



Spring Gully Power Station Project Coordinator-General's Report

September 2006

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1.0 Introduction

This Report has been prepared pursuant to s.35 of the *State Development and Public Works Organisation Act 1971* (Qld) (SDPWO Act) and provides an evaluation of the Environmental Impact Statement (EIS) process for the Spring Gully Power Station Project (Project). The EIS was conducted by Origin Energy Power Ltd and prepared on its behalf by URS Australia Pty Ltd.

An Initial Advice Statement (IAS) was lodged with the Coordinator-General on 30 November 2004 and the Project was declared to be a “significant project for which an EIS is required”, pursuant to s.26 of the SDPWO Act, on 22 December 2004.

The Project was referred to the Commonwealth Government under the *Environment Protection and Biodiversity Conservation Act 1999* (Cwth) (EPBC Act) on 10 February 2005 (Department of Environment and Heritage reference number EPBC 2005/1995). The proposal was determined not to be a ‘controlled action’ under the EPBC Act on 8 March 2005.

The objective of this report is to summarise the key issues associated with the potential impacts of the project on the physical, social and economic environments at the local, regional, state and national levels. It is not intended to record all the matters which were identified and subsequently settled. Instead, it concentrates on the substantive issues identified during the EIS process.

This report represents the end of the State impact assessment process. Essentially, it is an evaluation of the project, based on information contained in the EIS, submissions made on the EIS and information and advice from Advisory Agencies and other parties, and it states conditions under which the project may proceed.

2.0 Project Description

2.1 The Proponent

The Proponent for the Project is Origin Energy Power Ltd (Origin Energy).

Origin Energy owns and operates electricity generation facilities in Queensland, South Australia and Western Australia. Origin Energy is also a major investor in Australia's upstream oil and gas business with interests in the Cooper Basin in South Australia, the Surat and Bowen Basins in Queensland, both onshore and offshore in the Otway Basin in South Australia and Victoria, offshore in the Bass Basin in Victoria, and in the Perth and Carnarvon Basins in Western Australia.

2.2 The Project

Origin Energy proposes to develop a 1,000 megawatt (MW) combined cycle gas fired power station at Spring Gully, 80 km north-east of Roma, at Origin Energy's existing coal seam gas (CSG) production area. The power station is proposed to be developed in two stages of approximately 500 MW each.

Spring Gully has been chosen for the site of the Project to take advantage of synergies created by locating the power plant adjacent to the gas supply, as the gas will be supplied from Origin Energy's recently commissioned CSG project. Gas is extracted from the coal seams underlying Spring Gully and the surrounding properties, compressed in the gas plant and piped to the Queensland natural gas pipeline network.

Co-locating the Project with the CSG plant at Spring Gully avoids significant capital and ongoing operating costs associated with the evaporation of saline water and the transport of gas. It is proposed to use the saline water (a by-product of the CSG extraction process) as cooling water for the power station. The power station will evaporate large volumes of water thus significantly reducing the area and number of evaporation ponds that would otherwise be required as part of the CSG extraction process. Furthermore, use of this water avoids the need for using water from other sources which would be the case if the power station was not at Spring Gully. These benefits significantly outweigh the additional cost of the longer high voltage transmission line to the Queensland electricity grid. The environmental assessment and regulatory approvals for the transmission line are not part of this Project.

The Spring Gully property is owned freehold by Origin Energy. It was purchased as part of the development of the CSG project. The majority of the property is not required for CSG or power station operations and continues to be used for cattle grazing. The Spring Gully property has an area of approximately 4,500 ha and the power station site will occupy approximately 19 ha.

The power station will be located at the northern end of the Spring Gully property next to the existing CSG gas plant. This location has a number of benefits including:

- remoteness from neighbouring residences, minimising amenity impacts; and
- synergies from combined operations between the power station and the CSG plant.

2.3 Project Rationale

Queensland is experiencing unprecedented growth in demand for electricity which is forecast to continue to grow at a rate of 3.5% pa. This demand growth is the result of population growth and industrial expansion.

The National Electricity Market Management Company (NEMMCO) is charged with overseeing the operation of the national electricity network and providing forecasts of load growth and generation capacity. The 2004 Statement of Opportunities issued by NEMMCO indicates that new generation capacity is required in Queensland by 2008/09 to avoid the serious consequences of insufficient generating capacity to supply the forecast loads. Such consequences include loss of supply (blackouts) and/or extreme price spikes, leading to a higher average price of electricity.

In order to ensure reliability of electricity supplies and to mitigate against excessive price fluctuations, new generation capacity is required to be planned and built in a timely manner.

The objective of the Project is to provide timely new generation capacity for Queensland in a way that minimises additional greenhouse gas production without placing additional demand on Queensland's water resources.

2.4 Project Alternatives

The following Project Alternatives were investigated in the EIS (s. 4.1 to 4.3):

- alternative sites;
- power station configuration; and
- alternative of taking no action.

2.4.1 Alternative Sites

Two options for locating the power station were identified. Sites away from the Spring Gully property and sites within the Spring Gully property. Construction of a power station closer to Brisbane has the benefit of being closer to the electricity market and reduced costs associated with the power transmission line. However, a new gas pipeline would need to be constructed, as well as higher pressure gas compressors. Locating the power station adjacent to the gas plant allows lower pressure compressors to be used to supply the power station and avoids the cost of another gas pipeline. The benefits of shorter power transmission are not adequately compensated by the higher costs of gas transportation.

Another factor in determining site location is the availability of adequate volumes of cooling water for use in the power station produced as a by product of the CSG

extraction process. Water cooling is preferred to air cooling as it leads to higher thermal efficiency.

Within the Spring Gully property, the preferred site nominated in the EIS, adjacent to the existing CSG plant, would provide a number of benefits over the other sites, including:

- the provision of a buffer from neighbouring properties;
- efficiencies in utilising existing road infrastructure;
- the shortest possible length of interconnecting gas and water pipelines;
- limited site clearing;
- suitable geology for the construction of the power station; and
- centralisation of Origin Energy's on-site operations.

2.4.2 Power Station Configuration

The power station configuration is influenced by its interaction with the CSG plant and the high voltage electricity transmission grid. While a larger number of smaller generating units provides operational flexibility (e.g. there is a smaller impact when one unit goes off-line), the capital and maintenance costs for multiple smaller units are greater. As flow rates from CSG wells cannot be readily manipulated, planned or unplanned down-time is more difficult to manage with larger generating units.

Origin intends to select the gas and steam turbines size and type following a global competitive tender process between major suppliers of this equipment. Conditions set in this Evaluation Report, which mitigate the impacts of this Project on such matters as air, water and noise emissions; and the management of land, receiving dams and recyclable waste, as detailed for Environmentally Relevant Activities (ERA) in Appendix Two, are based on the total inputs and outputs of the Project, irrespective of the size and combination of gas and steam turbines.

2.4.3 Alternative of Taking No Action

The alternative of not undertaking the Project was investigated in the EIS (s. 4.3). This alternative would see:

- Origin lose the opportunities to develop generating capacity in Queensland and to trade electricity and gas in Queensland and broader Australian market;
- a greater area and number of evaporation ponds required by the CSG project for the disposal of CSG water without the additional evaporation capacity of the power station; and
- the lost opportunity for further investment by Origin in the Roma and surrounding districts.

3.0 Impact Assessment Process

3.1 Significant Project Declaration

An IAS was lodged with the Coordinator-General on 30 November 2004 who subsequently declared the Project to be a 'significant project for which an EIS is required', pursuant to s.26 of the SDPWO Act, on 22 December 2004.

The Project was referred to the Commonwealth Government under the EPBC Act on 10 February 2005 (Department of Environment and Heritage reference number EPBC 2005/1995). The proposal was determined not to be a 'controlled action' under the EPBC Act on 8 March 2005.

3.2 Review and Refinement of the EIS Terms of Reference

An IAS was released for public information and draft Terms of Reference (ToR) were advertised for public comment on 19 March 2005. Comments were accepted until close of business 15 April 2005. Final ToR was issued to the Proponent on 12 May 2005. Comments on the ToR were received from:

- Department of Emergency Services;
- Department of Employment and Training;
- Department of Main Roads;
- Queensland Health;
- Department of Natural Resources and Mines (now Department of Natural Resources, Mines and Water (NRMW));
- Environmental Protection Agency (EPA);
- Department of Aboriginal and Torres Strait Islander Policy; and
- Dr J and Mrs Baker.

3.3 Public Review of the EIS

The EIS was advertised on Saturday 12 November 2005 in the *Courier Mail* and *Roma Western Star* newspapers, inviting submissions from the public until Friday 9 December 2005. The two-volume print version and the CD-ROM edition of the EIS were available for purchase from the Proponent.

The EIS was displayed at:

- Bungil Shire Council, Cartwright Street, Roma; and
- Roma Library, Hawthorne Street, Roma.

Volume One of the EIS was also available on The Coordinator-General and Origin Energy web sites.

The following Advisory Agencies were approached formally to conduct an evaluation of the EIS:

- Department of Aboriginal and Torres Strait Islander Policy;
- Department of Communities;

- Queensland Health;
- Department of Emergency Services;
- Department of Employment and Training;
- Department of Local Government, Planning, Sport and Recreation;
- Department of Main Roads;
- NRMW;
- Department of Primary Industries and Fisheries;
- Department of State Development, Trade and Innovation;
- Department of the Premier and Cabinet;
- EPA;
- Department of Education and the Arts;
- Department of Industrial Relations;
- Queensland Transport;
- Queensland Treasury;
- Queensland Police Service; and
- Bungil Shire Council.

Following the public review of the EIS, a total of 11 submissions were received from Advisory Agencies and members of the public as follows:

- Department of Aboriginal and Torres Strait Islander Policy;
- Department of Emergency Services;
- Department of Employment and Training;
- Department of Main Roads;
- NRMW;
- Department of Primary Industries and Fisheries;
- EPA;
- Department of Education and the Arts;
- Queensland Health;
- Bungil Shire Council; and
- Mr Stuart Box (Durham Downs).

The substantive issues raised in submissions were:

- the discharge of high salinity water into the proposed evaporation ponds and the risk of contamination of the underlying ground water;
- the standard of the Roma-Taroom Rd and the safety of road users;
- increased construction traffic on the Roma-Taroom Road;
- negative impact on visual amenity of nearby residents;
- the relationship between the power station and the existing CSG facility under the *Petroleum and Gas Act 2004*;
- that the use of CSG water for cooling a power station is not an authorised activity under the *Petroleum and Gas Act 2004*, and will require authorisation under s.206 of the *Water Act 2000*;
- impacts on remnant vegetation on the site; and
- impacts on air quality from stack emissions.

3.4 Review of EIS Submissions

Submissions were forwarded to the Proponent. Following discussions with the Proponent's representatives and its technical consultants, a number of matters outlined in submissions required further information and/or clarification. Origin Energy subsequently provided a document titled "Response to Coordinator-General

Spring Gully Project – March 2006”, which was provided to all EIS respondents on 9 March 2006. Origin Energy also conducted direct discussions with relevant EIS respondents.

The following agencies advised that they were satisfied that all issues had been addressed:

- Department of Aboriginal and Torres Strait Islander Policy;
- Department of Emergency Services;
- Department of Employment and Training;
- Queensland Health; and
- Bungil Shire Council.

The EPA and NRMW provided comments in the format that those agencies would normally have prepared as a concurrence agency for a development permit pursuant to the *Integrated Planning Act 1997* (IPA).

The Department of Primary Industries and Fisheries indicated that it was satisfied that issues of interest to it were addressed by either the EPA or the NRMW.

Substantive issues raised in submissions, including those raised by a nearby landowner are discussed individually in the following section.

4.0 Evaluation of Environmental Effects

4.1 Introduction

The SDPWO Act defines 'environment' to include:

- a) ecosystems and their constituent parts, including people and communities;
- b) all natural and physical resources;
- c) the qualities and characteristics of locations, places and areas, however large or small, that contribute to their biological diversity and integrity, intrinsic or attributed scientific value or interest, amenity, harmony and sense of community; and
- d) the social, economic, aesthetic and cultural conditions that affect, or are affected by, things mentioned in paragraphs (a) to (c).

'Environmental effects' means "the effects of development on the environment, whether beneficial or detrimental". These effects can be direct or indirect, of short, medium or long-term duration and cause local or regional impacts.

The following section outlines the major environmental effects identified during the EIS process, including those raised in the EIS, in submissions on the EIS and in consultation with Advisory Agencies and other key stakeholders. I have provided comments on these matters and, where necessary, set conditions to mitigate adverse impacts.

This Report states conditions, collated in Appendix One and Two, which must attach to any Development Approval issued pursuant to the IPA. The Bungil Shire Council will be the Assessment Manager for development approval for material change of use for the proposed power station (Special Activity - Gas Fired 1000 Megawatt Capacity Power Station) and for an approved waste facility (evaporation pond) in accordance with the Bungil Shire transitional Planning Scheme. The waste facility component of the application is required as waste water (blowdown water) used in the cooling of the power station proposed to be released into evaporation ponds constructed and used for the CSG extraction process approved under the *Petroleum and Gas Act 2004*.

In addition to any approval of material change of use for this Project under IPA, approval will also be required from the EPA for any ERA carried out on site in accordance with the Environmental Protection Act 1994. Of relevance is:

ERA 7(a) Chemical storage—storing chemicals (other than crude oil, natural gas and petroleum products), including ozone depleting substances, gases or dangerous goods under the dangerous goods code in containers having a design storage volume of—more than 10 m³ but less than 1000m³; and

ERA 62 Concrete batching—producing concrete or a concrete product by mixing cement, sand, rock, aggregate or other similar materials in works (including mobile works) having a design production capacity of more than 100 tonne a year;

ERA 18(a) Power station—generating power by consuming fuel at a rated capacity of 10MW electrical or more—if the fuel used is natural gas;

ERA 15(b) Sewage treatment – operating a standard sewage treatment works having a peak design capacity to treat sewage of 100 or more equivalent persons but less than 1500 equivalent persons;

ERA 75(b)(iv) Waste disposal* – operating a facility for disposing of regulated waste (other than limited regulated waste) whether alone or in combination with any waste mentioned in paragraph (a), if the facility is designed to receive waste at the rate of 200 000 tonne or more per year.

*This activity is specifically restricted to and ONLY for the disposal of saline wastewater from the power station to the hazardous dams on Lot 16 on Plan AB174: SLPF36/1166 Parish of Narran, County of Aberdeen.

These approvals are obtained through the Integrated Development Assessment System in the IPA.

4.2 Construction Impacts

EIS Findings and/or Key Points

Construction - Construction of the Project is expected to be carried out throughout 2007 – 2009 over a period of approximately 28 months. With a site area of approximately 19ha, substantial site earth works are required, including earth moving, concrete work, craneage, welding, mechanical and electrical assembly and testing.

Flora and Fauna - Approximately 19.3ha of modified open grassland will potentially be impacted by vegetation removal as a result of the construction of the power station. The EIS concludes that the effects of the proposed vegetation removal will not have any measurable impact upon floral species or vegetation communities on a regional scale, or have any significant impact upon the ecosystem function of the integral vegetation communities found on site.

Any clearing or removal of vegetation associated with the power station use, especially that of remnant vegetation on site will require an application under the *Vegetation Management Act 1999*.

The removal of vegetation and potential loss of habitat associated with the Project is not considered to have any measurable impacts to the fauna of the study area. The modified grassland community is not critical habitat for any particular species known to the area, and the small area of vegetation disturbance proposed for the development is not considered to have any lasting impact on any fauna that may utilise this area.

The EIS indicates that the existing evaporation ponds to the south of the site have provided a positive impact on avian diversity in the area, providing habitat for wader bird species observed during the survey. A number of other migratory bird species may also utilise these ponds and habitat provided by the establishment of more evaporation ponds in the future.

Air Quality - Air quality impacts will include airborne particulates and exhaust fumes from construction plant. Concentrations of these emissions off-site during construction are considered to be low to warrant mitigation measures beyond those listed in the EIS.

Workforce - The construction workforce will average 200 people, with a peak of 440 people in months 19 and 20, who will be accommodated in an on-site construction camp. The majority of workers will be sourced from outside the Roma district.

Traffic - The EIS indicates that the majority of the traffic likely to be generated by the Project both during construction and operation is expected to originate from or pass through Roma. Minimal daily light vehicle traffic to the site during construction is anticipated. However considerable heavy vehicle traffic is anticipated, including concrete trucks and over-dimension vehicles transporting materials to the site. Passenger buses will be used to transport personnel to and from Roma (two return trips daily), with construction personnel anticipated to work 14 days over a 21 day period with seven days rest.

In response to safety concerns of local road users, especially with respect to proposed road usage by heavy vehicles along the Roma-Taroom Road, the Department of Main Roads has committed \$30 million to the upgrade of this road.

In addition, if Origin Energy financially commit to the Project, it will fund a \$5 million contribution to the upgrade the Roma-Taroom Road, contributing to a safe all weather access for road users. This contribution will be delivered through a separate agreement between Origin Energy and the Department of Main Roads.

I also note the commitment of Origin Energy, by letter dated 2 December 2005, to avoid heavy vehicle construction traffic on weekends during the construction period of the proposed power station.

Conclusion

Construction of the Project will require development permits under the IPA for assessable development for which the Bungil Shire Council is the administering authority and application to the EPA for a Registration Certificate for the following ERAs:

- ERA 75(b)(iv) Waste disposal;
- ERA 62 Concrete batching;
- ERA 18(a) Power station;

- ERA 15(a) Sewage treatment; and
- ERA 7(a) Chemical storage.

The EPA has nominated conditions that will apply to these aspects of development. These conditions, included in provisions listed in Appendix Two, are designed to control and limit potential impacts on the environment from contaminants that may result from activities associated with the Project, including construction. I recommend that these conditions be adopted, and Pursuant to s.41 of the SDPWO Act, I nominate the EPA as the concurrence agency for these conditions.

4.3 Operational Impacts

EIS Findings and/or Key Points

4.3.1 Air Quality and Greenhouse

Air Quality – Origin Energy is yet to determine the exact configuration and manufacturers of proposed gas turbines used in the power station. The EIS contains information relating to modelling of the impacts to air quality by using a representative range of power station configurations, with emissions calculated for two different gas turbine models. I accept that Origin Energy is yet to commit financially to the Project, which will be influenced by tender negotiations for turbine supply and configuration. In this regard, conditions in Appendix Two detail contaminant release limits that are acceptable for the operation of the power station, irrespective of turbine configuration and manufacturer. Contaminants are to be monitored regularly and only released from an approved release point.

Greenhouse Gas Emissions - The EIS outlines a range of information relating to the Projects' Greenhouse Gas emissions and provides a satisfactory context for decision making in regard to future management. The design of the power station, being a "combined cycle" plant, which uses both gas turbines and steam turbines, produces less overall Greenhouse Gas emissions per unit of power generated when compared to coal burning electricity generation and satisfactory efficiency in the electricity generation process.

4.3.2 Water

Surface Water – The EIS identifies that the locality around Spring Gully is traversed by three dominant creek systems: Scott Creek in the north, Eurombah Creek in the centre, and Durham Creek in the south. The site drains to the Dawson River, a sub-catchment of the Fitzroy River basin. The EIS provides a flood constraints map which shows that the 100 year Average Recurrence Interval (ARI) flood level is limited to the south of the site in the immediate vicinity of Eurombah Creek and at its confluences with Bluff and Durham Creeks. The proposed power station site is well removed from these areas and is therefore considered unlikely to be impacted by flood events.

Stormwater runoff from all paved areas of the site will be collected through a series of surface and subsurface drains, where oil/water separators will remove oily substances prior to discharge off site. Similarly, runoff from non-process areas will be directed to oil/water separators prior to discharge to the sediment/retention pond to the west of the CSG plant, prior to discharge to the natural drainage system.

NRMW has advised that sedimentation ponds must be constructed as a condition of an Environmental Authority and in accordance with the Code for self-assessable development for taking overland flow water (Refer also Appendix Two).

Wastewater - The major liquid waste from the power station will be 'blowdown' water from the cooling water system. This water will be sourced from the adjacent existing CSG plant and is a by-product of the gas extraction process. Other liquid wastes will include effluent from the demineralisation plant, stormwater runoff from process areas and waste oil from plant and equipment. Treated effluent will also be generated from the sewage treatment plant at the accommodation facilities. Waste oil will be collected in oil/water separators for separation and removal off site.

It will be necessary to discharge blowdown water from the cooling system to the CSG evaporation ponds, as the water in the circuit evaporates, the concentration of dissolved salts in the remaining water increases. Continuous blowdown of part of the cooling water and replacing it with make up water limits the salt concentration within the circuit and prevents problems such as fouling of the cooling tower and scaling of equipment.

Concern has been raised by NRMW during the EIS process about the potential impact on remnant vegetation from planned or accidental release of contaminants, sewage or wastes from Project dams. While I consider this to be a remote possibility, owing to the measures outlined in Appendix Two, which require:

- the design, construction and operation of all dams containing hazardous waste to be in accordance with the Code of Environmental Compliance; and
- an extensive groundwater monitoring program,

I nevertheless state the following condition:

Condition One

Hazardous waste dams must be constructed, monitored and maintained to minimise the likelihood that the accidental or planned release of effluent, contaminants or waste to any waters (including ground water) will impact on the extent of any remnant vegetation.

Where clearing¹, of assessable vegetation occurs as a result of accidental or planned release of effluent, contaminants or waste to any waters:

- measures are to be immediately implemented to prevent further clearing; and
- if the cleared area is larger than 0.5ha, then that area is to be offset by re-establishing an equivalent area of vegetation comprised of dominant tree species from that regional ecosystem.

Pursuant to s.41 of the SDPWO Act, I nominate NRMW as the concurrence agency for this condition.

In order to further minimise the potential impact on remnant vegetation, NRMW has also recommended that the Proponent site all evaporation ponds and effluent

¹ As defined in the *Vegetation Management Act 1999*: *clear*, for vegetation—

(a) means remove, cut down, ringbark, push over, poison or destroy in any way including by burning, flooding or draining; but

(b) does not include destroying standing vegetation by stock, or lopping a tree.

disposal areas at least 30 metres from any remnant endangered or of concern regional ecosystems.

NRMW advises that the use of CSG water (associated water) for a power station will require a water licence under s.26 of the *Water Act 2000*. If a petroleum tenure holder wishes to use associated water for another purpose, including supply to a third party, the holder must obtain a water licence under the *Water Act 2000*.

Groundwater – Spring Gully is situated on the eastern margin of the Great Artesian Basin (GAB) within the Surat Basin. The aquifers of particular relevance to the power station site (i.e. those aquifers that may be affected in the short and long term) occur within the Hutton Sandstone and the Precipice Sandstone.

The Hutton Sandstone is a major aquifer of the GAB and outcrops across the Spring Gully project area, mainly to the north as sandstone cliffs. This unit was deposited in a fluvial environment and averages about 300m thickness in the Spring Gully area. Because of the proximity of the power station to these recharge areas, this aquifer is deemed sensitive to potential groundwater impacts that may arise from activities at the site. The EIS cited a previous groundwater investigation that established a 'potentiometric link' between permanent waterholes in the Eurombah Creek and the groundwater levels within the Hutton Sandstone. As such, the investigation considered that certain reaches of the creek to be 'windows into the watertable', and therefore direct entry points for water into the aquifer system.

The Precipice Sandstone outcrops approximately 35 km to the north of the Spring Gully area adjacent to the northern boundary of the Surat Basin and encompasses a recharge area of approximately 4,400 km². This sandstone formation is approximately 80 m thick and is hydraulically isolated from the Hutton sandstone due to the presence of the Evergreen Formation. The Precipice behaves as a confined aquifer beneath the project site.

The operation of the power station will produce significant amounts of blowdown water which is proposed to be expended into evaporation ponds associated with the adjacent CSG facility. This waste water will be highly saline after circulating within the power station's cooling system. Origin Energy has advised that this waste has the potential to be reinjected into the ground once gas has been extracted as part of the CSG production process. In order to ensure that this reinjected, saline water from the power station does not contaminate the underlying ground water, particularly as previous studies indicate that groundwater within the Hutton Sandstone may be deemed sensitive to impacts arising from the activities of the site, I concur with the EPA that a reinjection management plan be prepared and submitted to the administering authority and recommendations must be taken into account before any reinjection takes place (Refer Appendix Two).

4.3.3 Scenic Values (Visual)

An assessment of the power station's impact on the site's scenic values was undertaken as part of the EIS, which included the power station and associated substation, as well as consideration of emissions from the stacks and cooling towers.

The proposed power station is located on the upper slopes of a broad valley, with Eurombah Creek running east-west along the valley approximately 8 km to the

south. The site has been extensively cleared for grazing with grassland being the dominant vegetation cover. Long distance views are available from many locations on the broad grass-covered ridges and spurs throughout the area, although patches of remnant vegetation often create visual barriers. The main conclusions of the visibility assessment as summarised in the EIS include:

- the primary visual catchment of the proposed power station site is defined by the Great Dividing Range to the north, a system of hills more than 30 km to the south and prominent tree-covered spurs to the east and west;
- the site is visible from some elevated sections of the Roma-Taroom Road where it passes over ridges but generally views from the road are blocked by roadside vegetation and local landforms; and
- the potential views of the site from homesteads in the region are generally blocked by trees and/or local landforms adjoining the homestead, although there will be some glimpses of the top of stacks between the tree canopies.

Overall, the visual impact assessment concluded that the proposed power station will have a low visual impact on homesteads and public roads in areas adjoining the site due to the combination of:

- potential views of the proposed power station from surrounding areas are generally screened by existing trees and natural landforms;
- the visible portion of the stacks of the power station, which may be visible from Durham Downs homestead, form a very small portion of the view and would be at a distance of 15 km;
- only the upper portions of the power station stacks would be visible from relatively short sections of public roads, with most potential views blocked by roadside trees and local landforms;
- those portions of the stacks that are in the line of sight from key view situations to the south of the site would generally be seen against a backdrop of the forest-covered ridgeline of the Great Dividing Range to the north, and therefore would not stand out against the background;
- the orientation of the power station in a north-south direction will limit the visibility to the southern structures, which will screen views of the northern structures from the key view locations, which are all located south of the site;
- visible portions of the stacks will generally be in shadow from a southerly viewpoint and this will minimise the level of visual contrast between the stacks and the dark-toned forest-covered slopes that form a background to views from most locations south of the power station;
- no visible emissions will be discharged from the stacks; and
- steam generated from the cooling towers will generally not be visible except under certain cool climatic conditions when condensation may be visible.

While the overall potential visual impact of the proposed power station on the surrounding area has been assessed in the EIS as low, Origin Energy has proposed a number of mitigation measures that will minimise the potential impact. These include:

- the use of dark-toned natural colours and non-reflective materials will minimise the visual contrast between the power station and the background formed by the forest-covered ridgeline to the north;
- power station lighting will, as a condition of the technical specification for the power station design, avoid direct line of sight from homesteads to the south of the site, as well as from Spring Gully Road and the Roma-Taroom Road where possible, except where required for safety reasons; and

- further discussion of individual mitigation measures directly with identified affected parties, which may include the potential for the planting of vegetation screening at critical viewpoints, should this prove effective.

I am satisfied that, taking into account the distance between the proposed power station and neighbouring residences and the limited number of concerns raised regarding the impact of the Project on the area's scenic values, the mitigation measures proposed by Origin Energy will limit any adverse impacts on the area's visual amenity to an acceptable level.

5.0 Environmental Management Plan

5.1 Introduction

If this Project proceeds, Origin Energy will become responsible for environmental management of the power station site. The EIS states that Origin Energy targets the achievement of high environmental standards and strives to ensure that activities within the power station are ecologically sustainable. Management mechanisms are provided to ensure that the impacts of the Project are acceptable, and to appropriately deal with all waste generated from the facility.

It will be necessary to implement management measures to control and minimise potential impacts associated with the construction, operation and decommissioning phases of the power station. The objective of these management measures, presented in the EIS as strategic measures for refinement and finalisation prior to the construction, operation and decommissioning phases will be to ensure that the power station can be operated without significant adverse long-term impact on the environment in the vicinity of the proposed site. Some short-term impacts such as elevated dust, construction traffic and noise will occur but will be minimised through the proposed management measures.

The management measures and site monitoring required to ensure that potential impacts are identified and minimised are presented in the draft Environmental Management Plan (EMP) prepared by the Proponent (refer EIS s. 21).

5.2 Format of the EMP

An EMP will be prepared for both the construction and operation of the Project, the decommissioning being included within the Operation EMP. Each EMP will be structured as follows for each environmental element:

- Element – the environmental aspect of construction or operation requiring management consideration;
- Objective – the guiding operational objective that applies to the element;
- Performance Criteria – the mechanisms and actions through which the objective will be achieved;
- Strategy – the detail by which the success of the implementation of the policy will be determined;
- Monitoring and Reporting – the process of measuring actual performance, or how well the policy has been achieved, including the format, timing and responsibility for reporting and auditing of the monitoring results; and
- Corrective Action – the action to be implemented and by whom in the case where a performance requirement is not met.

5.3 Environmental Elements

The following table summarises the elements of the project for which draft environmental management strategies have been prepared as part of the EIS process.

Project Element	Construction	Operation
Waste Management	✓	✓
Air Quality	✓	✓
Soil Management	✓	✓
Surface Water Management	✓	✓
Ground Water Management	✓	✓
Nature Conservation Management	✓	✓
Noise Management	✓	✓
Social and Community Management	✓	✓
Hazard and Risk Management	✓	✓
Cultural Heritage Management	✓	
Incidents Management	✓	✓
Power Station Decommissioning		✓

Conclusion

Implementation of the Construction and Operation EMP's should ensure the effective management of environmental impacts of the Project. Monitoring measures proposed within the EMP's will gauge the success of that effectiveness and through reporting arrangements lead, where necessary, to appropriate corrective action being taken.

I note that the EMP's also include extensive monitoring and reporting requirements as well as the requirement for a complaints process that is managed by the contractor(s) and overseen by the Proponent.

The effectiveness of the EMP's will be able to be gauged through the monitoring and reporting protocols incorporated within the structure of the plans.

I therefore state the following condition:

Condition Two

EMP's must be prepared to address the construction and operational phases of the Project. The construction EMP and a draft operation EMP must be submitted to the EPA for comment at least 28 days prior to the commencement of construction. The final operational EMP must be submitted to the EPA for comment at least 28 days prior to commissioning. Any comments from the EPA received within 21 days of each EMP being received, should be considered when implementing the EMP. The EMP's must be generally consistent with the findings and conditions of the Coordinator-General's Report and the findings of the EIS. Construction work must not commence until the EPA has given written acceptance of those elements of the EMP relevant to the conditions set out in Appendix Two of this Report.

Pursuant to s.41 of the SDPWO Act, I nominate the EPA as the concurrence agency for this condition.

6.0 Conclusion

The documentation provided during the EIS process has satisfied the requirements of the Queensland Government for impact assessment in accordance with the SDPWO Act. It has provided sufficient information to government and to the community to allow an informed evaluation of potential environmental impacts which could be attributed to the Project. Careful management of the construction and operation of the Project should ensure that any potential environmental impacts will be reduced to an acceptable level or avoided.

I consider that on balance there are appropriate environmental safeguards in place and substantial private and public benefits which would accrue as a result of construction of the Project. Therefore, I consider that the Project, detailed in the EIS and summarised in Section Two of this report, can proceed subject to conditions contained in Appendix One and Two, which must be attached to the development approval by the Assessment Manager.

If the Project proceeds, Origin Energy and its agents, lessees, successors and assigns, as the case may be, must implement the conditions in this Report and all commitments presented in the EIS and subsequent negotiations with Advisory Agencies. In the event of any inconsistencies between the EIS documents and the conditions in this Report, the conditions in this Report prevail.

Recommendations

I am satisfied that potential adverse environmental effects of the Project are able to be adequately addressed through:

- the attachment of conditions (as listed in Appendix One and Two) in the case of either a development approval under the IPA or approvals required under other legislation; and
- the preparation and implementation of appropriate EMPs for the Project.

As the assessment of the effects of the Project has been undertaken prior to final detailed design and finalisation of key agreements, further changes to the Project may occur as a result of detailed design work.

To the extent that a revised concept is selected as the preferred configuration through the development process, the Proponent will need to provide me with written notice of its intention to make a change to the Project detailing the changes and reasons for these changes. This would detail potential adverse impacts that are changed substantially from the concept described in the EIS, either in magnitude or on areas not previously impacted. I will determine what further assessment is required to address the changes proposed to the Project.

Copies of this Report will be issued to the:

- Proponent, pursuant to s.35(5)(a) of the SDPWO Act {This Report should then comprise part of the Proponent's application for development approval pursuant to the IPA}; and
- Assessment Manager pursuant to s.40 of the SDPWO Act;

A copy of this Report will also be made publicly available on The Coordinator-General web site.

Ross Rolfe
Coordinator-General
Date September 2006

APPENDIX ONE

CONDITIONS PURSUANT TO SECTION 39 OF THE STATE DEVELOPMENT AND PUBLIC WORKS ORGANISATION ACT 1971 (SDPWO Act).

Conditions provided by the Coordinator-General to be attached to the development approval granted by the Assessment Manager under the *Integrated Planning Act 1997*.

Condition One

Hazardous waste dams must be constructed, monitored and maintained to minimise the likelihood that the accidental or planned release of effluent, contaminants or waste to any waters (including ground water) will impact on the extent of any remnant vegetation.

Where clearing², of assessable vegetation occurs as a result of accidental or planned release of effluent, contaminants or waste to any waters:

- measures are to be immediately implemented to prevent further clearing; and
- if the cleared area is larger than 0.5ha, then that area is to be offset by re-establishing an equivalent area of vegetation comprised of dominant tree species from that regional ecosystem.

Pursuant to s.41 of the SDPWO Act, I nominate NRMW as the concurrence agency for this condition.

Condition Two

Environmental Management Plans (EMP's) must be prepared to address the construction and operational phases of the Project. The construction EMP and a draft operation EMP must be submitted to the Environmental Protection Agency (EPA) for comment at least 28 days prior to the commencement of construction. The final operational EMP must be submitted to the EPA for comment at least 28 days prior to commissioning. Any comments from the EPA received within 21 days of each EMP being received, should be considered when implementing the EMP. The EMP's must be generally consistent with the findings and conditions of the Coordinator-General's Report and the findings of the EIS. Construction work must not commence until the EPA has given written acceptance of those elements of the EMP relevant to the conditions set out in Appendix Two of this Report.

Pursuant to s.41 of the SDPWO Act, I nominate the EPA as the concurrence agency for this condition.

² As defined in the *Vegetation Management Act 1999*: *clear*, for vegetation—

(a) means remove, cut down, ringbark, push over, poison or destroy in any way including by burning, flooding or draining; but

(b) does not include destroying standing vegetation by stock, or lopping a tree.

APPENDIX TWO

Conditions, to which any development approvals given under the *Integrated Planning Act 1997* for the project for which the Environmental Protection Agency (EPA) is assessment manager, are to be subject.

Pursuant to s.41 of the *State Development and Public Works Organisation Act 1971* (Qld), I nominate the EPA as the concurrence agency for the following conditions **outlined in this Appendix** which apply to the following Environmentally Relevant Activities (ERA's):

ERA 62 Concrete batching—producing concrete or a concrete product by mixing cement, sand, rock, aggregate or other similar materials in works (including mobile works) having a design production capacity of more than 100t a year.

ERA 18(a) Power station—generating power by consuming fuel at a rated capacity of 10 megawatt (MW) electrical or more—if the fuel used is natural gas

ERA 15(b) Sewage treatment – operating a standard sewage treatment works having a peak design capacity to treat sewage of 100 or more equivalent persons but less than 1500 equivalent persons

ERA 7(a) Chemical storage—storing chemicals (other than crude oil, natural gas and petroleum products), including ozone depleting substances, gases or dangerous goods under the dangerous goods code in containers having a design storage volume of—more than 10 m³ but less than 1000m³

ERA 75(b)(iv) Waste disposal* – operating a facility for disposing of regulated waste (other than limited regulated waste) whether alone or in combination with any waste mentioned in paragraph (a), if the facility is designed to receive waste at the rate of 200000t or more per year.

*This activity is specifically restricted to and ONLY for the disposal of saline wastewater from the power station to the hazardous dams on Lot 16 on Plan AB174: SLPF36/1166 Parish of Narran, County of Aberdeen.

Location of ERAs – Lot 16 on Plan AB174:SLPF36/1166 Parish of Narran, County of Aberdeen

General

Prevent and /or minimise likelihood of environmental harm

General 1: In carrying out an ERA to which this approval relates, all reasonable and practicable measures must be taken to prevent and / or to minimise the likelihood of environmental harm being caused.

Maintenance of measures, plant and equipment

General 2: The operator of an ERA to which this approval relates must:

- install all measures, plant and equipment necessary to ensure compliance with the conditions of this approval;
- maintain such measures, plant and equipment in a proper and efficient condition; and
- operate such measures, plant and equipment in a proper and efficient manner.

Site Based Management Plan

General 3: From commencement of an ERA to which this approval relates, a site based management plan (SBMP) must be implemented. The SBMP must identify all sources of environmental harm, including but not limited to the actual and potential release of all contaminants, the potential impact of these sources and what actions will be taken to prevent the likelihood of environmental harm being caused. The SBMP must also provide for the review and 'continual improvement' in the overall environmental performance of all ERAs that are carried out.

The SBMP must address the following matters:

- environmental commitments - a commitment by senior management to achieve specified and relevant environmental goals;
- identification of environmental issues and potential impacts;
- control measures for routine operations to minimise likelihood of environmental harm;
- contingency plans and emergency procedures for non-routine situations;
- organisational structure and responsibility;
- effective communication;
- monitoring of contaminant releases;
- conducting environmental impact assessments;
- staff training;
- record keeping; and
- periodic review of environmental performance and continual improvement.

General 4: The site based management plan must not be implemented or amended in a way that contravenes any condition of this approval.

Records

General 5: Record, compile and keep all monitoring results required by this approval and present this information to the administering authority when requested.

General 6: All records required by this approval must be kept for five years.

Closure and Post-Closure Care

- General 7: When the deposition of waste to the receiving hazardous dams ceases, either the deposited material is removed, or a final cover system to the hazardous dams must be installed which minimises:
- infiltration of water into the dams;
 - the likelihood of any erosion occurring to either the final cover system or the materials in the dams; and
 - the timing of rehabilitation is to be outlined in the site management plan.
- General 8: Post-closure care of the receiving hazardous dams must be conducted following deposition of waste in the dams, for:
- a period of 30 years; or
 - such shorter period until the hazardous dams and surrounding site are geotechnically stable and that no release of waste materials, leachate, or other contaminants to the environment is likely.
- General 9: A site management plan pursuant to Chapter 7, Part 8, Division 5 of the *Environmental Protection Act 1994* must be developed and provided to the administering authority at least 12 months before the expected final receipt of waste in the hazardous dams. The site management plan must include, but is not to be limited to, the future land use and actions you intend to take for compliance with the closure and post-closure care requirements of this approval.

Security

- General 10: Measures must be taken to prevent unauthorised access to the site to which this approval relates.
- General 11: Suitable banks and/or diversion drains must be installed and maintained to exclude stormwater runoff from entering any hazardous dams or other structures used for the storage or treatment of contaminants including acid sulphate soils or wastes.

Notification

- General 12: Telephone the EPA's Pollution Hotline or local office as soon as practicable after becoming aware of any release of contaminants not in accordance with the conditions of this approval.

Monitoring

- General 13: A competent person(s) must conduct any monitoring required by this approval.

Equipment Calibration

- General 14: All instruments, equipment and measuring devices used for measuring or monitoring in accordance with any condition of this approval must be calibrated, and appropriately operated and maintained.

Investigation into Alternative Waste Management Practices

General 15: For the purpose of minimising the disposal of recyclable waste to landfill, in accordance with the waste management hierarchy and principles of the *Environmental Protection (Waste Management) Policy 2000*, you must implement a Waste Management Plan that addresses at least the following matters:

- waste management practices that will ensure that recyclables are diverted from landfill;
- procedures for identifying and implementing opportunities to improve the waste management practices employed including information and education packages for waste generators to assist in maximising the diversion of recyclable materials from landfill;
- details of any accredited management system employed, or planned to be employed, to implement the waste management practices;
- training programs and guidance for waste transport contractors in the identification and source separation of recyclable materials;
- procedures for auditing waste loads to identify material to be removed for recycling;
- how often the performance of the waste management practices will be assessed (at least annually);and
- the indicators or other criteria, taking into account economic, social and environmental factors on which the performance of the waste management practices will be assessed.

NOTE: The development of the local government's waste management strategic plan in accordance with the *Environmental Protection (Waste Management) Policy 2000* which addresses the above matters will be deemed to satisfy the requirements of this condition.

General 16: The daily operation of the waste water treatment system and pollution control equipment must be carried out by a person(s) with appropriate experience and/or qualifications to ensure the effective operation of that treatment system and control equipment.

Air Nuisance

Air 1: The release of noxious or offensive odours or any other noxious or offensive airborne contaminants resulting from the activity must not cause a nuisance at any nuisance sensitive or commercial place.

Air 2: The release of dust and/or particulate matter resulting from the ERA must not cause an environmental nuisance at any nuisance sensitive or commercial place.

Air 3: Dust and particulate matter must not exceed the following levels when measured at any nuisance sensitive or commercial place:

- dust deposition of 120 milligrams per square metre per day, when monitored in accordance with Australian Standard AS 3580.10.1 of 2003 (or more recent editions); OR

- a concentration of particulate matter with an aerodynamic diameter of less than 10 micrometre (μm) (PM10) suspended in the atmosphere of 150 micrograms per cubic metre over a 24 hour averaging time, at a nuisance sensitive or commercial place downwind of the site, when monitored in accordance with:
 - Australian Standard AS 3580.9.6 of 2003 (or more recent editions) 'Method of sampling and analysis of ambient air – Method 9.6 - Determination of suspended particulate matter - PM10 high volume sampler with size-selective inlet - Gravimetric method'; or
 - any alternative method of monitoring PM10 which may be permitted by the 'Air Quality Sampling Manual' as published from time to time by the administering authority.

Air 4: When requested by the administering authority, dust and particulate monitoring must be undertaken to investigate any complaint of environmental nuisance caused by dust and/or particulate matter, and the results notified within 14 days to the administering authority following completion of monitoring. Monitoring must be carried out at a place(s) relevant to the potentially affected dust sensitive place and at upwind control sites and must include:

- for a complaint alleging dust nuisance, dust deposition; and
- for a complaint alleging adverse health effects caused by dust, the concentration per cubic metre of particulate matter with an aerodynamic diameter of less than 10 micrometre (μm) (PM₁₀) suspended in the atmosphere over a 24hr averaging time.

Release of Contaminants

Air 5: The release of contaminants to the atmosphere from a point source must only occur from those release points identified in Table 1 - Contaminant release limits to air and must be directed vertically upwards without any impedance or hindrance.

Table 1 - Contaminant release limits to air

Release point number	Minimum release height (metres)	Minimum velocity (m/sec)	Contaminant release	Maximum release limit	Sampling frequency
Turbine Stack	28	19	NOx	88.8g/sec	Yearly ¹
			CO	21.91g/sec	Yearly ¹
			SOX	7.14g/sec	Yearly ¹

¹Monitoring is required twice yearly for the first two years of operation, then yearly.

- Air 6: Contaminants must be released to the atmosphere from a release point at a height and a flow rate not less than the corresponding height and velocity stated for that release point in Table 1 - Contaminant release limits to air.
- Air 7: Contaminants must not be released to the atmosphere from a release point at a mass emission rate/concentration, as measured at a monitoring point, in excess of that stated in Table 1: Contaminant release limits to air.
- Air 8: Contaminants must be monitored not less frequently than specified in Table 1: Contaminant release limits to air.
- Air 9: When requested by the administering authority, monitoring must be undertaken to investigate any complaint of environmental nuisance caused by a release to the atmosphere from a release point at the site, and the results thereof notified to the administering authority within 14 days following completion of monitoring
- Air 10: Monitoring of any releases to the atmosphere required by a condition of this approval must be carried out in accordance with the following requirements:
- monitoring provisions for the release points listed in Table 1: Contaminant release limits to air must comply with the Australian Standard AS 4323.1 - 1995 'Stationary source emissions Method 1: Selection of sampling positions' (or more recent editions);
 - the following tests must be performed for each required determination specified in Table 1: Contaminant release limits to air:
 - gas velocity and volume flow rate;
 - temperature; and
 - water vapour concentration (moisture content).
 - where practicable, samples must be taken when emissions are expected to be at maximum rates; and
 - during the sampling period the following additional information must be gathered:
 - MW being produced;
 - gas specification;
 - duct firing being on / off; and
 - reference to the actual test methods and accuracy of the methods.
- Air 11: All release points referred to in Table 1: Contaminant release limits to air must be conspicuously marked with the corresponding release point number.

Land

Land disposal

Land 1: The only contaminants permitted to be released to land are treated sewage to the areas shown in (Applicant to provide map showing location) in compliance with the limits levels stated in Table 2: Release limits - Land and the conditions of this approval.

Table 2: Release Limits - Land

Discharge Location	Monitoring Point	Quality Characteristics	Release Limit		Monitoring Frequency
			Concentration	Limit Type	
Discharge to absorption bed or irrigation field	Outlet of storage tank	5-day Biological Oxygen Demand	20 mg/L	Maximum	Monthly
		Suspended Solids	30 mg/L	Maximum	Monthly
		pH	6.5 – 9.0	Range	Monthly
		Dissolved Oxygen	2 mg/L	Minimum	Monthly
		Faecal Coliforms (organisms/100ml)	100 colonies /100 mL	Median	Monthly
		Faecal Coliforms (organisms/100ml)	1000 colonies /100 mL	Maximum	Monthly

Monitoring

Land 2: Monitoring must be undertaken and records kept of contaminant releases to land from the discharge location for the parameters and not less frequently than specified in Table 2: Release Limits - Land. All determinations of the quality of contaminants released must be:

- made in accordance with methods prescribed in the latest edition of the EPA Water Quality Sampling Manual; and
- carried out on samples that are representative of the discharge.

Land 3: The discharge of effluent to absorption beds or irrigation field(s) must be carried out in a manner such that:

- vegetation is not damaged;
- soil erosion and soil structure damage is avoided;
- there is no surface ponding or runoff of effluent;
- percolation of effluent (used for irrigation) beyond the plant root zone is minimised;
- the capacity of the land to assimilate nitrogen, phosphorus, salts, organic matter as measured by oxygen demand and water is not exceeded; and
- the quality of ground water is not adversely affected.

Land 4: Notices must be prominently displayed on areas undergoing effluent irrigation, warning the public that the area is irrigated with effluent and not to use or drink the effluent. These notices must be maintained in a visible and legible condition.

Land 5: Releases of effluent must not have any properties nor contain any organisms or other contaminants in concentrations that are capable of causing environmental harm.

Irrigation monitoring program

- Land 6: Implement and maintain an irrigation monitoring program (IMP) for the release of contaminants to land(s). As a minimum, the IMP must include:
- soil and sub-soil analysis, including assessment of the soils including types, structure, phosphorus adsorption capacity, nutrient status, salinity and sodicity, cation exchange capacity and sodium absorption ratio of the contaminant release area(s), to be carried out at no less than six representative sites on an annual basis;
 - ground water monitoring that determines the existence and rate of infiltration of effluent that has been irrigated to land, and the potential or actual impacts on ground water from such infiltration, to be carried out on an annual basis;
 - plant analysis to assess nutrient export to be carried out on a biannual basis;
 - determination of the quantity and quality of contaminants applied;
 - periodic re-assessment, including modelling of the water, nutrient and salt balances and irrigation rate and return period should be undertaken, if necessary, to ensure sustainable use of the contaminant release area is being achieved; and
 - reporting of monitoring results, and an assessment of the impact of the releases on the contaminant release areas.
- Land 7: Conduct and keep records of any monitoring programs of contaminant releases from the treatment plant at the monitoring points, frequency, and for the parameters specified in Table 2: Release Limits - Land.
- Land 8: Monitoring must be undertaken and records kept of a monitoring program of contaminant releases to the irrigation area at the monitoring points, frequency, and for the parameters specified in Table 2: Release Limits - Land.
- Land 9: The daily volume of contaminants released to land must be determined or estimated by an appropriate method, for example a flow meter, and records kept of such determinations and estimates.
- Land 10: When conditions prevent the irrigation of treated effluent to land (such as during or following rain events), the contaminants must be directed to a wet weather storage or alternative measures must be taken to store/lawfully dispose of effluent (such as wet weather storage or tanking off site to another treatment plant or sewer). A record must be kept of any removal or discharge off site, including destination, transporter, dates and volumes.
- Land 11: Pipelines and fittings associated with the effluent irrigation system must be clearly identified. Lockable valves or removable handles must be fitted to all release pipes situated in public access areas.

Land 12: Spillage of all chemicals and fuels must be contained within an on-site containment system and controlled in a manner that prevents environmental harm.

NOTE: All petroleum product storage's must be designed, constructed and maintained in accordance with AS 1940 – ‘The storage and handling of flammable and combustible liquids’.

Dams containing hazardous waste.

Land 13: The construction or operation of any dam containing hazardous waste within the operational land must comply with the attributes outlined in Table 3: Size and purpose of dam containing hazardous waste.

Table 3: Size and purpose of dams containing hazardous waste

Name of dam containing hazardous waste	Maximum surface area of dams (ha)	Maximum volume of dams (m ³)	Maximum depth of dams (m)	Purpose of dams
Hazardous Dam A	~82ha	1,250,000	2m	Evaporation
Hazardous Dam H	~27ha	480,000	2m	Evaporation

Land 14: Any dam containing hazardous waste constructed or operated within the operational land must be located within the control points defined in Table 4: Location of dams containing hazardous waste.

Standards and Criteria

Land 15: The holder of this development approval must design, construct and operate all high-hazard dams containing hazardous waste in accordance with the Code of Environmental Compliance for Environmental Authorities for High Hazard Dams Containing Hazardous Waste.

Land 16: The holder of this development approval must design, construct and operate all low-hazard dams containing hazardous waste in accordance with the criteria outlined in Appendix B of the Code of Environmental Compliance for Mining Lease Projects.

Inspection of dams

Land 17: Dams containing hazardous waste shall be inspected by a Registered Professional Engineer Queensland on or about 1st October but definitely before 1 November each year or at any time if alarming, unusual or otherwise unsatisfactory conditions are observed.

Land 18: For each inspection, the engineer shall assess the condition of the dams and its foundations to determine the hydraulic adequacy of the dams and assess the adequacy of the works with respect to dam safety.

Land 19: For each inspection, two copies of the engineer’s report and any recommendations as to measures to be taken to ensure the integrity of the dams shall be furnished to the administering authority within 28 days of the inspection.

Decommissioning of dams - Objective

Land 20: Dams containing hazardous waste must not be abandoned, must be decommissioned to a situation where water can no longer be stored in the dams and the dams and their contained waste(s) are removed or stable, whereafter the dams are no longer dams and they become landforms on the operational land and must comply with the rehabilitation requirements of this development approval.

Table 4: Location of dams containing hazardous waste.

Name of dam containing hazardous waste ⁽¹⁾	Longitude (GDA* 94)	Latitude (GDA* 94)
Hazardous Dam A	149.071366	-25.998605
	149.071234	-25.999381
	149.071567	-26.000483
	149.070562	-26.000548
	149.069765	-26.000301
	149.069495	-26.001069
	149.069309	-26.001644
	149.068970	-26.002773
	149.068876	-26.003259
	149.069261	-26.003843
	149.070229	-26.004403
	149.070878	-26.004753
	149.071445	-26.004397
	149.072105	-26.004530
	149.072342	-26.004971
	149.072394	-26.005793
	149.073175	-26.005881
	149.074298	-26.006491
	149.075049	-26.007127
	149.075152	-26.007863
	149.076239	-26.00846
	149.077010	-26.00935
	149.078868	-26.009317
	149.080401	-26.00811
	149.080648	-26.007381
	149.080536	-26.006069
	149.081127	-26.004616
	149.080428	-26.002751
	149.079996	-26.002416
	149.078633	-26.001930
149.077507	-26.000781	
149.075040	-25.999641	
149.073744	-25.999454	
149.072509	-25.999355	
149.071714	-25.999141	
Hazardous Dam H	149.060613	-25.946521
	149.060483	-25.945647
	149.054679	-25.946031
	149.053335	-25.946997
	149.052124	-25.949721
	149.053382	-25.950392
	149.055883	-25.949916
	149.058611	-25.948669
149.058804	-25.945671	

* Geocentric Datum of Australia (GDA)

Decommissioning of dams – Documentation and Compliance

Land 21: Decommissioning activities for dams must be documented in detail in the Design Plan required by the Code of Environmental Compliance for Environmental Authorities for High Hazard Dams Containing Hazardous Waste.

Noise Nuisance

Noise 1: Noise from the power station must not cause an environmental nuisance at any nuisance sensitive place or commercial place.

Noise 2: Noise from the power station must not exceed the levels specified in Table 5: Limits for noise from the Power Station.

Table 5: Limits for noise from the Power Station

At the noise monitoring site ¹					
Octave Band Centre Frequency (Hz)	31.5 ¹	63 ¹	125 ¹	250 ¹	500 ¹
Maximum noise level limit Leq (dB re 20µPa)	70	66	58	49	50
Within a sleeping area at the accommodation camp ²					
Maximum noise level limit L _{Ar, 1 hr} dB(A)	40				

¹ at the noise monitoring site (GDA 94 MGA94 (Zone 55) Grid Reference 706721, 7127723)

² at the accommodation camp (GDA 94 MGA94 (Zone 55) Grid Reference 706723, 7127461)

Noise 3: When requested by the administering authority, noise monitoring must be undertaken to investigate any complaint of noise nuisance, and the results notified within 14 days to the administering authority. Monitoring must include:

- L_{Ar, 1 hr}
- 24 band 1/3 octave analysis to determine low frequency and other noise levels likely from the facility;
- the level and frequency of occurrence of impulsive or tonal noise;
- atmospheric conditions including wind speed and direction;
- effects due to extraneous factors such as traffic and insect noise; and
- location, date and time of recording.

Noise 4: If monitoring indicates exceedence of the limits in Table 5: Limits for noise from the Power Station, then the holder of this development approval must:

- a) resolve the complaint with the use if appropriate dispute resolution techniques to the satisfaction of the administering authority; or
- b) implement noise abatement measures so emissions of noise from the activity do not result in exceedence of the limits in Table 5: Limits for Noise.

Noise 5: The method of measurement and reporting of noise levels must comply with the latest edition of the EPA's Noise Measurement Manual.

Social - Complaint Response

Social 1: The operator of the ERA must record the following details for all complaints received and provide this information to the administering authority on request:

- Time, date, name and contact details of the complainant;
- reasons for the complaint;
- any investigations undertaken;
- conclusions formed; and
- any actions taken.

Water

Water 1: Erosion protection measures and sediment control measures must be implemented and maintained to minimise erosion and the release of sediment.

Water 2: The size of any sedimentation dam must be sufficient to contain the runoff expected from a 24 hour storm with an average recurrence interval of one in five years.

Water 3: There must be no release of contaminated stormwater runoff at the site to any waters, roadside gutter or stormwater drain.

Water 4: All hazardous waste dams used for the storage or treatment of contaminants, sewage or wastes at or on the authorised place must be constructed, installed and maintained:

- so as to minimise the likelihood of any release of effluent through the bed or banks of the dam to any waters (including groundwater);
- so that a freeboard of not less than 0.5 metres is maintained at all times, except in emergencies; and
- so as to ensure the stability of the dam's construction.

Water 5: Suitable banks and/or diversion drains must be installed and maintained to exclude stormwater runoff from entering any dams or other structures used for the storage or treatment of contaminants or wastes.

Sewage - Land Disposal

Water 6: The only contaminants other than settled/treated stormwater runoff waters permitted to be discharged to land are treated effluent to the designated absorption bed or irrigation field area shown in Attachment Figure 1 in compliance with the effluent quality limit levels stated in Table 2: Release Limits - Land and the conditions of this approval.

Water 7: When conditions prevent the absorption of treated effluent to land (such as during rain events), alternative measures must be taken to store/dispose of effluent (such as wet weather storage or tankering off site). There must not be any release of effluent from any wet weather storage to any waters or storm water drain.

Shallow Groundwater

- Water 8: The holder must prepare and submit a shallow groundwater monitoring program to the administering authority at least 60 days prior to the commissioning of the power station. If the administering authority gives to the holder of this approval any comment on the monitoring program within 21 days of receiving the document, the holder of this approval must have due regard to those comments when implementing the monitoring program.
- Water 9: The groundwater monitoring program must be able to detect any significant changes to groundwater quality and level due to activities authorised under this development approval. The program must:
- include a groundwater monitoring network designed and installed for the hazardous dams;
 - include a sufficient number of monitoring sites to provide information on the following:
 - seepage from the hazardous dams can be detected and effect on groundwater understood; and
 - background groundwater quality in hydraulically up-gradient or background bore(s) that have not been affected by any release of contaminants to groundwaters;
 - include location of monitoring points, parameters to be measured, frequency of monitoring, monitoring methodology used, trigger values, and procedures to establish background ground water quality; and
 - be installed and maintained by a person possessing appropriate qualifications and experience in the fields of hydrogeology and groundwater monitoring program design to be able to competently make recommendations about these matters.
- Water 10: The release of contaminants to groundwaters is not considered to cause environmental harm if monitoring carried out as described in condition Water 8 and Water 9 shows that the release does not result in statistically significant, mid to long term water level and contaminant concentration increases of more than 10% above what would seasonally be expected at the following locations:
- existing bores used to provide water for potable, stockwater or irrigation purposes; and
 - areas where groundwaters recharge Eurombah Creek.
- Water 11: The method of water sampling required by this development approval must comply with that set out in the latest edition of the EPA's Water Quality Sampling Guidelines.
- Water 12: Report the results and analysis of groundwater monitoring to the administering authority:
- (a) when any significant changes in water level; and/or deterioration in groundwater quality is detected; or
 - (b) upon request .

Information must be provided within 14 days of receipt of analysis.

Water 13: If groundwater monitoring indicates that changes as described in Water 12 (a) occur, then the information required must include any proposed actions to mitigate the changes in groundwater quality or quantity as well as means to prevent the event recurring.

Re-injection of saline brine

Water 14: A reinjection management plan must be prepared and submitted to the administering authority for review and the administering authority's recommendations must be taken into account before any reinjection takes place.

Disposal of blowdown water to dams

Dams containing hazardous waste

Water 15: Blowdown and other contaminated wastewater water can only be discharged to Hazardous Dam A and Hazardous Dam H (Table 4: Location of dams containing hazardous waste).

Water 16: The design storage allowance, being the spare capacity always available within the storage for any dam containing hazardous waste constructed or operated within the operational land must comply with Table 6: Storage Design for dams containing hazardous waste.

Table 6: Storage Design for dams containing hazardous waste

Dam Name	Design Storage Allowance	Spillway Critical Design Storm*	Mandatory Reporting Level**
Hazardous Dam A	Two back to back 1: 100 Year 72hr storms plus wave allowance of 0.5metres	1:1000 Year ARI	1:100 year 72 hour ARI storm
Hazardous Dam H	Two back to back 1: 100 Year 72hr storms plus wave allowance of 0.5metres	1:1000 Year ARI	1:100 year 72 hour ARI storm

NOTE: ARI means average recurrence interval.

* The critical storm has a duration that produces the peak discharge for the catchment

** The level (in metres) below spillway crest that can accommodate rainfall from a 1:100 year 72 hour ARI storm

Water 17: The spillway for any dam or compartments within the dam containing hazardous waste, constructed or operated within the operational land must be designed and maintained to withstand the peak flow from the spillway critical design storm defined in Table 6: Storage Design for dams containing hazardous waste.

Water 18: The holder of the development approval must mark the mandatory reporting level defined in Table 6: Storage Design for dams containing hazardous waste on the spillway of all dams or compartments of dams containing hazardous waste within the operational land.

Water 19: The holder of the development authority must notify the administering authority when the pondage level of any dam containing hazardous waste, reaches the mandatory reporting level defined in Table 8: Storage Design for dams containing hazardous waste

Surface Water

Water 20: The holder must prepare and submit a surface water monitoring program to the administering authority at least 60 days prior to the commissioning of the power station. If the administering authority gives to the holder of this approval any comment on the monitoring program within 21 days of receiving the document, the holder of this approval must have due regard to those comments when implementing the monitoring program.

Water 21: The surface water monitoring program must be able to detect any significant changes to surface water quality and flows due to activities authorised under this development approval. The program must:

- (a) be installed and maintained by a person possessing appropriate qualifications and experience in the fields of hydrology and surface water monitoring program design to be able to competently make recommendations about these matters; and
- (b) include records kept of planned and unplanned releases to watercourses, the location of monitoring points, parameters to be measured, frequency of monitoring, procedures for event monitoring, monitoring methodology used, trigger values, and procedures to establish background surface water quality.

Water 22: The planned or unplanned release of contaminants to surface waters is not considered to cause environmental harm if monitoring carried out as described in conditions Water 20 and Water 21 shows that the release does not result in statistically significant, mid to long term water level and contaminant concentration increases of more than 10% above what would seasonally be expected at the background monitoring locations.

Water 23: The method of water sampling required by this development approval must comply with that set out in the latest edition of the EPA's Water Quality Sampling Guidelines.

Water 24: Report the results and analysis of surface water monitoring to the administering authority:
(a) when any significant changes in water quality is detected; or
(b) upon request.

Information must be provided within 14 days of receipt of analysis.

Water 25: If surface water monitoring indicates that changes as described in Water 24(a) occur, then the information required must include any proposed actions to mitigate the changes in surface water quality as well as means to prevent the event recurring.

Definitions

Words and phrases used throughout this approval are defined below. Where a definition for a term used in this approval is sought and the term is not defined within this approval the definitions provided in the relevant legislation shall be used.

"administering authority" means the EPA or its successor.

"annual return" means the return required by the annual notice (under section 316 of the *Environment Protection Act 1994*) for the section 73F registration certificate that applies to the development approval.

"approval" means 'notice of development application decision' or 'notice of concurrence agency response' under the IPA.

"authorised place" means the place authorised under this development approval for the carrying out of the specified ERA's.

"commercial place" means a place used as an office or for business or commercial purposes.

"dam" means a containment or proposed containment whether permanent or temporary, which is designed to contain, divert or control flowable substances. However this does not include a fabricated or manufactured tank or container designed to a recognised standard.

"design plan" - in the context of a dam design is the documentation required under the "Code of Environmental Compliance for High Hazard Dams Containing Hazardous Waste" to describe the physical dimensions of the dam, the materials and standards to be used for construction of the dam, the procedures and criteria to be used for operating the dam and the decommissioning and rehabilitation objectives in terms procedures, works and outcomes at the end of dam life. The documents can include design and investigation reports, drawings, specifications and certifications.

"dwelling" means any of the following structures or vehicles that is principally used as a residence:

- a house, unit, motel, nursing home or other building or part of a building;
- a caravan, mobile home or other vehicle or structure on land; and
- a water craft in a marina.

"foreseeable future" is the period used for assessing the total risk of an event occurring. Permanent structures and ecological sustainability should be expected to still exist at the end of a 150 year foreseeable future with an acceptable risk of failure before that time.

"geotechnical stability of the hazardous dams" means a situation where instability related to the excessive settlement and subsidence caused by decomposition and consolidation of the wastes deposited in the dams, and sliding instability of the unit slope has ceased.

"hazardous waste" means any substance, whether liquid, solid or gaseous, derived by or resulting from, the processing of minerals that tends to destroy life or impair or endanger health.

"infrastructure" means water storage dams, roads and tracks, buildings and other structures built for the purpose of mining activities but does not include other facilities required for the long term management of mining impacts or the protection of potential resources. Such other facilities include dams containing hazardous waste, waste rock dumps, voids, or ore stockpiles and buildings as well as other structures whose ownership can be transferred and which have a residual beneficial use for the next owner of the operational land or the background land owner.

"intrusive noise" means noise that, because of its frequency, duration, level, tonal characteristics, impulsiveness or vibration:

- is clearly audible to, or can be felt by, an individual; and
- annoys the individual.

In determining whether a noise annoys an individual and is unreasonably intrusive, regard must be given to Australian Standard 1055.2 – 1997 Acoustics – Description and measurement of environmental noise - Part 2 – Application to specific situations.

" $L_{Ar, 1 \text{ hr}}$ " means the specific noise level measured as the A-weighted equivalent continuous noise level plus any adjustment for the character of the noise (tonal and/or impulsive) determined over a reference time interval of one hour.

" $L_{eq, T}$ " is the equivalent continuous A-weighted sound pressure level measured over a time period T.

"land" in the "land schedule" of this document means land excluding waters and the atmosphere.

"landfill facility" means all contiguous land and structures, other appurtenances, and improvements on the land used or associated with the disposal of waste.

"leachate" means a liquid that has passed through or emerged from, or is likely to have passed through or emerged from, a material stored, processed or disposed of at the licensed place which contains soluble, suspended or miscible contaminants likely to have been derived from the said material.

"mandatory reporting level" means the level below the spillway crest, equivalent to the lower of the 72 hour average recurrence interval (ARI) storm or the ARI wave allowance whichever level is lower.

"mg/L" means milligrams per litre.

"noxious" means harmful or injurious to health or physical well being.

"NTU" means nephelometric turbidity unit.

"nuisance sensitive place" includes:

- a dwelling, residential allotment, mobile home or caravan park, residential marina or other residential premises;

- a motel, hotel or hostel;
- a kindergarten, school, university or other educational institution; or
- a medical centre or hospital;
- a protected area under the *Nature Conservation Act 1992*, the *Marine Parks Act 1982* or a World Heritage Area;
- a public thoroughfare, park or gardens; or
- a place within the curtilage of such a place reasonably used by persons at that place.

"offensive" means causing offence or displeasure; is disagreeable to the sense; disgusting, nauseous or repulsive.

"quarry material" means material on State coastal land, other than a mineral within the meaning of any Act relating to mining. Material includes for example stone, gravel, sand, rock, clay, mud, silt and soil, unless it is removed from a culvert, stormwater drain or other drainage infrastructure as waste material.

"regulated waste" means non-domestic waste mentioned in Schedule 7 of the *Environmental Protection Regulation 1998* (whether or not it has been treated or immobilised), and includes:

- for an element - any chemical compound containing the element; and
- anything that has contained the waste.

"site" means the place to which this development approval relates or the premises to which this development approval relates.

"spillway" means passage or outlet from the dam through which surplus water flows.

"stable" means land form dimensions are or will be stable within tolerable limits now and in the foreseeable future. Stability includes consideration of geotechnical stability, settlement and consolidation allowances, bearing capacity (traffic ability), erosion resistance and geochemical stability with respect to seepage and contaminant generation.

"statistically significant" means when the difference between groups of data is sufficient for a statistical test to reject the *null hypothesis*. For example, a requirement for a statistical test is that you have a minimum of two hypotheses, the null hypothesis and one or more alternative hypotheses. If you have data from two groups of bores (say A = background values and B = values at locations hydraulically down gradient of the dams), and you wish to test whether A is different from B, the *null hypothesis* would be that A and B are from the same population (no significant difference). After performing the statistical test, you will either accept or reject the null hypothesis.

"tolerable limits" means that a range of values could be accepted to achieve an overall environmental management objective (eg a range of settlement of a tailing capping could still meet the objective of draining the cap quickly, preventing pondage and limiting infiltration and percolation).

"uppermost aquifer" means the geologic formation nearest to the natural ground surface that is an aquifer. The term includes any aquifers that are likely to be hydraulically interconnected with this aquifer within the landfill facility property boundary.

"watercourse" means a river, creek or stream in which water flows permanently or intermittently:

- in a natural channel, whether artificially improved or not; or
- in an artificial channel that has changed the course of the watercourse.

"waters" includes river, stream, lake, lagoon, pond, swamp, wetland, unconfined surface water, unconfined water natural or artificial watercourse, bed and bank of any waters, dams, non-tidal or tidal waters (including the sea), stormwater channel, stormwater drain, roadside gutter, stormwater run-off, and groundwater and any part-thereof.

"50th percentile" means not more than three of the measured values of the quality characteristic are to exceed the stated release limit for any six consecutive samples for a release/monitoring point at any time during the environmental activity(ies) works.

"80th percentile" means not more than one of the measured values of the quality characteristic is to exceed the stated release limit for any five consecutive samples for a sampling point at any time during the environmental activity(ies) works.

END OF CONDITIONS