# GRIFFIN ENERGY PTY LTD

## Collie B Power Station

## Proponents responses to Submissions

## Attachment 9

# Power Station Water Supply Strategy

**April 2005**

# Power Station Water Supply Strategy

Outlined below is the water supply strategy for the Bluewaters/Collie B Power Station. The approach outlined is reasonable and practical in context with the mining operations linked to the proposed new power station(s).

## 1. Water Supply Demand – Blue Waters Power Station / Collie B Power Station

Development of the Bluewaters/Collie B power station(s) will require a highly secure water supply. Absence of a highly secure water supply will adversely influence the ability of the power station(s) to operate at all times. A total annual supply of 8.6 GL is forecast, for a design operating periods of 30 years. This supply forecast is based on raw water being salinity less than 500 mg/L and is made up of 3.25 GL/annum for Bluewaters Unit 1 and an additional 5.35 GL/annum for Griffin's two options of either a 200 MW power station unit (Bluewaters Unit 2) or a power station unit of up to 330 MW at Collie B.

Mining studies for the Ewington I and Ewington II deposits forecast aggregate dewatering abstractions from 2005 to 2030 in the range from 43.5 to 12.6 GL/annum (Table 1). These forecasts are preliminary, pending the outcome of final predictive dewatering simulations.
The forecast abstractions:

- are typically greater than or in the order of 20 GL/annum up until 2019;
- remain in the order of 12.6 to 18.9 GL/annum from 2019 to 2030; and
- steadily reduce after 2019.

It needs to be recognised that the predicted long-term forecasts of abstraction in particular carry some uncertainty. The uncertainty is linked to lack of demonstrable evidence of the long-term sustainable yields the aquifer systems being locally dewatering to facilitate mining. Nevertheless, the predictive results are considered to indicate that the mine dewatering abstractions at Ewington I and Ewington II provide a robust platform for long-term water supply to the proposed power station(s).

**Table 1**

**Predicted Ewington I and Ewington II Pit Dewatering Abstractions**

| Year | Groundwater Abstraction (GL/annum) | | |
|---|---|---|---|
| | Ewington I | Ewington II | Aggregate |
| 2005 | 2.5 | 20.5 | 23.0 |
| 2006 | 12.6 | 30.9 | 43.5 |
| 2007 | 10.5 | 22.9 | 33.4 |
| 2008 | 9.6 | 16.5 | 26.1 |
| 2009 | 8.8 | 14.2 | 23.0 |
| 2010 | 8.1 | 14.2 | 22.3 |
| 2011 | 7.5 | 14.2 | 21.7 |
| 2012 | 7.0 | 14.2 | 21.2 |
| 2013 | 6.4 | 14.2 | 20.6 |
| 2014 | 6.0 | 14.2 | 20.2 |
| 2015 | 6.6 | 14.2 | 20.8 |
| 2016 | 6.7 | 14.2 | 20.9 |
| 2017 | 6.4 | 14.2 | 20.6 |
| 2018 | 6.5 | 14.2 | 20.7 |
| 2019 | 6.3 | 13.8 | 20.1 |
| 2020 | 6.1 | 12.8 | 18.9 |
| 2025 | 5.2 | 9.9 | 15.1 |
| 2030 | 4.7 | 7.9 | 12.6 |

## 2 Secure Supply Options

There are only three very secure individual local water supply sources in the vicinity of the proposed power stations. These are:

- Groundwater (fresh and brackish) abstracted from the Collie Basin for the dewatering of current, planned and proposed coal-mining operations.
- Brackish to fresh water from Collie River East Branch or Wellington Dam.

- Fresh water from Harris River Dam.

It is understood that up to 10 GL/annum of divertible streamflow is available for power generation from the Wellington Catchment and Harris River. This includes an existing allocation of 5.1 GL/annum from the Wellington Catchment for power generation.

## 3 Make-up Supply Options

There are other potential resources that might be co-developed to supplement the supply strategy. These potential resources may be co-developed to enhance the security of supply and provide value to the power station(s) through strategic water resources improvements, environmental or sustainability benefits. These supply options include:

- Fresh to brackish (1,000 to 1,300 mg/L TDS) currently water stored in accessible open pit and underground mined voids such as the Chicken Creek Mine.
- Untreated, brackish (1,500 to 3,500 mg/L TDS) streamflow planned to be diverted from the Collie River East Brach to the Chicken Creek and/or Muja mined voids, commencing in 2005.
- Streamflow diverted to mined voids and treated to provide a fresh resource.

## 4 Proposed Supply Strategy

The proposed strategy is both practical and reasonable. It is framed based on forecasts of mine dewatering abstractions and known water resources issues in the Wellington Catchment and Collie Basin. It is also framed understanding there is competition for the available resources, particularly abstractions from mine dewatering, as these are usually of high quality and comparatively easily diverted for power station use.

In fundamental terms, the developed supply options should be demonstrably secure, sustainable for the life of the power stations and environmentally responsible. Given the comparatively large supply volumes and competition for the available water resources, where practicable, an independence from other water supply activities may be prudent.

The following ranked priority supply options have been determined based on these aspects.

***Priority 1:***

(a) Mine dewatering abstractions from Ewington I.

(b) Mine dewatering abstractions from Ewington II.

***Priority 2:***

(a) Mine dewatering abstractions from future coal mining operations.

***Priority 3:***

(a) Diverted brackish streamflow from Collie River East Branch.

(b) Harris River Dam (fresh).

(c) Waste water from the power stations.

***Priority 4:***

(a) Water harvesting from the Ewington I and Ewington II mined voids.

## 5 Management and Trigger Points for Change in Water Supply Strategy

The water supply strategy is strongly focussed on use of the mine dewatering abstractions. The predictive assessments indicate that there is unlikely to be a shortfall in supply to the power stations from the mine dewatering programmes. However, these predictive assessments incorporate some uncertainty. In the long-term, the current uncertainty potentially influences the security of supply. As such, the ranked supply options are intended to be regularly reviewed and modified as appropriate to ensure security of supply. The reviews would incorporate comparative assessments of actual and predicted effects of the mine dewatering abstractions, with subsequent revisions of dewatering abstraction forecasts. This approach would also link future adjustments in planning of existing and future mines to revised dewatering requirements.

Trigger points for change in ranking of supply options and water supply strategy are intended to be linked to circumstances where the review process identifies future shortfalls in supply from mine dewatering abstractions. Trigger points would occur if:

- The reviews identify a potential supply shortfall in mine dewatering abstractions. At this time the future supply options would be re-assessed and prioritised according to security of supply, cost and future risk.
- Supply shortfalls are forecast to occur within a five-year time-frame. Under this scenario, the power stations(s) would have about five years to secure and develop alternative make-up water supplies.

It is anticipated that the predictions of future mine dewatering abstractions will be more accurate after the effects of up to five years abstraction, from Ewington I and the deeper aquifer systems at Ewington II, have been monitored and assessed. These assessments will enable improved interpretation of effective local and regional aquifer hydraulics and storage characteristics and, improvements in calibration of the developed groundwater flow models. In the interim, it would be preferable for the project to advance with a reserved allocation of 5 GL/annum from the available local surface water resources of the Wellington Catchment and/or the Harris River.

It is understood that supply of mine dewatering abstraction for power stations use would form part of the term, limitation and conditions of Groundwater Well Licences abstraction for the mine developments at Ewington. The licences might also include appropriate aspects that address the future reviews of water supply options and trigger points as outlined.

**Disposal to the Local Environment**

Disposal to the local environment conforms to historical practises and is both reasonable and practical. To facilitate the management of predicted dewatering impacts, the disposals to the local environment would preferably occur at several locations. These locations include:

- Collie River East Branch at Buckingham;
- The headwaters of local tributaries of the Collie River East Branch; and
- Local tributaries of the Collie River South Branch.

The quality of the groundwater being disposed to the environment needs to conform to existing criteria stipulated by the Department of Environment. These criteria include:

- pH 5.0 to 8.5
- TSS <80 mg/L
- TDS <550 mg/L
- Oil and Grease <5 mg/L
- Soluble Iron <3.0 mg/L
- Manganese <0.5 mg/L
- Dissolved Oxygen ≥5.0 mg/L

These criteria are expected to be met by the abstracted groundwater.