

INITIAL ADVICE STATEMENT

Spring Gully Power Station Project

Prepared for

Origin Energy Power Limited

13 / 1 King William Street
Adelaide
South Australia

24 November 2004

PROJECT NUMBER: 42605757

URS



environmental
and engineering
professional services

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1.1 Purpose of Document

URS Australia Pty Ltd (URS) on behalf of Origin Energy Power Ltd (Origin) has prepared this Initial Advice Statement (IAS) to initiate the impact assessment procedures of the Queensland *State Development and Public Works Organisation Act 1971* for a proposed gas fired power station at Spring Gully approximately 80 km north-east of Roma. The power station will be located at the site of Origin Energy CSG Limited's existing coal seam gas (CSG) production (Figure 1).

The purpose of this IAS is twofold. Firstly it is to provide sufficient information to allow the project to be declared a "Significant Project". Secondly it is to provide sufficient detail to allow the preparation of Terms of Reference for an Environmental Impact Study. Specifically this IAS describes:

- The proposed plant.
- Raw material requirements.
- Process description.
- Waste, effluent and emission streams
- The project timetable.
- A summary of project benefits.
- The existing environment.
- Potential environmental impacts.
- Nominal monitoring and mitigation measures for the identified impacts.

1.2 Approvals Process

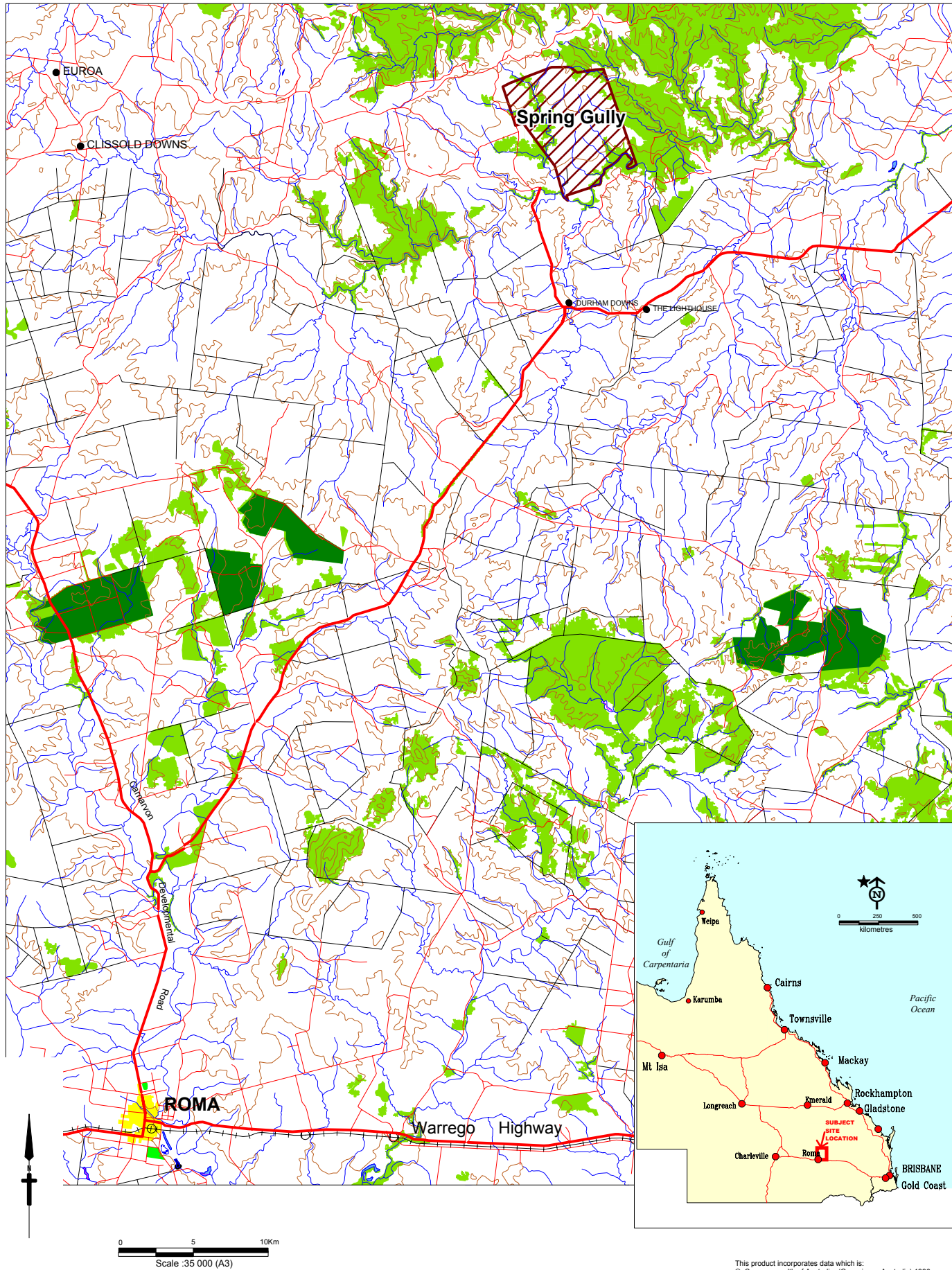
1.2.1 Queensland Government

The project has industrial and economic importance to the State of Queensland. Owing to this importance, Origin is seeking to have the project declared a "Significant Project" under *State Development and Public Works Organisation Act* by the Co-ordinator General. Under this Act, the state is obliged to take environmental issues into account in decision making. This obligation is conferred by s25:

" the Co-ordinator General shall, ..of his own motion or at the direction of the Minister, co-ordinate departments of the government and local bodies throughout the state in activities directed towards ensuring that in any development proper account is taken of environmental effects".

The Responsible Authority for this project is expected to be the Department of State Development and Innovation (DSDI). DSDI will be responsible for managing the project's impact assessment process.

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ORIGIN ENERGY POWER LIMITED

SPRING GULLY POWER STATION INITIAL ADVICE STATEMENT

REGIONAL LOCATION

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PROJECT No: 42605757 DATE: 23-11-04
FILE: 42605757-g-010b.wor

Figure: 1

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As the project is located within the Bungil Shire Council area, should environmental approval be granted, a development application to and decision from the Council will be required in respect of a material change of use for the site pursuant to the requirements of the *Integrated Planning Act 1997*. Approval will also be required from the Environmental Protection Agency for any Environmentally Relevant Activities to be carried out on site in accordance with the *Environmental Protection Act 1994*.

1.2.2 Commonwealth Government

Under the *Environment Protection and Biodiversity Conservation Act 1999*, the project will require approval by the Commonwealth Minister for the Environment if the project is deemed to have, or is likely to have, significant impact on a matter of national environmental significance. Matters of national environmental significance include:

- World Heritage properties.
- Ramsar Wetlands of international importance.
- Listed threatened species or communities.
- Migratory species protected under international agreements.
- Nuclear actions.
- The Commonwealth marine environment.

A referral will be submitted to the Commonwealth Department of Environment and Heritage by Origin so that a decision can be made with respect to environmental effects. The Minister may approve the project, reject the project, or request more information be made available. The form that this additional information takes may be an environmental impact study. Its purpose is to facilitate a better understanding of the magnitude of potential impacts and whether these can be adequately managed so that matters of national environmental significance are not affected.

1.3 Project Overview

1.3.1 Power Station Project

The power station will have a nominal design capacity of 1,000 MW. It will be built in two stages each with a nominal capacity of 500 MW.

It is expected to be configured as a multiple gas turbine/steam turbine combined cycle plant. The plant will be located within the Origin Energy Spring Gully coal seam gas production development area. The coal seam gas project has already been approved and is currently being constructed. It is due to be commissioned in May 2005 and will provide coal seam gas to various markets in Australia. In addition, it will provide coal seam gas to fire the proposed power station.

Cooling water for the power station will be sourced by using some of the water produced from the coal seam gas fields. The source water is produced when extracting coal seam gas, and approvals have been obtained to evaporate this water in evaporation ponds.

The power station will operate as a base-load generator.

The cost of the power station project (Stages 1 and 2) is estimated to be \$870 million.

1.3.2 Other Projects

Coal Seam Gas Project

The power station will use some of the gas from Origin's Spring Gully CSG fields and potentially other gas available through the connection of the Spring Gully processing facilities to the gas distribution network. Spring Gully production has gas market commitments to AGL, QAL and Origin Energy. The Spring Gully CSG production has been approved and commissioning will be completed mid 2005.

The approved project involves infrastructure associated with gas gathering, dewatering and compression. It has an ultimate potential resource of approximately 1,200 PJ (Origin's share) of recoverable gas. An approved 90 km long gas pipeline to Wallumbilla (east of Roma) is currently under construction and will deliver the gas to the Queensland gas transmission system.

This CSG project is separate from the power station project and has already obtained all necessary approvals in accordance with the requirements of both the *Environmental Protection Act* and the *Petroleum Act*.

Transmission Line Project

A high voltage transmission line will be required from the power station at Spring Gully to connect to the national electricity grid. This connection is likely to be at Braemar (near Kogan) or Auburn River substation a distance of 250 km or 200 km respectively. The existing 132 kV transmission line from Tarong to Roma is already fully utilised by the existing Roma Power Station and upgrading this line for the proposed Spring Gully Power Station is not technically feasible. Construction of the connecting powerline will be undertaken as a separate project by a third party (i.e. not Origin) and will be subject to a separate approval process.

1.4 The Importance of the Project

Queensland is experiencing unprecedented growth in demand for electricity forecast to continue at the rate of 3.5% pa. This demand growth is driven by increased domestic consumption due to population growth and air conditioning and industrial growth.

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 (SOO) issued by NEMMCO indicates that Queensland will face reduced reserve margin (i.e. essential spare generating capacity) from 2008/09. These studies indicate that new generation capacity is required to be operational by this time 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 higher average cost of electricity.

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

The planning, development and construction of a large new gas fired power station takes approximately 4 years. Therefore to meet the requirement for new generation capacity in Queensland in 2008, the process of planning, designing and building new capacity needs to start now.

1.5 Proponent

1.5.1 The Company

Origin is an integrated energy company with significant interest in:

- The exploration and production of oil and gas reserves.
- Electricity generation.
- Electricity, LPG and natural gas retailing and associated services.
- Gas network asset management.

Origin is a major national retailer of electricity and natural gas. Origin's 2 million customers annually use around 15 TWh of electricity and consume 123 PJ of natural gas.

Origin is also a major investor in the upstream oil and gas business with interests in the Cooper Basin in South Australia, Surat and Bowen Basins in Queensland, both onshore and offshore Otway basin in South Australia and Victoria, offshore in the Bass Basin in Victoria and the Perth and Carnarvon Basins in Western Australia. It is the interests in the gas fields in the Bowen Basin in Queensland that have particular strategic opportunities with this project.

Origin owns and operates approximately 900 MW of electricity generation plants in SA, Qld and WA. The majority of this output is contracted to third parties.

The development of a gas fired power station in southern Queensland will allow Origin to meet a significant part of its customers' electricity demand, fuelled by natural gas from its own gas reserves from the same region. It also provides an additional market and incentives for further gas field development.

1.5.2 Contact Details

The project proponent is:

Origin Energy Power Limited
Level 13 / 1 King William Street
Adelaide, SA, 5000
Attn. Mr Robert Connell

2.1 Project Location

2.1.1 Site Description

The power station will be located at Spring Gully approximately 80 km north-east of Roma in southern Queensland (Figure 1). The Spring Gully property was recently acquired by Origin. The site locality is shown on Figure 2.

The power station will be built adjacent to the Spring Gully coal seam gas plant. Two alternative locations are currently being considered. Their locations are shown on Figure 3.

The power station will occupy an area approximately 300 m x 500 m (approximately 15 hectares). It will be located within the Spring Gully property owned by Origin (4,500 ha).

The property is remote and currently has dry weather road access only. An all weather access road is to be built as part of the CSG production development.

It is located off the Roma- Taroom Road and is described as Lot 16 on Plan AB174 Parish of Narran. The local government authority is the Bungil Shire Council.

The site is zoned Rural and is drained by Eurombah Creek. This creek drains to the Dawson River, which is located north of the site.

The proposed power station site has the following advantages:

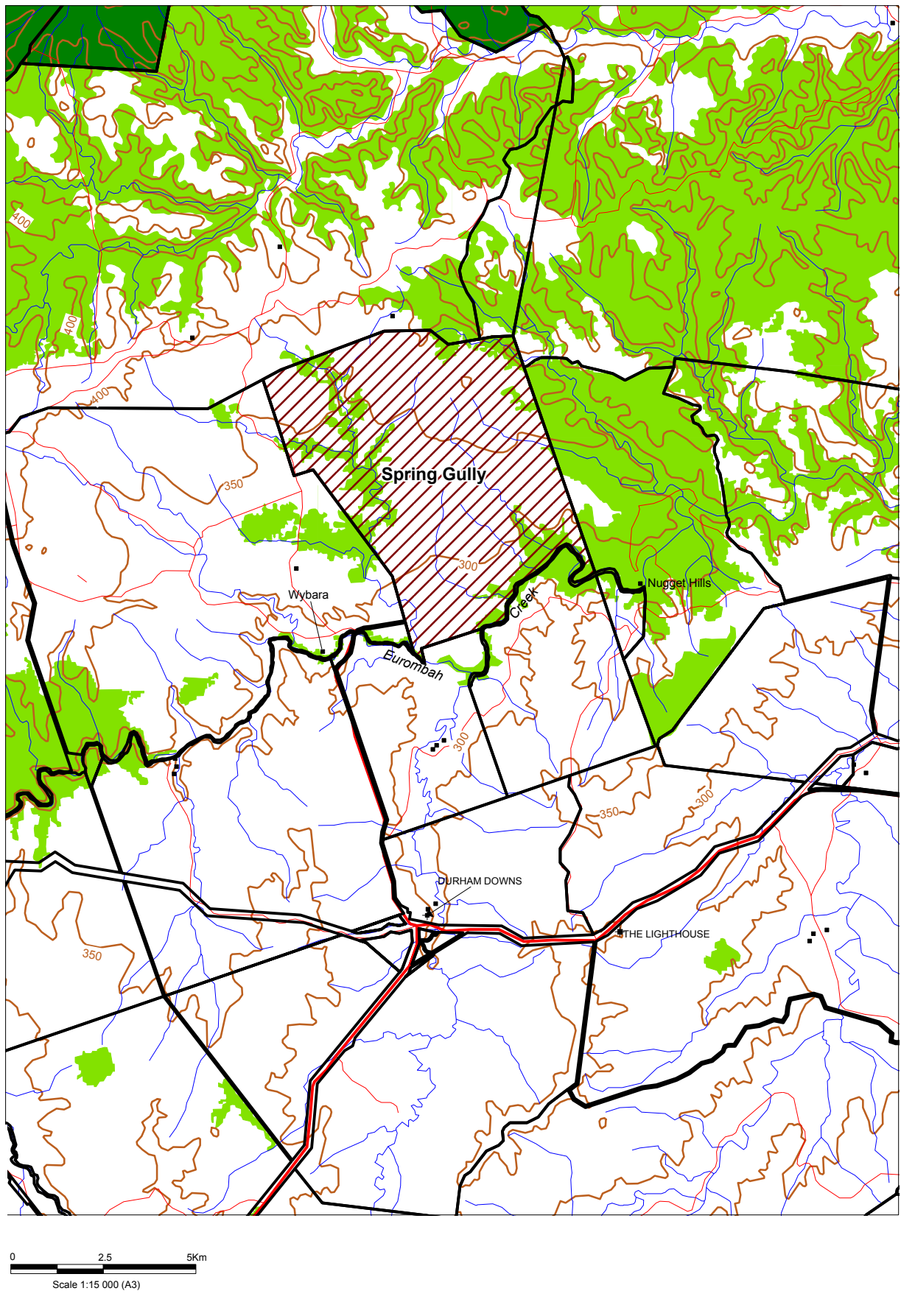
- Adjacent to the Spring Gully gas plant, within the Spring Gully CSG development area.
- In an area with substantial land holdings held by Origin that provide a buffer zone to the nearest off-site residence.
- Geography and underlying geology that provides suitable conditions for construction.
- The site has good road access.

2.1.2 Alternative Sites Considered

A number of alternative locations were considered on the Spring Gully property including:

- Southern end of the property, adjacent to one of the CSG production evaporation ponds. This site, while suitable, is considered not to have any significant advantages, is closer to neighbours, and is likely to have increased visual impact.
- North-west of Spring Gully homestead. This site is considered suitable but does not have any significant advantages in terms of being in close proximity to either the gas plant or water supply.

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ORIGIN ENERGY POWER LIMITED

SPRING GULLY POWER STATION
INITIAL ADVICE STATEMENT

SITE LOCALITY

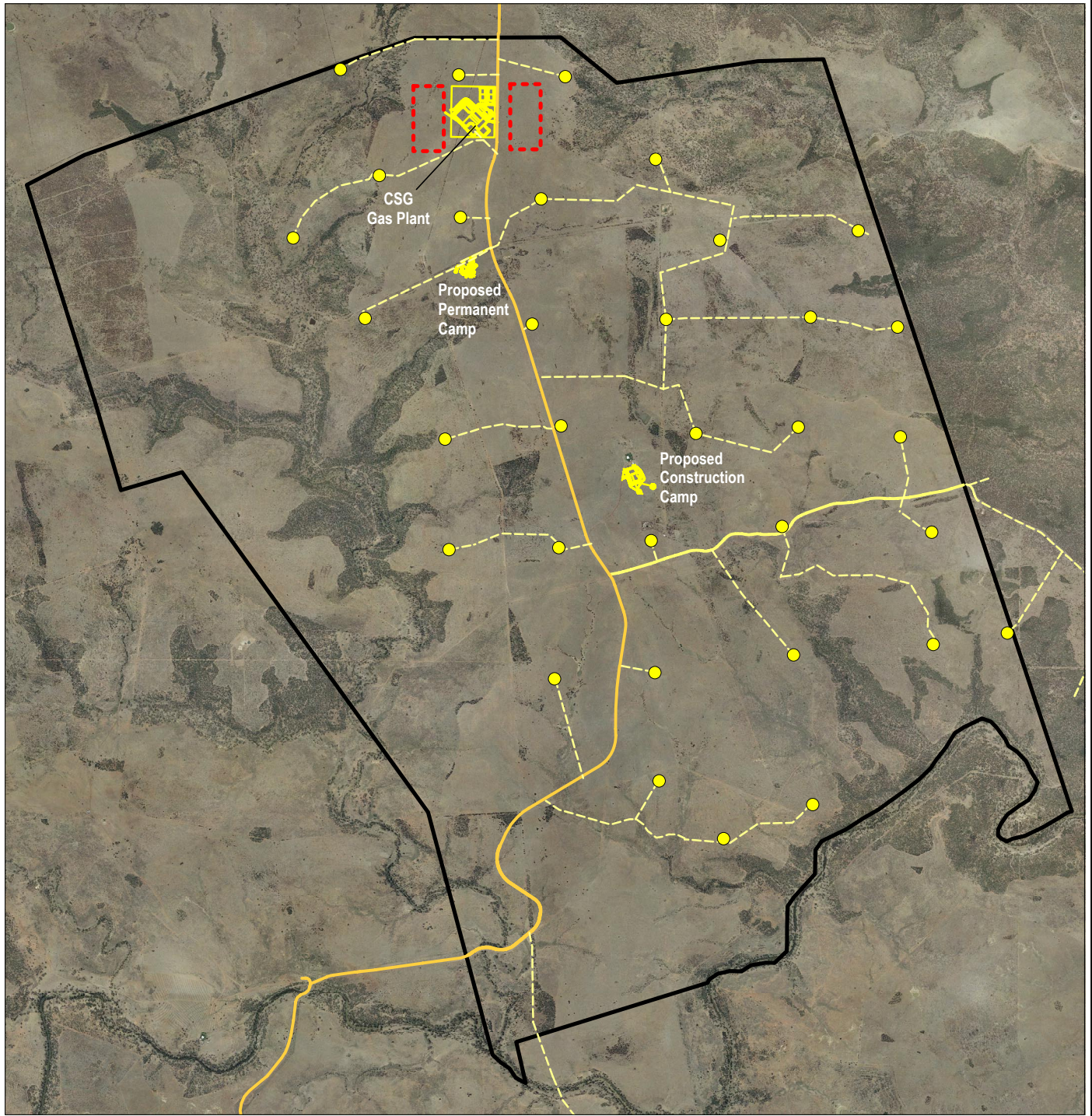
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POWER STATION PROJECT

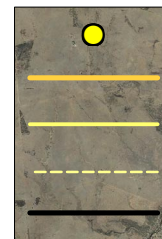
CSM PROJECT



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Power Station Site Alternatives



- Gas Wells
- Proposed Road - Sealed
- Proposed Road - Gravel
- Proposed Road - Wells
- Spring Gully Boundary

Source: SGGasPlant (Proposed Spring Gully Gas Plant) Proposed Development current as at 16/6/2004
 SGPropAccess (Proposed Access) Proposed Development current as at 16/6/2004
 SGConstructionCamp (Proposed Construction Camp) Proposed Development current as at 16/6/2004
 SGPermanentCamp (Proposed Permanent Camp) Proposed Development current as at 16/6/2004
 SGPropWells (Proposed Wells) Proposed Pipeline Current as at 9/3/2004
 Roma (Aerial Photo) Aerial photography supplied by Fugro Spatial Solutions Pty Ltd 2003. Image acquired 24/10/2002.

ORIGIN ENERGY POWER LIMITED

SPRING GULLY POWER STATION INITIAL ADVICE STATEMENT

PROPOSED POWER STATION LOCATION AND CSG INFRASTRUCTURE

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- Other sites which involved the clearing of undisturbed native vegetation were not considered.

The construction of a power station closer to Brisbane with a gas pipeline from Spring Gully was also considered as it potentially offered advantages in terms of reduced costs (a gas pipeline has lower capital cost than an overhead transmission line and does not suffer from line losses). However, gas compression and transport costs would have balanced the alternative electrical transmission costs.

Another benefit with the location of the proposed power plant is that a source of cooling water is available from the approved CSG production. Water is produced as part of CSG extraction, and this is evaporated in evaporation ponds with deferred re-injection back into the coal seams towards the end of the project as the gas wells are spent. The proposed power station will utilise water currently produced from the CSG production and will reduce the area required for evaporation ponds by approximately 50%, resulting in an environmental and economic benefit. A power station located away from Spring Gully would not only result in larger ponds for the CSG production, it would also require a new source of water to be identified or be air cooled with a subsequent loss in efficiency.

Locating the power station adjacent to the gas plant also has synergies in terms of the power station being able to supply power to the gas plant and all accommodation facilities to be in one location.

Overall, co-locating the power station at Spring Gully will lead to a number of economic and environmental benefits over a plant located closer to Brisbane.

2.2 Power Station

2.2.1 Combined Cycle Generation Process

The designation of the power station as a combined cycle station is due to the combined use of gas turbines and steam turbines to produce electricity. The gas turbines will produce electricity by burning the coal seam gas. The high temperature exhaust gases from this process will be channelled into heat recovery steam generators to produce steam which will be used to drive the steam turbine to produce additional electricity. The combination of the two cycles leads to high overall conversion efficiency of gas to electricity.

A range of options is being considered for the plant configuration but it is likely that each stage will consist of two or more gas turbines and a steam turbine. One possible configuration would be three GE 9E type gas turbines and a steam turbine.

Gas consumption for each 500 MW stage would be approximately 35 PJ/year.

Exhaust gases from the gas turbines and the heat recovery steam generator will be vented to atmosphere via a stack on each heat recovery steam generator.

2.2.2 Cooling Circuit

Exhaust steam from the steam turbine will pass through a condenser where it will be cooled, condensed and recycled back to the heat recovery steam generators to raise more steam. Cooling water used to cool the steam in the condenser will flow to a mechanical draught cooling tower where it will be sprayed through a moving air stream and cooled by evaporation. The cooled water will be recirculated back from the base of the cooling tower to the condenser to continue the cooling process.

Water for the cooling circuit will be sourced from the water produced when the coal seam gas is extracted. The quality of the produced water is not suitable for irrigation or drinking by livestock as it is mildly saline (TDS 6,500 ppm). However this is not a constraint to its use as cooling water. Use of the water in the power station will significantly reduce the volume of water requiring evaporation, leading to an overall reduction in pond area required for the CSG production (approximately 50%). The ability to use CSG produced water is an important aspect of the synergistic benefits of locating the power station on the gas field.

The power station will use approximately 600 tonnes of cooling water per hour for each 500 MW stage. The blowdown rate will be approximately 120 tonnes per hour.

2.2.3 Ancillary Equipment

In addition to the main equipment items described above, a number of items of ancillary equipment are necessary for the effective operation of the power station. These include a demineralisation water plant, electrical switchyard, and chemicals storage area. Administration and control facilities will also be provided as well as a workshop and other support facilities.

The demineralisation water plant is required to produce high quality water to be used for steam generation in the heat recovery steam generator. The demineralisation process is yet to be determined but could be a resin bed ion exchange or reverse osmosis process. The small volume of waste water produced by this process will pass through a neutralisation tank prior to being discharged to an evaporation pond.

The switchyard will accommodate switch gear for the turbines and the step-up transformers. The transformers will transform the electricity from the generators up to the voltage necessary to send it to the national grid.

A range of chemicals will be used for various water treatment purposes. These will include treatment for both the boiler water and cooling water circuits. Most chemicals will be used at relatively low rates and only small storage inventories will be necessary. The main chemical to be used will be sulfuric acid which will be stored in tanks and consumed at a rate of approximately 25 tonnes per day.

Potable water and sewerage services will be provided to the power station from the existing services that have been developed for the adjacent CSG production.

2.2.4 Operation Workforce

The power station will operate 24 hours per day, 7 days per week. The operational workforce is expected to work 2 x 12 hour shifts. The expected number of operational personnel on site at any one time will be about 17.

The operational workforce will live in the nearby accommodation facilities to be used for the CSG production workforce.

2.3 Construction

The construction of the power station is expected to take approximately 30-34 months. The type of equipment to be used will be similar for any major civil/mechanical construction project. Activities will include earthworks and excavations, heavy lift cranes, concrete batch production, hammering, welding, painting and equipment installation.

The construction workforce will average approximately 200 but will peak at about month 20 at 400. They will be accommodated at a construction camp to be developed on the Spring Gully property.

3.1 Regional Climate

The project is located in south-west Queensland and experiences a climate characterised by hot wet summers and dry, relatively cool winters. The dominant winds in warmer months (November to March) are from the north-east, while in the cooler months (April to October) a south –westerly wind prevails.

Annual rainfall in Roma is 599 mm. The average annual evaporation rate is 2,389 mm.

Daily temperatures range from 20°C during July to 35°C during January. Humidity is lowest during the cooler winter months, especially April to August, and more than 60% of the area's rain falls between November and March when humidity is at its highest.

3.2 Topography, Geology & Soils

3.2.1 Existing Environment

The northern part of the study area consists of undulating country with rounded hills and ridges developed on the Hutton Sandstone. The southern part of the site consists of gently undulating country generally developed over the Middle to Upper Jurassic Injune Creek Group.

The Taroom 1:250,000 Geological Map and the Roma 1:250,000 Geological Map shows the study area's surface geology is dominated by rocks of the Hutton Sandstone and the Injune Creek Group. The Hutton Sandstone consists of argillaceous sublabile sandstone and quartzose sandstone, minor mudstone and rare pebble conglomerate beds (ERM, 2003a). It is relatively flat and has a thickness of approximately 500 metres.

3.2.2 Potential Effects & Mitigation

During plant construction, some land will be cleared for the plant site and cut and fill may be required. This may increase the potential for soil erosion, however environmental management measures will be adopted to minimise this impact. Measures to be considered will include the diversion of runoff water from around the plant site, minimising activities in drainage lines, construction of a sedimentation pond, and use of berms to restrict water flow. The high proportion of fine material in the topsoil, and the degeneration of its workability under high moisture content, dictates that topsoil recovery should occur when it is dry or slightly moist in the cooler months. A minimum number of passes by heavy earth moving equipment will help to minimise erosion and dispersion of soils by the wind.

The possibility of potential acid sulfate soils (PASS) being present in areas proposed for construction is considered minimal owing to the elevation of the proposed plant site and the terrestrial origin of the soils.

3.3 Hydrology, Hydrogeology & Water Quality

3.3.1 Existing Environment

The site is drained by Eurombah Creek and its tributaries. Eurombah Creek, which is located along the site's southern boundary, flows into the Dawson River approximately 70 km downstream of the study area. Eurombah Creek is ephemeral which, like many other catchments in the region, is subject to infrequent flow events. Between flow events, the creek divides into a series of shallow waterholes. A number of these waterholes appear to persist throughout an average dry season. Anecdotal evidence suggests that up until several years ago a much greater length of the creek was occupied by waterholes. It is thought that the recent decrease in water within Eurombah Creek may be due to a reduced groundwater discharge as a result of the extended period of dry weather experienced in the area.

The main flow channel of Eurombah Creek is well incised with typical bank heights of approximately 10 m. The channel bed is generally clayey and silty with some sand bars clear of vegetation and may contain numerous rock outcrops and/or embedded boulders. The channel banks are sandy and rocky, are relatively steep, and contain significant stands of vegetation.

3.3.2 Potential Effects & Mitigation

The construction of the proposed power station will alter the surface hydrology in the vicinity of the plant due to the presence of construction activities and earthworks. The environmental management strategies to be adopted will ensure that water quality is not adversely affected by the construction phase runoff from the project site. Normal stormwater management practices will be implemented such as diverting runoff from disturbed areas through a sediment trap prior to discharge.

The power station site will be of the order of 15 ha and a portion of this will consist of impervious roof or paved areas. The impervious area will increase stormwater runoff during storm events beyond those generated from the undeveloped site. Stormwater flow from the site will be discharged to a tributary of Eurombah Creek. The additional amount of stormwater runoff will not be excessive although arrangements may be required to ensure that any additional flows do not create erosion or bed instability in the creek system.

No significant contamination of stormwater from the power station site is expected. During the operational phase, a stormwater management system will be introduced which will retain and treat first flush runoff from potentially contaminated areas. Runoff from uncontaminated areas will be discharged to natural drainage systems.

During the operational phase, the cooling water to be used by the power station will be the water that is produced by the CSG gas field dewatering process. Evaporation of this water in the cooling towers will gradually concentrate dissolved salts and, as a result, it will be necessary to "blowdown" part of the cooling water flow to reduce excessive salt build up. The blowdown water will be too saline to discharge to the environment and will be disposed of in the evaporation ponds already approved as part of the CSG

production. The use of water produced as part of CSG extraction for power station cooling will minimise the total area required for evaporation ponds as part of the CSG project.

3.4 Waste Streams

In addition to the cooling water discussed in Section 3.3.2, other waste streams from the power station are likely to include boiler water blowdown and demineraliser backwash. These will be disposed of in the evaporation ponds.

There will also be effluent from the sewage treatment plant that will be installed at the accommodation camp. Treated effluent from this plant will most likely be managed via irrigation in accordance with standard industry practice.

Construction wastes will be reused or recycled where possible with waste transported to landfill as necessary. These wastes will be managed by applying the waste management hierarchy principles of reduce, reuse, and recycle.

3.5 Ecological Values

3.5.1 Existing Environment

Regional Ecosystems Mapping

The Department of Natural Resources and Mines (DNRM) uses regional ecosystems (REs) to describe the relationships between major floral species and the environment at the bioregional scale. REs are mostly derived from linking vegetation mapping units recognised at a scale of 1:100,000 to land zones that represent major environmental variables, in particular geology, rainfall and landform. The Queensland Herbarium has developed a program for explicitly mapping REs across Queensland. Maps were provided by DNRM to identify the REs within the study area. Significant REs that are of conservation status are discussed in Section 3.5.2.

The EPBC Act Online Database

The Environmental Protection and Biodiversity Conservation (EPBC) Act online database also provided information on the species likely to occur in the area. The relative reliability of this database must be born in mind as species highlighted by this search do not necessarily correlate to actual observations. Species are highlighted if their distribution overlaps with the search area by one degree of latitude/longitude.

A protected matters report was generated utilising the EPBC online database. A specific search of the power station site was generated by specifying a one kilometre buffer around the site. Listed flora and fauna species and other conservation values produced by this search are addressed in Section 3.5.2.

Bioregion

The bioregions of Queensland are based on landscape patterns that reflect changes in geology and climate, as well as major changes in floral and faunal assemblages at a broad scale. Bioregions are used as the fundamental framework for the planning and conservation of biodiversity in Queensland. The Spring Gully site is situated within the Southern Brigalow Belt bioregion, of which approximately 2.2% is currently conserved in protected areas.

The Brigalow Belt bioregion contains a number of sub-regions or provinces that delineate significant differences in geology and geomorphology. Spring Gully is found within the Southern Downs province.

3.5.2 Potential Effects & Mitigation***EPBC Act Listed Ecological Communities***

Two significant ecological communities as listed by the EPBC Act are in the region. Both are Brigalow dominated communities. These communities have significant conservation values as their ranges have rapidly diminished within the Brigalow Belt bioregion. The communities are as follows:

- Semi-evergreen vine thicket. Within the Brigalow Belt bioregion this community has been fragmented, reduced in area and degraded in ecological integrity. Threatening processes include land clearing and agricultural grazing practices. It is estimated that currently somewhere between 9 and 30% of its former range still exists.
- Brigalow (*Acacia harpophylla* dominant and co-dominant). This ecological community has suffered a severe decline in extent following the clearance of land for agricultural use in both Queensland and northern NSW. Nationally, the extent of Brigalow communities is estimated to currently be no more than approximately 10% of their original range.

These communities are also recognised in the three significant REs that have been mapped on the Spring Gully site. Table 3.1 summarises the conservation status and descriptions of these REs.

Table 3.1
Significant Regional Ecosystems on the Spring Gully Site

RE	Status ¹	Description
11.3.25	Of Concern	<i>Eucalyptus populnea</i> woodland on alluvial plains
11.9.4	Endangered	Semi-evergreen vine thicket on Cainozoic fine grained sedimentary rocks
11.9.5	Endangered	<i>Acacia harpophylla</i> and/or <i>Casuarina cristata</i> open forest on Cainozoic fine-grained sedimentary rocks

¹Status: *Queensland Vegetation Management Act, 1999*:

Endangered= <10% of the pre-clearing extent remained in September 2000,

Of concern= 10-30% of the pre-clearing extent remained in September 2000

Not of concern= Extent was > 10 000 ha and >30% of the pre-clearing area in September 2000

Patches of semi-evergreen vine thicket exist in some of the remnant vegetation along the stream lines in the northern half of the Spring Gully site. More extensive areas of semi-evergreen vine thicket are located on the property to the east. Also a small patch of Brigalow is located along the site's northern boundary.

Biological surveys of the site will ensure that these listed ecological communities will not be disturbed by the project.

The power station will be located on cleared land away from sensitive vegetation communities. In this way any communities with conservation significance will not be affected by the project.

EPBC Act Listed Fauna

Ten EPBC Act listed fauna species were identified as likely to occur within a one kilometre radius of the Spring Gully site (Table 3.2). Of these, nine were identified as vulnerable and one endangered.

Table 3.2
EPBC Act Listed Fauna

Class	Scientific Name	Common Name	QNCA ¹	EPBC ²	Sig ³	Source ⁴
Birds	<i>Erythrotriorchis radiatus</i>	Red Goshawk	E	V	Y	Pmr, NC(W)R
	<i>Geophaps scripta scripta</i>	Squatter pigeon (Southern)	V	V	Y	Pmr, NC(W)R
	<i>Neochima ruficauda</i>	Star Finch		E	Y	Pmr
	<i>Rostrallata australis</i>	Australian Painted snipe	V	V	Y	Pmr, NC(W)R
Mammals	<i>Chalinolobus dwyeri</i>	Large pied bat	R	V	Y	Pmr, NC(W)R
	<i>Nyctophilus timoriensis</i>	Eastern long-eared bat	V	V	Y	Pmr, NC(W)R

Class	Scientific Name	Common Name	QNCA ¹	EPBC ²	Sig ³	Source ⁴
	<i>Egernia rugosa</i>	Yakka skink	V	V	Y	Pmr, NC(W)R
	<i>Furina dunmalii</i>	Dunmall's Snake	V	V	Y	Pmr, NC(W)R
	<i>Paradelma orientalis</i>	Brigalow scaly-foot	V	V	Y	Pmr, NC(W)R
	<i>Rheodytes leukops</i>	Fitzroy tortoise		V	Y	Pmr,

¹QNCA status: *Queensland Nature Conservation Act 1992*. Presumed Extinct (PE), Endangered (E), Rare (R), Vulnerable (V), Common (C) or Not Protected ().

²EPBC status: *Environment Protection and Biodiversity Conservation Act, 1999*. Conservation Dependent (CD), Critically Endangered (CE), Endangered (E), Extinct (EX), Extinct in the Wild (XW), Vulnerable (V)

³**Significant:** Indicates whether a taxon is conservation significant by the display of a Y (i.e. Yes). Conservation significant species include those that are listed as rare or threatened under the *Nature Conservation Act 1992* or threatened under the *Environment Protection and Biodiversity Conservation Act 1999*, have a management status of rare or threatened, or are listed under an international agreement (such as JAMBA, CAMBA and Bonn Convention).

⁴**Source:** EPBC Protected Matters Report (PMR). Listed as per the *Queensland Nature Conservation (Wildlife) Regulation, 1994* (NC(W)R)

Biological surveys of the site will be undertaken to ensure that habitats of these listed species will not be disturbed by the project.

3.6 Noise & Vibration

3.6.1 Existing Environment

Background noise levels have been monitored at Spring Gully as part of the environmental studies associated with the CSG production. The average background noise levels recorded at the surrounding residential locations are summarised in Table 3.3. The nearest residence beyond the site is approximately 6 km from the proposed power station location.

Table 3.3
Average Background Noise Levels dB(A)

Measure	Day	Evening	Night
Average L _{A90}	34	35	31
Lowest 90 th percentile	27	26	23
Average L _{A10}	46	43	41
Average L _{Aeq}	44	42	40

3.6.2 Potential Effects & Mitigation

Major noise sources at the power station would include the following:

- Gas turbines
- Steam generators
- Steam turbines
- Cooling towers
- Stacks

Where required, noise attenuation will be incorporated into the design of the above major noise sources.

The noise levels from the above sources are yet to be determined. However, noise modelling of a similar gas fired combined cycle power plant in Brisbane (Dames & Moore (1995) *Environmental Impact Statement Proposed Gibson Island Cogeneration Plant*, report for Gibson Island Power Pty Ltd, Brisbane) has shown that noise levels will reduce to approximately 30 dB(A) within 3 km of the site. This was based on the following noise attenuation assumptions:

- Turbines – housed in acoustic enclosures with silenced ventilation fans.
- Steam generator and stack – all ducting to incorporate silencers.
- Cooling towers – low speed fans and enclosed pumps.

Given that the nearest residence beyond the site is 6 km from the power station, existing noise levels as given in Table 3.3 are not expected to be increased as a result of the power station's operations.

A noise investigation will be undertaken to ensure the impact of construction and operation on the noise environment is acceptable. Impacts will be assessed in accordance with the Environmental Planning Policy (Noise).

3.7 Air Quality

3.7.1 Existing Environment

The site is located in a rural area and is surrounded by large tracts of agricultural land utilised for cattle grazing.

3.7.2 Potential Effects & Mitigation

Construction Phase

Dust will be generated during the earthworks component of the power station's construction phase. However, this phase will be of relatively short duration and, when necessary, watering will be used to control dust generation. Origin will prepare a Construction Environmental Management Plan that outlines how dust and other air emissions will be managed to minimise potential environmental impacts during the construction phase.

Given this, and the fact that the nearest residence beyond the site is more than 6 km from the site, no significant air quality impacts are likely during construction.

Operational Phase

The proposed gas-fired power station will have a number of air quality advantages when compared to an equivalent coal-fired facility. These include reduced greenhouse gas emissions as well as minimal SO₂ and odour emissions.

Principal air emissions from the gas-fired power station will be the products of the combustion of coal seam gas which are NO_x, CO and CO₂.

Predicted maximum 1 hour ground level concentrations of NO₂ from a 660 MW gas-fired power station in Brisbane (using low NO_x burners) were approximately 30 µg/m³ (Dames & Moore (1995)

Environmental Impact Statement Proposed Gibson Island Cogeneration Plant, report for Gibson Island Power Pty Ltd, Brisbane). This is less than 10% of the EPA guideline of 320 (µg/m³). Assuming similar concentrations at Spring Gully, it is unlikely that NO_x emissions would be of concern.

NO_x is also a precursor to photochemical smog. Ozone (as a measure of smog) is a product of the photochemical reactions involving NO_x and reactive organic compounds which are commonly found in urban airsheds. These reactions take some time to occur and hence ozone is normally generated some distance downwind from the NO_x source. As there are no other significant sources of either NO_x or reactive organic compounds in the Spring Gully airshed, the formation of photochemical smog is unlikely to be an issue.

Particulate emissions from gas combustion are negligible and will not be of concern at Spring Gully.

The power station will generate greenhouse gas emissions in the form of CO₂. When compared to the equivalent coal-fired power station, there are significant greenhouse benefits. Australian best practice black coal generators produce about 900 kg CO₂-e/MWh, while combined cycle gas turbines generate around 550 kg CO₂-e/MWh. Hence although the project's greenhouse emissions must be assessed, best practice fuels and combustions systems will be used to minimise these emissions.

3.8 Aesthetics

3.8.1 Existing Environment

The power station site has been largely cleared for agricultural purposes, however in parts of the balance of the Spring Gully property, areas of native vegetation remain.

3.8.2 Potential Effects & Mitigation

The main visual elements of the power station will be a large industrial facility consisting of turbines, generators, exhaust stacks (possibly 40 m high), and cooling towers. Smaller visual elements will include ancillary buildings, switchyards and infrastructure facilities.

Because of their size, the main visual elements of the power station will be visible from surrounding areas. They will also be visible at night time, as the buildings will be lit for operational and safety reasons.

The Spring Gully site is located at an elevation of approximately RL 300 m – 400 m. North of the site the land rises to approximately RL 500 m while to the south the land flattens out over a relatively broad area with elevations ranging generally from RL 300 m – 350 m. Because of its elevated position, and because it is generally open cleared land, the Spring Gully site is visible from extensive areas to the south-west to south-east of the site. It is likely that the main visual elements of the power station will be visible from these areas.

Screening of some of the lower elements of the power station will be possible if advantage can be taken of local topographical variations. Also from some angles, the structure will be able to be blended into the background rather than appearing against the skyline. Judicial use of colours, building materials and lighting will also be able to reduce the visual impacts.

3.9 Cultural Heritage

Consultations with Aboriginal people concerned with the site are an integral part of any cultural heritage study. Such consultations will be held during the EIS process for the project.

The Spring Gully property includes land which is covered by two native title claim groups who constitute “Aboriginal parties” under section 35 of the *Aboriginal Cultural Heritage Act 2003* (Qld). These native title claims share a common border. The northern part of the Spring Gully property, where the proposed power station is to be located, falls within the Iman People’s native title claim (QC97/55). The southern half of the property is covered by the Mandandanji People’s native title claim (QC97/50). Through the CSG production, Origin has existing and ongoing cultural heritage arrangements for new projects with both the Mandandanji People and the Iman People.

In addition to the above arrangements, Origin has established procedures for dealing with cultural heritage issues. These procedures will be used in managing cultural heritage issues associated with the power station project.

3.10 Socio-Economics

3.10.1 Existing Environment

The property is remote with topography and natural vegetation creating a natural buffer to the nearest off site residences approximately 6 km away.

Roma, 80 km to the south-west, is the major population centre in the vicinity of the site. It has a population of approximately 7,000 people and is the main service centre for a region that is dominated by sheep and cattle grazing.

3.10.2 Potential Effects & Mitigation

As discussed in Section 2.3, the construction workforce will average approximately 200 but will peak at about 400. They will be accommodated at a construction camp to be developed on the Spring Gully property and will operate on a 'fly-in/fly-out' basis via Roma.

The construction of the power plant will generate employment and business opportunities that will flow to the local community. The power plant represents an investment of ultimately approximately \$870 million, for stages 1 & 2. Where possible, part of this investment will be spent in the local or regional economy through the utilisation of skilled local and/or regional construction expertise and workforce.

The power plant will create about 30 full time jobs during operation. The operational phase will also provide some increased economic activity and income for the Roma region.

Accommodation for the construction and operational workforce will be provided on or close to the site in conjunction with the existing accommodation as part of the CSG production. The EIS will assess the effects of the additional demand for these services generated by the project workforce.

3.11 Transportation

During construction, heavy construction loads will be delivered to the site by road. The most likely route will be along the Warrego Highway from either Brisbane or southern states to Roma, and then north along the Carnarvon Developmental Road and along the road to Taroom. While the access road from Durham Downs to the site is currently a gravel road, it will be upgraded and paved as part of the CSG production and hence will be able to accommodate the power station project's construction loads.

The construction workforce will be accommodated on-site and will fly in and out of Roma. Travel to and from Roma will be by bus.

The power station's operation workforce will be relatively small and will be generally accommodated on-site. This arrangement will not generate any significant additional traffic on the local road system.

There will be little heavy vehicle traffic generated by the power station's operation. It will be limited to one to two trucks per day delivering chemicals and consumables or collecting wastes.

4.1 Introduction

Origin is committed to eliminating or managing risks and practices that cause accident, injury or illness to people, damage to property or unacceptable impacts on the environment or community. It is committed to contributing to the sustainable development of its communities and conducting activities on decisions that recognise short and long-term economic, environmental and social considerations.

4.2 Construction

The construction phase of the project will involve site clearing, civil works, erection of steel work, installation of machinery and equipment and the integration of management and process systems. During the construction of the project, measures will be undertaken to ensure that all environmental risks associated with the construction will be minimised. All construction materials and practices will be in accordance with relevant Australian standards.

The project construction manager will be responsible for the development and implementation of a construction phase environmental management plan to achieve the above objectives.

4.3 Operation

The power station will be operated on a continuous 24 hours per day/365 day per year basis with periodic scheduled shutdown for maintenance. Its design philosophy will incorporate the need to minimise inventories of materials and the minimum use of chemicals and reagents with a high environmental impact. The plant will also be designed to minimise the generation of solid, liquid, and gaseous wastes.

The operational phase environmental management plan will be developed to manage risks identified during the EIS process.

4.4 Safety Features

The efficiency and stability of the power station's operations will be maximised by the use of a high level of automation, regular preventative maintenance, and safeguards such as back-up systems and the provision for safe emergency shut-downs.

Prior to plant commissioning, all personnel will be required to undertake an extensive training program to ensure safe operating practices. The training program and subsequent regular refresher programs will involve issues covering operations, hazards, safety and emergency procedures and environmental management.

4.5 Community

It is Origin's policy not only to ensure that the project provides a net benefit to the community but also to work with the community in achieving this outcome.

Origin has undertaken extensive consultation with the community and stakeholders as part of the CSG production and will continue to operate in an open and transparent way commensurate with commercial requirements. This will begin with a comprehensive community consultation program during the preparation of the project's EIS. It will continue during operations with regular reporting to the community and administering authorities concerning the operations, impacts, performance and other issues relating to the operation of the power station.

4.6 Monitoring

Origin will be setting up a comprehensive environmental monitoring program to measure and record the operations of the power station with emphasis on the release of contaminants, discharges and incidents. This will be to confirm that discharges and emissions comply with all relevant environmental licence and approval conditions.

Regular environmental audits will be undertaken. These audits will help management assess the efficiency and effectiveness of the plant's operation from an environmental, safety and community view and to take appropriate corrective action as necessary.

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