GRIFFIN ENERGY PTY LTD

Bluewaters Power Station Phase II

(Bluewaters II)

Proponent's Response to Submissions

April 2005

Table of Contents

List of Tables

List of Figures

Attachments

1 Summary of Submissions Received

A total of 16 submissions were received from the following:

- Department of Environment (DoE)
- Department of Conservation and Land Management (CALM)
- 2 x private citizens
- Department of Industry and Resources (DoIR)
- Department of Health (DoH)
- Conservation Council WA, Climate Action Network, WWF, Australian Conservation Foundation (CCWA, CAN, WWF, ACF)
- Pollution Action Network (PAN)
- WA Sustainable Energy Association
- Conservation Council of WA (CCWA)
- Dr Mark Diesendorf
- Denmark Environment Centre
- Shire of Collie
- Department of Indigenous Affairs (DIA)
- Western Power Corporation (WPC)
- CR & MA Tonkin

Summary of Submissions

The submissions focused on four main factors, namely Greenhouse emissions, noise, health impacts and water supply and disposal.

The main theme with respect to Greenhouse was that the project was not justified. This basis for arguing against the proposal ignored the fact that the demand which justifies the proposal had already been established by Western Power Corporation and the subsequent decision to call for tenders under the Power Procurement Process. Other issues raised in objection focused on government policy. Griffin acknowledges that there is an ongoing public policy debate surrounding the use of coal for electricity generation, however the company is constrained to act within the requirements of the Power Procurement tender process and has endeavoured to respond in a rational, complete and sensitive manner to issues.

Other issues raised were mainly expansions on issues raised from the Bluewaters I proposal and have been addressed as far as is practicably possible.

2 Noise

Issue 2.1 *Raised by Department of Environment.*
The DoE has concerns that the three PER documents in respect of coal-fired power station proposals are not providing standardised modelling information for noise. This makes it difficult to establish whether modelling will reflect actual impacts if constructed. In addition, the PER modelling does not appear to include any impacts from noise from existing and proposed Ewington mining operations.

Response The differences in the noise modelling for the three PERs occurred because the two Collie B PERs had Bluewaters power station located in a different position.

Cumulative noise modelling to include mining activity is awaiting the finalisation of the mine plant for Ewington 1. Herring Storer Acoustics (HSA) has been commissioned to undertake this modelling once the mine plan has been finalised.

Herring Storer Acoustics recently carried out noise level measurements of noise emissions from the Collie A Power Station. Noise levels from the power station were recorded at the following locations:

L1 North West corner of car park area
L2 Approximately 1900 metres from power station
L3 Approximately 3.4km from power station
L4 Near intersection of Collie -Williams and Boys Home Roads.

The noise level measurements recorded are summarised below in Table 1.

Table 1 – Summary of Noise Levels

Location	**Noise Level (dB(A))**
L1	56
L2	37
L3	30
L4	25

The noise level measurements were carried out under light SE wind conditions.

Based on the noise levels recorded and using SoundPlan to determine the noise reduction from the Collie A Power Station to measurement locations L1 and L2 the sound power levels as listed in Table 2 were determined for Collie A. The sound power noise level for the general plant was based on reverse propagation from measurement location L1 as the noise level at this location was dominated by noise emissions from the plant and the cooling towers. The sound power level for the stack

was then determined from the noise level recorded at Location L2. The levels recorded at L2 contained other source noise and hence the determined sound power levels must be considered conservative (an overestimate of Collie A immissions).

Table 2 - Collie Power Station Sound Power Level

Source	Octave Band Centre Frequency (Hz) / Sound Power Level (dB)								
	63	**125**	**250**	**500**	**1k**	**2k**	**4k**	**8k**	**dB(A)**
Plant	122.5	119.0	112.9	110.7	104.1	102.7	97.5	91.6	112.2
Stack	124.2	120.7	115.6	112.7	106	104.8	103.1	98.0	114.5

Note: The noise level measured at location L1 contained components of both plant and cooling tower noise, hence the sound power level for the plant includes the cooling towers.

For information, the octave band sound power levels used in the Bluewaters Power Station noise model are listed in Table 3.

Table 3 – Bluewaters Sound Power Level

Source	Octave Band Centre Frequency (Hz) / Sound Power Level (dB)								
	63	**125**	**250**	**500**	**1k**	**2k**	**4k**	**8k**	**dB(A)**
Plant	113.3	114.5	107.6	105.0	109.0	112.3	108.3	107.1	116.6
Stack	104.8	108.8	101.1	99.3	104.0	105.8	106.8	100.1	111.8

The overall sound power levels used for the Bluewaters modelling were based on measured levels of a 400MW coal fired power station supplied by the proponent. The reported level was a sound pressure level of **60** dB(A) at **150**m distance. By reverse propagation the overall sound power level was calculated to be **121** dB(A). For propagation calculations this source was assumed to be equally divided into a medium height main plant and infrastructure source and a high-level stack discharge source of equal energy i.e. **118** dB(A) each.

The spectral make up of the determined sound power levels was based on measurements of the Muja coal fired power station.

Initial modelling of the Bluewaters power station (first proposed location), indicated exceedances to the regulatory assigned noise levels may occur under certain atmospheric conditions. Consequently the design power levels were reduced to **117** and **112** dB(A) (plant and stack levels respectively).

Subsequent modelling (at the current proposed location) used these sound power levels however, unintentionally, the levels were used for each 200MW stage resulting in the overall sound power levels for the 2 stage proposal of 400MW being **120** and **115** dB(A) for the plant and stack respectively. This therefore can be considered a conservative estimate of sound power.

With respect to the comparison of the Bluewater's proposal and the Collie A station, measurements were made of the Collie A station noise immission levels and by reverse propagation, the sound power levels were determined. These results were reported in our submittal of 31 March 2005 and in summary resulted in the following:

Collie A **112** and **115** dB(A) (plant & stack)
Bluewaters Stage 1 **117** and **112** dB(A) (plant & stack)

Comparison of the spectral make-ups indicates that Collie A produces higher low frequency noise (below 500 Hz) and lower high frequency noise than the Bluewaters proposal. The higher low frequency components of Collie A do not have a significant affect on the overall A weighted levels as mid frequencies tend to govern the far field results.

Based on the sound power levels determined from the noise level measurements and as listed in Table 3, single point calculations were carried out for Collie A Power Station using both SoundPlan and ENM under similar weather conditions that occurred at the time of the measurements and the results are listed in Table 4.

Table 4 – Summary of Single Point Calculations

Location	**Noise Level (dB(A))**		
	Measured	**SoundPlan**	**ENM**
L1	56	59	59
L2	37	38	38
L3	30	30	31
L4	25	26	26

Note: The modelling did not contain any directivity or barrier effect for the stacks. Therefore, the calculated noise levels for Location L1 should be higher than the measured noise level. However, if only noise emissions from the plant were taken into account, then the modelled noise level correlates with the measured noise level.

Modelling was carried out under a south easterly breeze with the plant and stack located at 20m and 170m above the ground.

The results of the single point calculations using both SoundPlan and ENM correlate with the measured noise level.

As requested by the DEP, the following modeling has been undertaken:

Collie A based on HSA noise level measurements (both in ENM and SoundPlan)
Bluewaters I and II (in SoundPlan)
Collie A and B and Bluewaters I and II (in SoundPlan).

Modelling was carried out using the following source heights:

- Collie Power Station Stack 170m
- Collie Power Station Plant 20m
- Bluewaters Power Station Stack 100m
- Bluewaters Power Station Plant 20m

ENM modelling was carried out under a south easterly breeze.

The results of the SoundPlan modelling are attached as Figure A1 to A3 in attachments 1 to 3.

A comparison of the SoundPlan and ENM models for Collie A is attached as Figure B1 in attachment 4.

Modelling of mining activities will be carried out once mine plans for Ewington I have been finalised.

Noise propagation using both ENM and SoundPlan correlate reasonably well under light wind conditions. However, under standard DEP weather conditions, modelling using ENM results in higher noise levels than predicted by SoundPlan. This is because under higher wind speeds there is a significant additive effect for temperature and wind in the ENM model. However, this additive effect is only in the 1000Hz and 2000Hz octave bands and not evenly spread across the spectral range, whereas SoundPlan relatives the temperature inversion with wind speed, which more accurately predicts noise propagation. Thus the ENM noise model is conservative and over predicts noise levels at distance.

Although it is not suggested that the Bluewaters proposal should have the same sound power levels as the Collie A power station, modelling of the Bluewaters proposal was undertaken using the Collie A data. The maximum propagation noise contours of this scenario are shown in the attached Figure C1 (attachment 11)

The inclusion of a stack in the Collie Power Station noise model is highly significant, as the noise emissions from the stack becomes the dominant noise source at distances of more than about 2km. Due to the height of the stack and the spectral makeup of the Collie Power Station stack source, the rate of decay for noise stack will be less than that for the Bluewaters Power Station.

Summaries of the comparison, based on single point calculations at the Collie/Williams intersection location, are listed in Table 5.

Table 5 - Collie Williams Rd location Bluewaters site modelling scenarios

	Octave Band Centre Frequency (Hz)						dB(A)
	63	125	250	500	1K	2K	
Bluewaters as per PER	10	21	20	24	26	16	29
Bluewaters with Collie A Plant	18	24	24	28	23	10	32

It can be seen that there is a 3 dB(A) increase using the Collie A sound power levels at the Bluewaters site.

The above differential is a function of the different sound power levels of each scenario. Other differentials, when comparing Collie A modelling using the ENM program and Bluewaters using the SoundPlan program, were due to modelling algorithm differences. The modelling showing that under light downwind propagation both models gave similar results. However, under medium downwind and temperature inversion conditions, ENM tended to result in levels around 4 dB(A) higher than SoundPlan. There were other considerations for differentials, in particular the fact that the original modelling for Collie A did not include a higher level stack source.

Using the Collie / Williams Road location a cumulative noise level was determined from the measured levels of Collie A and Ewington II and predicted levels for Bluewaters I and II, Coolangatta Estate and Ewington I. The results are listed in Table 6.

Table 6 - Collie Williams Rd location cumulative Noise Levels

Source	Overall Level, dB(A)
Collie A	24
Bluewaters I	26
Bluewaters II	26
Coolingatta	30
Ewington II	26
Ewington I	38/20*
Total	**39/35**

* Initial stages of constructing noise barrier results in 38 dB(A), ongoing mining is 20 dB(A).

It is considered that the nominal use of 112 dB(A) stack discharge sound power level for each stage of the Bluewaters proposal is practicable.

Stack noise emission is the result of noise propagation from boiler combustion and the airflow induced noise of the ID fans.

It is unusual for any modern plant not to incorporate absorptive or reactive type silencers after ID fans. Typically modern power station stack discharge levels are around 85 dB(A) at 2 metres distance.

This relates to a sound power level of around 100 dB(A). With good fan selection and the use of reactive type silencers, this level of emission is readily achieved, providing it is incorporated into the design.

It is worthy of note that modern industrial plant must be designed to satisfy 85 dB(A) criteria at 1 metre distance from any source in order to comply with occupational health regulations. In the case of the Bluewaters station this criteria is likely to be more critical than the far field environmental requirements.

The sound power levels determined from Herring Storer Acoustics noise level measurements resulted in reduced overall sound power level for the plant (including cooling towers) and a significant reduction in the low frequency noise levels compared to that used in previous modelling.

The inclusion of a stack in the Collie Power Station noise model is highly significant, as the noise emissions from the stack becomes the dominant noise source at distances of more than about 2km. Due to the height of the stack and the spectral makeup of the Collie Power Station stack source, the rate of decay for noise stack will be less than that for the Bluewaters Power Station.

It appears that the high low frequency component used in previous modelling of Collie A, compensated for the stack noise emissions.

Additionally, the overall sound power level of the Collie Power Stations stack is almost 3dB(A) higher than that used for the Bluewaters stack, which because the relationship between noise reduction and distance is logarithmic, the distance required for noise emissions from the Collie Power Station to decay to 30 dB(A) is in the order of an additional 1km compared to that for the Bluewaters Power Station.

Based on the modelling carried out, the critical element to ensure noise emissions from the Bluewaters Power Station complies with Regulatory requirements is the inclusion of noise control to the stack. This has already been recognized by the reduction stack sound power levels from 118 dB(A) used in the original modelling of the Bluewaters Power Station 111 dB(A). We believe that control of the stack noise emissions is one of the simpler elements to control at the design stage. Therefore, we believe that the noise modelling for Bluewaters Power Station is practicable and achievable.

As part of the Coolangatta Industrial Estate Structure Plan, a Noise Management Plan for the Estate has been prepared (Attachment 5).

Commitment Number Ten in the PER commits Griffin Energy to the development of a Noise Management Plan for Bluewaters. The information and studies referred to above will be used as reference and source material for the development of the Noise Management Plan. The Noise Management Plan will provide for “as built noise measurements”.

The Plan will take into account other noise sources including mining operations.

Issue 2.2 *Raised by CR & MA Tonkin and a private citizen.*
The noise modelling is inconsistent between PERs.

Response Refer to response 1.1.

Issue 2.3 *Raised by Shire of Collie.*
Cumulative noise impacts are of concern. Bluewaters II by itself may present no more problem than does the existing Collie A power station. However it is the cumulative effect that may well indicate something different. The Council is concerned to know how any problems with respect to power stations and coal mining operations will be addressed in the future, bearing in mind that closure of operating power stations or coal mines could not possibly be a solution

Response Cumulative noise modelling was carried out for this proposal and for the Coolangatta Industrial Estate. A Special Control Area (buffer zone) has been applied around the Coolangatta Industrial Estate to manage impacts from the Indusial Estate which will include the power stations. The Coolangatta Industrial Estate has a Noise Management Pan in place for the Estate.
The proposed mining activities are transient by nature. Part of the Industrial Estate will not become available for Industrial development until such time mining has been completed and that part of the mine rehabilitated.
Modelling has shown that noise from the Power stations or the Industrial Estate will not add to the noise impact of the mine operations.

Issue 2.4 *Raised by a private citizen.*
I am concerned about noise emissions from the proposed powers stations and Coolangatta Industrial Estate. The developments are about three km and over the road from our property. Members of my family and I have had some serious health problems in recent years and we are concerned that the noise may cause us additional ill health.

Response Griffin Energy is committed to full and open communication with adjacent landowners. Modelling undertaken by the Herring Storer Acoustics and reported in the PER has shown that at the distance specified from the power station all standards will be met. Griffin is willing to maintain open dialogue with any adjacent landowner in order to address concerns and provide further contextual information regarding the outcomes of studies undertaken to date in relation to gaseous and noise emissions predicted for Bluewaters.

Issue 2.5 *Raised by a private citizen.*
The Power Station has been moved on a number of occasions to avoid the neighbours being affected by noise from the plant. The site is now

the most eastern it can be without being situated over anticipated mining or on unsuitable land to the south east.
What if the modelling is incorrect and the noise reduction by moving the plant can't be achieved will the power station be closed? More work clearly needs to be done particularly when considered in light of the conflicting noise modelling when compared with the Collie B PER's.

Response The location of the power station was moved partly in response to community consultation demonstrating the beneficial outcomes of consultation. It was also moved to overcome a slight geotechnical difficulty with the original site.
For details on noise impacts and further information on the noise modelling refer to the response to Issue 1.1.

Issue 2.6 *Raised by CR & MA Tonkin*.
The Noise emission maps do not factor in varying wind conditions.

Response The noise modelling report specifies wind conditions used in the modelling. Refer also to the response to Issue 1.1.

Issue 2.7 *Raised by CR & MA Tonkin*.
The information provided by the Industrial Estate consultants differs from that provided by both proponents for the Collie B proposals.

Response The differences relate to the differing locations used and the different models used to generate the individual reports. For more information refer to the response to Issue 1.1.

Issue 2.8 *Raised by CR & MA Tonkin*.
The Noise maps are cut off to the south and west.

Response The noise maps cut off at 25dB(A), below which any predictions would be meaningless.

Issue 2.9 *Raised by CR & MA Tonkin*.
We are already in the 40-45dB area of exposure for Ewington I.

Response The Ewington I operators will be responsible for meeting noise regulation levels.

Issue 2.10 *Raised by CR & MA Tonkin*.
It would appear we are in the 35-45dB range for the proposed power stations. This is above the 30dB limit set for the Coolangatta Industrial Estate which was not to be exceeded.

Response The noise modelling report attached to the PER clearly shows this not to be the case. It is consistent with the noise modelling for the Coolangatta Industrial Estate

3 Surface Water and Groundwater

Issue 3.1 *Raised by Department of Environment.*
The proposed power station lies within the Wellington Dam Catchment Area. Wellington Dam is presently used for irrigation supplies. The potential for using the Dam as a public drinking supply is being investigated by Government. A Priority classification is currently not assigned to this area but the potential exists for it to be classified P3. Heavy or energy industries are not compatible in P3 areas according to the Land Use Classification Table. The PER does not take into account the proclaimed catchment area in the text. Could the proponent comment on this matter?

Response Griffin Energy is aware of the potential classification. Griffin Energy would expect to be consulted in any proposal to assign a classification to the area. Griffin's Bluewaters proposals are compatible with existing uses in the area given that there are already two major power station facilities operational in the area.

Issue 3.2 *Raised by Department of Environment.*
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?

Response This will be addressed in the induction and training programs which are a component of the Construction and Operational Environmental Management Plans as detailed in commitment number one in the PER.

Issue 3.3 *Raised by Department of Environment.*
Wellington is CAWS Act clearing control area so any proposed clearing will need to be considered by the Department of Environment. The extent of any clearing must be determined and an application for a CAWSA Licence to Clear submitted to DoE

Response Should any clearing of native vegetation be required for Bluewaters, a Licence to Clear will be submitted to the DoE for approval.

Issue 3.4 *Raised by Department of Environment.*
There are potential water quality risks from hazardous material storage, washdown waters, fallout of air emissions to soil, saline water leakage from storage ponds, fly ash disposal in mine overburden, spills and leakage from the packaged treatment plant. Can the proponent provide more information on 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?

Response All these matters will be addressed in the Construction and Operational EMPs as specified in commitment one for which the DoE is an advising agency.

Issue 3.5 *Raised by Department of Environment.*
The proponent should demonstrate that under both normal and potentially abnormal operating conditions water contaminants in use or produced at the power station are fully contained?

Response All these matters will be addressed in the Construction and Operational EMPs as specified in commitment one for which the DoE is an advising agency. Griffin has committed to a plant design to ensure that contaminants are not released to the environment (PER, Section 6). All potentially hazardous materials will be stored in accordance with pertinent regulations, and the design of the plant will be such that all potentially contaminated water will be captured and directed to storage areas and treated if required. As defined in the PER (s.7.7) two levels of containment will be provided to all areas where petroleum products are to be stored on-site. All tanks will be bunded, and any spills that could overflow these bunds will flow to the internal drainage systems and to sumps. Griffin recognises that effective on-site management of oils, chemicals and other water contaminants is an integral component of responsible environmental performance, and will address these aspects as contamination management (spill) plans to be prepared for both construction and operational phases. (See also Commitment No. 8 in PER Table 15).

Issue 3.6 *Raised by Department of Environment.*
IntraGIS suggest there is a stream running through the property, or near to it, and the proposed power station is about 1.3km south of the Collie River so there may be a fairly direct path for any contaminants to enter the waterways and into Wellington Dam. A comprehensive monitoring and audit program would be required.

Response Griffin recognises the need for regular monitoring to ensure that any potential downstream impacts are managed appropriately over the project lifetime. Monitoring the quality of surface water will be an integral part of an overall water management plan for the site. This matter will be addressed in the Construction and Operational EMPs as specified in commitment six for which the DoE is an advising agency. The water management plan will outline volumes, treatment objectives, efficiency targets, compliance requirements, monitoring programme design and implementation, data management and quality assurance.

Issue 3.7 *Raised by Department of Environment.*
Contractor's construction site facilities need to be considered in terms of sewerage disposal, fuel and hazardous material storage, stormwater management etc

Response All these matters will be addressed in the Construction EMPs as specified in commitment one for which the DoE is an advising agency. EMPs will be applicable to contractors' activities to ensure that all

practicable measures are taken to maintain the environmental values of the local environment surrounding the Bluewaters II location.

Issue 3.8 *Raised by Department of Environment.*
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*
- *Soil liners to contain low-hazard waste*
- *Toxic and hazardous substances*

Response All these matters will be addressed in the Construction and Operational EMPs as specified in commitment one for which the DoE is an advising agency.

Issue 3.9 *Raised by Department of Environment.*
A map showing the location of surface drainage features and topography should be provided.

Response Attachment 6 shows the necessary detail. For more accurate photography, DoE is referred to the file Bunbury_Collie_Mosaic available from DLI, dated November 2000 / January 2001.

Issue 3.10 *Raised by Department of Environment.*
The discussion on potential impacts on surface water features requires further development – in particular how construction activities may increase surface water and sediment runoff. An understanding of mechanisms for potential impacts is necessary for management of potential impacts.

Response These matters will be addressed in the Construction and Operational EMPs as specified in commitments four and five for which the DoE is an advising agency.

Issue 3.11 *Raised by Department of Environment.*
The DoE has concerns regarding the difficulty of establishing the exact amount of water available from dewatering in the medium and long terms and has advised proponents of potential coal-fired power stations that it would be prudent for them to develop an alternative water supply, rather than depend on dewatering water for a secure long-term supply. As the DoE has taken the position that it will not issue any new groundwater licences to Energy Groups for power station operations it is recommended that Griffin Energy seek to source an alternative, secure long-term water supply.

Response Griffin has prepared a water supply strategy to cater for medium to long term water supply management issues. Refer to attachment 9 for the detail of the strategy

Issue 3.12 *Raised by Shire of Collie.*
It is not clear from the PER as to where Griffin will derive its potable water supply for Bluewaters – will this be piped in from the Harris Dam or will Griffin be treating water on site to make it potable? It is also not clear as to what quantities of potable water will be required.
It is essential that licensing conditions for Bluewaters clearly enunciate that all cooling waters are to be sourced from Ewington I mine dewatering activities. It is essential that licensing conditions prohibit the interference of ground water supplies to adjacent private landowners.

Response The 3.25 GL/yr includes the amount required for potable water. Potable water will be drawn from the mine dewatering water and treated on site. No other sources are contemplated at this time.
Griffin is committed to ensuring that water rights are protected for adjoining landowners and has given assurances in writing to this effect. Griffin would welcome the Shire of Collies input into the licensing process for Bluewaters.

Issue 3.13 *Raised by Shire of Collie, CR & MA Tonkin and a private citizen.*
The proponents indicated that the development of Stage I of the Coolangatta Industrial Estate in which the Power Station would be located would not affect the adjoining landowners in terms of run-off. This is simply wrong with a contour plan showing surface watershed entering the neighbour's property creek system.

More work needs to be done to address the concerns of the landowners regarding both ground water availability and contamination.

Response The Structure Plan for Coolangatta has been adjusted to account for drainage into neighbouring properties. The power station site does not impact on the drainage lines concerned. Griffin has committed to asurface water and drainage management plan for the project and will consult with adjoining landowners in the development of the plan.

Issue 3.14 *Raised by CR & MA Tonkin and a private citizen.*
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.

Response The Griffin Group is mindful of the water supply situation in the Collie area and has commissioned a number of studies into the water supply and management situation as it applies to Griffin's operations. The commissioned studies take into account possible impacts of a revised water regime, including, but not restricted to, a change in rainfall.

Griffin Energy has prepared a water management strategy for the Coolangatta Industrial Estate. Griffin Energy is also consulting with the DoE on water supply strategies for the Bluewaters power station. Mine dewatering is an essential step in the coal mining operation and given the priority use for water from the Collie basin is power generation, the use of mine dewatering water for power generation projects such as Bluewaters is consistent with current allocation policy and strategy. Griffin understands the impact of mine dewatering in the Collie basin and will continue to actively practise and promote responsible stewardship of this essential resource. Griffin will continue to consult with all concerned stakeholders on water sources, usage and allocation.

4 Flora and Fauna

Issue 4.1 Raised by CCWA, ACF, WWF, CANA.
The statement in the PER that "Construction of the plant does not require… disturbance to any ecosystems" contradicts the results of the flora and fauna survey, which refers to the potential impact on Baudin's Cockatoo and Red-Tailed Black Cockatoo. Both species are listed Threatened Species under the Commonwealth ***Environment Protection and Biodiversity Conservation (EPBC) Act 1999****.*

Response The flora and fauna report covered a larger area than that which will be impacted by Bluewaters. The purpose of the flora and fauna report was twofold, namely to provide information on a regional context and on site specific information. As Bluewaters is to be built on cleared agricultural land there will be no disturbance to any ecosystems.
Bluewaters II was referred to DEH under the requirements of the EPBC Act and the decision handed down as required under the Act, was that the proposed action was not a controlled action (EPBC 2004/1632). The reader is referred to Attachment 13.3 to the PER for more information.

Issue 4.2 *Raised by Department of Environment.*
Can the proponent provide aerial photographs showing the boundaries of the development proposal and vegetation associations at an adequate scale (i.e. <1:25,000) to allow for interpretation of the area? The DoE currently only has black and white aerial imagery available making interpretation difficult.

Response Attachment 6 shows the necessary detail. For more accurate photography, DoE is referred to the file Bunbury_Collie_Mosaic available from DLI, dated November 2000 / January 2001.
It should be noted that the project area is currently cleared agricultural land with a few stands of remnant vegetation in a highly degraded state.

Issue 4.3 *Raised by CALM.*
The likely downstream impacts of the proposal regarding the clearing of forest for mining and power transmission to support the project should be clearly identified.

Response Bluewaters is located on currently cleared agricultural land. It is also noted that the connection points for this project are characterised by cleared land. The coal supply for the power station will be sourced from the Ewington I coal mine. The coal mine is in the final stages of obtaining approval for its Environmental Management Plan. The mine will supply other customers besides Bluewaters. The projected life for Bluewaters and the Ewington I mine is expected to be of the order of twenty five years. The impacts of the mine development have been fully documented in the approval process for the mine. Therefore, the downstream impacts of the proposal with respect to mining have been fully documented.

Bluewaters will access the existing distribution network. It is not anticipated that additional network infrastructure is required to distribute Bluewaters produced electricity to customers. Over time it may be that the distribution network could require upgrading, however, this should be able to be accomplished within the existing network distribution corridors. Ultimately, management of environmental impacts of the distribution network is the responsibility of the network provider.

Issue 4.4 *Raised by a private citizen.*
The flora report indicates that the Jarrah along with sheoak and banksia where affected by Jarrah Leaf Miner. In my 25-year career as a forester I have never seen sheoak and banksias affected by leaf miner.

Response Griffin Energy acknowledges the point and has advised the consultants who prepared the report of the information.

Issue 5.5 *Raised by Western Power.*
*The statement "*Monitoring undertaken by Western Power has indicated that effects from sulphur dioxide emissions from the existing coal fired power plants at Collie are negligible and almost impossible to quantify (Morris 2004, pers comm..). *on page 27 of the PER has been taken out of context and appears to relate to the preceding discussion on regional emissions. The comment should have related to the program of vegetation monitoring Western Power undertook in the vicinity of Collie A between 1997 and 2000 to determine the effects of ambient sulphur dioxide on vegetation. The results of this program indicated that no statistically significant effects on vegetation were identified.*

Response Griffin Energy acknowledges the point. The word "*vegetation"* should have been included before the word *"monitoring"* at the beginning of the sentence, and the words "*on vegetation*" should have been included between the words "*effects*" and "*from*" in the sentence.

5 Atmospheric Emissions

Issue 5.1 *Raised by Department of Environment.*
It is difficult to fully assess the expected PM_{10} impacts because the contribution from mining operations in the region has not been addressed. Can the proponent provide further information on emissions from mining activities?

Response Figure 7 in section 7.10.1 in the PER show dust levels from a monitoring point at the eastern edge of the town of Collie. The results support the findings of the air emission modelling that dust levels in the town are within accepted standards. Griffin Energy will be happy to cooperate in any collaborative dust measurement and monitoring program..

The dust monitoring program is undertaken by independent consultants. The results are presented in the Griffin Coal Mining Company's Annual Environmental Report.

Issue 5.2 *Raised by Department of Environment.*
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 public health impacts due to SO_2 and PM_{10} at locations determined in consultation with the DoE and the Department of Health?

Response Griffin Energy is willing to participate in a regional monitoring program centred on Collie that would involve all other major emitters in the region. The Griffin Group, through the Griffin Coal Mining Company already participates in dust monitoring in the region.

Issue 5.3 *Raised by Department of Industry and Resources*.
The nomination of the European Directive 2001/80/EC as the emission standard to be met for Bluewaters and hence the need for flue gas desulphurisation technology to be used in new coal-fired power stations is not supported.

Response Griffin Energy notes agrees with this assertion and points out that such a standard results in a net environmental loss in direct contravention to the principles of *the Environmental Protection Act, 1986.* Furthermore no recent Australian coal fired power station has been required to install this technology.

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Issue 5.4 *Raised by a private citizen.*
I am concerned about dust and gas emissions from the proposed powers stations and Coolangatta Industrial Estate. The developments are about three km and over the road from our property. Members of my family and I have had some serious health problems in recent years and we are concerned that the gas and dust may cause us additional ill health.

Response Griffin Energy is committed to full and open communication with adjacent landowners. Modelling undertaken by the CSIRO and reported in the PER has shown that at the distance specified from the power station all standards will be met. Griffin is willing to maintain open dialogue with any adjacent landowner in order to address concerns and provide further contextual information regarding the outcomes of studies undertaken to date in relation to gaseous and noise emissions predicted for Bluewaters.

Issue 5.5 *Raised by Pollution Action Network and Conservation Council of WA. The Bluewaters proposals have not adequately addressed the question of mercury pollution. PAN sees this as an issue of concern and would like to see an inquiry into the level of mercury in the Collie air shed, its health impacts and the likely impacts of further coal fired power stations.*

Response The CSIRO modelling clearly demonstrated that mercury is not an issue in the Collie airshed, with cumulative annual-averaged emissions predicted to be orders of magnitude smaller than WHO guidelines for the protection of human health (see Attachment 13.4 to the PER). Furthermore research undertaken by Peterson, Nelson and Morrison (2004) indicate that the level of mercury attributed to coal fired power stations in Australia is over-estimated. In their report published by the CCSD, the conclusion to the report states in part "*Emission inventories of Hg are subjected to large uncertainties. According to the latest published global emission inventory, Australia is suggested to emit 110.9 tonnes Hg/yr, which is nearly 11 times more than that estimated by the National Pollutant Inventory. It has been demonstrated that the higher figure of 110.9 tonnes is not credible and arises by the application of incorrect emission factors (primarily for coal combustion) during the calculation of Hg emissions."*

Issue 5.6 *Raised by Pollution Action Network and Conservation Council of WA Sulphur dioxide emissions from the two plants are very high. Considering the possible health impacts of SO_2, NO_x and particulates – we agree with the EPA Report and Recommendations on the Bluewaters I proposal that the proponents should meet European Commission limits as set in Directive 2001/80/EC rather than the NEPM standard.*

Response Modelling by the CSIRO in support of the proposal showed that Bluewaters was not a contributor to high levels of SO_2 in Collie as suggested in this submission. The analysis undertaken by Benchmark Toxicology Services then showed that the proposal is unlikely to compromise the health of residents of Collie. Therefore the need for the implementation of the European Directive 2001/80/EC has not been demonstrated. In any event implementation of the directive comes at a cost to the environment, namely:

- Requirement for 50 tonnes per day of limestone
- An extra 2 megalitres of water per day
- Increase in waste disposal
- The creation of an extra wet waste stream, and

- Increased Carbon dioxide emissions due to lower plant efficiency.

Directive 2001/80/EC was created to manage problems of acid rain and eutrophication in Europe. Similar problems do not exist in the South West of WA, further demonstrating the lack of justification for the application of the Directive.

Issue 5.7 *Raised by Pollution Action Network.*
The proposal will be excessively polluting. This pollution will contribute to premature deaths, asthma attacks, learning disabilities, acid rain, global warming and toxic mercury pollution of streams and water bodies.

Response Griffin notes the concerns raised, however the scientific studies undertaken do not support the subjective and emotive assertions suggested in the submission. This submission disregards the independent findings of the CSIRO air emission study and the assessment carried out by Benchmark Toxicology Services undertaken for the PER. Taking into account the current state-of knowledge of the relative risks posed by the proposal, Griffin Energy rejects the assertions out of hand and is of the opinion that the Bluewaters II project can be managed so as to meet the EPA's objectives for environmental protection.

Issue 5.8 *Raised by Pollution Action Network.*
Considering the seriousness of POPs and the UN Stockholm Convention on Persistent Organic Pollutants that came into force in May signed by Australia, we urge that these emissions are modelled, despite the small rates expected.

Response The POPs expected to be produced by power plants such as Bluewaters will be predominately dioxins and furans. Griffin has estimated the total amount of POPs produced by Bluewaters II to be in the order of less than 0.5 grams per year (see Table 6 in PER – Key Proposal Characteristics). The amounts of dioxins and furans produced by wood fires and bush fires (both controlled and wild) far outweigh any amounts produced by power stations, therefore any modelling of POPs emitted from power stations in the Collie area would produce meaningless results.

Issue 5.9 *Raised by Department of Health.*

The cumulative risks that may be associated with exposure to multiple contaminants are not discussed. The potential health impacts that may arise from community exposure to the emission mixture (c.f. individual emission components) are yet to be considered.

Response The Health Risk Assessment has been undertaken within the framework of agreed national environmental health risk assessment guidelines. These, other than identifying the difficulties of assessing the risks of poorly defined and constantly changing mixtures, are relatively silent on the issue of cumulative impacts. Griffin Energy is not aware of any

guidelines by the Department of Health that would facilitate the quantitative health risk assessment of mixtures, but welcomes specific guidance on how to deal with the issue.

The approach which is sometimes undertaken is to determine the hazard index (HI) for the mixture. The HI is the sum of the hazard quotient (the ratio of the estimated ground level concentration to the reference value or standard) for each component of the mixture. This approach may be considered appropriate for substances that have a common mechanism of action and toxic end point. Thus it may be applied to assess the cumulative impacts of irritant gases such as SO_2, NO_2, O_3, HF and other likely irritants in the mixture such as PM_{10}.

The dispersion air modelling was undertaken to assess risks of individual substances. Modelling and model output were agreed by regulators at an early stage of the assessment process when they were given the opportunity to have an input.

In order to assess the cumulative risks the concentration at selected locations of each of the emission components would need to be estimated and cumulative risks assessed. Therefore, different modelling outputs would be required.

It would not be sufficient to calculate the hazard index for the emission mixture by adding the hazard quotient for the maximum concentration of each of the components estimated from contour maps, since the maximum concentration for each component might occur at different places and different times, i.e., not coincide.

The appropriate approach would be to select strategic locations and estimate the concentration of each component coinciding with the maximum concentration of one component – leading to several possible combinations of concentrations and exposure scenarios. Whether dispersion air modelling can produce these results is unclear. More importantly, it is unclear what value such an exercise would add to the assessment of individual substances, other than a very rough estimate of the likely cumulative impacts.

Notwithstanding the reservations expressed above, the following table, compiled from the CSIRO report, summarises the HQ and HI for the irritants for the Collie Township from ground level concentrations for Bluewaters I and II (Exposure scenario 2). Where, ground level concentrations have not been reported for exposure scenario 2, the ground level concentrations have been estimated from the difference between the reported ground level concentration for scenarios 5 and 4 – the difference between the two scenarios is the inclusion of Bluewaters I & II in scenario 4. The health reference for HF is the chronic exposure

limit published by California EPA[1], since it is more appropriate to compare a 24 hour average value to an annual reference value, rather than a 1 hour average value, eg, as published by WHO [2].

Substance	Averaging time (h)	GLC ($\mu g/m^3$)	Reference ($\mu g/m^3$)	HQ
SO_2	1	191	570	0.34
NO_2	1	24	120	0.20
O_3	1	0	100	0.00
PM_{10}	24	0	50	0.00
HF	24	0.2	14	0.014
Hazard Index				**0.55**

These calculations suggest that no cumulative impacts are predicted for the irritant emissions from Bluewaters I & II assuming that all maximum concentrations occur simultaneously in the Collie Township. It needs to be restated, however, that some of these calculations are strictly not valid (eg, using maximum values which may not coincide, using different averaging times). In addition, while there are no differences between ground level concentrations for scenarios 4 and 5 for O_3 and PM_{10} estimates for scenarios 2 and 3 indicate that Bluewaters I & II contribution to the total air shed is too small to be reflected in the estimates from total emissions.

Issue 5.10 *Raised by Department of Health.*
The estimations employed to provide the power station emission profile are not suitably discussed. It is understood that the estimations were based upon emissions data collected from Collie power stations and the National Pollutant Inventory (NPI), but details are lacking.

Response Details of the emissions are provided in the Public Environmental Review document on page 33. The proponent is willing to provide any further detail that the DoH identifies as missing from the submission and discuss any specific aspect identified by the DoH.

Issue 5.11 *Raised by Department of Health.*
Department of Health objections raised in the BWI response regarding the use of NPI data for modelling are not addressed. The use of NPI data only enables a broad estimate of emissions to be determined, which may not be accurate. Accurate characterisation of emission is necessary to provide confidence in modelling results.

Response This appears to be a clarification or extension of the comments under the previous issue. The use of NPI data to estimate emissions in proposed

[1] OEHHA (2003). Fluorides Including Hydrogen Fluoride *(hydrofluoric acid (aqueous solution); hydrogen fluoride (gas) fluoride salts (particulates or in solution)* CAS Registry Number: 7664-39-3. http://www.oehha.ca.gov/air/chronic_rels/pdf/2ApnA_Fluoride_Final.pdf (Accessed March 2005).

[2] WHO (2000) Air Quality Guidelines for Europe. WHO Regional Publications, European Series, No 91, Second Edition, pp 143-145

facility is the standard practice when actual data are not available, and is supported by regulatory agencies. This approach has been previously accepted by the DoH. The uncertainties associated with the NPI database are generally recognised. It is generally accepted that the NPI database contains emission estimates which can range from general best estimates for the industry or process to actual measured stack emissions.

It is unclear why this is being raised as an objection in this assessment in its general form. It is particularly unclear what is meant by "accurate characterisation of emissions", an issue that was previously addressed to the DoH and EPASU's satisfaction in relation to the Bluewaters I proposal. The proponent will address any specific issues raised by the DoH with respect to the use of NPI data to estimate emissions in this proposal against any criteria that the DoH makes available. Reference to the objections raised by the DoH to the Bluewaters I proposal is unhelpful as the objections were also framed in general terms only.

The issue to be addressed here is whether or not estimates of ground level concentrations based on NPI data, which are considered a broad estimate of emissions, are likely to pose a health risk or at least lead to an underestimation of the risks. Sufficient information is provided in the submission for a judgement to be reached by the DoH. If the regulator's assessment is that the risks have been underestimated, then they should call for appropriate engineering and regulatory management measures during the operation of the facility to ensure that any emissions do not adversely impact on the health of the community. The independent studies undertaken by CSIRO have confirmed the prediction that ground level concentrations from cumulative sources in the Collie airshed would be well below national and international reference criteria for the protection of human health and amenity. This will be achieved through adoption of best practicable technology (including low NO_X burners and dust collection technology), validated by best practice monitoring and management practices during plant operation.

Issue 5.12 *Raised by Department of Health.*
The report does not currently consider potential health impacts to workers. This is particularly pertinent for short term exposures to emission components such as SO_2 and PM_{10} that may exert significant acute effects.

Response The health risk assessment report clearly states that occupational health is not considered, as the assessment relates to impacts on public health. Occupational health and safety is the responsibility of Worksafe, the requirements of which are statutory.

Issue 5.13 *Raised by Department of Health.*
Modelling does not incorporate emissions from current or proposed mining sources, thereby creating uncertainty in the accuracy of subsequent exposure assessment. It is noted that surveys with residents

have indicated that they suspect health impacts arising from exposure to mining related dusts.

Response The dispersion air modelling indicates that Bluewaters I and II do not measurably contribute to the PM_{10} load in the region and only marginally for other emissions. The exclusion of mining sources from the modelling does not create uncertainty about the predicted ground level concentration from emissions from the two proposals. Dust monitoring carried out in and around Collie show that NEPM standards have not been exceeded. The air modelling results show that dust levels from the power stations will not add significantly to measured dust levels in the region. Given that the mines predominately produce dust from their operations and do not contribute significantly to other emissions then it is reasonable to draw the conclusion that all relevant cumulative impacts have been modelled and reported as far as is practicable. It should be noted that the PERs for the Collie B proposals did include mining emissions in the modelling, with the results indicating that PM10 levels are still within NEPM guidelines.
The resident surveys did not indicate high levels of concern from residents with respect to health impacts from mining related dusts rather the surveys indicated that a few (10) knew that some of the emissions were mining related.

Issue 5.14 *Raised by Department of Health.*
Given that Western Power have committed to the decommissioning of Muja power station stages A and B, it would have been useful to provide modelling scenarios reflective of potential emissions, i.e. current scenarios 3 & 4, minus Muja A & B.

Response The dispersion air modelling suggests that Bluewaters I and II do not contribute measurably to overall emissions in the region. It's not clear whether this point is an objection or a suggestion. Griffin Energy agrees that it would have been useful to provide modelling scenarios reflecting future changes in the area, however the advice on Muja A & B closure was received after the air emission modelling had been completed. Such modelling is provided in the PERs for the Collie B proposals.

Issue 5.15 *Raised by a private citizen.*
In the Bulletin issued for Bluewaters I there was a reference to a European Standard regarding Sulphur Dioxide levels. This community does not want to European Standards implemented 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.

Response Griffin Energy notes and agrees with this comment..

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Issue 5.16 *Raised by Department of Health.*
As previously noted in response to BWI, the WHO 10-minute guideline for SO_2 of 500 ug/ m^3 is considered more appropriate for assessment

purposes than the NHMRC value (700 ug/ m^3). Modelling results indicate that the highest predicted concentrations of SO_2 (10-minute average) within the township of Collie exceed the guideline for Scenarios 3,4 & 5, while predicted 3-minute averages approach or exceed the guideline for all scenarios. As scenarios 3 & 4 are most reflective of likely conditions should the project proceed, the modelling results indicate that 'best practice' SO_2 reduction measures should be employed. However it is noted that modelling scenarios do not incorporate Muja A&B are likely to report significantly lower SO_2 ground level concentrations

Response The NHMRC 10 min average for SO_2 was used on the advice of Mark Feldwick of the DoH. Griffin Energy was advised that it was the most appropriate reference value and the source was consistent with the hierarchy outlined in the national enHealth Guidelines. The subsequent advice to the EPA that the WHO guideline is the more appropriate reference value to use was not communicated to Griffin Energy. Griffin Energy became aware of the change in position of the DoH when it received comments on the Bluewaters I proposal – after the Public Environmental Review document for Bluewaters II was submitted.

There are no reasons given in any of the communications by the DoH why it is more appropriate to use the 10 min average for SO_2 of 500 µg/ m^3 by WHO instead of the value of 700µg/m^3 by the NHMRC, the national health advisory jurisdiction in Australia. According to the enHealth environmental health risk assessment guidelines, Australian reference values should be used if available.

Notwithstanding, the position of the DoH results in an incongruous, regulatory situation. The 10 min average reference value of 500 µg/m^3 considered more appropriate by the DoH is lower than the 1 hour average standard for SO_2 published in the ambient air quality NEPM (570 µg/m^3).

Thus ground level concentrations of SO_2 that comply with the 1 h average standard, hence considered safe, would be considered to pose a risk over shorter periods of ≤ 10 min.

This is inconsistent with the scientific data and their interpretation by WHO referenced in the health risk assessment document appended to the PER (last paragraph, page 14). The effects of SO_2 at concentrations above the threshold for irritancy and respiratory effects are immediate and prolonged exposure is unlikely to lead to a worsening of the adverse effects, rather at threshold concentrations prolonged exposure is likely to lead to an adaptation to the effects.

Notwithstanding, the exceedances identified by the DoH with Scenarios 3, 4 and 5 are attributable to current, inefficient facilities in the area, not to estimated emissions from the current proposal. The estimates for the 10 min average concentration of SO_2 at the Collie Townsite for scenario 1 and scenario 2 (Bluewaters proposals) are about 60 and 80% of the WHO reference value for the 10 min average SO_2 concentration. The

addition of Bluewater I and II to the current operations in the Collie region (scenario 4) contributes less than 10% to the estimated 10 min average SO_2 concentration for the Collie township for all facilities combined [((764-702)/764)*100 = 8.1%; values for scenarios 4 (all facilities) and 5 (all without Bluewaters) are taken from Table 3.2a of the CSIRO report].

Issue 5.17 *Raised by Department of Health.*
Discussion should be provided regarding why the proposed adoption of 1000 ug/m^3 as a compliance limit for dust control is considered appropriate.

Response Monitoring is proposed to be undertaken at the boundary of the plant site. The 1,000 ug/m^3 limit is 30% of the occupational health limit and is considered an appropriate level to ensure that public exposure is minimised whilst at the same time not unnecessarily causing interference with work on site by initiating corrective actions when workplace exposure levels are being met. The limit is then also able to be used as a control for workplace exposure.

Issue 5.18 *Raised by Department of Health.*
The health risk assessment is inconsistent in the provision of sample calculations. Those sample calculations that are provided are poorly presented and discussed. Justifications regarding calculation assumptions were typically absent and many calculated values could not be verified.

Response These comments are difficult to address as no specific cases have been cited. It is unclear whether the issue is that the DoH could not verify the outcomes of the calculations or whether the outcomes and assumptions are inappropriate and lead to an underestimation of the risks to health.

Importantly, the issues to be addressed are whether the assessment adequately addresses the potential health risks from the emissions, and, if not, whether sufficient information has been provided for the DoH to concluded whether or not the proposal poses a health risk from the estimated emissions. The aim is not solely to assess whether or not the proponent has achieved a certain standard of excellence in undertaking and reporting environmental assessment. The aim is to evaluate the submission as a whole in terms of the information provided, not just how the information is provided.

Issue 5.19 *Raised by Department of Health.*
Consistent with a holistic approach to health risk assessment, a synopsis of the major health issues identified as confronting future development in the Collie region is considered appropriate. The following key issues are identified by the Department of health.

1. *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*

(<1hr) 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.

2. *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 the particulate matter that may have significant health implications.*

3. *Potentially significant sources of air emissions have not been acknowledged by current development proposals. While it is noted that modelling of all possible land uses is not feasible and that each candidate industry will be required to obtain environmental approvals, consideration of indicative emission scenarios is necessary to better characterise probable future health impacts.*

4. *Exposure assessments currently conducted for the Collie area are limited. Predicted exposures are reliant upon air quality 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.*

Response The 4 key issues identified by the DoH, whilst identifying in very general terms the uncertainties in current risk assessment common to all development proposals as well as existing facilities, are not specifically able to be addressed by the Public Environmental Review for Bluewaters II. The information provided by the Department of Health in their submission appears to reflect some as yet undefined and unpublished policy on "holistic" risk assessment and State development, which appears to be directed to the EPA specifically and Government in general, all of which is not within the responsibility or the capacity of Griffin Energy to address in the context of a single proposal.

The purpose of the Public Environmental Review is to assess whether or not the proposed Bluewaters II Power Station can be anticipated to operate in an environmentally safe and responsible manner.

The one specific point which could be considered relevant to the current proposal is made under the first point above and relates to the claim that recent air quality monitoring data and modelling results indicate that levels of sulphur dioxide and particulate matter in the Collie area are problematic. As no reference is provided for the observation, it is difficult for Griffin Energy to address this issue with a considered response.

Moreover, what is meant by "problematic" is not explained. A generic statement on the potential effects of short term exposure to either sulphur dioxide or PM_{10} possibly resulting in adverse health effects, particularly "lung irritation" is provided. There is no mention of the critical doses that may lead to these effects, nor what the "problematic" concentrations of SO_2 and PM_{10} are. The statement that "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" is unhelpful in guiding Griffin Energy in addressing this issue whilst conducting a quantitative risk assessment.

Notwithstanding, given that SO_2 and PM_{10} concentrations are "problematic" in the Collie region, the focus of regulatory agencies should be on assessing the performance of current activities and taking appropriate measures to improve the air quality in Collie. Once again, this is outside the area of responsibility of Griffin Energy.

The responsibility of Griffin Energy is to ensure that its Bluewaters proposal does not pose a health risk to the Collie community. This has been clearly demonstrated in the Public Environmental Review, where it was shown that emissions from Bluewaters II do not pose a health risk and do not contribute significantly to the environmental load in the Collie air shed. The DoH does not challenge this conclusion in its submission to the EPA, it merely comments on a few aspects of the submission.

The Department of Health does not reach any definitive conclusions on the acceptability of the potential health risks of the proposal, should it proceed. Rather the Department of Health expresses concerns with some aspects of the report and raises objections said to be similar to those raised against a previous proposal of Griffin Energy, some of which it acknowledges have been addressed.

Importantly, the Department of Health does not recommend that the project should not proceed, hence it may be inferred that the "concerns" and "objections" are cosmetic. If the Department of Health considered that the potential health risks from the proposed Bluewater II Power Station were unacceptable for the Collie community, it would advise that

the EPA recommend to the Minister for the Environment against its approval. This is not the case.

Issue 5.20 *Raised by CCWA, ACF, WWF, CANA and Pollution Action Network. The main air pollutants of concern to human and ecosystem health are SO_2, CO2, CO, NO_x, dioxins and furans and particulates. Bluewaters II will contribute significantly to the emissions of all these pollutants into the Collie airshed. Exceedances of the NEPM are likely for SO_2, NO_x and possibly PM_{10} as a result of Bluewaters II.*

Information on $PM_{2.5}$ should be provided and we ask that the proponent consider $PM_{2.5}$ measurement and impacts, rather than simply PM_{10}.

Response This submission is not consistent with the findings of the CSIRO as reported in the Air Emission study provided for Bluewaters. The CSIRO found that Bluewaters will not contribute any exceedances of NEPM levels at Collie; in fact any exceedances are attributed to Muja and Collie Power Stations. Given that Western Power has committed to the closure of Muja A & B before the commissioning of either Bluewaters Power Station, the net effect is predicted to be an improvement in air quality at Collie.

There is very little information available on $PM_{2.5}$ emissions at Collie, currently there is only a draft Advisory Reporting Standard to refer to. $PM_{2.5}$ will be monitored as part of the ongoing monitoring program for the Power Station.

Issue 5.21 *Raised by CCWA, ACF, WWF, CANA.*
The proponent should be required to contribute to an air modelling study for Collie and pay for the cost of an air quality management plan for the airshed. This includes a network of monitoring stations.

Response Griffin has produced several air modelling studies for the Collie airshed. They are all included with the Public Environmental Reviews for the Bluewaters and Collie B proposals. In the event that a collaborative monitoring program is established, Griffin Energy is willing to contribute its share of the cost.

Issue 5.22 *Raised by a private citizen.*
The modelling for air emissions shows all aspects within acceptable limits. I am concerned that the emissions are only within acceptable limits if Muja A & B are decommissioned.

Response The air emission modelling for Bluewaters II assumes that Muja A & B stay on line. Therefore, the assessment undertaken for the purpose of the PER presents a 'worst case', or conservative assessment of predicted maximum ground level concentrations. The more likely scenario of Muja A and B being decommissioned will result in lower levels of emissions to atmosphere in the Collie airshed.

Issue 5.23 *Raised by C.R. & M.A. Tonkin.*
There needs to be a "gaseous emission buffer" established around Bluewaters the same as was set for Collie Power Station.

Response EPA Bulletin 472 recommendation number 2 made the following recommendation:

"*The Environmental Protection Authority recommends that prior to any residential, commercial or industrial developments progressing on the 1500ha of land owned by the State Energy Commission of Western Australia adjacent to the proposed power station, the proponent should liaise with relevant planning authorities to establish a buffer zone adequate to maintain air quality objectives to the satisfaction of the Environmental Protection Authority"*

This recommendation is reflected in condition number 3 of Ministerial Statement number 146 dated 12 June 1991 which authorised the development of the Collie Power Station. The condition states:

"Prior to any residential, commercial or industrial developments progressing on the land owned by the proponent and, adjacent to the proposed power station, the proponent shall liaise with relevant planning authorities to establish a buffer zone adequate for the maintenance of appropriate air quality objectives, to the satisfaction of the Environmental Protection Authority."

In addition to the above condition, condition number 4 required noise to be limited at nearby residents to 40dB(A), with no tonal components, between 10PM and 7AM every day.

Subsequent to the establishment of conditions, SECWA (now Western Power) established a notional boundary around the power station of 35dB(A) on the assumption that the Power Station would be 600MW (net). After checking that the air emission modelling produced results that were within accepted standards, of the time, inside this line, the line was used to delineate the boundary for the Town Planning Scheme amendment which created the Collie Power Station Buffer Zone.

In effect, condition 3 of the ministerial statement was met by the creation of the buffer zone using 35dB(A) as the outer limit for the buffer zone as the air emission criteria were met much closer to the Power Station. The creation of the buffer zone effectively ensured that conditions 3 and 4 of the Ministerial Statement were complied with.

In a similar manner, a Special Control Area (buffer) has been proposed for the Coolangatta Industrial Estate.

Issue 4.28 *Raised by CCWA, ACF, WWF, CANA and a private citizen.*
Although individual projects may not on their own contribute significantly to health risks, the cumulative impacts of the coal mining

and power generation industry must be taken into account in assessing individual projects.

Response Cumulative impacts were taken into account in the air modelling and health impact assessment. All emission levels that are compared to standards assume the addition of Bluewaters I and II and Collie B with the retention of Muja A&B. Dust monitoring carried out in and around Collie show that NEPM standards have not been exceeded. The air modelling results show that dust levels from the power stations will not add significantly to measured dust levels in the region. Given that the mines predominately produce dust from their operations and do not contribute significantly to other emissions then it is reasonable to draw the conclusion that all relevant cumulative impacts have been modelled and reported as far as is practicable. It should be noted that the PERs for the Collie B proposals did include mining emissions in the modelling, with the results indicating that PM10 levels are still within NEPM guidelines.

Issue 4.29 *Raised by CCWA, ACF, WWF, CANA*
Research from overseas clearly indicates a link between coal-fired generation and increased occurrences of asthma and respiratory disease.

Response The health profile as presented at the Bluewaters I health risk workshop showed that the health profile for the town of Collie is very similar to the rest of the State, indicating that there are no identifiable risks in Collie from the current coal fired power generation activities. The modelling and assessments undertaken for Bluewaters II support this conclusion.

Issue 4.30 *Raised by CCWA, ACF, WWF, CANA, and a private citizen.*
Although individual projects may not on their own contribute significantly to health risks, the cumulative impacts of the coal mining and power generation industry must be taken into account when assessing individual projects.

Response Griffin has been mining in the Collie area for 74 years, with incremental developments over that time expanding and adding value to the coal assets. The Bluewaters project has been signalled for some time and will to some extent offset the losses to the community that will inevitably occur when the Muja A and B Power Stations close. Griffin has undertaken studies and initiatives (including, but not restricted to monitoring) to address the impacts of the development. There has been extensive modelling (noise and air emissions) undertaken for this project, which have taken into account impact from existing and proposed future developments. It is acknowledged that mining activity contributes to dust in the local area, however monitoring to date has shown that NEPM levels have been met to ensure the maintenance of human health and wellbeing. All initiatives taken with respect to Bluewaters have been aligned with the Griffin Group's approach to sound environmental management.

The Project will be the subject of regular monitoring and audited Environmental Management Plans as specified in commitment number one in the PER

Issue 4.31 *Raised by CCWA, ACF, WWF, CANA.*
It is clear from the results of the workshop process undertaken for the Bluewaters I project that the cumulative health impacts of the coal industry, with respect to both mining and power generation have been insufficiently investigated in the Collie region. Through the workshop process for Bluewaters I the community stated that they desired a far greater level of knowledge regarding the impacts of these industries and their associated pollutants. The health risks to the community must be assessed on a cumulative as well as incremental basis.

Response Griffin commissioned a health risk assessment from Benchmark Toxicology Services on Bluewaters II. It would appear that the results of that assessment have been ignored by the submitters.
The health risk assessment undertaken for Bluewaters II was undertaken on the basis of a worst case scenario (i.e. cumulative basis) a fact that is clearly evident when reviewing the CSIRO report and the report from Benchmark Toxicology Services.

Issue 4.32 *Raised by Conservation Council of WA*
The proponent should be required to run a series of community workshops in Collie, addressing the impacts of mercury on health, both directly and in the food chain.

Response Griffin Energy has conducted a series of workshops in Collie on the health impacts of various proposals. Griffin also keeps the community informed on all manner of issues arising from Griffins operations in Collie. Mercury has been demonstrated to not be a concern to human health and wellbeing in Collie. Griffin will continue to consult the community on operational projects and projects under consideration. Specific workshops dedicated to mercury are not warranted.

Issue 4.33 *Raised by Department of Industry and Resources.*
The EPA should consider development of an Environmental Protection Policy (SO_2) for Collie based on nationally endorsed NEPM ambient standards.

Response Griffin Energy agrees and would expect to be considered a stakeholder and to be involved in the development of such a policy.

Issue 4.34 *Raised by a private citizen*
Page 2 and page 5 of the Health Assessment of Emissions from the Proposed Power Stations at Bluewaters in the Collie Region document from BenchMark Toxicology Services appear to have two sets of conflicting demographic information. Which one is correct?

Response It is not entirely clear to which sets of demographic information this comment refers.

The following have been identified as a possible source of confusion:
The second paragraph under Section 3 ***Overview/General comments*** on page 2 states:

> *The social study has identified that the Collie community consists of a slightly higher proportion of younger, working-age residents and young couples with small children than the Western Australian average, has a higher unemployment rate and a lower socioeconomic status than the state average. Individuals identify strongly with the local community and local industry and generally support the establishment of additional coal-fired power generating facilities.*

Presumably the comment relates to the age demographics summarised in the first sentence in which the adjective younger may be misleading the reader. If this is the case, the adjective can be removed.
Dot point 3 under Section 4.1 ***Socio-demographic*** on page 5 states:

- *A relatively low number of young people and the elderly compared to the number of people of working age, in comparison to the state average;*

Both this statement and the statement on page 2 refer to the proportion of working age and non working age residents of Collie and the Collie region stated conversely.
Both statements are supported by the information provided in Table 3 of the report from Sheridan Coakes Consulting (2004a) where it is shown that the age dependency ratio (elderly and children) for Collie is 41.3 cf 46.4 for the State – showing a higher proportion of working age people in Collie than the State average or conversely, a lower proportion of non working age people (young people and the elderly). The dependency ratio is also lower than the State average for the two subgroups of children and elderly.

6 Greenhouse Issues

Issue 6.1 *Raised by Pollution Action Network.*
The Greenhouse emissions from this project are unacceptably high and no effective greenhouse reduction options are proposed. There is no evidence to suggest that the proponent has examined a range of lower emission technologies that could improve the environmental performance of the power station. The proponent also states that there are no specific offsets applied to this project.

Response The size of the plant and technology determine the emission rate. Alternative low emission technologies were discussed at length in section 3.3 of the PER. It is misleading to claim that there are no specific offsets applied to the project. In a letter to the EPA dated 2 December 2004 Griffin detailed offsets to be applied across the final power options that it will ultimately build. The letter is attached as attachment 7. Refer also to the responses to the next two issues.

Issue 6.2 *Raised by CCWA, ACF, WWF, CANA.*
The Proponent has not provided a comprehensive Greenhouse Gas Emission Management Plan.

Response Griffin Energy has committed to preparing a Greenhouse Gas Emission Management Plan (PER commitment number 12). The plan will be made public (PER Section 7.9.3.4).

The Greenhouse Gas Emission Management Plan will comprise:

- Participation in the Commonwealth Government's *Greenhouse Challenge* Programme that focuses on continuous improvement in reducing emissions of greenhouse gases
- An inventory of GHG emissions from the Bluewaters project, and benchmarking of GHG efficiency with other comparable projects
- An action plan with specific actions to minimise emissions where practicable, and performance measures to measure progress, and
- Continued investigation of 'no regrets' and 'beyond no regrets' options for greenhouse minimisation during the life of the project.

Preparation of the plan prior to construction is consistent with the timing of similar plans for other large proposals.

Issue 6.3 *Raised by CCWA, ACF, WWF, CANA and PAN.*
The PER did not fulfil the requirements of the Environmental Protection Authority (EPA) Guidance Statement for Minimising Greenhouse Gas Emissions (No. 12).

Response The submission does not specify how the requirements are not met however, Griffin Energy has committed to preparing a Greenhouse Gas Emission Management Plan (PER commitment number 12). The plan will be made public (PER Section 7.9.3.4). It will be consistent with the EPA Guidance Statement for Minimising Greenhouse Gas Emissions (No. 12). Preparation of the plan prior to construction is appropriate and consistent with the timing of similar plans for other large proposals.

Issue 6.4 *Raised by CCWA, ACF, WWF, CANA; CR & MA Tonkin and a private citizen.*
The proponent has not provided sufficient information on the level of offsets that will be applied against the project or on the planned Greenhouse Gas Management Plan for the project.

Response Griffin Energy is committed to participating in the Greenhouse Challenge (**www.greenhouse.gov.au/challenge**) as detailed in the PER. Griffin Energy has adopted a sustainable approach to Bluewaters and views the management of carbon dioxide as part of the project's sustainability. The project proposes best available coal fired technology appropriate to the size of the plant, complements the Griffin Group's adopted strategy for the Collie River Basin and will, therefore, contribute to the long term and ultimate rehabilitation of Wellington Dam.
Refer to letter to EPA dated 2 December 2004 detailing offsets. (Attachment 7).

In the letter, Griffin has offered a suite of offsets against the total number of power stations that may ultimately be built by Griffin arising out of the Bluewaters I proposal and the Power Procurement Process. There are three possible scenarios that will have the package of initial offsets applied against them. The scenarios are as follows:

Table 7 - Offsets versus Power Stations Built

Scenario	MW	% offset of total CO2 emissions
Bluewaters I	200	16
Bluewaters I and II	400	8
Bluewaters I and Collie B	500	6

Issue 6.5 *Raised by CCWA, ACF, WWF, CANA, Department of Health and a private citizen*
The sub-critical technology proposed for the Bluewaters Power Station is "old technology" and is less efficient than super-critical technology. As Griffin Energy has stated that a 200 MW station is too small to use super-critical technology and Bluewaters II in combination with Bluewaters I is an option for the 300MW Western Power, Power Procurement Process, then it should investigate the option of constructing a larger generator of 400MW that can utilise more efficient technology and justify why 2 X 200MW plants are proposed.

Response Bluewaters II will only be built if the Bluewaters option wins the Power Procurement Process. There are three other competing bids; therefore it is not feasible for the Bluewaters plants to be combined to create a 300MW option. Griffin has provided a 300MW option for the Collie B site; this is the subject of a separate environmental assessment under the *E.P. Act* 1986.

The 200 MW unit size proposed by Griffin Energy is not within the typical commercially supported size range for supercritical coal fired technology, therefore, there is no commercial basis for it to be anything other than a sub-critical plant.

A detailed justification of the size of the power station is contained in section 3.3.3 of the PER.

Issue 6.6 *Raised by CCWA, ACF, WWF, CANA.*
The Proponent should provide evidence that a critical assessment of options and plant optimisation has been conducted prior to the selection of the fuel and final plant configuration.

Response The plant configuration has been developed by one of the world's most highly successful and respected power plant developers and manufacturers, with a capability and knowledge of virtually all plant technologies currently available. See also response to the previous issue.

Issue 6.7 *Raised by CCWA, ACF, WWF, CANA.*
The PER does not assess 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. Assessment should have been undertaken regarding the possibility of building fewer, larger generators that could utilise best-practice, less greenhouse intensive technologies, such as CHP and super-critical boilers.

Response Bluewaters is proposed as the corner-stone development in the Industrial Estate. As such, the future potential for CHP is allowed for in the Industrial Estate. The issue of size and technology of the Power Station, and the merits of future local opportunities to encourage CHP and biomass co-firing), are discussed at length in section 3.3.4 of the PER. Biomass co-firing is possible up to 5% of the overall heat input, however the availability of sufficient quality, reliable supply is not currently guaranteed. The option of biomass co-firing will be kept open and, should it become technically and economically viable, will be pursued by Griffin.

Issue 6.8 *Raised by CCWA, ACF, WWF, CANA.*
The description of the proposed Bluewaters II technology provides no information regarding what Best Practice Standards exist worldwide for a generator of this size utilising coal with similar characteristics.

Response Section 3.3 of the PER provides a technical justification for the technology used in the plant.

Issue 6.9 *Raised by CCWA, ACF, WWF, CANA.*
As Australia has ratified the United Nations Framework Convention on Climate Change (UNFCCC) and it has come into force, Western Australia is arguably obliged under International Law to contribute towards the objective of the treaty.

Response Meeting the objectives of the UNFCCC is a matter for the Commonwealth Government and is not an issue for the proponents of Bluewaters. Notwithstanding this, Griffin Energy has committed to the development of a Greenhouse Gas Management Plan as detailed in the PER, which will include an action plan to minimise GHG emissions where practicable and continued investigation of further greenhouse minimisation during the life of the project.

Issue 6.10 *Raised by CCWA, ACF, WWF, CANA.*
It is difficult to see how the plant would significantly reduce the sent-out carbon intensity of electricity generation of the SWIS.

Response The issue highlights the difficulty in accounting for greenhouse contributions from various sources into a network such as the SWIS. However, it is clear that the introduction of Bluewaters into the system will reduce the Greenhouse intensity of coal fired electricity produced in the Collie region due to the better efficiencies used by Bluewaters when compared to the aging Muja Power Station. The exact reduction is difficult to quantify as it will be a calculation that will be reliant upon the production profile of Bluewaters and all of the other coal fired plants being available at the time of calculation.

Issue 6.11 *Raised by a private citizen.*
I do not think that the inclusion of offsets should be undertaken if they undermine the economic viability of the project. However it is worth noting that there are a number of significant publicly listed companies growing trees on a commercial basis. Therefore why could it not be possible for the proponent to investigate and invest in the establishment of plantation forestry to offset some of these emissions?

Response Griffin Energy agrees that offsets affect the economics of the proposal. Griffin is investigating many investment opportunities. Currently, plantation timber is not considered a core business opportunity. Griffin is currently investing in a manner that is designed to add value to existing Collie assets. Plantation timber remains a future potential investment opportunity for Griffin.

Issue 6.12 *Raised by a private citizen.*
Given that the proponent is proposing to burn coal to produce electricity instead of cleaner and more efficient natural gas, I thought that they would consider making a commitment to implement some form of greenhouse gas reduction strategy such as tree planting.

Response Griffin Energy is evaluating a broad range of options for carbon management. The options are detailed in the PER in section 7.9.3

Issue 6.13 *Raised by Conservation Council of WA.*
The proponent should be required to offset 100% of the greenhouse emission from this project.

Response This is an unrealistic proposition which would make the project uneconomic. Griffin has committed to a suite of offsets which are economically and practically achievable.

Issue 6.14 *Raised by Conservation Council of WA.*
The proponent must be required to source and co-locate a Combined Heat and Power (CHP) host within the Coolangatta Industrial Estate next to Bluewaters to utilise the waste heat from any power station that is constructed.

Response Griffin Energy is actively promoting the Coolangatta Industrial Estate as an Energy Park with a view to optimising energy production and use.

Issue 6.15 *Raised by CCWA, ACF, WWF, CANA*
Australians have the highest level of greenhouse gas emissions in the world. Western Australia produces approximately 12% of the nations greenhouse gas emissions, despite having only 10% of the country's population. In 1997 Western Australians had the highest per capita greenhouse gas emissions of the states at 19Mt per person per year.

Response Griffin Energy queries the accuracy of the 19Mt figure as quoted. That would imply that each person in WA is consuming the output of nearly 15 Bluewaters power stations each year. There are various figures available for per capita greenhouse gas emissions. These generally range between 10 and 20 t/a for Australia in recent years.

Australia's high level of greenhouse emissions is an artefact of the energy mix in Australia, it does not necessarily follow that Australians are the largest consumers of electricity. In OECD countries significant amounts of electricity is generated using nuclear power (c.f. France at at approximately 80%).

Issue 6.16 *Raised by CCWA, ACF, WWF, CANA.*
The potential for building a bigger plant to take advantage of CHP or super-critical technologies should be examined.

Response The CHP process is widely used in densely-populated cities in cold climates. It features the distribution from the power plant of hot water at less than 100° C for domestic heating and hot water. The process substitutes energy from a low-temperature heat source for this purpose in place of high-grade energy (electricity, or natural gas). Conditions for the application of CHP do not exist at Collie.

The sale of steam to industrial customers is a different consideration; the steam is bled from the turbine at appropriate conditions causing a reduction in the electric power output. Cycle efficiency is increased, but

steam must be priced appropriately in recognition of its energy content and the foregone electrical energy. Currently there are no industrial demands for steam in the vicinity of the project but these may arise when the adjacent industrial estate is developed.

Issue 6.17 *Raised by Dr Mark Diesendorf.*
The plant is not needed because,

- *the states electricity requirement can be met increased energy use efficiency;*
- *the majority of growth in demand over the next half decade in Western Australia will be in peak demand, and there will be little growth in base load demand;*
- *bio-energy from crop residues will meet all of the medium term increase in demand for base load energy;*
- *wind power stations approximate base load power stations;*

Response Griffin Energy believes Dr Diesendorf's reasoning does not show a full understanding of the existing electricity industry. He bases his argument on the above tenets,

Dealing with each tenet in turn:

Increased energy use efficiency:

Griffin Energy strongly supports increased energy use efficiency but notes Dr Diesendorf lists an array of impediments to achieving widespread improvements. Further, while Dr Diesendorf cites the potential improvement in efficiency described by SRC Australia in its 1991 study for Queensland, he does not proffer any concrete methods to achieve efficiency improvements. He also does not give evidence of any material improvements in energy use efficiency in Queensland.

Somewhat counter intuitively there has been a considerable growth of both coal fired and gas fired base load and peaking capacity in Queensland since the mid 1990's, including power stations at Collinsville (192 MW coal fired shoulder duty) Oakey (280 MW, gas/liquid fuel, peaking) Mt Stuart (300 MW, gas/liquid fuel, peaking) Townsville (initially liquid fuelled 160MW peaking, recently converted to 220 MW gas fired base load), Callide C (840 MW, coal fired base load) Swanbank E (360 MW gas fired shoulder duty) Millmeran (840 MW coal fired base load) Tarong North (420 MW coal fired base load). In addition construction has commenced on Kogan Creek Power Station (750 MW coal fired base load).

In summary, more generating capacity has been added in Queensland in the period following the SRC study than the 1991 peak demand quoted by Dr Diesendorf.

It is conceded that some 800 MW of this capacity is usually exported to NSW, however such phenomenal growth in the supply side of the

equation would suggest that few gains have been made in energy use efficiency in Queensland in the past decade despite the means Dr Diesendorf believes can be readily implemented.

The majority of growth in demand over the next half decade in Western Australia will be in peak demand, and there will be little growth in base load demand;

While Western Australia, similarly or more so than for other States, is suffering from the pattern of peak demand rising more rapidly than base load demand, Western Power believes that the latter is growing at approximately 100 MW per year. In addition Western Power has announced that Muja A Power Station is reaching the end of its viable life and must be retired in the next few years. Hence there would appear to be a need for at least 500 MW of base load power in the next few years if current demand growth continues and the indicated base load capacity retirement occurs.

The rate of growth in peak demand indicates the total required capacity will be significantly greater than 500 MW with estimates for 2010 of a new capacity requirement of up to 1500 MW.

Bio-energy from crop residues will meet all of the medium term increase in demand for base load energy

Dr Diesendorf's vision of a rapid increase in the use of bio-energy flies in the face of experience to date in Australia. Admittedly, several bagasse fired projects have been successfully completed in Queensland in recent times. Their success is at least partly attributable to there comprising cogeneration facilities for the associated sugar mills, and through the sale of Renewable Energy Certificates (RECs). These projects generate the majority of their energy output in the crushing season.

There has been another notable success in the case of the Tumut paper mill power project. Its fuel is wood waste and again its success is at least partly attributable to its cogeneration nature and revenue from RECs.

In contrast, projects that have attempted to use supplements to bagasse or other bio-fuels have a poor record to date. Notable examples are Stanwell Corporation's Rocky Point power project and Staplyton power station.

The fuel for Rocky Point is bagasse and wood waste. Stanwell Corporation's public abandonment of all other bio-energy projects does not auger well for the commercial viability of Rocky Point.

Staplyton power station is currently proceeding after many delays in its development period and has been reduced to only a few megawatts from the original intended 30 MW.

Griffin Energy is aware of 2 other sizable wood waste burning power projects (>20 MW) one each in Tasmania and South Australia. These two have encountered development difficulties and are still yet to proceed. Financiers' concerns regarding the fuel security risk are understood to be a significant problem.

Griffin Energy is not aware of any material project in Australia (>10 MW) fired by crop residues. Hence it is difficult to imagine the establishment of even 100 MW of bio-energy based power generating capacity in the next half decade. On the other hand the use of bio-mass as a partial replacement fuel for the Bluewaters project has been investigated and does appear to be a technically viable option based on the success achieved at Liddell Power Station in NSW.

Wind power stations approximate base load power stations;

Griffin Energy obviously supports wind energy initiatives, evidenced by its joint development of the 80 MW Emu Downs wind farm with Stanwell Corporation. However despite Emu Downs having the benefit of a favourable wind regime, its capacity factor is less than 40%. There is the additional matter of the unpredictability of wind derived electric power. Dr Diesendorf indicates in the first full paragraph on page 4 of his paper that "*We consider wind farms to be base load power stations*" in Table 1 of his paper he more reasonably restricts the contribution of wind farms towards peak demand to approximately16% of installed capacity.

Conclusion

Dr Diesendorf's vision for new generating capacity and increased energy use efficiency for Western Australia, is laudable, but has not been demonstrated to be achievable. Regardless, his reasoning that a project should not be approved because he believes it is not needed has no validity in the approval process. Rather this is a commercial question to be addressed by Griffin Energy at its own risk.

Issue 6.18 *Raised by CCWA, ACF, WWF, CANA and Dr Mark Diesendorf. Research shows that Western Australia's current additional energy needs – up to 500MW can be utilised using a mix of energy efficiency and renewable energy. Therefore, there is no justification for this project to proceed.*

Response The research referred to suggest that the mix would include 500MW of wind power and 244 MW of bio-electricity. Information available in the public domain suggests that this is not realistic in the near future for WA. The capacity factor for wind power (0.3) would mean that additional spinning reserve would be needed to enable the use of this much wind power in the mix. The current size of the SWIS grid limits the amount of useful wind power to approximately 200MW.
Bluewaters II is an option presented to Western Power Corporation for the Power Procurement Process. The power requirement has been previously been justified by Western Power at the initiation of the Power

Procurement Process. The events of February 2004 underlined the importance for the requirement for new electricity generation facilities. The demand is underlined by the realisation that the older less efficient Muja plant is required to be withdrawn from service.
The following graph of power demand (Figure 2), using information provided by Western Power, clearly demonstrates the demand for electricity.

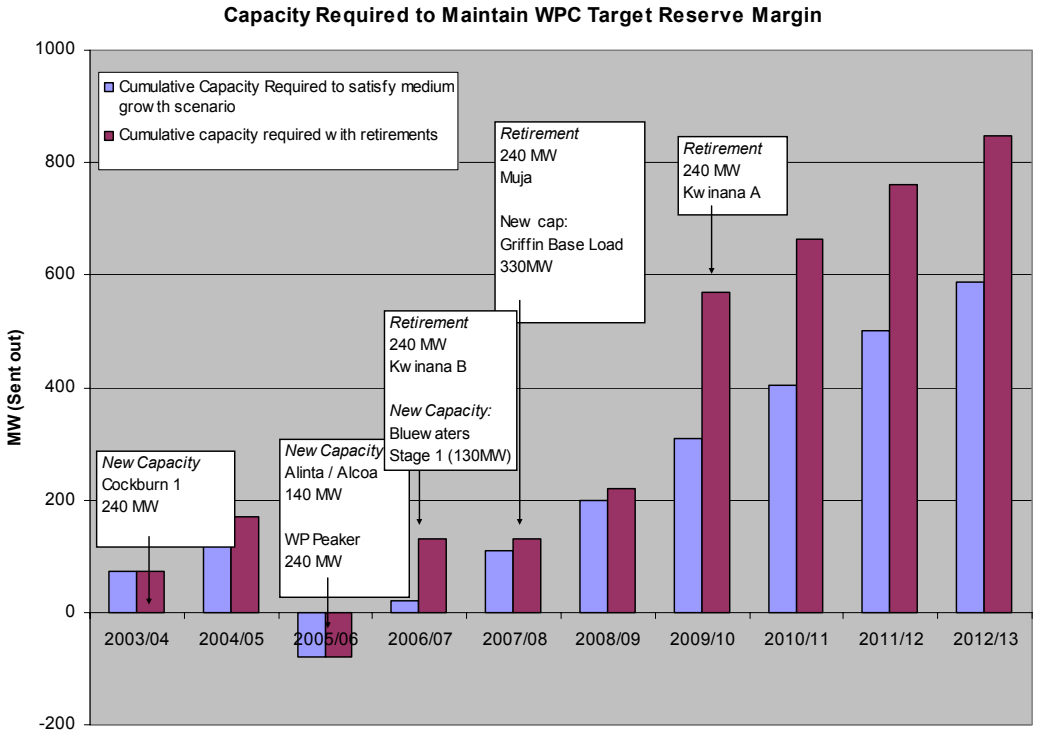

Figure 1 - Capacity required to maintain WPC Target Reserve Margin

Issue 6.19 *Raised by Pollution Action Network and Denmark Environment Centre. More acceptable options for power generation in the south-west are available. And sustainable energy systems based on cogeneration, renewables and energy conservation should be considered.*

Response A detailed response on renewable options is provided in response to issue number 6.17 above.

7 Liquid and Solid Waste Disposal

Issue 7.1 *Raised by Department of Environment.*
Although the proponent states that the saline water discharge will be 1.2GL per annum, this does not match with the calculation for discharge in Section 6.3.3. The DoE notes the limitations that apply to the disposal of saline water through Western Power Corporation's existing Collie 'A' Power Station saline wastewater pipeline and ocean outfall system.

Response The updated saline water discharge quantities will be revised with the updated information from plant suppliers as shown in Table 8 below: The scenarios listed in the table relate to the three possible outcomes for coal fired power stations in Collie after the finalisation of the Power Procurement Process.

Table 8 – Estimated Water Discharge Quantities

	Original*			**Modified**		
USER	**Scenario 1**	**Scenario 2**	**Scenario 3**	**Scenario 1A**	**Scenario 2A**	**Scenario 3A**
Collie A (use in 03/04)	0.53GL	0.53GL	0.53GL	**0.53GL**	**0.53GL**	**0.53GL**
Collagen Plant	0.02GL	0.02GL	0.02GL	**0.02GL**	**0.02GL**	**0.02GL**
Bluewaters 1	1.2GL	1.2GL	1.2GL	**0.5GL****	**0.5GL****	**0.5GL****
Bluewaters 2	1.2GL	Nil	Nil	**0.5GL****	**Nil**	**Nil**
Collie B (Griffin)	Nil	1.8GL	Nil	**Nil**	**0.82GL*****	**Nil**
Collie B (Wesfarmers)	Nil	Nil	1.46GL	**Nil**	**Nil**	**1.46**
TOTAL	2.95GL	3.55GL	3.21GL	**1.55GL**	**1.87GL**	**2.51GL**
Pipeline Capacity	2.91GL	2.91GL	2.91GL	**2.91GL**	**2.91GL**	**2.91GL**
Spare Capacity	-0.04GL	-0.64GL	-0.30GL	**+1.36GL**	**+1.04GL**	**+0.4GL**

*All figures in the original PER's in scenarios 1, 2 & 3 were correct based on the available information furnished by plant suppliers during PER submission.
** Average Bluewaters saline water discharge based on revised information received from Mitsui/IHI on the proposed plant water balance. *(Attachment 8)*
*** Original number (1.8GL) may have assumed a lower than optimum concentration ration for the cooling water system. More recent advice from the contractor has provided the amended figure (0.82GL) in the above table.

Based on the revised Bluewaters saline water discharge quantities, there will be spare capacity in the Collie A saline water pipeline as shown in Scenarios 1A, 2A & 3A.

If the pipeline spare capacity is the only factor for consideration, the Bluewaters liquid waste discharge volume can always be reduced to suit the allocated pipeline capacity with the proposed volume reduction technique mentioned below.

The peak flow of the Bluewaters and Collie B power stations will only happen during commissioning which will last about 20 days per unit. The peak flows are 0.6 MLD and 0.2 MLD higher than the normal flows for

Bluewater 1 and Collie B (Griffin) respectively. Simultaneous peak flows from the power stations will not happen since they will be commissioned in different time under all scenarios.

The Collie A waste water treatment plant design has a total storage capacity of 27 ML getting from the saline water emergency pond (1x20ML), the water collection tanks (2x3ML) and the saline water disposal tank (1x1ML). Peak flows from the power stations are managed with adequately sized buffer / storage facilities.

Under normal operation of the Collie A power station, the 27 ML storage capacity can provide a 6-day buffer for the 4 MLD pump breakdown or a sudden increase in waste water flow to the storage system.

Issue 7.2 *Raised by Department of Environment.*
The proponent states that if use of the WPC saline pipeline is not technically or economically feasible for disposal of waste from Bluewaters 2, then the alternative will be dispose of into an evaporation pond system. Additional detail on alternative disposal systems is required.

Response The evaporation pond option will be considered only if the WPC saline pipeline is not technically or economically feasible. It is expected that the evaporation pond option will be incorporated with volume reduction facilities upstream of the evaporation pond. Volume reduction will be carried out by using reverse osmosis membrane and brine concentrator. The order of volume reduction will be approximately 10 times for using reverse osmosis membrane and 100 times for using combined reverse osmosis membrane and brine concentrator. The size of the proposed evaporation pond will therefore be much smaller than the one without upstream volume reduction. For the combined Bluewaters I and II liquid waste discharge of 0.97GL/year at 1,500ppm concentration, the reduced volume for evaporation can be as low as 97ML/year or 9.7ML/year at about 15,000ppm TDS or 150,000ppm TDS respectively. This is based on an assumed wastewater quality similar to that of Collie A. The permeate from the reverse osmosis membrane and the distillate from the brine concentrator can be re-used for the power station to reduce raw water consumption rate.

In the Collie area, the evaporation rate has been recorded with an average total of approximately 1,500mm per year and exceeded rainfall for seven months of the year. The means rainfall is about 900mm per year. If meteorological conditions are still considered not able to support the evaporation pond option, crystallisation of the brine slurry to solid brine salt by installation of crystalliser will be considered. The solid salt of about 3,000 tonnes per year for two units will be transported to an appropriate licensed landfill disposal site.

If the pipeline spare capacity is the only factor for consideration, the Bluewaters liquid waste discharge volume can always be reduced to suit

the allocated pipeline capacity with the proposed volume reduction technique. It can be demonstrated easily that the combined concentration of the Collie A saline water and the concentrated Bluewaters saline water will still satisfy the Collie A saline water discharge license conditions as shown in Table 9 below:

Table 9 – Saline Water Discharge Conditions

Based on Scenario 1A (without considering Collagen Plant)	Unit	Design	Average
Collie A saline water discharge rate (based on 2003/2004)	GL/y	1.132	0.53
Collie A saline water TDS	mg/L	1,500	1,500
Assumed BWI&II reduced volume	GL/y	0.0097	0.0097
Assumed BWI&II TDS in reduced volume	mg/L	150,000	150,000
Combined quantity at ocean outfall	GL/y	1.1417	0.5319
Combined TDS concentration at ocean outfall	mg/L	2,762	4,169
Collie A pipeline design capacity	GL/y	2.91	2.91
Collie A licensed TDS discharge concentration	mg/L	32,000	32,000

The above example assumes a 100 times volume reduction of the combined Bluewaters I & II discharge rate of 0.97GL/yr. It shows that the combined concentration in TDS is well below the licensed limit.

In the event that capacity in the saline discharge line is restricted or not available a combined RO and possibly a brine concentrator volume reduction facility similar to the one in Muja power station is proposed as an option for management of saline discharge water.

The RO will be used to pre-concentrate the feed upstream of the brine concentrator with pre-treatment facility designed to suit the feed chemistry. The station waste water retention pond will be designed to provide a relatively constant quality for the RP process. The RO will probably recover more than 70% of the feed.

The evaporation pond, should it be required, will be designed based on appropriate engineering and environmental standards to minimise operational and environmental risks. The design will include impervious liners to minimise potential of underground water through seepage, and sufficient freeboard on top of the design wall height to avoid overflow due to rainfall during winter and operational spillage. A subsurface drainage system will be installed to remove the accidentally leaked wastewater. In the course of time, salts deposited in the pond must be removed. Options for safe disposal of salt deposits include sale to interested buyers, or disposal of the salt to an approved waste disposal facility. An open area of 1 to 2 ha would be required for a final evaporation.

Locating the powers station within the Coolangatta Industrial estate has ensured that sufficient land will be available should the above options be required.

Accidental waste spillage of the above combined system during operation, and potential seepage and overflow of the waste effluent during operation and decommissioning are potential environmental impacts. These potential impacts are catered for and managed by implementation of the Construction and Operations EMPs.

Issue 7.3 *Raised by Department of Environment.*
The water supply source is based on the assumption that the mine dewatering yield will be sufficient. The assumption needs to be justified.

Response

Dewatering water will be supplied by Griffin Coal to the Bluewaters power station under a water supply contract. Pre-treatment of the de-watering water will be provided by the supplier. Contractual parameters will be controlled and the TDS will be controlled at 260ppm. The mining studies for Ewington I and Ewington II deposits forecast aggregate dewatering abstraction from 2005 to 2030 in the range from 23.0 to 12.6 GL/year. More detail is provided in the Water Supply Strategy (Attachment 9)

The quality of the Bluewaters saline water has been assumed the same as Collie A at 1500ppm TDS.

With the pipeline option, the proposed Bluewaters I & II discharge will be about 0.97GL/year at 1500ppm TDS. The heavy metal concentrations will be expected to be similar to that of Collie A. A saline water treatment facility similar to that in Collie A will be provided to treat the saline water before discharging into the pipeline for license conditions compliance in particular for heavy metal concentrations control. The facility will provide treatments including oxidation, flocculation, neutralisation, clarification and filtration for the saline water. The existing Collie A saline water discharge license conditions will be satisfied

Issue 7.4 *Raised by Department of Environment.*
3.25GL of water per year will be sourced from mine dewatering activities. Saline water discharge will be 1.2GL per annum. Therefore, it is expected that contaminant concentrations in source water could be concentrated by a factor of about 2.7 (due to evaporation). In addition, there are pre-treatment chemicals. Taking the leachate results from Ewington 1(page 78) and multiplying these concentrations by a factor of 2.7 (to allow for evaporative losses) provides a way of estimating saline discharge concentrations. Doing this, it can be seen that the likely concentrations of Cd, Cr, CU, Ni and Zn could exceed licence conditions. Can the proponent provide further clarification in regard to this matter?

Response This DoE submission refers to leachate results on page 78 of the PER to predict saline discharge concentrations to the saline pipeline. There is no

table on page 78; however Table 11 on page 76 refers to leachate from **fly ash** which is in no way related to liquid waste disposal to the saline pipeline.

Issue 7.5 *Raised by Department of Environment.*
The PER does not supply an estimate of cumulative loads of contaminants discharged. The current licence conditions referred to on page 83 would allow a discharge of approximately 0.4 tonnes/day or 146 tonnes/annum of total suspended solids. Are there potentially toxic constituents of the TSS in the Bluewater effluent? What is known about sediment accumulation, modification or turbidity effects in the vicinity of the diffuser?

Response A discussion on the effects of cumulative loading on the saline water discharge is presented on pages 85 and 86 of the PER.

The water quality data presented on pages 83 to 85 of the PER show that the present (Collie A) concentrations of contaminants in the wastewater are considerably less (in most cases by a factor of more than 10) than stipulated in the present licence. Combined with the low volume of discharge (16 L/sec compared to the design discharge of 92.5 L/sec) results in much lower loadings than were allowed for in the original proposal for the Collie A power station.

The predicted doubling of the discharge volume to 32 ML/sec will still be less than half of that originally proposed for Collie A. As the concentrations will remain unchanged, this will result in an approximate doubling of the load, but as previously noted in the PER, the cumulative load will be well within the previously assessed level for all contaminants.

While it may be possible under the present licence to discharge solids at the rate of 400 kg/day, the present load, based on Western Power data for discharge (16 L/sec) and TSS (23 mg/L) is approximately 32 kg/day. The predicted doubling of the load for the combined discharge (Collie A plus Bluewaters II) would give a loading of 64 kg/day. Assuming measured background TSS concentration of approximately 5 mg/L in the vicinity of the outfall during field surveys to be the norm, the TSS concentration at the edge of the zone of initial dispersion would rise by less than 0.2 mg/L, or 4%.

The results of monitoring at the site of the wastewater discharge location show no evidence of accumulation of contaminants in the sediments in the vicinity of the outfall (URS 2003, HGM 2003, 2004).

Issue 7.6 *Raised by Department of Environment.*
The terms Limits of Reporting (LOR) and detection limits are used interchangeably in the PER [p84]. However, LOR refers to the lowest level of contaminant that can be estimated to a pre-defined accuracy.

The limit of detection does not imply any particular accuracy on the concentration estimate.

Response The use of the term detection limit in reference to Limit of Reporting (perhaps more appropriately termed the Practical Quantitation Limit [PQL]) was by way of a brief explanation of the term. It was not used in reference to any of the data quoted.

Issue 7.7 *Raised by Department of Environment.*
The EQO for maintenance of aquaculture has been excluded. Could this be justified?

Response The EQO for aquaculture was not included in the PER as it is not an existing or considered a likely future use of these waters, given that the location is highly exposed to prevailing wind and seas and the waters are relatively shallow, i.e. not suitable for cage aquaculture.

Notwithstanding this, the requirements for physical stressors (pH and dissolved oxygen) will be met.

For the protection of wild fish stocks (refer to ANZECC & ARMCANZ 2000 guidelines section 4.4.1) the concentration guidelines for the identified toxicants present in the effluent (nitrate-nitrogen, cadmium, chromium, copper, lead, mercury and zinc) will be met at the edge of the ZID. This conclusion is based on existing modelling undertaken for the design discharge condition of 92.5 L/sec, which exceeds both the existing and proposed discharge rate.

Issue 7.8 *Raised by Department of Environment.*
The 80% species protection EQO for the bioaccumulants Cd and Hg appear to be met at end of pipe. The 99% species protection EQO are generally met at the edge of the mixing zone (conservatively assuming 100 dilutions), with the following qualifications:

- *For copper, the predicted concentration is close to the EQO. It would be useful to determine the fraction of copper concentration that is bioavailable; and*
- *There is uncertainty about the form of Chromium in the effluent. Also the state of knowledge on the speciation of Chromium in the marine environment is poor. The predicted concentration of chromium at the edge of the mixing zone is well below 99% species protection guideline for Cr(3) and is only marginally above the corresponding Cr(6) guideline. It is recommended that the speciation of chromium in the effluent be further investigated.*

Response As identified in Commitment 7, it is proposed to confirm the composition and quantity of the saline wastewater discharge and conduct a detailed modelling assessment of the ocean outfall discharge to demonstrate that the water quality guidelines are met at the edge of the mixing zone for the combined wastewater discharge (Commitment 7.2).

A saline wastewater monitoring programme for the project will be designed and implemented (Commitment 7.3). A review will be

undertaken of all analyses currently performed at that time. This review will include the analytical methods, levels of detection and need for additional analyses such as speciation of particular metals, where appropriate.

Issue 7.9 *Raised by Department of Environment.*
Groundwater/leachate monitoring will be required in order to gauge the effect of disposing of fly ash by mixing it with overburden and returning it to the Ewington mine.

Response This is indeed a commitment proposed by the Griffin Group to ensure responsible monitoring of ash leachate. The final monitoring program for Ewington mine is overseen by the Collie Coal Mines Environment Committee (CCMEC) thus ensuring that relevant stakeholders such as CALM and DoE are included in the design of the monitoring program and assessment of results. Details of groundwater monitoring are included in the Griffin Coal Mining Company annual environmental report.

Issue 7.10 *Raised by CCWA, ACF, WWF, CANA.*
More information must be provided about the composition of the saline effluent and if it exceeds EPS standards the proponent must be required to dilute it or treat it.

Response Details on the expected effluent composition are provided in the PER in section 7.8.2 (Tables 12 & 13). Griffin Energy has committed to ensuring that the effluent will meet existing licence discharge requirements.

Issue 7.11 *Raised by CCWA, ACF, WWF, CANA*
There is no mention of the composition of the fly ash.

Response Table 10 on page 75 of the PER details the expected fly ash composition from the coal intended to be supplied to the power station.

Issue 7.12 *Raised by CCWA, ACF, WWF, CANA*
Previous analysis of fly ash from Australian coal have shown a significant thorium and uranium content.

Response In 2003 Griffin Energy commissioned a report on the radioactive potential of Collie coal. The results (Table 10 below) of the report indicated the following:

Table 10 – Radioactivity of Collie Coals

Element	Calculated Total Activity (Bq/kg)
Collie coal	466
WA power station coals (average)	574

As a guide to the significance of the total activity of the above coals, the total activities of the Earth's crust and garden soil are 1,434 and 1,480 Bq/kg respectively.

This would indicate that the radioactivity levels of Collie coal is below background levels.

Issue 7.13 *Raised by Department of Environment,* CCWA, ACF, WWF, CANA., *and Shire of Collie*
A significant concern relates to the proposed method of disposal of fly ash.

Response Simulated testing of rainfall ingress into the fly ash using overburden from Ewington I mine site is nearing completion. The test data to date shows the overburden causes a significant reduction in the leaching of environmentally sensitive material from the ash. Some further work about to be undertaken will assess worst and best case scenarios.

The hydrogeological studies have commenced. Models of ash disposal locations and methods are being prepared, taking into consideration current, during mining and post-mining groundwater levels, surface water features and the location of any future mine void. The leaching rates determined during the leachate testing will be input into the disposal models to assess potential plume flow. It is envisaged that the studies will be completed over the next 2-3 months.
The scope of the hydrogeological studies currently underway includes consideration of contingency planning for leachate recovery should it become necessary. The nature of any proposed groundwater recovery system will be dependent on modelling predictions of where any leachate plume will appear. Until the hydrogeological studies are complete any definitive plans for contaminated groundwater management cannot be made.

The groundwater monitoring program will continue throughout the life of the Ewington I mine and if necessary post-mining to ensure integrity of the rehabilitated disposal site.

DoE and CALM will be kept informed on the results of the testing program and will be included as advising agencies in the development of management plans associated with fly ash disposal.

8 Social and Heritage Issues

Issue 8.1 *Raised by Shire of Collie.*
Bluewaters is a responsible and sustainable extension of Collie's coal mining industry.

Response Griffin Energy agrees that Bluewaters will be a positive contribution to Collie and the South West. This is further detailed in the ACIL Tasman report and referenced in the PER.

Issue 8.2 *Raised by Shire of Collie*
Council has previously raised concerns about traffic issues connected with proposed developments in the Collie coal basin. Whilst it is acknowledged that proposed traffic flows on existing public roads will not exceed standards and that an alternative access route would not become available until after the cessation of coal mining activity in the northern part of Ewington I it is appropriate to raise the point that future access into the Coolangatta area may well present traffic concerns.

Response Griffin Energy will consult with the Shire in producing a Traffic Management Plan for the construction of Bluewaters and nominates the Shire as an advising authority in the production of the Traffic Management Plan. Griffin will maintain a continuing dialogue with Council on traffic management issues.

Issue 8.3 *Raised by DIA.*
The proponent should fully explore Indigenous and Archaeological issues associated with the development and will be required to seek approval from the Minister for Indigenous Affairs should any Aboriginal sites be discovered during construction.

Response Griffin Energy has fully explored Indigenous and Archaeological issues associated with the development. Copies of applicable Ethnographic and Archaeological reports were supplied to the DIA covering the site chosen for the power station. In a letter to the EPA dated 22 June 2004 the DIA stated "*The DIA is satisfied that Aboriginal Heritage surveys have been undertaken within the proposed project area*". However in the event that any items or sites of significance are discovered at the site the DIA and any other appropriate authority will be notified.
Commitment number 15 in the PER addresses this issue.

Issue 8.4 *Raised by a private citizen.*
The proponent has made no effort to address the visual impacts of the power station.

Response Visual Amenity was addressed in Section 7.13 of the PER. Griffin Energy acknowledges that the plant stack will be visible from some distant vantage points. It is not possible to totally screen the plant from view. The plant is to be constructed in a designated Industrial area within a region that has accepted such plants before and seeks to include

them to advantage in the promotion of "Industrial Tourism" for the town and region.

Issue 8.5 *Raised by a private citizen.*
There is no reference in the PER in the light impact from the power station. The large number of industrial developments in the Collie region already ensures a number of glows which turn night into twilight.

Response Griffin Energy will limit the light shed from the power station to extent possible, whilst ensuring that safety standards are met. Appropriate Australian Standards will be used to provide guidance in the design of lighting for the Power Station.

9 WETLANDS

Issue 9.1 *Raised by DoE*
No information has been provided on wetland buffers, which are required to protect wetlands from potential adverse impacts and maintain ecological processes and functions. The description of 'seasonal sedge swamp' areas on page 63 of the PER suggest the presence of wetlands. If the delineation of the vegetation association MpB14 is interpreted as the wetland area, it appears that the buffer of 750 metres will be sufficient to reduce adverse potential impacts on the wetland.

Response The mapping of vegetation assemblages (Figure 1 of Attachment 1 in the PER) shows the power station site to be located on cleared land with minor remnant Jarrah/Marri/Sheoak (EmCcAf) open forest

The nearest areas of wetland associated vegetation are *Melaleuca preissiana*, *Banksia littoralis* low open woodland located some 750 m to the southwest and seasonal sedge located some 1250 m to the south east of the power stations site. The nearest defined drainage channel is located on cleared land some 500 m to the south of the proposed power station. This channel then passes through previously mined area before entering one of the tributaries of the Collie River.

It is considered that the physical separation (minimum 750 m) between the site and the remnant wetland vegetation and the drainage channel are sufficient in combination with proposed management measures to be implemented through the Constructional and Operational Environmental Management Plans to provide an adequate buffer between the proposed power station and the wetlands and Collie River.

Given Griffins commitment to address containment procedures for the storage of hazardous materials and containment of contaminants through the development and implementation of Constructional and Operational Environmental Management Plans (refer to response to issues 2.4 and 2.5) and the proposal to dispose of fly ash off site (refer to response to issues 7.13) the available buffer distance between the power station and identified areas of wetland vegetation will be sufficient to minimise any potential adverse impacts on wetlands. In addition, Griffin has recognised the need for regular monitoring to ensure that any potential downstream impacts of the project are being managed appropriately over the lifetime of the project. Monitoring of water quality will be an integral part of the Surface Water and Drainage Management Plan for the site and will also be addressed in the Constructional and Operational Environmental Management Plans for the site.

Issue 9.2 *Raised by DoE*
Page 70 in the PER states that "Construction activities may increase surface water and sediment run-off to nearby wetlands". However, there is no indication of where the wetlands referred to are situated, the type of geomorphic wetland or the wetland values that may be impacted. There are concerns regarding the impacts of groundwater drawdown on wetlands in the vicinity of the mine and power station.

Response Construction of the Bluewaters II power station will take place some 750 m to the northeast of the wetland vegetation defined by the presence of *Melaleuca preissiana.* Management of the construction site to control surface runoff and sediment transport will be addressed in the Construction Environmental Management Plan. In operation the proposed Bluewaters II power station will not discharge waste to wetlands. Griffin will work to ensure that the integrity of adjacent streams and wetlands is maintained.

The Griffin Group is mindful of the water supply situation in the Collie area and has commissioned a number of studies into the water supply and management situation as it applies to Griffin's operations. The commissioned studies take into account possible impacts of a revised water regime, including but not restricted to, a change in rainfall. Griffin understands the impact of mine dewatering in the Collie basin and will continue to actively practice and promote responsible stewardship of this essential resource. Griffin will continue to consult will all concerned stakeholders on water sources, usage and allocation.

Issue 9.3 *Raised by DoE*
It is recommended that comprehensive wetland information ias provided in the future management plans developed as management commitments outlined in the PER

The management plans to be developed by Griffin for the Bluewaters II power station, including the:

- construction and operational phase Environmental Management Plan
- Surface Water and Drainage Management Plan
- Vegetation and Flora Management Plan and
- Fauna Management Plan

will include relevant information on any wetland which may be directly or indirectly impacted by the project. It is noted that the power station is located some 750 m from the nearest area of wetland vegetation.

10 Other Issues

Issue 10.1 *Raised by Department of Industry and Resources.*
The EPA should process the assessment of the environmental impact of Griffin Energy's Bluewaters power station projects as a priority, using the nationally endorsed NEPM standards for management of SO_2 emissions and not benchmarking greenhouse gas offsets outside of an agreed whole of government approach.

Response Griffin Energy agrees.

Issue 10.2 *Raised by Department of Industry and Resources.*
The EPA should develop a final Environmental Position Statement on environmental offsets and that an accompanying State Environment Policy be prepared on a whole of government basis for endorsement by Cabinet

Response Griffin Energy agrees and would expect to be considered a stakeholder and to be involved in the development of such a policy.

Issue 10.3 *Raised by Department of Industry and Resources.*
The EPA should, in conjunction with other stakeholders, participate in the development of a social and economic assessment of the role of mining, power generation and other opportunities for coal in the local Collie community, South West region and the State as a whole.

Response Griffin Energy agrees and would expect to be considered a stakeholder and to be involved in the assessment. The proponent has also proceeded with the development of a Sustainability Position Paper, taking into account the environmental, social and economic benefits of the proposed Bluewaters developments.

Issue 10.4 *Raised by Department of Industry and Resources.*
The EPA should, in conjunction with other stakeholders, participate in the preparation of the WA Coal Future Strategy, one of the Government's recent election commitments.

Response Griffin Energy agrees and would expect to be considered a stakeholder and to be involved in the development of the strategy.

Issue 10.5 *Raised by CCWA, ACF, WWF, CANA.*
The incremental approach applied to the assessment of the Bluewaters project is unacceptable and misleading. As Bluewaters II will only be constructed if Bluewaters I is approved, the environmental assessment process should be recommenced with both phases of the Bluewaters development assessment as one project.

Response Bluewaters II does not necessarily follow Bluewaters I; it is an option for the Power Procurement process. Each plant stands on its own merits,

however where possible, infrastructure will be shared to maximise efficiencies.

Griffin Energy has followed due process in preparing and presenting the PER for public review. The preceding scoping document and the PER were reviewed by the EPA prior to release to the public for review. There is a considerable amount of support for the project in the Collie area and the greater South West. Griffin Energy is responding to all issues raised in submissions. The responses are available to the public. There is no justification for starting the assessment process again.

Issue 10.6 *Raised by Pollution Action Network.*
We ask that the EPA undertake a strategic review of all proposals for coal fired power stations proposed for the Collie area. It is unacceptable that in the 21st century, Western Australia could be building up to 5 more coal fired power stations, all based on subcritical polluting technology.

Response There have been two Strategic Environmental Reviews carried out recently on Coal fired Power Generation; the issues have been well canvassed in these SERs and the PERs on specific projects. There is no justification for any further strategic reviews.

The submitters have over-estimated the number of new coal fired power stations. In reality there may only be one new coal fired power station in Collie (Bluewaters I). The Power Procurement Process has four options to consider; Bluewaters II, Collie B (two proposals) and a gas proposal. Furthermore, Western Power has committed to the closure of two stations (Muja A & B) **before** the commissioning of any of the above proposals. Therefore, if coal wins the Power Procurement Process, the outcome will be two new plants replacing two older, less efficient plants.

Issue 10.7 *Raised by CCWA, ACF, WWF, CANA.*
Information should be presented to verify the statement that "Collie coal is an efficient, available and comparatively inexpensive local source of energy".

Response The price of the coal is commercial in confidence and not relevant to the Environmental Review process. However, the availability of Collie coal is a matter of record by virtue of the stated reserves.

Collie coal is a comparatively inexpensive local source of energy for electricity production purposes in WA. By comparison wind and solar sources, while considered cost free, require much higher capital cost equipment to convert the energy source to electricity.

Issue 10.8 *Raised by Department of Environment*
Three pieces of legislation are missing from the Applicable legislation table. Namely

1. *Collie Coal (Griffin) Agreement Act 1979*
2. *Rights in Water and Irrigation Act,1914*

3. Shire of Collie Town Planning Scheme Number One

Response Table 11 (below) is an amended Table of applicable legislation.

Table 11 - Applicable Legislation

Applicable Legislation - State
Department of Indigenous Affairs • *Aboriginal Heritage Act, 1972 - 1980* Scope: Protects aboriginal sites **Department of Agriculture** • *Agriculture and Related Resources Protection Act, 1976* Scope: Management of pests and weeds **Local Government Authority** • *Bush Fires Act, 1974* Scope: Fire safety **Department of Conservation and Land Management** • *Conservation and Land Management Act, 1984* Scope: Protection and management of national, marine, conservation and regional parks, State forests, and timber, nature, and marine nature reserves. • *Wildlife Conservation Act, 1950* Scope: Protection of rare and endangered flora and fauna. **Environmental Protection Authority - Department of Environment** • *Environmental Protection Act, 1986* Scope: The EPA was established as in independent authority with the broad objective of protecting the State's environment. **Department of Industry and Resources** • *Explosives and Dangerous Goods Act, 1961 - 1986* Scope: Regulates the manufacture, use and storage of explosives and dangerous goods. • *Collie Coal (Griffin) Agreement Act 1979* Scope: Provides administrative arrangements for Collie coal mined by Griffin. **Department of Environment** • *Rights in Water and Irrigation Act, 1914* Scope: Regulates water issues with respect to water supply and irrigation. **Department of Health** • *Health Act, 1911* Scope: Regulation for the protection of public health. **Native Title Tribunal** • *Native Title Act, 1993* Scope: Deals with aboriginal claims for native title to land. **WA Planning Commission** • *State Planning Commission Act, 1976* Scope: Controls the State's land development. **Water and Rivers Commission (now DoE)** • *Waterways Conservation Act, 1976* Scope: Conservation and management of waters and the associated land and environment. • *Rights in Water and Irrigation Act,1914* Scope: Conservation and management of riparian water rights. **Water Corporation** • *Country Areas Water Supply Act, 1947* Scope: Regulates supply of water to country areas. **Department for Planning and Infrastructure** • *Town Planning and Development Act 1928*

Scope: Legislative framework for the preparation of Local Town Planning Schemes and Amendment to Schemes. **Shire of Collie** • *Shire of Collie Town Planning Scheme Number One* Scope: Zoning of land, classification of land uses and development control provisions to assess new land developments.
Applicable Legislation – Commonwealth
Department of Environment and Heritage • *Environment Protection and Biodiversity Conservation Act, 1999 (EPBC Act)* Scope: Protects matters of national environmental significance, including National Heritage Places.

Issue 10.9 *Raised by CCWA, ACF, WWF, CANA and PAN.*
The PER does not meet the requirements of the EPA's Guidelines for Preparing a Public Environmental review, as it does not provide a description of legal framework, including existing zoning and environmental approvals and decision making authorities.

Response Legal framework, legislation and decision-making authorities are covered in Section 2 of the PER. Griffin Energy followed due process in preparing the PER. The scoping document was accepted by the EPA and the PER was approved to be issued for public review.

Issue 10.10 *Raised by CALM.*
CALM requests that it be included as an advising agency with respect to proponent's Commitment Number 9, Action 9.8 and Action 9.10 in relation to developing and implementing EMPs.

Response Griffin Energy accepts the request to include CALM as an advising agency in the development and implementation of the Construction and Operational EMPs for the project.

Issue 10.11 *Raised by a private citizen.*
There are missing references on page 74 and page 98 of the PER.

Response The missing references were caused by a word processing formatting error. The missing reference on page 74 is Table 10 on page 75. The missing reference on page 98 is Figure 3 on page 30.

Issue 10.12 *Raised by private citizen.*
Should the project go ahead I believe that a condition should be the establishment of a full spectrum of baseline data, which is also monitored ion a continual basis and released publicly to ensure none of the environmental factors are being compromised.

Response Griffin Energy is committed to regular environmental monitoring and reporting as part of the Construction and Operational EMPs specified in Commitment One. Griffin promotes consultation with adjacent landowners and is willing to involve them in the EMP process for Construction and Operations.

Issue 10.13 *Raised by CCWA, ACF, WWF, CANA.*

The PER contains unsubstantiated claims regarding the impacts of the project on the economic well-being of Collie specifically, and the South West generally.

Response The economic benefits are substantiated in a report commissioned by Griffin Energy from ACIL Tasman in April 2004 and referenced in the PER.

Issue 10.14 *Raised by CCWA, ACF, WWF, CANA*
It must be kept in mind that Bluewaters II will have a lifetime of around 25 years, by which time the outer limits of the Collie township may have expanded to be closer to the proposed location of the project, further exacerbating problems associated with the project.

Response The Collie population is currently in decline, and on that basis the submission is without foundation. Furthermore, the Town Planning Scheme for the Shire of Collie prevents any encroachment of the town towards the project.

Issue 10.15 *Raised by CCWA, ACF, WWF, CANA, Denmark Environment Centre and WA Sustainable Energy Association*

The submitters questioned whether the project could be described by the proponent as 'sustainable' when in the submitter's opinion the project cannot be claimed as a sustainable development.

Response These submissions focused on Griffin Energy's use of the term "Sustainability". The definition used by Griffin to define Sustainability includes reference to economic factors. In a letter to Griffin dated 27 February 2004, the EPA stated *"the role of the EPA does not allow it to consider economic sustainability…"* On this basis Griffin provided the information on sustainability as background information to help define the context of the project.

Whilst acknowledging that the submitters definitions of 'sustainability' would emphasise 'ecological sustainability', Griffin has consistently maintained that the 'triple bottom line approach' when used as a measure of sustainability is an appropriate measure of sustainability for the project especially in relation to its impact on the social and economic well being of the town of Collie and the surrounding region.

The issue in these submissions revolve around how the definition of 'sustainability' is applied. Griffin acknowledges that its definition may be different to others.

Issue 10.16 *Raised by a private citizen*
The proponent has not considered adjacent landowners as key stakeholders. The impact on the neighbours will result in a financial loss if and when they propose to sell their land.

Response Griffin Energy has always considered neighbours as key stakeholders. To this end a number of meetings will adjacent landowners were held in late 2004 and early 2005. The meetings were held with the landowners as a group and on an individual basis. A continuing dialogue has been developed and maintained. The adjacent landowners were individually invited to public meetings and workshops that have been held to discuss various Griffin proposals including the Bluewaters power stations, the Coolangatta Industrial Estate and the Ewington mine development.

Adjoining landowners (Tonkin, Yates and Britten) addressed a meeting of the Collie Shire Council on 12th April 2005 at which they advised Council that their concerns on the development (which includes the power station proposals) had been satisfied. Refer attachment 10 (extract from Shire of Collie Minutes of ordinary meeting 12th April 2005).

It is unlikely that the development will adversely affect adjacent land values. The trend has been that the rezoning of land to Industrial status has had the effect of increasing the value of nearby land. The creation of industrial land creates extra demand for nearby land due to the location of industrial facilities that require servicing and support from population centres.

11 Glossary

ACF	The Australian Conservation Foundation
AGO	Australian Greenhouse Office
ANZECC	Australian and New Zealand Environment and Conservation Council
ARMCANZ	Agriculture and Resource Management Council of Australia and New Zealand
BPM	Best Practicable Measure
BWEA	Bunbury Wellington Economic Alliance
CANA	Climate Action Network
CALM	Department of Conservation and Land Management
CCMEC	Collie Coal Mines Environment Committee
CCSD	Cooperative Research Centre for Coal in Sustainable Development
CCWA	Conservation Council of WA
CHP	Combined Heat and Power
CO	Carbon Monoxide
COAG	Council of Australian Governments
CO2CRC	Cooperative Research Centre for Greenhouse Technologies
CRC	Cooperative Research Centre
CSIRO	Commonwealth Scientific and Industrial Research Organisation
dB	Decibel
dB (A)	Decibel A weighted
DEFRA	Department of Environment Food and Rural Affairs
DIA	Department of Indigenous Affairs
DoE	Department of Environment
DoH	Department of Health
DPI	Department of Planning and Infrastructure
EC	European Commission
EMP	Environmental Management Plan
EPA	Environmental Protection Authority
EPASU	EPA Service Unit
EPBC Act	Environment Protection and Biodiversity Conservation Act (Cmw)
EQO	Environmental Quality Objective
g	Grams
GHG	Greenhouse Gases

GJ	Gigajoule
ha	Hectare
HCWA	Heritage Council of Western Australia
Hg	Mercury
HP	High Pressure
IDGCC	Integrated Drying Gasification Combined Cycle
IEA	International Energy Agency
IGCC	Integrated Gasification Combined Cycle
IPP	Independent Power Producer
kg	kilogram
L/sec	Litres per second
m^2	Square metres
m^3	Cubic metre
Mg/Nm^3	Milligrams per normal cubic metre
MPa	Mega Pascal
MTE	Mechanical Thermal Expression
MW	Megawatt
MWh	Mega Watt hour
NEPM	National Environment Protection Measure
NHMRC	National Health and Medical Research Council
NO_2	Nitrogen Dioxide
NO_x	Nitrogen Oxides
NPI	National Pollutant Inventory
NSW	New South Wales
OECD	Organisation of Economic Cooperation and Development
PAN	Pollution Action Network
PAH	Polycyclic Aromatic Hydrocarbon
PER	Public Environmental Review
PM_{10}	Particulate matter less than 10 microns in diameter
PPP	Power Procurement Process
R&D	Research and Development
SKM	Sinclair Knight Merz
SO_2	Sulphur Dioxide
SOx	Oxides of Sulphur
SWCCI	South West Chamber of Commerce and Industry

SWDC	South West Development Commission
SWIS	South West Interconnected System
SWPP	South West Power Project
TAPM	The Air Pollution Model
tpd	Short (US) tons per day
t/h	Tonnes per hour
UNFCCC	United Nations Framework Convention on Climate Change
VOC	Volatile Organic Compounds
WHO	World Health Organisation
WPC	Western Power Corporation
WRC	Waters and Rivers Commission (now DoE)
WRCA	W.R. Carpenter Agriculture Pty Ltd
WWF	World Wildlife Fund
ZID	Zone of Initial Dilution
$\mu g/m^3$	Micro grams per cubic metre
^oC	Degrees centigrade
µg/L	micrograms per Litre

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