proposal and the best gas fired alternative to be insufficient.	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 that were raised in the comments that were received, the EPA considers that greenhouse gas emissions is a relevant environmental factor.

Table 4: Identification of relevant environmental factors and principles

Preliminary Environmental Factors	Proposal Characteristics	Government Agency and Public Comments	Identification of Relevant Environmental Factors
POLLUTION			
Greenhouse gas emissions (Continued)	The proposed power station will generate up to 1,971,475 tonnes of CO_2 per year.	**Conservation Council of Western Australia (Continued)** As Australia has ratified the United Nations Framework Convention on Climate Change (UNKCC) and it has come into force, Western Australia is arguably obliged under International Law to contribute towards the objective of the treaty which is 'the stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system.' It is prudent for any long term energy planning in Western Australia that decision makers consider the constraints in $C0_2$ emissions that may exist over the entire lifetime of a project 25 years in this case) and what the cost of energy may be in the medium and long terms when a price on $C0_2$ emissions is in place. Meeting Western Australia's future energy demand must occur within the context of the global necessity to stabilise atmospheric greenhouse gases. Of course, the energy needs of Western Australians must be reliably met at a reasonable cost. However, projected increase in demand for energy does not require the utilisation of such a greenhouse intensive fuel as sub bituminous coal. The EPA has already identified that energy efficiency measures must be utilized as the priority before attending to supply side solutions, and have noted that 'old coal technology' is the fourth least preferred of five supply side options. This section of the Collie B Expansion PER does not assess alternative technologies particularly, new coal' or low emission' technology options) to a suitable standard. This overview of options that have not been explored or evaluated within this PER document does not necessarily imply support for them, but indicates that more information regarding possible alternatives is required. It does not assess: - The potential to apply emerging 'low emission" coal technologies, such as Integrated Drying Gasification Combined Cycle (I1DGCC), Mechanical Thermal Expression (MTE) or dewatering technologies; - The potential to apply these emerging 'low emission' coal technologies as a pilot or research plant in order to contribute to research being undertaken to lower emissions from coal use; - The potential to apply Combined Heat and Power (CHP) options, despite the fact that the proposed power station will be located within an industrial park; - The potential use of biomass instead of coal;	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 that were raised in the comments that were received, the EPA considers that greenhouse gas emissions is a relevant environmental factor.

Table 4: Identification of relevant environmental factors and principles

Preliminary Environmental Factors	Proposal Characteristics	Government Agency and Public Comments	Identification of Relevant Environmental Factors
POLLUTION			
Greenhouse gas emissions (Continued)	The proposed power station will generate up to 1,971,475 tonnes of CO_2 per year.	**Conservation Council of Western Australia (Continued)** - The potential application of biomass co firing. According to COAL21 "Co firing of biomass in large, efficient coal fired power stations gives a potential 35-50 per cent increase in efficiency over that possible from a dedicated biomass power station." The assessment of options has not provided an assessment of geosequestration potential. Given that the proposed Collie B expansion has a projected lifetime of 30 years, emerging low emissions coal technology must be applied to this project. **Members of the public** The role of greenhouse gas in climate change with the consequent impact on water supplies, agriculture, ecosystems and third world communities compels us to change our patterns of production and consumption. There are viable alternatives available right now that can not only reduce greenhouse gas pollution, but can also drive a new economic paradigm that will produce prosperity and ecological recovery. In the face of this evidence it is morally undefendable. Collie coal, being 'sub bituminous' coal is particularly greenhouse intensive, with only Victoria's brown coal being worse. There are no indications of greenhouse gas offsets given in this PEM. Some examples of J Power's offsets for previous project overseas are given, but there is a lack of anything specific in this area of the PEM. The proponent has not offered any significant greenhouse offsets which I calculate to be less than 5% of the emissions. 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 (Great Southern Plantations, Timbercorp and Integrated Tree Cropping) valued at in excess of $1 billion that are growing trees on a commercial basis profitably. 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? Clearly no offsets is not enough but I don't how much is the right amount but something more than 5% needs to be done. WA needs to join the global effort to combat climate change. Climate change is already having major effects on water supplies in the South West and the changes in temperature, rainfall and sea level caused by climate change will impact heavily on WA's health, tourism and agricultural sectors, biodiversity and infrastructure.	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 that were raised in the comments that were received, the EPA considers that greenhouse gas emissions is a relevant environmental factor.

Table 4: Identification of relevant environmental factors and principles

Preliminary Environmental Factors	Proposal Characteristics	Government Agency and Public Comments	Identification of Relevant Environmental Factors
POLLUTION			
Greenhouse gas emissions (Continued)	The proposed power station will generate up to 1,971,475 tonnes of CO_2 per year.	**Members of the public (Continued)** Generating electricity from coal fired power stations is the biggest single source of human made $C0_2$ emissions worldwide, accounting for 37% of emissions, Coal is the most carbon intensive fossil fuel, producing 70% more $C0_2$ emissions from the same energy output as natural gas. Given what we now know about the tremendous impact our greenhouse emissions are having on the environment and global climate, any new Collie station or expansion is simply not an option for WA. Such a station would have a lifetime of at least 30 years, committing us to further coal reliance far into the future when we need to take action now. Is it really worth taking the easy way out, when it will mean further increasing the levels of greenhouse gases, toxic heavy metals and volatile organic compounds in our atmosphere, causing not only environmental damage but immediate short term health risks? These and other results of fossil fuel burning are interrelated, and what we release into the atmosphere will affect us all. It is well understood that Collie (in addition to many other towns and communities) has an economic reliance on coal mining and generation, but with government assistance (such as a Structural Adjustment Package) Collie can minimise it's vulnerability to changes in energy policies, and be better equipped for a sustainable energy future. There is no use waiting until the coal runs out to make the transition to clean energy; WA's decision makers must deny the inevitable no longer and invest in renewable energy sources instead of desperately hanging on to our coal dependent, environmentally ignorant past.	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 that were raised in the comments that were received, the EPA considers that greenhouse gas emissions is a relevant environmental factor.
Atmospheric emissions	The Collie B Power Station will emit a variety of atmospheric emissions. Refer to Table 1 for details on relevant species and annual quantities that will be emitted.	**Shire of Collie** It is vital that proposed 'management plans' for air emissions are established and maintained. Some community concern has been expressed about the possible 'cumulative effect' of air (and noise) emissions from all activities existing and planned within the coal basin (Collie 'A', Collie 'B', Bluewaters I and Bluewaters II power stations, Coolangatta Industrial Estate, and Ewington I and Ewington II coal mining operations) and it has been suggested some all encompassing modelling should be conducted in this regard. It is reasonable for the general public to have a comprehensive understanding of all environmental impacts emanating from within the coal basin. This is an issue the EPA may give consideration towards as a means of reassurance to the general public. **Department of Industry and Resources** The EPA released its report on Bluewaters 1 (Bulletin 1160) on 18 January 2005, just prior to the release of Wesfarmers J Power's PER for Collie B on 21 January 2005. The EPA expressed the opinion in Bulletin 1160, that the Bluewaters 1 project proposal can be managed to meet EPA's environmental objectives with respect to the control of $S0_2$ emissions: “Consistent with industry standards, by considering European Directive 2001/80/EC for outer regions as the standard during the DOE licensing process”.	In view of the significant quantity of atmospheric emissions that will be emitted by the proposed power station, and the nature of the concerns that were raised in the comments that were received, the EPA considers that atmospheric emissions is a relevant environmental factor.

Table 4: Identification of relevant environmental factors and principles

Preliminary Environmental Factors	Proposal Characteristics	Government Agency and Public Comments	Identification of Relevant Environmental Factors
POLLUTION			
Atmospheric emissions (Continued)	The Collie B Power Station will emit a variety of atmospheric emissions. Refer to Table 1 for details on relevant species and annual quantities that will be emitted.	**Department of Industry and Resources (Continued)** The nomination of the European Directive 2001/80/EC as the emission standard to be met and hence the need for flue gas desulphurisation technology to be used in new coal fired power stations, is not supported. According to Griffin Energy and Wesfarmers Energy J Power, no coal fired power stations in Australia have used this technology, due to the relatively low sulphur content of Australian coal. The Department recommends that the nationally endorsed NEPM ambient standards be used to assess the performance of Wesfarmers Energy J Power's proposed Collie B, or any other new coal fired power station, with respect to the management of $S0_2$ emissions. Separately, in recent discussions Wesfarmers Energy-J-Power advised the Department that the directive in Bulletin 1160 will not only severely impact on the financial viability of Wesfarmers Energy J Power Collie B project, but also add considerable extra demands on the environment, such as an increased water requirement and greater solid waste through the use of limestone in the process. If the EPA is concerned that the combined effect of existing and proposed coal fired power stations was such that the existing NEPM standards are likely to be exceeded, then it could establish a specific Environmental Protection Policy and set of regulations for managing $S0_2$ emissions in the Collie region, along the lines that have been gazetted for the Kalgoorlie Boulder urban areas. The Department recommends that the EPA processes the assessment of the environmental impact of Wesfarmers Energy J Power's Collie B proposal (and any other coal or gas based power station proposals) as a priority, using the nationally endorsed NEPM standards for management of $S0_2$ emissions, and not benchmarking greenhouse gas offsets outside of an agreed whole of government approach. The EPA considers development of an Environmental Protection Policy ($S0_2$) for Collie, based on nationally endorsed NEPM ambient standards. **Department of Environment** It is difficult to fully assess the expected PM_{10} and other particulate impacts because the contribution of surface sources such as home heating and mining operations in the region has not been addressed. Can the proponent provide further information on emissions from home heating and mining activities? The combination of increased SO_2 concentrations and inhalable particulate matter is of concern due to the possibility of synergistic health impacts. In view of the above, is the proponent willing to make a commitment to undertake air quality monitoring to determine possible health impacts due to $S0_2$ and PM_{10}, at locations determined in consultation with the DoE and the Department of Health?	In view of the significant quantity of atmospheric emissions that will be emitted by the proposed power station, and the nature of the concerns that were raised in the comments that were received, the EPA considers that atmospheric emissions is a relevant environmental factor.

Table 4: Identification of relevant environmental factors and principles

Preliminary Environmental Factors	Proposal Characteristics	Government Agency and Public Comments	Identification of Relevant Environmental Factors
POLLUTION			
Atmospheric emissions (Continued)	The Collie B Power Station will emit a variety of atmospheric emissions. Refer to Table 1 for details on relevant species and annual quantities that will be emitted.	**Department of Environment (Continued)** Is the proponent willing to participate, along with existing significant local emitters of pollutants, in an ongoing and expanded meteorological monitoring program that will assist in the ongoing refinement of air dispersion models for the region? **Department of Health** Given the anticipated life span of most industrial projects to be undertaken in Collie, it is not considered appropriate to limit health impact assessment to current development proposals. It is recognised that individual industrial projects that adopt 'best practice' methods are unlikely to significantly increase current impacts to public health; however, pollutant concentrations within the Collie air shed are the result of emissions from many sources. Consideration of the cumulative impacts arising from existing sources and proposed and anticipated future industry should be incorporated into an effective management approach that ensures potential health impacts are minimised. The DOH has previously advocated the development of a strategic approach for air quality in the Collie region at a meeting with the EPA on 9 September 2004. While several important processes have commenced in this regard, it is anticipated that further efforts will be required to adequately address concerns with ongoing development. Recent air quality monitoring data and modelling results indicate that levels of sulphur dioxide and particulate matter in the Collie area are problematic. Relatively short term inhalation exposure (<l hr) to either sulphur dioxide or particulate matter may result in a variety of adverse health effects, particularly lung irritation. Infrequent instances when the concentrations of these pollutants are significantly elevated are therefore likely to cause transitory respiratory effects in sensitive members of the Collie population. Consequently, any strategy that reduces community exposure to sulphur dioxide or particulate matter may provide measurable health benefits for the Collie region. In this regard, the DOH strongly supports the Western Power commitment to decommission Muja Power Station stages A and B, which are recognised as significant contributors to current sulphur dioxide and particulate matter levels. The elimination of outmoded, inefficient and emissions intensive industry is considered essential to the development of the Collie area in a manner that is protective to public health. Although contributing sources may be readily identified, the nature of 'background' particulate matter in the Collie region is ill defined. Health risk assessments undertaken by current development proposals are limited by various assumptions regarding particulate matter that may have significant health implications. Additional data to clarify the composition and origin of particulate matter, potential daily and seasonal variation and the influence of uncommon events on peak concentrations is required to address this issue. However, the level of investigation necessary to obtain such data is typically beyond the scope of individual development proposals and reinforces the need for a strategic approach to air quality in Collie.	In view of the significant quantity of atmospheric emissions that will be emitted by the proposed power station, and the nature of the concerns that were raised in the comments that were received, the EPA considers that atmospheric emissions is a relevant environmental factor.

Table 4: Identification of relevant environmental factors and principles

Preliminary Environmental Factors	Proposal Characteristics	Government Agency and Public Comments	Identification of Relevant Environmental Factors
POLLUTION			
Atmospheric emissions (Continued)	The Collie B Power Station will emit a variety of atmospheric emissions. Refer to Table 1 for details on relevant species and annual quantities that will be emitted.	**Department of Health (Continued)** Potentially significant sources of air emissions have not been acknowledged by current development proposals. The report Collie Industrial Site Study (1991) prepared by Halpern Glick Maunsell identified several candidate industries that may be placed within the proposed Coolangatta Industrial Estate. While it is noted that modelling of all possible land uses is not feasible and that each candidate industry will be required to obtain appropriate environmental approvals, consideration of indicative emission scenarios is necessary to better characterise probable future health impacts. Exposure assessments currently conducted for the Collie area are limited. Predicted exposures are reliant upon air quality modelling methods that provide estimated contaminant distributions. However, such distributions are imprecise and cannot be verified without extensive monitoring. Health risk assessments typically fail to adequately discuss such uncertainty and the potential health implications. Furthermore, exposure assessment is restricted to existing populations. As industrial development is anticipated to encourage the economic growth of Collie, it is reasonable to expect associated population growth and the expansion of current residential areas. The limitations of exposure assessment must be acknowledged and taken into consideration during the development of the Collie area. Verification of modelling results by continued air quality monitoring throughout the region will provide greater confidence in the assessment of future proposals. **Men of the Trees** Besides greenhouse gases, coal fired power stations emit a range of air pollutants including acidic gases, heavy metals and volatile organic compounds, polycyclic aromatic hydrocarbons and particulates, all of which are capable of causing serious ecological and human health impacts. They also emit mercury, a toxic heavy metal, into the atmosphere. Elevated levels of mercury are harmful to everyone. Women of childbearing age are especially at risk because the unborn and infants are vulnerable to mercury. **Conservation Council of Western Australia** CCWA is very concerned about the heavy metal emissions associated with this project, particularly mercury. The proponent does not address this critical issue in any way. We are concerned that the issue of mercury emissions - 46kg per year in addition to the existing Collie load is not addressed in detail. Mercury is a toxic, persistent pollutant that travels long distances and accumulates in the food chain. Air concentrations may be low and of little direct concern, however atmospheric mercury fails to earth through rain and enters lakes, rivers and estuaries, then transforming into methyl mercury, its most toxic form, and accumulating in fish and animal tissues. Fossil fuel fired utilities are the largest world wide source of human generated mercury emissions. Methyl mercury attacks the central nervous system. It is of particular risk to pregnant women and children as the developing fetus is sensitive to the toxic effects of mercury and exposure to even low concentrations before birth puts children at increased neurological risk.	In view of the significant quantity of atmospheric emissions that will be emitted by the proposed power station, and the nature of the concerns that were raised in the comments that were received, the EPA considers that atmospheric emissions is a relevant environmental factor.

Table 4: Identification of relevant environmental factors and principles

Preliminary Environmental Factors	Proposal Characteristics	Government Agency and Public Comments	Identification of Relevant Environmental Factors
POLLUTION			
Atmospheric emissions (Continued)	The Collie B Power Station will emit a variety of atmospheric emissions. Refer to Table 1 for details on relevant species and annual quantities that will be emitted.	**Conservation Council of Western Australia (Continued)** Far too little information has been supplied in this PER regarding the potential health impacts of this project. The Health Impact Assessment being undertaken should have been included in the PER. It is entirely insufficient to expect stakeholders to do follow up work after the close of the PER submission process to investigate the outcomes of this report when clearly the health impact is one of the key areas of concern for such a project. The precautionary principle would suggest that, if insufficient information is available regarding the health impacts of current coal related activities in Collie, then further developments should not proceed until that situation is rectified and the broader Collie community is satisfied. Research from overseas clearly indicates a link between coal fired power generation and increased occurrences of asthma, respiratory diseases. **Members of the public** Besides greenhouse gases, coal fired power stations emit a range of air pollutants including acidic gases, heavy metals and volatile organic compounds, polycyclic aromatic hydrocarbons and particulates, all of which are capable of causing serious ecological and human health impacts. They also emit mercury, a toxic heavy metal, into the atmosphere. Elevated levels of mercury are harmful to everyone. Women of childbearing age are especially at risk because the unborn and infants are vulnerable to mercury. The modelling for air emissions shows all aspects will be within acceptable limits generally. I am concerned that the emissions are only within acceptable limits if Muja A & B are decommissioned. There is a risk that this will not occur as a result of lack of capacity in the Western Power grid If Muja A & B stay on line serious breaches will occur. In the EPA Bulletin issued for Bluewaters 1 there was a reference to a European Standard regarding Sulphur Dioxide levels. This community does not want European Standards implements for impacts we haven't 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. A new coal fired power station will have a lifetime of at least 30 years, committing ourselves and future generations of Western Australians to dirty, polluting energy until around 2040! The transition to WA's clean energy future has to start now. The planning for this power station and a number of other projects in the area are premised by the closure of Muja A & B. I think this will not occur when anticipated because the power needs of WA will not be met if Muja A & B are decommissioned. I also believe when decommissioned it will be at a time when Collie B comes on line to ensure coal contracts are not disrupted putting miners out of work. There is a potential for some short term adverse air emissions if Muja A & B are not decommissioned when planned. Concerns about dust are related to this and other projects on a cumulative basis. As long as the proponent manages and suppresses dust during the construction no impacts should occur.	In view of the significant quantity of atmospheric emissions that will be emitted by the proposed power station, and the nature of the concerns that were raised in the comments that were received, the EPA considers that atmospheric emissions is a relevant environmental factor.

Table 4: Identification of relevant environmental factors and principles

Preliminary Environmental Factors	Proposal Characteristics	Government Agency and Public Comments	Identification of Relevant Environmental Factors
POLLUTION			
Liquid and solid waste disposal	The Collie B Power Station will generate 1.46GL/year of saline wastewater and 112,000tpa 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 existing Western Power Corporation facilities on the Collie Power Station site.	**Collie Shire Council** 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 site or discharge into ground water aquifers. **Department of Environment** Contractor's construction site facilities need to be considered in terms of sewage disposal, fuel and hazardous material storage, stormwater management etc through the CEMP. Has the proponent considered these facilities and, if so, can they provide any details? In relation to any proposal to discharge waste to the marine environment, the following principle should be observed: All reasonable and practical measures should be taken to avoid, reuse or recycle generated wastes. No alternatives to ocean disposal of the cooling water effluent have been considered. The PER does not discuss this proposal in the context of the Bluewaters 1 and 2 power station proposals. These projects also propose using the Collie A pipeline for discharging saline cooling water. At present different documents suggest different discharge rates into the Collie A pipeline, one suggests that the Collie A and Collie B combined maximum discharges alone (i.e. not including Bluewaters discharge) will be 85L/s which is almost at the maximum design flow rate for the pipe. This issue needs to be resolved as the option of using evaporation ponds may be necessary. Consistent with the environmental quality management framework outlined in the State Water Quality Management Strategy Report 6 (Implementation Framework for Western Australia for the Australian and New Zealand Guidelines for Fresh and Marine Water Quality and Water Quality Monitoring and Reporting), this section should list the environmental values (EVs) and environmental quality objectives (EQOs) and the level of ecological protection to be applied to the marine environment in the vicinity of the ocean outfall (including the mixing zone). These EVs determine the specific environmental quality criteria to be achieved in the receiving environment. By default the EVs of 'Ecosystem health', 'Fishing and aquaculture', 'Recreation and aesthetics' and 'Industrial water supply' would apply. The level of ecological protection to be achieved for the region has already been set through previous precedents by the EPA and DoE (eg. Water Corp sewerage outfall) and is represented by the 99% species protection guidelines for toxicants (i.e. these guidelines should be met at the edge of the zone of initial dilution). Guidance for establishing these management objectives can be found in the State Water Quality Management Strategy Report 6 and in Perth's Coastal Waters: Environmental Values and Objectives (EPA, 2000). Information is required on the size of the mixing zone for the ocean outfall and the number of dilutions obtained at the edge of the mixing zone. Can the proponent supply this information?	In view of the significant quantity of liquid and solid wastes that will be generated by the proposed power station, and the nature of the concerns that were raised in the comments that were received, the EPA considers that liquid and solid waste disposal is a relevant environmental factor.

Table 4: Identification of relevant environmental factors and principles

Preliminary Environmental Factors	Proposal Characteristics	Government Agency and Public Comments	Identification of Relevant Environmental Factors
POLLUTION			
Liquid and solid waste disposal (Continued)	The Collie B Power Station will generate 1.46GL/year of saline wastewater and 112,000tpa 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 existing Western Power Corporation facilities on the Collie Power Station site.	**Department of Environment (Continued)** A map of the benthic habitats surrounding the ocean discharge point is required particularly showing the location of seagrasses, macroalgal assemblages [what are the dominant species], the pipeline and diffuser). Diagrams and maps need to be at a scale that is useful and relevant to the discussion. Can the proponent provide these maps? Quantitative information on the current quality of the marine environment around the outfall is required. The information provided in Appendix 1 is minimal and not very helpful. Baseline information on sediment quality around the outfall is also required, as well as a discussion on whether the increased discharge is likely to affect the quality of sediment and biota in the vicinity of the outfall. Baseline sediment quality data should be compared to the ISQG low sediment quality guidelines from ANZECC & ARMCANZ (2000). The monitoring and management plan should include sediment quality surveys. Can the proponent provide this information? There is no information provided on the expected quality of the saline wastewater apart from it being approximately 10% of seawater salinity. Other documents have indicated that the mine dewatering water has many other contaminants, some of which may be at levels of concern. The expected concentration of each contaminant in the wastewater needs to be provided so the implications for the ocean outfall can be assessed. The analytical limit of reporting for chemical analyses of the waste water or the source water must be sufficient to make firm predictions on whether the environmental quality criteria for the receiving environment are likely to be met. Can the proponent provide this information? The key management objective for marine environmental quality is to protect the environmental values for the area by achieving the environmental quality objectives and levels of ecological protection ascribed to the discharge area. These EVs need to be established for the proposal and the objective should form part of the proponent's commitments. The EVs, EQOs and levels of ecological protection should be listed in Section 2.1 9 (see comments above). A baseline survey of the spatial distribution, density and health of the benthic primary producer habitats (seagrasses and pavement algal communities) is required using quantitative measures so that any future changes potentially caused by the outfall can be ascertained from quantitative data. The survey in 2002 referred to in the PER (Sinclair Knight Merz, 2002) shows the existence of seagrass meadows around the pipe outfall but only gives a very general qualitative assessment of health. Can the proponent supply an additional baseline survey of the spatial distribution, density and health of the benthic primary producer habitats?	In view of the significant quantity of liquid and solid wastes that will be generated by the proposed power station, and the nature of the concerns that were raised in the comments that were received, the EPA considers that liquid and solid waste disposal is a relevant environmental factor.

Table 4: Identification of relevant environmental factors and principles

Preliminary Environmental Factors	Proposal Characteristics	Government Agency and Public Comments	Identification of Relevant Environmental Factors
POLLUTION			
Liquid and solid waste disposal (Continued)	The Collie B Power Station will generate 1.46GL/year of saline wastewater and 112,000tpa 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 existing Western Power Corporation facilities on the Collie Power Station site.	**Department of Environment (Continued)** The statement that the saline waste water is expected to be free of contaminants other than biocides and corrosion and scale inhibitors is unjustified (see comments on Section 3 5 3). A list of all contaminants should be tabulated against the respective environmental quality guidelines for each environmental value (and relevant level of ecological protection for ecosystem health). (Note that there is a typographical error in Table 5: the acceptance criterion for the biocides is not 31µg/L). The ANZECC guidelines provided in Table 8 are all incorrect. Guidelines must be sourced from the current National Water Quality Management Strategy Report 4 Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZECC & ARMCANZ, 2000). Water quality guidelines should be considered for each of the environmental values to be protected. How have the 'typical discharge' values in Table 8 been derived from the source document? This needs to be explained. It is the 95th percentile of the potential impact data that must be compared with toxicant environmental quality criteria, and the median of the physico-chemical indicators that are compared with the relevant indicators. Given the errors and uncertainty surrounding the information provided in Table 8, and that no level of ecological protection has been established for the mixing zone, the conclusion that all environmental quality guidelines for the receiving environment will be met at the discharge point can not be justified. Can the proponent comment on this issue? The survey in 2002 referred to in the PER (Sinclair Knight & Merz, 2002), shows the existence of seagrass meadows around the pipe outfall but only gives a very general qualitative assessment of health. This cannot be used as a definitive measure of whether the outfall has had an effect or not. In addition, the current proposal would double the quantity of effluent discharged from the pipe so even if there was quantitative information showing that the Collie A discharge hadn't affected the seagrasses, this would not necessarily suggest that the addition of Collie B discharge would also have no effect. As already suggested in the comments for section 6 2 1 above, a baseline survey of the spatial distribution, density and health of the benthic primary producer habitats (seagrasses and pavement algal communities) is required using quantitative measures so that any future changes potentially caused by the outfall can be ascertained from quantitative data. The monitoring program for the discharge should include an annual assessment of diffuser performance (in terms of dilutions achieved) by diffuser inspection and field measurement to confirm the required number of dilutions is being achieved. In view of the impending increase to near capacity flow, the limited number of toxicants monitored for, and the addition of pre treatment chemicals, it is recommended that the Whole of Effluent Toxicity (WET) testing is required on an annual basis using procedures recommended by the Australian Water Quality Guidelines, to demonstrate that 99% species protection levels met at the edge of the mixing zone. Is the proponent willing to do this testing?	In view of the significant quantity of liquid and solid wastes that will be generated by the proposed power station, and the nature of the concerns that were raised in the comments that were received, the EPA considers that liquid and solid waste disposal is a relevant environmental factor.

Table 4: Identification of relevant environmental factors and principles

Preliminary Environmental Factors	Proposal Characteristics	Government Agency and Public Comments	Identification of Relevant Environmental Factors
POLLUTION			
Liquid and solid waste disposal (Continued)	The Collie B Power Station will generate 1.46GL/year of saline wastewater and 112,000tpa 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 existing Western Power Corporation facilities on the Collie Power Station site.	**Department of Environment (Continued)** The operating Environmental Management Plan (Plan) referred to in Section 6.2.3 needs consider monitoring and management of the effluent input to the Collie A pipeline as well monitoring and management of the combined ocean discharge. There are jurisdictional issues that will also need to be addressed. This Plan needs to be prepared immediately and submitted to the EPA as additional information to provide it with the information necessary for assessment and provide surety to the community and Government that the marine environment will be adequately protected. The Plan should incorporate environmental quality targets which, if not met, signify that environmental quality is compromised and triggers a management response, and also the management actions that will be implemented to return and maintain environmental quality at acceptable levels. The environmental outcome should include protection of the Environmental Values (Ecosystem Health, Fishing and Aquaculture, Recreation and Aesthetics and Industrial Water Supply) set for the receiving waters. Can the proponent prepare this Plan? The possibility that other power stations may be proposing to discharge cooling/blow down waters effluents through the existing Collie A pipeline is recognised in this section. However, the proponent assumes that any excess capacity in the pipeline would be made available to it as a priority. This is an important issue as the capacity of the Collie A pipeline is likely to be exceeded when the saline effluent from the Bluewaters power station(s) is also considered. Can the proponent resolve these issues as the option of using evaporation ponds may be necessary? Proponent commitment 10: this commitment refers to the preparation and implementation of an Operating Environmental Management Plan prior to commissioning of the power plant that includes management of the saline water effluent discharge to the Collie A pipeline. Comments made above (General comments and sections 2.1.9, 6.2.1, 6.2.2 and 6.2.3) apply to this issue, including: a. Need for the plan to be prepared and assessed with the PER; b. Plan needs to address management of the combined outfall as well as the saline discharge to the Collie A pipeline from this proposal; c. Jurisdictional responsibilities for management of the combined effluent and discharge; d. Identification of the environmental values to be protected for the receiving waters and a commitment to their protection; e. The environmental quality targets that will be used to trigger a management response and the management responses that will be implemented if there have been an exceedance of the targets; f. Baseline information on benthic primary producer habitat health and sediment quality;	In view of the significant quantity of liquid and solid wastes that will be generated by the proposed power station, and the nature of the concerns that were raised in the comments that were received, the EPA considers that liquid and solid waste disposal is a relevant environmental factor.

Table 4: Identification of relevant environmental factors and principles

Preliminary Environmental Factors	Proposal Characteristics	Government Agency and Public Comments	Identification of Relevant Environmental Factors
POLLUTION			
Liquid and solid waste disposal (Continued)	The Collie B Power Station will generate 1.46GL/year of saline wastewater and 112,000tpa 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 existing Western Power Corporation facilities on the Collie Power Station site.	**Department of Environment (Continued)** g. Diffuser performance, and h. WET testing of the combined effluent. **Conservation Council of Western Australia** The saline water emissions are a serious concern as this effluent may pollute the marine environment and destroy habitat, including seagrass meadows. More information must be provided about the composition of the saline effluent and if it exceeds EPS standards they must be required to dilute it or treat it. The proponent has provided almost no information about how ash from this project will be managed. This is a critical issue with major implications for groundwater. The method of ash disposal has the potential to have severe impacts on groundwater. The proponent has not supplied sufficient information regarding fly ash. Previous analyses have shown significant thorium and uranium content in fly ash from Australian coal. This is of concern as high levels of uranium and thorium sediment are found in the Yilgarn craton. The proponent has not undertaken an analysis of the uranium content of the fly ash they should be required to do so and a supplementary PER released. If they have undertaken such an analysis, the results should be available for public consideration.	In view of the significant quantity of liquid and solid wastes that will be generated by the proposed power station, and the nature of the concerns that were raised in the comments that were received, the EPA considers that liquid and solid waste disposal is a relevant environmental factor.
Surface water and groundwater	The Collie B Power Station will require up to 5.1GL/year of water which will be sourced from mine dewatering activities at Premier coal mine.	**Collie Shire Council** It is essential that all water for operating the power station (estimated at over 5 Gigalitres per year) is accessed from mine dewatering as stated in the PER. Water from deep aquifers or potable water supplies (eg Harris Dam) should not be considered. **Department of Environment** The proponent has advised that its Collie 'B' power station will consume approximately 5.1 GL of water per annum and has proposed to source its primary supply from dewatering activities at Wesfarmers Premier Coal's (WP Coal) Premier Mine. In managing the water resources of the Collie Basin, the DoE supports the principles and objectives of the Collie Water Advisory Group, 1999 (CWAG), which includes a strategy of maximising the use of mine dewatering water for power generation. One of two preferential uses of any water sourced from dewatering activities required for safe mining conditions is for power generation, the other being recharging the Collie Coal Basin's groundwater system. There are concerns regarding the difficulty of establishing the exact amount of water available from dewatering and has advised proponents of potential coalfired power stations in the Collie area that it would be prudent for them to develop an alterative water supply, rather than depend on dewatering water for a secure long term supply. Could the proponent provide information on potential alternatives?	In view of the significant quantity of groundwater that will be required by the proposed power station, and the nature of the concerns that were raised in the comments that were received, the EPA considers that surface water and groundwater is a relevant environmental factor.

Table 4: Identification of relevant environmental factors and principles

Preliminary Environmental Factors	Proposal Characteristics	Government Agency and Public Comments	Identification of Relevant Environmental Factors
POLLUTION			
Surface water and groundwater	The Collie B Power Station will require up to 5.1GL/year which will be sourced from mine dewatering activities at Premier coal mine.	**Department of Environment (Continued)** In the case of its Collie 'B' proposal, the proponent has advised that dewatering at the Premier Mine would be sufficient to supply the power station for "at least half of the 30 year life of the project" (p.xv PER). The DoE has reviewed a dewatering designs report submitted by WP Coal for the Premier Mine in support of its groundwater license amendment application and asked for clarification on a number of matters including the volume and quality of water available. In respect of volumes, although the PER states that the estimates of ground water are conservatively low, subsequent advice to the DoE (URS, lan Brunner, pers comm) has suggested that the estimates are conservatively high. It follows that if the volumes to be dewatered from the Premier Mine are less than anticipated and there are other demands for this water, (eg. Western Power Corporation or Environmental Water Requirements (EWRs)), then the proponent may not be able to rely on dewatering from Premier as a secure supply source. It should however be noted that at present apart from localised use on the mine site, there does not appear to be any demands on the Premier Mine dewatering water other than that proposed by the proponent for Collie 'B'. Can the proponent clarify the above concerns? How will the proponent address these issues? The proponent has recognised some uncertainty with supply from the Premier Mine and has indicated that it will prepare a water supply development and management strategy, if the need for alternative sources to mine dewatering water becomes apparent from regular reviews of the resource. Reviews of the water supply need to be undertaken to identify a trigger point of 5 years in order to mitigate risks associated with shortfalls both in the short and long term. The DoE would endorse a water supply strategy that intends to use available dewatering water while developing an alternative water supply if dewatering water is inadequate for power station demand. Is the proponent willing to comply? The quality of the available groundwater at Premier is being subject to a monitoring program by WP Coal and the results of this monitoring will clarify whether the water is suitable for the assumed design specifications of the proponent's power station. If the quality of dewatering water is poorer than anticipated, then this may create user problems requiring pre use water treatment or the sourcing an alternative supply. How will the proponent address this matter? As the DoE has taken the position that it will not issue new groundwater licences in the Collie Coal Basin to Energy Groups for power station operations, it is strongly recommended that the proponent seeks to source a contingent, primary and supplementary water supply for Collie 'B'. Also, it is strongly recommended that the proponent seek to establish certainty about the quantity and quality of its proposed water supply or, alternatively, source a contingent, primary and supplementary water supply for Collie 'B'.	In view of the significant quantity of groundwater that will be required by the proposed power station, and the nature of the concerns that were raised in the comments that were received, the EPA considers that surface water and groundwater is a relevant environmental factor.

Table 4: Identification of relevant environmental factors and principles

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 up to 5.1GL/year which will be sourced from mine dewatering activities at Premier coal mine.	**Department of Environment (Continued)** Development should be consistent with the following Water Quality Protection Notes WQPNs): Above ground chemical storage tanks in PDWS Areas, Groundwater monitoring bores, industrial sites near sensitive environments establishment and operation, industrial sites near sensitive water bodies, mechanical servicing and workshops, stormwater management at industrial sites, soil liners to contain low hazard waste, and toxic and hazardous substances storage and use. How will the proponent incorporate these? It was noted that the PER did not discuss environmental values, environmental quality objectives and levels of ecological protection for surface waters (rivers, creeks, wetlands and estuaries). These should be established up front for all potentially affected surface waters just as they must for marine waters. The State Water Quality Management Strategy Report 6 (Implementation Framework for Western Australia for the Australian and New Zealand Guidelines for Fresh and Marine Water Qualify and Water Quality Monitoring and Reporting) provides guidance for this exercise. Can the proponent provide this information? The proposed power station lies within the Wellington Dam Catchment Area that was proclaimed in October 2000. Wellington Dam is presently used for irrigation supplies. The potential for using the Dam as a public drinking water supply is still being investigated by Government. A Priority classification is currently not assigned to this area but according to the Land Use Compatibility Table (LUCT) it would be likely to receive a P3 classification. Heavy or energy industries are not compatible in P3 areas according to the LUCT. The proposal does not discuss in detail the proclaimed Catchment Area and does not appear to list the Country Areas Water Supply Act 1947 as one of the relevant pieces of legislation. Can the proponent provide information on the catchment area? Construction and operating staff at the power station should be made aware that they are within a PDWSA. How will the proponent address this matter? There are potential water quality risks from chemical and hazardous material storage, hydrocarbon storage, washdown waters, fallout of air emissions to soil, leakage from storage ponds, flyash disposal, domestic wastewater treatment. Can the proponent provide information on each of these risks and how they will be minimised including a site plan showing where treatment plants, storage ponds etc will be located and how they will be constructed? The proponents should demonstrate that under both normal and potentially abnormal operating conditions water contaminants in use or produced at the power station are fully contained. This should be supported by a water balance. Could the proponent provide this information?	In view of the significant quantity of groundwater that will be required by the proposed power station, and the nature of the concerns that were raised in the comments that were received, the EPA considers that surface water and groundwater is a relevant environmental factor.

Table 4: Identification of relevant environmental factors and principles

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 up to 5.1GL/year which will be sourced from mine dewatering activities at Premier coal mine.	**Department of Environment (Continued)** 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 management carefully. How will the proponent address this issue? Environmental management plans (both operational and construction) should be prepared and submitted as information for the environmental impact assessment process. Advice on the acceptability of the proposal can not be provided in full without knowing what management strategies are to be implemented to manage potential environment impacts. In terms of the ocean discharge this includes the environmental monitoring program for the outfall, the environmental quality targets that will be used to trigger a management response (i.e. if an unacceptable environmental impact has occurred) and the management responses that will be implemented if there has been an unacceptable environmental impact. **Conservation Council of Western Australia** CCWA are concerned that insufficient certainty exists regarding the required water supply over the entire life of the project and that in the latter years of the project's life that operation of this power station would compromise water supply and quality in the Collie Basin. **Member of the public** 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. It is simply not good enough to keep dragging it out of the ground. The `water cycle" was in balance prior to industrial development impacts. There is a strong need to ensure all of the community water needs are considered and met. This includes power generators, mining companies, farmers, Collie, recreation visitors and the environment etc. More work needs to be done to address the concerns of the landowners regarding both ground water and surface water availability and contamination.	In view of the significant quantity of groundwater that will be required by the proposed power station, and the nature of the concerns that were raised in the comments that were received, 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.	**Shire of Collie** It is noted that Collie 'A' currently meets approved noise standards and that with the addition of Collie 'B' those standards still will not be compromised. Again, community concern has been expressed about 'cumulative effect' and the suggestion made above under Air Emissions is applicable.	Given the nature of the concerns that were raised in the comments that were received, the EPA considers that noise is a relevant environmental factor.

Table 4: Identification of relevant environmental factors and principles

Preliminary Environmental Factors	Proposal Characteristics	Government Agency and Public Comments	Identification of Relevant Environmental Factors
POLLUTION			
Noise (Continued)	Construction and operation of the Collie B Power Station has the potential to affect existing noise levels.	**Western Power Corporation** Modelling of the noise emission propagation from the expanded power station did not extend to Collie townsite. It would be useful to indicate the noise parameters by showing environmental noise contours extending into Collie townsite (irregardless of the resulting low noise levels). **Department of Environment** At a recent meeting with representatives from Griffin Energy Pty Ltd and Wesfarmers Energy, regarding the Part IV assessment of noise emissions from the proposed Bluewaters II and Collie B power stations, it was agreed that further noise modelling would be requested as part of the cumulative noise assessment particularly in order to clarify an apparent discrepancy between the two acoustic models used. The various noise reports have been reviewed and the following advice is provided in relation to further noise modelling that is needed to provide a definitive picture. **Department of Planning and Infrastructure** The PER indicates that there may be some off site environmental impacts, which extend outside the existing Collie A Power Station buffer. Although the PER indicates that the proposal is expected to result in minimal environmental and health impacts, the PER does not address the need to consider a revised buffer definition under Shire of Collie draft TPS 4. Consideration of a revised controlled development buffer area reflecting the cumulative impact of the existing and proposed power stations and the Coolangatta Industrial Estate may be appropriate. Modelling has been undertaken which considers the cumulative noise impact of Bluewaters 1, 2 and Collie A and B. This has not been translated in the document to clearly describe the cumulative impact area. The proposed Coolangatta Industrial Estate in which the Bluewaters Power station is located within, has not been factored into the cumulative noise modelling. The overall impacts of this modelling will provide a basis under which an appropriate buffer area can be recognised and incorporated into the Shire Town Planning Scheme. It should be noted that SPP 4.1 promotes industry containment of impacts and risk onsite. If these cannot be contained on site, mechanisms to manage off site impacts or establish and maintain buffers need to be considered. As indicated above, the PER indicates that there is potential for off site impacts; however, does not comprehensively detail an area for buffer requirements and buffer management measures. A buffer area is considered to be an area in which sensitive land uses are prohibited or special measures are necessary to ameliorate the impacts of industry. Buffer areas are not considered to an alternative to control at the source, rather buffers can assist in the minimisation of off site impacts. High standards of environmental management by industry should, therefore, be adopted. Industrial emissions and risk factors associated with the subject proposal have been identified in the planning and environmental assessment processes. It is considered important that they be managed in accordance with licence conditions and statutory environmental conditions.	Given the nature of the concerns that were raised in the comments that were received, the EPA considers that noise is a relevant environmental factor.

Table 4: Identification of relevant environmental factors and principles

Preliminary Environmental Factors	Proposal Characteristics	Government Agency and Public Comments	Identification of Relevant Environmental Factors
POLLUTION			
Noise (Continued)	Construction and operation of the Collie B Power Station has the potential to affect existing noise levels.	**Conservation Council of Western Australia** CCWA share the concerns of the Collie community that the noise modelling undertaken for the proponents' Collie B proposal differs from the Wesfarmers/ J Power modelling for the Collie Power Station Expansion, which is the same project. **Griffin Energy Pty Ltd** Griffin Energy Ply Ltd (Griffin) notes that the noise report which forms part of the above mentioned Public Environment Review (PER) has the Bluewaters Power Station located incorrectly. The incorrect location has resulted in incorrect noise contours being published in the PER. The attached noise report, commissioned by Griffin, provides noise emission data for the Bluewaters Power Station in the correct location and the correct information for the combined noise impact of both the Collie Power Stations and the Bluewaters Power Stations. **Members of the public** The information provided by the Griffin's Industrial Estate consultants differs vastly from that provided by both the proponents for the Collie B proposals. The first information for the Griffin's Coolangatta Industrial Estate Structure Plan initially published noise emission data, prepared by Herring and Storer, in which a noise level over 30dB which would have prohibited any residential development on some private land to the north of the power station with no compensation payable to the disadvantaged land owners. After some immediate and angry protest by local residents affected the noise map was redrawn overnight to meet a standard which did not impinge on the landowners. Very Fishy Business. The confusion in our minds has become more evident with the release of the Griffin Energy Pty Ltd's and Wesfarmers/J Power's PERs for Collie B. The noise emissions data in these two PER's prepared by SVT Engineering, more closely conforms to the earlier estimates of Herring & Storer, discussed above. In fact, because these two PERs include wind direction scenarios, linked with various combinations of power stations (See Appendix A Commencing Page 18 Wesfarmers Energy/J Power and from Page 13 on in the Griffin Energy Pty Ltd Collie B Environmental noise assessment data). Bluewaters 1 & Collie A; Bluewaters 1 & 2 & Collie A; Bluewaters 1 & Collie A & B; and Bluewaters 1 & 2 & Collie A & B.	Given the nature of the concerns that were raised in the comments that were received, the EPA considers that noise is a relevant environmental factor.

Table 4: Identification of relevant environmental factors and principles

Preliminary Environmental Factors	Proposal Characteristics	Government Agency and Public Comments	Identification of Relevant Environmental Factors
POLLUTION			
Noise (Continued)	Construction and operation of the Collie B Power Station has the potential to affect existing noise levels.	**Members of the public (Continued)** It is noted, too that noise emission maps provided by Wesfarmers/J power are cut off on the west and south towards residential areas, giving no indication of the noise situation in these directions. We have looked at the scenario by conservatively extending the maps in these two directions. In low wind speed conditions from the N, NE, E, SE and S it would appear this noise exposure increases to 45B north of Williams Rd and the 30dB line to the westerly direction crosses the Collie River to Krakouer Street in North Collie and to Palmer and Foster Roads to the areas east of Inkerman Street. As more power stations (Collie A & B and Bluewaters 1 & 2) are factored in, the noise level increases to the 40-45 dB contour. North of Williams Road on a calm day and the 30dB contour reaches practically all of Ewington and extends up Booth Street to approximately P & D Piavanini's home. Similar observations can be made for residents to the west (Tonkins 35-40 dB and Rees 35 40dB) and the south, (Ewington residents)35-40dB. On a day of mild easterly winds people immediately north and west of Williams road are in a 40-45 dB zone. All of Ewington is in a 30 35 dB zone. This same noise zone (30-35dB) also reaches areas to the west of Steere Street in North Collie, and crosses back towards the Collie River and Ewington around the area of the BMX track in Wallsend Street. The noise emissions area of the proposal will need careful monitoring if not the advice of an independent acoustics expert as the differences between the two lots of advice we have received are incomprehensible to us as amateurs as they are so far apart in their predictions. Cumulative noise is a major concern as Wesfarmers/J Power have not addressed the cumulative noise factor of its power station noise in combination with Collie A and Griffin's Ewington 1 mine. A map of the mine noise, based on Griffin's 2001 was provided to us by Griffin, but it did not include the cumulative noise scenario, which they stated was outside their obligations. (It is not, however, outside the obligations of the Collie B proponents who must model all existing and planned projects in the area in their noise modeling). The noise modeling from the 2001 Ewington 1 mine document was based on a dragline operation. Griffin Energy's Responses Document indicate that a 35dB level of noise from mining can be expected at our house, (Tonkins), across the Williams Rd at Rees's and Hoddell's and at a number of properties in North Collie and Ewington. In fact the cumulative noise factor from the Ewington 1 mine will be greater. As a 24 hour, day, 363 days a year excavator and truck operation is now planned. (Griffin's May 2004 EMP). This will be a noisier operation than the one used for the noise modeling. At the Health Impact Meeting 23/02/2005 the senior officer present from that unit told us that in our (Tonkin, Yates, Evans, Britten) situation it was essential to consider the cumulative noise factors of the multiple projects involved because of the severe potential health impacts relevant to our situation all intruding with noise into our homes/prospective homes and lifestyle. The Power Station will be located adjacent to the Collie A facility and as such we do not expect any noise impacts. Our property has not been affected by the noise emissions from Collie A in the last 3.5 years since we have owned our property.	Given the nature of the concerns that were raised in the comments that were received, the EPA considers that noise is a relevant environmental factor.

Table 4: Identification of relevant environmental factors and principles

Preliminary Environmental Factors	Proposal Characteristics	Government Agency and Public Comments	Identification of Relevant Environmental Factors
POLLUTION			
Noise (Continued)	Construction and operation of the Collie B Power Station has the potential to affect existing noise levels.	**Members of the public (Continued)** Since the release of the Bluewaters I and II plans and the proposed Coolangatta Industrial Estate plans which contained noise modelling undertaken by Herring Storer which showed noise modelling (excluding Ewington Mines) that were within the agreed standards a conflicting model has been produced. This proponent along with Griffin commissioned SVT Engineering to undertake the modelling for Collie B Power Station. One model used Soundplan the other ENM to undertake their modelling both have reconfirmed that the information is correct yet the results are dramatically different. The EPA should ensure the community has a set of noise models including all impacts, which is accurate!	Given the nature of the concerns that were raised in the comments that were received, the EPA considers that noise is a relevant environmental factor.
Light shed	Operation of the Collie B Power Station has the potential to affect existing night time light levels.	**Member of the public** The proponent has made no reference to light shed and they should where possible reduce the impact of light on the neighbours etc.	The EPA considers that the concern that was raised have been adequately addressed by the response provided by the proponent. This environmental factor does not require further evaluation by the EPA.
SOCIAL SURROUNDINGS			
Risk and hazards	Operation of the Collie B Power Station will not lead to any significant increase in risk levels. The existing Collie Power Station includes a buffer zone around it which has been developed to protect the community from potential impacts of industry, including risk of industrial accidents. The existing Collie Power Station is not considered to be a major hazard facility.	No specific concerns were raised in the submissions that were received.	This environmental factor does not require further evaluation by the EPA.
Aboriginal culture and heritage	No archaeological or ethnographical sites have been recorded within the Collie Power Station site. There is a low to moderate potential for previously unrecorded ethnographical sites to be reported within the broad study area.	**Department of Indigenous Affairs** In the summary of environmental factors, objectives and management reference is made to no archaeological or ethnographic sites being located within the Collie Power station site. Then of page 130 reference is made to studies conducted in 1990 for the ERMP. I am concerned that the heritage investigations appear to have been conducted 15 years ago, prior to the advent of Native Title. For such reasons it is strongly suggested that consultations are conducted with representatives of the relevant Native Title claimant groups and/or people who have a known and recognised association and heritage knowledge of the area. In section 7.11.2 of the PER a statement is made that the proponent will prepare a Construction Environmental Management Plan and that further archaeological inspections and consultations with relevant Aboriginal people will be conducted prior to any ground disturbing works commencing at the site. Provided this is commitment is abided by the proponent will have adequately considered Aboriginal heritage matters. Finally, if the proposed works will impact upon any Aboriginal heritage sites the proponent will need to seek consent from the Minister of Indigenous Affairs under section 18 of the *Aboriginal Heritage Act 1972* prior to any disturbing works commencing.	The EPA considers that the concerns that were raised have been adequately addressed by the responses provided by the proponent. The proponent has made a commitment to prepare and implement a Construction Environmental Management Plan that addresses Aboriginal heritage management. This environmental factor does not require further evaluation by the EPA.

Table 4: Identification of relevant environmental factors and principles

Preliminary Environmental Factors	Proposal Characteristics	Government Agency and Public Comments	Identification of Relevant Environmental Factors
SOCIAL SURROUNDINGS			
European heritage	There are no known European heritage sites located within the project area.	**Heritage Council of Western Australia** It is noted that six places included in the Heritage Council's Register of Heritage Places are located in the Collie Area: P535 Collie Courthouse, Wittenoom Street Corner Pendleton. P540 Railway Goods Shed and Footbridge, Coalfields Highway. P541 Round House with Turntable, Coalfields Highway. P550 Collie Post Office (fmr), Throssell & Pendleton Streets. P552 All Saints' Anglican Church, Mungalup Road (previously Harvey Street) & Venn Street. P3551 Suspension Footbridge, Collie River. It is also noted that none of the above mentioned places are located near the Collie Power Station. Based on the above information and an assessment of the received document, a Conservation Officer, with Delegated Authority from the Heritage Council's Development Committee advises the Environmental Protection Authority that there are no objections on heritage grounds to the proposed development.	Given the that the Heritage Council of Western Australia has no objections to the proposed development on heritage grounds, this environmental factor does not require further evaluation by the EPA.
Visual amenity	The visual appearance of the power station will not be altered significantly as the existing Collie A Power Station stack, which is the tallest structure, will also be used by the Collie B Power Station. The plume from the stack may be more visible on colder days due to the larger flow of exhaust gases.	**Member of the public** The visual impact is not going to be increased significantly (as the impact already exists from Collie A) but there is not much the proponent can do for the impacts they create and they should say so!	The EPA considers that the concern that was raised has been adequately addressed by the response provided by the proponent. Section 7.9.3 in the PER document indicates that the proponent will undertake a number of management strategies to improve the visual amenity of the proposed power station. This environmental factor does not require further evaluation by the EPA.

Table 4: Identification of relevant environmental factors and principles

PRINCIPLES		
Principle	**Relevant Yes/No**	**If yes, Consideration**
1. The precautionary principle *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.* *In application of this precautionary principle, decisions should be guided by –* *a. careful evaluation to avoid, where practicable, serious or irreversible damage to the environment; and* *b. an assessment of the risk-weighted consequences of various options.*		
	No	
2. The principle of intergenerational equity *The present generation should ensure that the health, diversity and productivity of the environment is maintained and enhanced for the benefit of future generations.*		
	No	
3. The principle of the conservation of biological diversity and ecological integrity *Conservation of biological diversity and ecological integrity should be a fundamental consideration.*		
	No	
4. Principles relating to improved valuation, pricing and incentive mechanisms *b. Environmental factors should be included in the valuation of assets and services.* *c. The polluter pays principle – those who generate pollution and waste should bear the cost of containment, avoidance and abatement.* *d. 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.* *e. 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.*		
	Yes	Principle 4b was considered in assessing greenhouse gas emissions.
5. The principle of waste minimisation *All reasonable and practicable measures should be taken to minimise the generation of waste and its discharge into the environment.*		
	Yes	Principle 5 was considered in assessing greenhouse gas emissions and atmospheric emissions.

Appendix 4

Recommended environmental conditions and proponent's consolidated commitments

Statement No.

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 super-critical coal-fired base-load power generating facility with a nominal generating capacity of 300 megawatts on a site located approximately 10 kilometers north-east of Collie, as documented in schedule 1 of this statement.

Proponent: Wesfarmers Energy Limited

Proponent Address: PO Box 4184, MYAREE BUSINESS CENTRE WA 6960

Assessment Number: 1542

Report of the Environmental Protection Authority: Bulletin 1178

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:

   i. an inventory of emissions;
   ii. opportunities for abating "greenhouse gas" emissions in the organisation;
   iii. a "greenhouse gas" mitigation action plan;
   iv. regular monitoring and reporting of performance; and
   v. 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.

6-3 Prior to the commencement of construction, the proponent shall make the Greenhouse Gas Emissions Management Plan required by condition 6-1 publicly available.

7 Stack Emissions and Ambient Air Quality Monitoring

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

The objectives of the plan are:

- 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 a high level of ecological protection outside the zone of initial dilution for the marine outfall;

    - protect a low to moderate level of ecological protection inside the zone of initial dilution for the marine outfall;

    - 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 established environmental values;

    - protect the established levels of ecological protection; 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. 1542)

The proposal is to construct and operate a 300 megawatt power station (known as the Collie B Power Station) on a site directly adjacent to the existing Collie A Power Station and located approximately 10km east-north-east of Collie (Figure 1). It will be a supercritical coal-fired base-load generation facility with a nominal generating capacity of approximately 300MW. The Collie B Power Station will supply electricity to the South West Interconnected System (SWIS).

Existing facilities at the Collie A Power Station site include:

- 300MW power generating unit, comprising boiler and turbo generator;
- a 170 metre stack;
- on-site coal receival, crushing, storage and handling facilities;
- off-site water supply and on-site water storage facilities;
- wastewater management and disposal system;
- cooling water system;
- ash handling, storage and transport facilities;
- site substation;
- water treatment plant; and
- workshop and offices.

The construction of the power station would require the following additional facilities:

- boiler and turbo-generator;
- cooling tower with cooling water pump station and side filter;
- electrostatic precipitators;
- workshop;
- administration building (includes laboratory);
- electrostatic precipitator and ash handling electrical room;
- warehouse;
- electrical control panel room;
- fuel oil storage facility;
- make-up water tank;
- unit transformers;
- gas cylinder store; and
- emergency diesel generator and auxiliary steam boiler.

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.

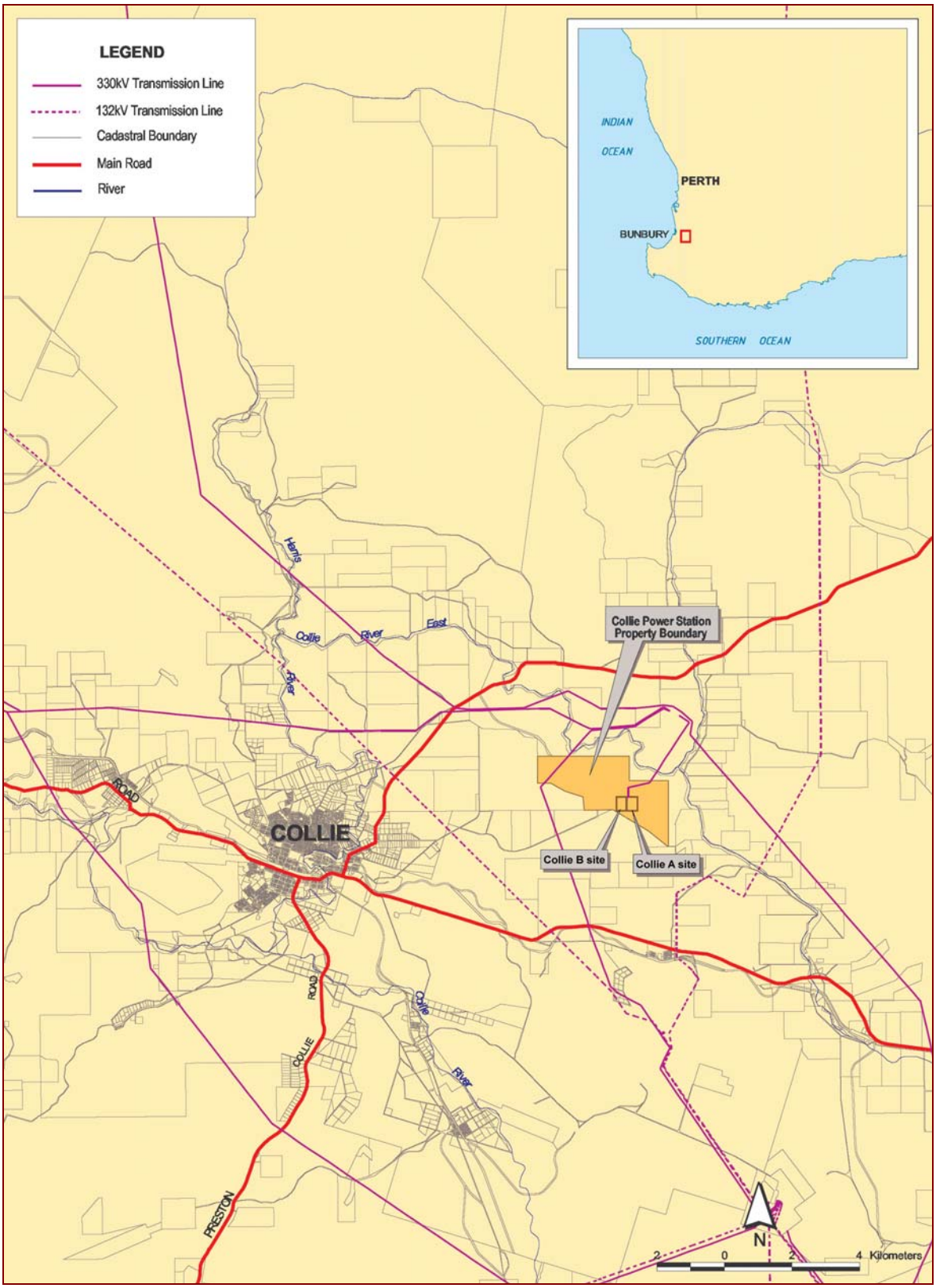

Figure 1: Regional location (Source: Figure 1 from Strategen 2005a)

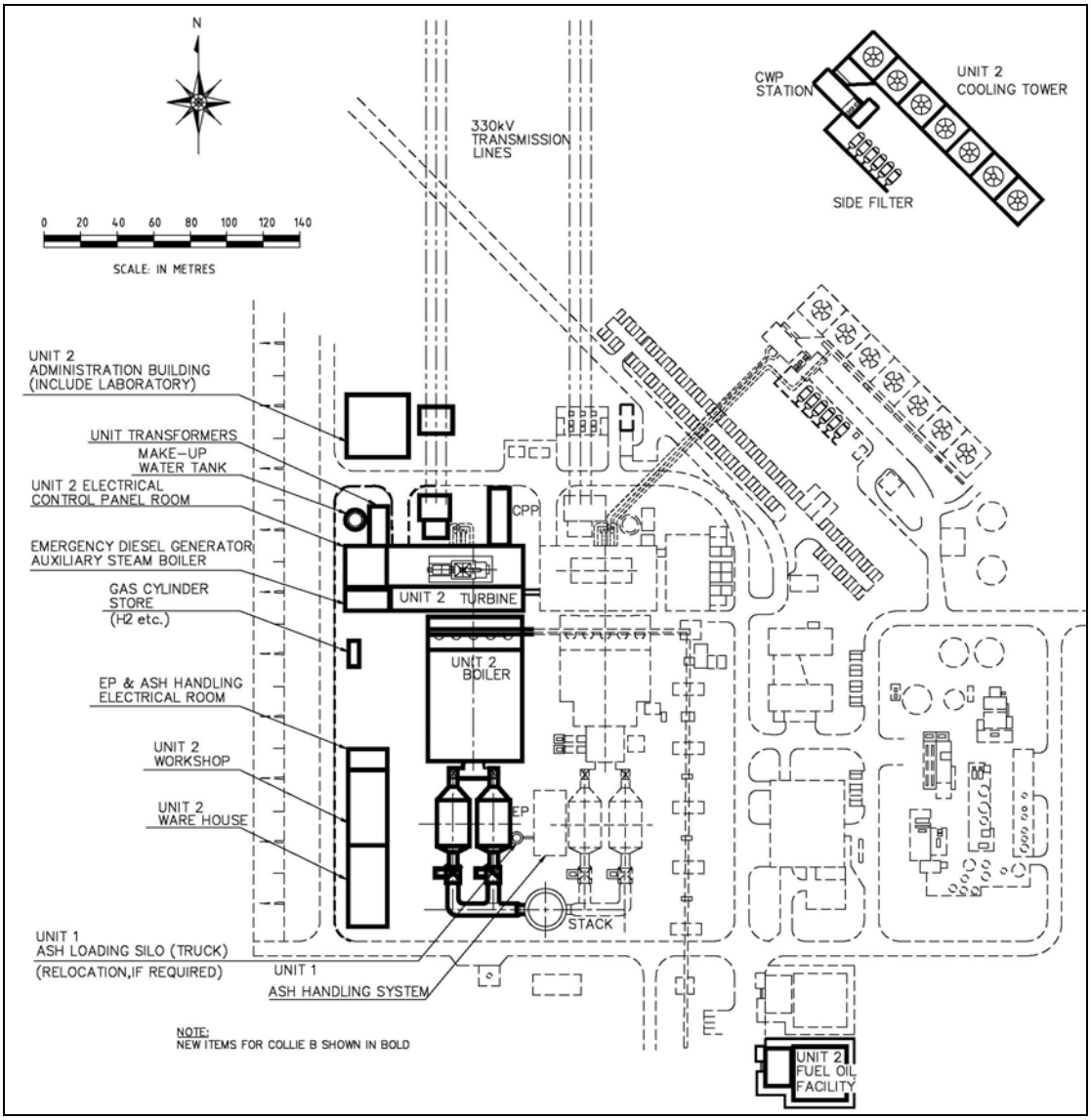

Figure 2: Plant layout (Source: Modified version of Figure 3 from Strategen 2005a)

Wesfarmers Energy Limited
Collie B Power Station
Mass Balance Diagram

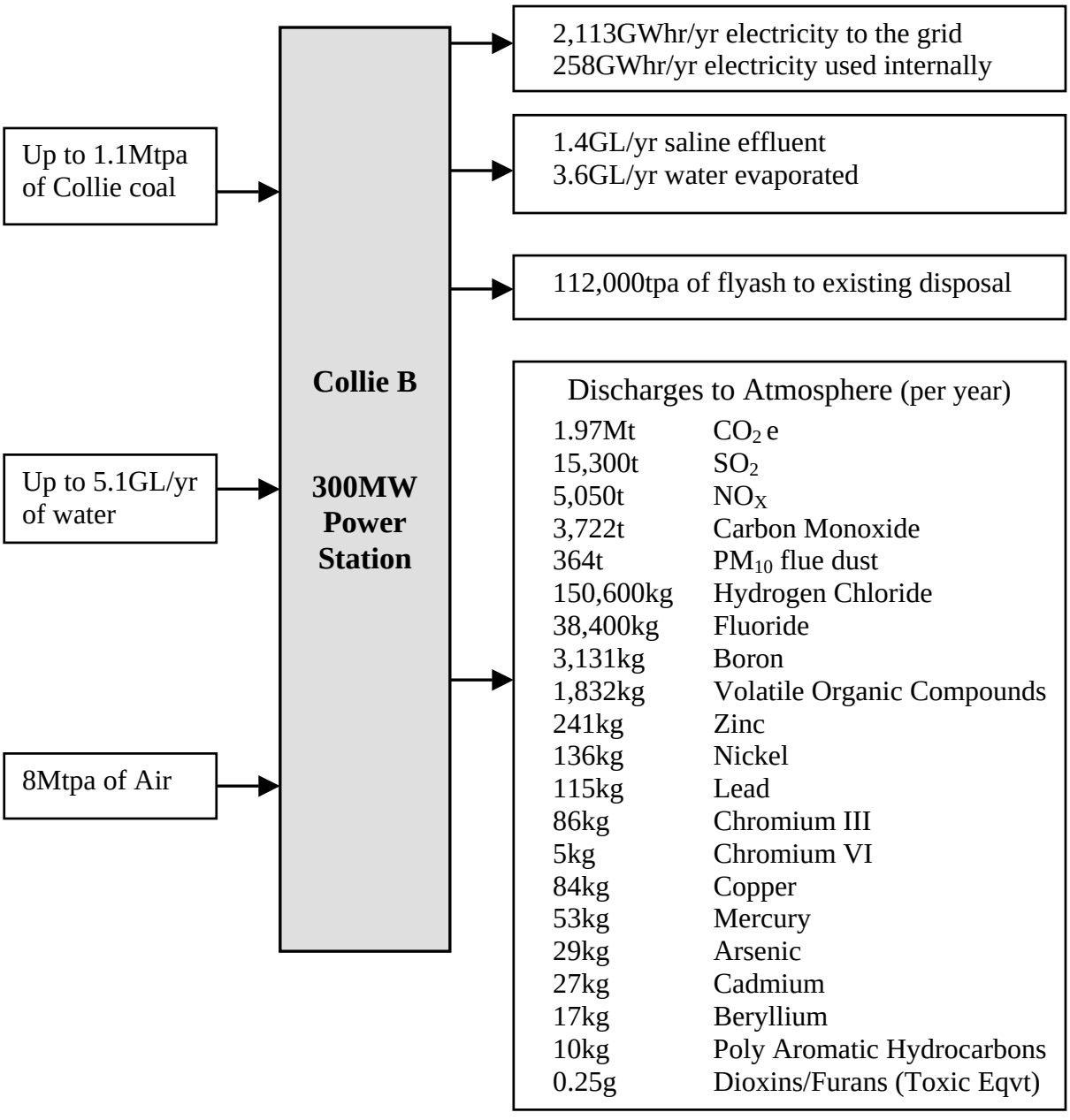

Figure 3: ***Mass balance diagram (Source: Modified version of Mass Balance Diagram from Wesfarmers Energy Limited 2005)***

Table 1: Summary of key proposal characteristics

ELEMENT	DESCRIPTION
General	
• Facility Description:	Construction & operation of a supercritical, pulverised coal-fired steam generation power plant matching the existing Collie A Power Station output.
• Location:	Collie Power Station Site, 10km east-north-east of Collie Townsite, Western Australia.
• Footprint:	Area approximately 30,000m^2 at Collie Power Station Site.
• Project Purpose:	To produce electricity for the Western Power, Power Procurement Process and other customers in a base load 24 hour per day, 365 days per year operation.
• Generating Capacity:	335MW Gross Output, 303MW Sent Out Capacity.
• Thermal Efficiency:	38.08% full load, sent out, HHV (Coal as tested). 40.81% full load, sent out, LHV (Coal in accordance with AS1038.16-1996).
• Construction Period:	38.5 months from Commencement to Contract Completion.
• Project Life:	30 years.
Plant Facilities	
• Coal Facility:	Upgraded existing Collie A coal storage and transport system.
• Water Supply System:	Duplicated existing water supply.
• Stack:	Existing shared with Collie A, 170 metres high. Two x 4.8 metre ID flues. (designed for 2 units).
• Boiler:	Balanced draft, pulverised coal fuel, supercritical, similar to Collie A.
• Pollution Control Equipment:	Low NO_X burners, 3-field Electrostatic Precipitators.
• Steam Turbine:	Tandem compound, fully condensing, reheat, supercritical with 335MW synchronous generator.
• Cooling Towers:	Evaporative type, matching Collie A.
• Water Treatment Plant:	Upgraded existing Collie A unit.
• Waste Water Treatment Plant:	Existing shared with Collie A. (designed for 2 units).
• Waste Water Collection & Treatment:	Existing shared with Collie A (designed for 2 units) plus compliant interceptors, and licensed contractor disposal of items not suitable for the water treatment plant.
• Saline Water Pipe:	Existing shared with Collie A. (designed for 2 units).
• Ash Disposal:	Existing shared with Collie A. (designed for 2 units).
• Diesel Storage:	New bunded tank 1000kL adjacent to Collie A.
• Lubricant & Cleaning Agents:	Small quantities of greases, oils and cleaning agents in compliant bunded workshop storage.
Utilities	
• Water Use:	Up to 5.1GL/yr.
• Coal Supply:	1,095,430tpa.
• Electricity:	330kV capacity 3.5km from Collie B site to existing Shotts substation.
Emissions	
• PM_{10} Flue Dust:	50mg/Nm^3 at 7% O_2, 101.3kPa, 0 deg C, 12.5g/s, 364tpa.
• Nitrogen Oxides NO_X:	500mg/Nm^3 at 7% O_2, 101.3kPa, 0 deg C, 134g/s, 5050tpa.
• Sulphur Dioxide SO_2:	2159mg/Nm^3 at 7% O_2, 101.3kPa, 0 deg C, 579g/s, 15,300tpa.
• Carbon Monoxide CO:	552mg/Nm^3 at 7% O_2, 101.3kPa, 0 deg C, 148g/s, 3722tpa.
• Greenhouse Gases:	1,971,475tpa CO_2 e.
• Volatile Organic Compounds (VOCs):	Estimated 1832kg/yr in accordance with NPI VOC Definition & Information Ver 2.4, 23 Mar 2003.
• PAHs:	10kg/yr.
• Fluorides:	38,398kg/yr.
• Hydrogen Chloride HCl:	150,637kg/yr.
• Lead:	115kg/yr.
• Zinc:	241kg/yr.
• Mercury:	53kg/yr.
• Cadmium:	27kg/yr.
• Chromium (III):	86kg/yr.
• Chromium (VI):	5kg/yr.
• Arsenic:	29kg/yr.
• Beryllium:	17kg/yr.
• Copper:	84kg/yr.
• Nickel:	136kg/yr.
• Boron:	3131kg/yr.
• POPs excluding Dioxins & Furans:	Nil.
• Dioxins & Furans:	1.10g/yr.
• Dioxins & Furans (TEQ):	0.25g/yr.
• Noise: predicted worst-case noise level at site boundary:	64dB(A).
• Noise: predicted worst-case noise level at buffer boundary:	37dB(A).
• Noise: predicted worst-case noise level at nearest sensitive receptor:	35dB(A).

ELEMENT	DESCRIPTION
Waste	
• Ash:	112,000tpa.
• Sewage:	1,200tpa.
• Saline Water:	Up to 1.4GL/yr.
Workforce	
• Construction Period:	Approximately 600 persons (peak number).
• Operations:	Up to 50 full time personnel.

Notes:

Items with measurement units of /year, /yr, and tpa are estimates based on a power requirement of 80% of the capacity of the power station per year of operation.

Abbreviations

AS1038.16-1996	Australian Standard 1038.16-1996	LHV	lower heating value
CO_2 e	carbon dioxide equivalents	m^2	square metres
dB(A)	decibels A weighted	mg/Nm^3	milligrams per normal cubic metre at 1 atmosphere, O deg C
deg C	degrees Celsius	MW	megawatts
g/s	grams per second	O_2	oxygen
g/yr	grams per year	pa	per annum
GL/yr	gigalitres per year	PAHs	polycyclic aromatic hydrocarbons
ID	internal diameter	POPs	persistent organic pollutants
HHV	higher heating value	PM_{10}	particulate matter with an aerodynamic diameter of less than 10 micrometres
kg	kilograms		
kg/yr	kilograms per year	TEQ	toxic equivalent
kL	kilolitres	tpa	tonnes per annum
kPa	kilopascals	Ver	version
kV	kilovolts	%	percent

Source: Modified version of Table 2 from Strategen 2005b

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.**