Queensland Coke & Energy Pty Ltd
(A subsidiary of Macarthur Coal Limited)

Stanwell Corporation Limited
(and/or a wholly owned subsidiary of Stanwell Corporation Limited)

INITIAL ADVICE STATEMENT

<u>COKE PLANT & POWER STATION PROJECT</u>

STANWELL ENERGY PARK & GLADSTONE EXPORT PORT

December, 2004

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ABBREVIATIONS

AMC – Australian Magnesium Corporation

ANZECC – Australian and New Zealand Environment and Conservation Council

CA - Cement Australia

CQPA - Central Queensland Port Authority

DSDI – Department of State Development and Innovation (QLD)

EIS - Environmental Impact Statement

EPA - Environmental Protection Agency (QLD)

EPBC – Environmental Protection and Biodiversity Conservation Act 1999 (Commonwealth)

IAS - Initial Advice Statement

MCC - Macarthur Coal Limited

μS/cm – Micro siemens per centimeter

Ml – Mega litres

Mt – Million tonnes

Mtpa – Million tonnes per annum

MW – Mega Watts

PCI - Pulverised Coal Injection

PCM - Pusher Charger Machine

QCE – Queensland Coke & Energy Pty Ltd

SCL - Stanwell Corporation Limited

SDPWOA - State Development and Public Works Organisation Act (1971 QLD)

SEP - Stanwell Energy Park

SPS - Stanwell Power Station

EXECUTIVE SUMMARY

Queensland Coke & Energy Pty Ltd (QCE) (a subsidiary of Macarthur Coal Limited - MCC) and Stanwell Corporation Limited (SCL) are jointly investigating the feasibility of a project that will employ modern heat recovery coke making technology to produce a superior quality blast furnace coke for the export market. The technology uses heat generated from the combustion of gases contained within the coal to convert coal into coke. Surplus heat will be captured and used for the generation of electricity. Queensland Coke & Energy Pty Ltd is responsible for the coke making operations and SCL is responsible for the generation of electricity.

A detailed investigation of a number of alternative sites has been conducted in Queensland. These sites included Abbot Point, Gladstone and the Stanwell Energy Park (SEP). The proposed location of the project is the SEP which is located off the Capricorn Highway approximately 25km south west of Rockhampton and 129km by rail from Gladstone. The SEP site stands out as having the following significant advantages:

- The ability to take advantage of a power generation alliance with SCL for the efficient use of surplus heat from the coke making process;
- The opportunity to share existing infrastructure including water services, road and rail access and power transmission facilities thereby reducing the environmental impact of new facilities and capital costs;
- Ample land for the planned size of the project and potential expansion, which has already been allocated for industrial use, and a willingness by SCL to make the land available to the project.
- Ability to make use of engineering, geotechnical and environmental investigations associated with the Stanwell Power Station (SPS) and, the Australian Magnesium Corporation (AMC) project;
- Access to a broad range of new and existing coal supply sources, critical to the viability of the project;
- Access to a labour pool at Rockhampton and the surrounding region; and
- Access to high capacity rail transport to Gladstone for the export of coke products.

The current concept is to construct a coke plant with an initial production capacity of 2.1Million tonnes per annum (Mtpa), allowing for expansion to 3.2Mtpa, subject to market commitments. At the 3.2Mtpa level the project will consume approximately 5.0Mtpa of Bowen Basin coking coal and it is expected that new coking coal production capacity will be developed to meet the long-term requirements of the project. Heat generated from combusted coal gases in the coke making process will be sufficient to generate up to 370MW of electricity for the 3.2Mtpa scenario.

Coke will be railed to a new export facility at the Fisherman's Landing port site in Gladstone in standard Blackwater train consists. Once at Gladstone the coke is discharged from trains via a rail unloader then conveyed to a new wharf and ship loader. Panamax size vessels will then ship the coke product to markets in Asia, Europe and the Americas.

It is envisaged that the majority of the coke will be exported to steel producers under long-term "take or pay" contract arrangements. The steel producers have indicated they will import coke as an alternative to refurbishing their own ageing coke making facilities or constructing new oven capacity. The mills will import a processed coke product instead of the raw coking coal because they realise benefits from capital savings, a reduced need to allocate space for a coke plant, a lower volume of product to be transported (5.0 Million tonnes (Mt) of coal is replaced with 3.2Mt of coke) and supply security. Queensland benefits from the ability to utilize the gases from the coal to generate "environmentally smart" electricity. New jobs will also be created from the additional coal production and its downstream processing into coke and electricity.

The proposed coke making technology is based on modern heat recovery processes used in the United States of America and elsewhere. The expected emission levels from this type of technology comply with the most stringent international standards and are significantly lower than conventional by-product coke oven technology, the latter most commonly associated with integrated steel mills. This is due to the nature of the coking process in which gaseous products are combusted in a negative pressure environment. Surplus heat generated by the combusted coal gases is converted to steam. Electricity will be produced by modern steam turbines operated by SCL.

Based on a recently completed pre-feasibility study the forecast capital cost of the combined coke and power project is estimated to be approximately $A1 billion. This capital estimate does not include the necessary expansion of Queensland's coal mining capacity.

Benefits to Queensland

The benefits to Queensland are expected to be substantial. These include:

- Creating up to 300 new long-term jobs in the coke and power project and in the associated coal, transport and shipping operations;
- Creating up to 200 jobs in expanded coal mining capacity;
- Creating approximately 1200 jobs on average over two years during the construction phase, for stage 1;
- Indirect generation of an estimated 3000 full time equivalent jobs throughout other sectors of the regional economy;
- Generating approximately $480 million in flow on value-added activities throughout the regional economy;
- Improving the skill base of the labour pool;
- Development of additional coking coal resources in the Bowen Basin.
- Providing an additional electricity generation capacity by the "environmentally smart" use of combusted coal gases;
- Developing a new export port facility; and
- Generating additional export revenue by "value adding" to steel making raw materials which would otherwise not be retained in Queensland.

Project Status and Timing

In October 2004 QCE and SCL completed studies of the project and selected the site and export port. At the same time QCE has embarked on an intensive market survey and is now in the process of securing formal "Letters of Intent" from prospective long-term coke buyers. In addition, QCE has commenced a review of potential coal sources and is in discussion with candidates for the supply of the coke making technology and the preparation of an environmental impact statement (EIS).

Queensland Coke & Energy Pty Ltd and SCL are now satisfied that there is sufficient market interest and a detailed feasibility study is now underway. The intention is to complete the study prior to the end of 2005 with a view to making a decision to proceed with construction in early 2006. If this can be achieved coke production could commence as early as October 2007.

It is envisaged that SCL's rights and interests in the project will be held by a wholly owned subsidiary of SCL, approval for the incorporation of which will be sought when the project is further developed.

The projects' indicative key completion dates are as follows.

Key Tasks	Indicative Completion Dates
1. Technology Selection	January, 2005
2. Environmental Impact Statement	August, 2005
3. Detailed Feasibility Study	October, 2005
4. Final Project Approvals	December, 2005
5. First Coke (Stage 1)	October, 2007
6. Full Coke Production (Stage 1)	January, 2008

Note: If Stage 2 is considered feasible an allowance of an additional 12 to 18 months will be required.

1.0 INTRODUCTION

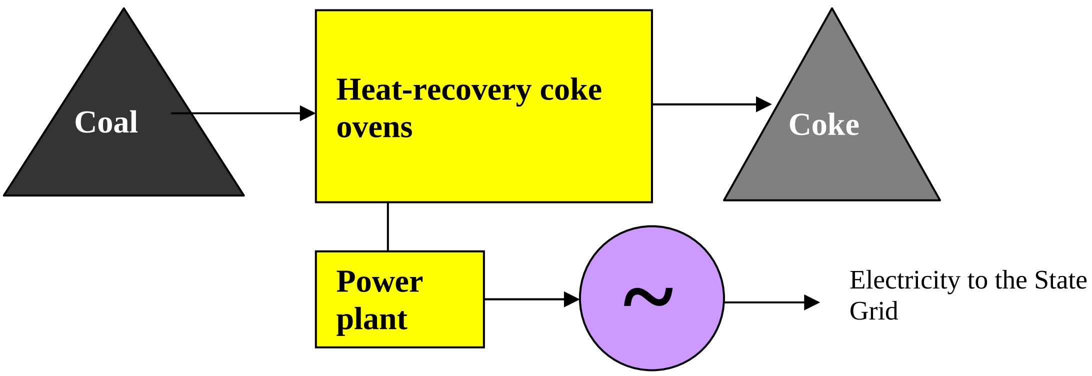
1.1 Project Overview

Queensland Coke & Energy Pty Ltd (QCE) (a subsidiary of Macarthur Coal Limited - MCC) and Stanwell Corporation Limited (SCL) are proposing to construct and operate a combined coke plant and power station within the SEP located 25km south west of Rockhampton in Central Queensland. The SEP is located adjacent to the existing SPS. The coke plant will produce high quality coke for use in blast furnaces in the steel industry, using coal sourced from Queensland mines. The coke will be transported by rail to the Port of Gladstone for export to markets in Asia, Europe and the Americas. Excess heat, generated by the combustion of coal gases in the coke plant, will be used to produce steam to generate electricity for the National Electricity Market. In summary the project is estimated to:

- Create up to 300 new long-term jobs in the coke and power project and in the associated coal, transport and shipping operations;
- Create up to 200 jobs in expanded coal mining capacity;
- Create approximately 1200 jobs on average over two years during the construction phase, for stage 1;
- Indirectly generate an estimated 3000 full time equivalent jobs throughout other sectors of the regional economy;
- Generate approximately $480 million in flow on value-added activities throughout the regional economy;
- Improve the skill base of the labour pool;
- Develop additional coking coal resources in the Bowen Basin.
- Provide an additional electricity generation capacity by the "environmentally smart" use of combusted coal gases;
- Develop a new export port facility; and
- Generate additional export revenue by "value adding" to steel making raw materials which would otherwise not be retained in Queensland.

An overview of the project is provided below in Figure 1.

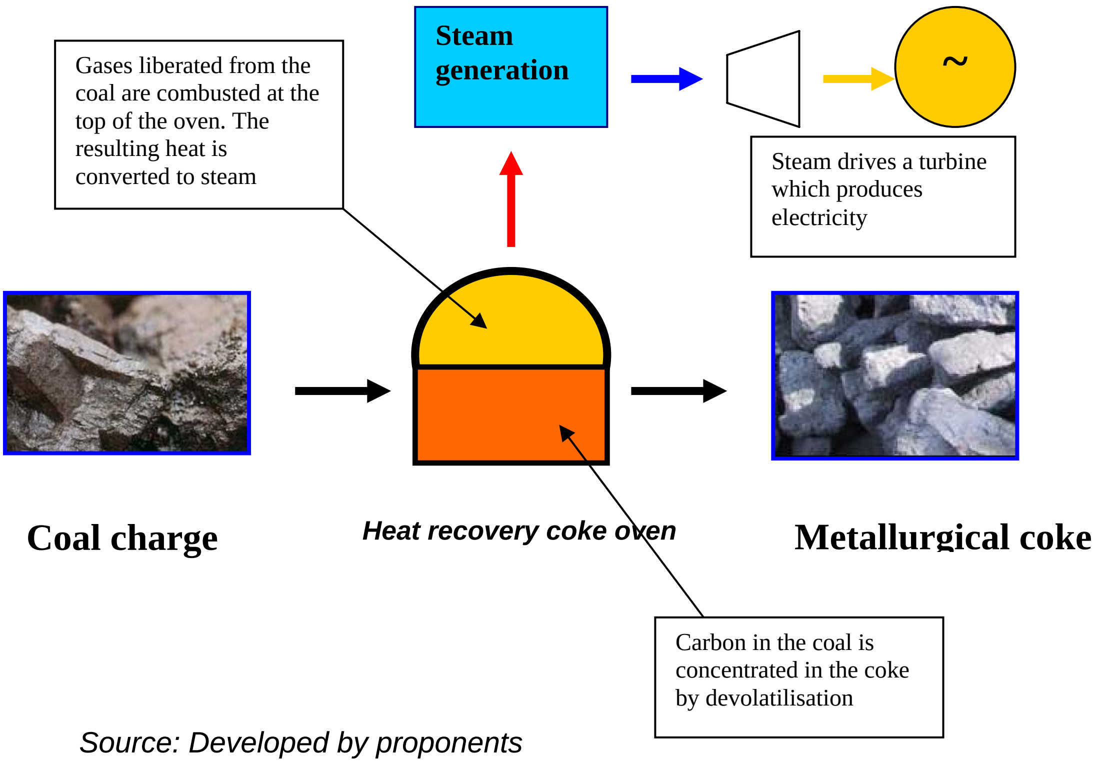
Figure 1. A Visual Overview of the Project



Source: Developed by proponents

A summary of the coal to coke and power generating process is provided in Figure 2.

Figure 2. Coal to Coke and Power Process



Source: Developed by proponents

The **key** elements to note about the production process are:

- Coke is produced by heating coal, in a controlled atmosphere, thus liberating volatile matter (gas and moisture);
- The gas is combusted in an environmentally "smart" way so as to produce the heat to make the coke. Excess heat is produced in the process and this is used to generate electricity;
- The process does not rely on the combustion of coal, only the gas liberated from the coal; and
- The greenhouse gas emissions of the process are typical of a simple gas-fired power generator. That is, one that raises steam that passes through a turbine.

1.2 Purpose and Scope of Document

The purpose of this Initial Advice Statement (IAS) is to provide information to:

- Assist the Coordinator-General to make a decision on a declaration of the project as a "Significant Project" under Section 26 of the *State Development and Public Works Organisation Act (SDPWOA) 1971* which would initiate the statutory impact assessment procedures of Part 4 of the Act;

- Assist the Department of State Development and Innovation (DSDI) to prepare draft terms of reference for an EIS for the proposed project; and
- Enable stakeholders to determine the nature and level of their interest in the proposal.

1.3 The Proponents

The project is a venture involving two proponents – QCE (a subsidiary of MCC) and SCL. Macarthur Coal Limited (ABN 40 096 001 955) is a Queensland based coal mining company listed on the Australian Stock Exchange with a market capitalisation of over $600 million. The company presently operates two coal mines west of Mackay in Central Queensland, Coppabella and Moorvale, producing a total of 6.2Mtpa of low volatile Pulverised Coal Injection (PCI) and thermal coal. The PCI coal is crushed and directly injected into the blast furnace to provide energy to the steel making process. It substitutes more expensive coke thereby improving economic and environmental performance of steel mills. MCC holds 73.3% of the Coppabella and Moorvale operations with the assistance of a number of Japanese and Chinese joint venture partners.

The company has a proven track record of profitability generating $11.7 million net profit last financial year and is anticipating significantly increased profitability in the current financial year of between $40 million to $45 million. MCC invests significant funds in the exploration of an extensive tenement holding in the Bowen Basin of Central Queensland and intends to grow organically through the development of new coal mines in order to meet the growing global demands for energy and metallurgical coals.

Stanwell Corporation Limited (ABN 37 078 848 674) is a Queensland Government owned company established under the *Government Owned Corporations Act (1993) (Qld)* and is registered under the *Corporations Act 2001 (C'th)*. The Corporation is one of Australia's leading generators (1,643MW) of environmentally responsible electricity with an extensive portfolio of coal-fired, gas-fired, wind, hydro, and bio-energy power generation facilities.

Stanwell Corporation Limited is committed to providing low cost, reliable electricity and to leading the market in asset and environmental performance, while pursuing a balanced portfolio that gains strength from investments in diverse energy technologies at sites nationwide. Stanwell Corporation Limited has generating assets and projects located in Queensland, New South Wales, Victoria, South Australia and Western Australia. The most significant presence is in Queensland where SCL contributes nearly 20% of the electricity generated in the State. Stanwell Corporation Limited employs more than 300 people nationally.

As at 30 June 2004, SCL had total assets of $1,560 million and total liabilities of $550 million. Interest bearing liabilities total $234 million as at 30 June 2004 and are borrowed from Queensland Treasury Corporation.

Further examination of the most appropriate vehicle, or vehicles, for delivery of the project will be undertaken by SCL during the project's development.

It is envisaged that SCL's rights and interests in the project will be held by a wholly owned subsidiary of SCL, approval for the incorporation of which will be sought when the project is further developed.
The contact details for the two proponents are:

- Queensland Coke & Energy Pty Ltd
  Level 10
  380 Queen Street
  Brisbane. Q4000.
  Phone: (07) 32217210
  Fax: (07) 32291776

- Stanwell Corporation Limited
  Level 12, 1 Eagle Street,
  Brisbane. Q4000.
  Phone: (07) 33357444
  Fax: (07) 33357477

1.4 Financing

Macarthur Coal Limited has a current net debt to equity ratio of 39.2%. In 2004 the company had a surplus of $18.9 million in cash flows from operating activities. Net cash used in investing activities was $47.5 million during 2004. Returns for 2005 are forecast to increase significantly providing additional funds for investment in developing new projects. MCC proposes to fund the coke part of the project using an appropriate mix of project and corporate debt, equity, and surplus cashflow.

Stanwell Corporation Limited is currently lowly geared, with a Debt / (Debt + Equity) ratio of approximately 25% as at 30 June 2003. Stanwell generates excellent operating cash flow ensuring strong debt servicing capacity. The Corporation has a strong net asset balance sheet position (in excess of $1 billion) with low debt servicing obligations that provide a solid base for growth. Stanwell Corporation Limited's current credit rating provided by Fitch is BBB+ on a stand alone basis or AA- with implied Government support. Stanwell Corporation Limited proposes to fund the power station component of the project on balance sheet.

1.5 The Sites

The Coke Plant will be located within the SEP adjacent to the SPS. The associated power generation facilities will also be located on the SEP, central to the coke plant. Coal and coke loading and unloading associated with the new enterprise will be located in the vicinity of the existing rail loop and coal unloading facilities.

The Port of Gladstone will provide a site at Fisherman's Landing for the unloading of coke from the rail transport, and the loading of coke on to a ship. It is envisaged that the project will share a multi-user wharf at this location.

Figure 3 depicts the location of the above sites.

2.0 NEED FOR THE PROJECT

2.1 Global Demand for Coke

In 2003 world coke production totalled 391Mt. China was the largest producer with an estimated 172Mt followed by Japan with 39Mt. Australia produced just under 3Mt. The majority of this coke is produced in integrated steel works using conventional by-product type manufacturing processes.

The metallurgical coke trade is relatively small. It is dominated by China and totalled approximately 30Mt in 2003. Demand is driven largely by blast furnace based steel production which accounts for over 90% of coke consumption. Other users include foundries, domestic heating (homes in Europe & elsewhere), tobacco and sugar beet refining.

2.2 The Changing Market for Coking Coal and Coke

In 2003-04 the seaborne market for steel making raw materials changed dramatically. This was largely driven by a surge in Chinese demand for steel products. China started consuming iron ore and coking coal to fuel its booming domestic steel industry and, unable to secure sufficient domestic coking coal, turned to the seaborne trade. Chinese coking coal imports increased from less than 0.5Mt in 2002, to 2.8Mt in 2003, and a forecast 4.6Mt in 2004. This represents an approximate nine-fold growth in demand over two years.

At the same time demand for imported coking coal continued to increase steadily in India and Brazil. Supply out of Australia in particular struggled to keep up with demand. This was exacerbated by production and coal port problems. The end result has been a dramatic and ongoing increase in the price of coking coals. The price of prime Australian hard coking coal has increased from less than US$60 per tonne FOB in early 2004 to in excess of US$100 per tonne. The 20 year historical average export price is around US$50 per tonne.

At the same time as the coking coal market was tightening the price of Chinese export blast furnace coke also went through a substantial rise. Prices rose from less than US$80 per tonne FOB in 2002 to in excess of US$450 per tonne in mid 2004. China supplies around 52% of the world coke trade. As the Chinese Government came under pressure to assure the market that it would continue to maintain coke export levels at around 14Mt (despite growing domestic demand), prices started to fall. The November 2004 spot price for Chinese 10.5% ash blast furnace coke was US$250 per tonne FOB. This is still well above the historical average of US$70 per tonne.

2.3 The Changing Attitude of Steel Manufacturers

The above situation has caused world coking coal and coke importers to re-think their buying strategies. In 2004 some steel producers had the experience of not being able to secure sufficient coking coal or coke to maintain blast furnace operations. There is currently a heightened level of activity to consider developing new coking coal supply with projects in Mozambique, Central Kalimantan and Siberia. However, it is likely that supply and demand for prime coking coal will remain closely balanced for the medium term.

The ability of the Chinese to increase coke exports significantly also appears to be limited. The Chinese Government is closing down the older cottage beehive type industry and any new capacity is being directed to the growing domestic market.

Simultaneously, steel makers have had to adjust to a quantum shift in the price of coal and coke. In addition, facing potential shortages, a number have had to make decisions regarding the expansion of their own coke making capacity or to replace ageing coke ovens. This combination of circumstances has provided a "*window of opportunity*" for the proponents' coke power project to provide high quality coke to this emerging market.

A number of steel producers in Asia, the Americas and Europe have expressed interest in entering into long-term "take or pay" contracts for the importation of coke. For them this is an alternative to constructing their own coke making capacity or relying on potentially unreliable spot purchases of Chinese coke to meet future needs.

The supply of coke from Australia offers security of supply from a politically stable country with abundant coking coal resources, and savings on capital. In addition, there is the added advantage that the coke making technology proposed by QCE will enable the use of weaker or non-traditional coking coals thereby increasing resource security overall. There are also logistical advantages for the buyer with fewer tonnes of coke being required relative to coal. It takes about 1.6 tonnes of coal (on a wet basis) to produce 1 tonne of coke.

To date QCE has received "Letters of Intent" for the supply of 2.1Mt of coke per annum from customers in Asia and South America. A commitment to supply an additional 1.1Mt is under negotiation.

3.0 PROJECT BENEFITS AND COSTS

3.1 Economic Benefits

Initial estimates suggest that the project will create direct employment for some 1900 persons at the peak of the construction phase and an average of 1200 persons over the 2 year construction phase. Once full production is reached approximately 300 operational phase jobs will be created. It is estimated that approximately 40 jobs will be located at the new port facility in Gladstone. The supply of coal is expected to generate additional economic activity in the Bowen Basin.

In addition to the direct employment impact, the project is envisaged to significantly boost indirect employment and value-added output throughout the regional economy. Using Queensland Treasury's Office of Economic and Statistical Research (OESR) Input-Output model[1] for the Fitzroy Statistical Division, it is estimated that approximately 3000 additional full time equivalent jobs may be generated throughout other sectors in the regional economy.

Furthermore, using the OESR model, the project is estimated to generate an additional $480 million in value-added activities in the Fitzroy regional economy.

3.2 State and Local Government Policy Support

The proposed project is expected to support in principle, and where practicable, the implementation of a number of key Queensland and Local Government policies and strategies. In addition, it may also support community based development initiatives in the Rockhampton and Gladstone communities. These policies and strategies are listed below:

- Key Priorities of the Queensland Government:
  - *Priority* - "managing urban growth and building Queensland's regions" (specifically regional jobs creation and building on the strengths of Queensland's diverse regions);
  - *Priority* - "growing a diverse economy and creating jobs;"
- Queensland Energy Policy: A Cleaner Energy Strategy;
- Smart State Strategy;
- Export Solutions - Queensland Government's Trade Strategy;
- The Local Industry Policy - A Fair Go for Local Industry;
- The Draft Indigenous Economic Development Strategy (IEDS);
- The Central Queensland Training and Employment Strategy: A Smart State Initiative; and
- Community based economic development initiatives of Rockhampton Regional Development Ltd and the Gladstone Area Promotion and Development Ltd.

[1] See References

3.3 Greenhouse Benefits from Low Emission Coke Oven Technology

The heat recovery coke making process converts coal to coke by a process called carbonisation. In this process the carbon in the coal is concentrated in the coke by heating. The carbon in the coal is not combusted in the coke making process. Therefore, there is very little carbon loss to the environment.

The coke produced by the project will replace coke manufactured by older and less environmentally friendly by-product coke ovens operating around the world. This project will therefore make a positive net contribution to the reduction of global pollution.

3.4 Cleaner Energy

The coke plant burns gases driven off from the coal to further heat the coal to form the coke product. The heat produced by the combustion of these gases is also used to produce electricity. A simplified diagram of the coke production and power generation process is attached as Figure 4.

This “smart” generation of power will assist in the reduction of greenhouse gas emissions as it generates electricity using the heat produced from the combustion of gas in the coke ovens. The generation of electricity from gas, with little or no combustion of coal, produces electricity with a greenhouse gas intensity considerably better than modern coal fired power stations. Thus, electricity generated from the project will displace generation from older less efficient coal-fired plants. This will result in a net reduction in greenhouse gas emissions.

The use of these coal gases as a fuel in the coke production process, and for the production of heat for electricity generation, may assist the diversification of the state’s energy mix. The proponents believe it will facilitate the greater use of gas and renewables in energy production.

3.5 Water Reuse

The proposed use of recycled waste water supports the Government’s “smarter” use of the finite state resources strategy.

The project intends to be “smart” in its use of water. Studies will pursue the use of waste water (blowdown water) from the existing SPS and any new generation unit associated with the project as quenching water in the coke production process.

The use of such water may significantly reduce the project’s need to draw raw water from the Fitzroy River. The potential ability to use power station waste water streams, thereby significantly reducing water demand, was a significant issue in selecting the SEP as the project location. The coke plant does not produce waste water and hence has no waste water discharges to the environment.

3.6 Use of by Products

Coke and coal fines may be used for incorporation into the existing SPS coal feedstock or recycled back into the coke oven charge. The concept of briquetting the fines to produce an alternate value-added product will also be investigated.

3.7 Costs

3.7.1 Coke Oven Emissions

The proponents intend to apply the latest coke production technology and three stage gas combustion process to the project. However, while only the volatile gas component of the coal will be combusted there will still be some environmental outputs. As well as the combustion of the gas component of the coal a very minor portion of the coal is combusted incidental to the process. The resultant outputs are typical of a simple gas fired power station albeit with a small amount of particulate emissions. The proponents intend to quantify these outputs in the EIS and to develop management plans (where necessary) to address them.

3.7.2 Increased Demand on Infrastructure and Workforce

The project may also place increased demand pressure on the skilled labour pool in the region and on local utility and community services. The demand for bricklayers for oven construction will be substantial. The proponents intend to address these issues during the EIS process in consultation with the relevant stakeholders. The proponents note that these issues were successfully addressed through the EIS and consultation processes for the recent AMC project.

The project also calls for construction of new materials handling facilities and a new wharf at Fisherman's Landing at Gladstone. The demands on the labour pool at Gladstone to perform these activities are considered relatively small compared to other recent construction projects in the area. However, these impacts will be fully assessed as part of the EIS process.

3.7.3 Increase in Water Demand

It is envisaged that at full capacity the project may use up to 12,000Ml of raw water per year for coke quenching and steam condensing through a cooling tower. However, final demand projections for water consumption by the project will be determined in the EIS.

4.0 PROJECT DESCRIPTION

4.1 Alternative Project Locations

Project sites at Abbot Point, Gladstone and the SEP near Rockhampton have been evaluated to determine the most appropriate location for the project.
In the final analysis the following key issues determined the ultimate selection of the site:

- Capital cost;
- Materials handling;
- Access to suitable coking coal;
- Opportunities for heat usage;
- Labour availability;
- Port access;
- Availability of water; and
- Proximity to electricity transmission grid.

A summary of the salient assessment factors for each site is presented in Table 1.

Table 1. A Summary of Site Assessment Factors

Abbot Point	Gladstone	Stanwell Energy Park
- Limited number of operating coal sources. - Potential site approx. 8km from coal terminal. - Ability to utilise existing Ports Corporation Queensland terminal, financially constrained. - High capital cost for water supply. - Environmental sensitivity for sea water cooling. - Limited labour pool. - High capital cost of connection to the power grid.	- A number of potential sites but preferred site limited in area due to oil shale lease and topography. - Aldoga site large but will require trucking or rail to port. - Adequate water-low capital. - Access to coals on the Blackwater and Moura rail systems.	- Potential site adjacent to power plant-additional heat utilisation options. - Access to coals on Blackwater rail system. - Adequate water-low capital. - No competing land use. - Access to Rockhampton labour source, infrastructure and facilities. - Located between the coal fields and the port hence the rationalisation of rail usage. - Potential waste water streams available for use.

The SEP was selected as the preferred site for the coke and electricity generation plants. The Fisherman's Landing wharf is the preferred location for an export wharf for the coke product.

4.2 Project Components and Staging

4.2.1 Coke Plant

The coke plant is proposed to be constructed in two stages. The first stage is intended to produce 2.1Mt of coke and the second stage 1.1Mt.

It is envisaged that the coke plant, after completion of stage 2, would comprise approximately 640 coke ovens. Each oven would be 14.3m long and 3.7m wide. The plant is expected to require an area in the order of 100 hectares.

The coke plant will consist of banks of coke ovens (batteries). Each battery is serviced by a coke pusher and coal charging machine (PCM) that operates on the outside of the ovens. A flat bed hot coke receiving car operates on the inside of the battery. Each set of parallel oven banks is serviced by heat recovery boilers, water quenching towers and waste water collection, and dust suppression equipment.

4.2.2 Power Station

It is intended to construct appropriately sized power generation facilities, possibly up to 370MW, within the SEP. These facilities will consist of a stand alone power station (turbo alternator, condenser, cooling water pumps and a switchyard) or a combination of a stand alone power station and pipe work which would use some of the heat to generate additional electricity in the existing SPS. The electricity produced will be supplied to the grid and to the coke plant.

4.2.3 Raw Materials Storage and Handling

Coal will be delivered to the coke plant site via the existing SPS rail loop which is connected to the main Blackwater Rail System by a dedicated spur line approximately 1km long. The SPS loop is currently designed only to accommodate loaded trains entering the loop from the west and empty trains returning in the same direction. The proponents anticipate that the rail loop will need to be modified to enable trains to leave the SPS site turning east to the port.

It is estimated that based on an annual coal consumption of 5.0Mt for the coke project, and deliveries in standard Blackwater train consists, an additional 16 trains per week will be required.

Coal delivered to the existing SPS unloading hopper is proposed to be transferred to a new conveyor taking coal to an elevated stacking conveyor for discharging on to individual stockpiles. Coal is then reclaimed by front end loaders from the stockpiles into hoppers. A blended feed can then be conveyed to a surge bin which will be the interface with the coke plant coal charging system.

4.2.4 Coke Product Transport and Port Handling

It is proposed that coke will be railed 129km to a new wharf export facility at Fisherman’s Landing, between the Cement Australia (CA) and Comalco's new wharf at Gladstone. This area is depicted in Figure 5.

The current concept is for coke produced at the SEP site to be crushed to a top size limit of 100mm, screened to remove fines then loaded into standard Blackwater train consists of approximately 4,200 tonnes of coke. Coke fines generated at the site may be used in power station feedstock or recycled back into the coke oven charge. Queensland Rail and the proponents will investigate the most effective train consist for the process.

The coke will exit the loop in an easterly direction towards the Gladstone port. It is estimated that approximately 15 trains consists of 4,200 tonnes of coke will be required per week.

Once at Gladstone the coke will be discharged from trains via a new rail unloader to be constructed within the existing CA rail loop. A coke stockyard and reclaim facility will be constructed adjacent to the loop on land controlled by the Central Queensland Ports Authority (CQPA). The coke will then be conveyed to the new wharf and ship loader after being screened to remove fines generated during transport and handling. The fines may be sold to CA or other local markets as a fuel feedstock.

An agreement in principle has been reached with the CQPA to manage the process of unloading the trains, stockpiling the coke and loading vessels. The CQPA are well equipped to manage this process as they currently operate two coal loading facilities at Gladstone. These coal loading facilities handle almost 40Mt of coal per year and are operated under approved environmental management systems.

4.3 Coke Production Process

Coke will be produced utilising proven, state–of-the-art, heat recovery technology. There are several suppliers of this technology and they will be assessed as part of feasibility studies.

The production process commences with the loading of a bed of coal in each coke oven using the PCM equipment. The oven is sealed and the carbonisation process initiated. The coal bed absorbs heat from the refractory bricks and combustible volatile matter is liberated. A portion of the gas is then combusted at the top of the oven.

The partially combusted gas is then drawn down through vents within the oven walls to the bottom of the oven and further combusted with secondary air which is added via "sole flue dampers". The heat from this secondary combustion is used to carbonise the coal at the bottom of the coal bed.

This ensures that carbonisation takes place from top and bottom thereby adding to the efficiency of the operation. Completely oxidised flue gas is then drawn into the uptakes within the oven walls. The gases then exit the ovens via "uptakes" within the oven walls to uptake ducts where air is added to complete the combustion process.

The hot flue gas from each oven then enters a duct, common to a bank of ovens, which delivers the hot gas to the heat recovery boilers. The temperature of the flue gas in the tunnel is expected to be in the range 1,050 deg C to 1,300 deg C. A suction fan located down stream of the boilers draws the flue gases into the boilers or, if the option to use some of the heat in the existing power station is developed, the boiler water is heated and returned to the SPS.

The completeness of the combustion process and the negative pressure of the ovens, relative to atmosphere produced by the suction fan, results in the combustion of almost all the volatile gases. Virtually no hydrocarbons are emitted from the plant.

The produced coke is removed from the oven using a pusher car which engages the coke mass and pushes it onto the waiting flat bed quench car. The quench car then travels to the quenching tower where the coke is cooled by water. The water used for coke quenching mostly evaporates. This method of the coke oven coal charging and coke pushing limits coal and coke dust emissions. It therefore complements the benefits provided by the negative oven pressure in limiting air emissions.

The quenched coke moves to the coke wharf (coke storage facility) and is pushed onto the wharf from the quench car using a stationary coke pusher. Coke is then conveyed to a sizing plant and then to either a stockpile or directly to a train.

4.4 Process Inputs

4.4.1 Coal Supply

At the proposed maximum coke production level of 3.2Mt, the coke plant will consume up to an estimated 5.0Mt of wet coking coal annually. It is anticipated that this coal will be totally sourced from the Bowen Basin coal fields. It is anticipated that this need for coal will provide incentives for the development of new coal mines and/or the expansion of existing mines keen to take advantage of a secure, long-term and domestic supply contract.

Blast furnace operators prefer the lowest possible ash, sulphur and phosphorus and the highest possible strength for their coke. Based on this requirement, an indicative target coal blend is likely to be as described in Table 2 below.

Table 2. Indicative Target Blend Specifications

Total moisture (ar)	8.5%
Inherent moisture (ad)	1.5%
Ash (ad)	8.5%
Ash (db)	8.6%
Sulphur (ad)	0.5% (0.6% max)
Volatile matter (ad)	24% (range 22.5% - 26%)
Volatile matter (db)	24.4%
Phosphorus (ad)	0.06%
FSI	6.5 – 8.5
Vitrinite reflectance (Romax)	1.1% - 1.3%

4.4.2 Water Supply

Detailed water demand modelling will be undertaken as part of the EIS. However, at this stage the proponents envisage that the coke plant and power generation facilities may require up to an estimated 12,000Ml of cooling system makeup water and coke quenching water at maximum production levels. The proponents are considering drawing raw water from the current resource capacity of the Fitzroy River using the existing SPS system which could require additional pumping capacity along the water pipeline. As mentioned previously, the use of power station waste water streams will be considered as a source of coke quenching water. This offers the potential to significantly reduce the demand for raw water.

Raw water is supplied to the SPS holding dam, located 2km south-east of the station, by pipeline from the Laurel Bank take off point located on the Fitzroy River. The water is conveyed to the dam via a 19km long buried pipeline. The holding capacity of the dam is approximately 1,800Ml. A new pipeline is proposed to be constructed to take water from the holding dam to the coke plant and the new stand-alone power plant.

In addition, a small volume of demineralised water will be required for the plant. This will also be sourced from the existing power station system either from the SPS demineralised water system or through a new purpose built water treatment plant.

4.4.3 *Auxiliary Power Supply*

It is estimated that 13MW of power will be required for the operation of the coke plant service equipment, water pumps, fans, conveyor belts, lighting and air conditioning, for example. The primary supply will be sourced from SCL's generation facilities.

It is proposed that stand-by power will be sourced from the grid to guarantee continuous operation of the key elements of the coke plant. A stand-by arrangement may be entered into with Powerlink, Ergon or SCL.

4.5 Process Outputs

4.5.1 *Coke*

Based on preliminary coke oven performance data it is expected that the project will produce a maximum of 3.2Mt of coke at full capacity. The anticipated indicative quality of this coke is given in Table 3.

Table 3. Indicative Coke Quality (Lump Coke)

Total moisture (ar)	4.5%-6.5%
Ash (db)	11.2%
VM (db)	< 0.5%
Sulphur (60% to coke)	0.47%
Phosphorus	0.079%
CSR	approx 70
CRI	22 (+/- 1.5)
DI 150/15	85%
M40	84-85
M10	5.9-6

The above coke specification is indicative only and is yet to be confirmed in coking trials.

4.5.2 *Electricity*

The project will produce up to 370MW of high availability base load electricity for input to the National Electricity Market and to the coke plant. The electricity supplied to the market will be traded by SCL as part of its generation portfolio.

The source of energy for this electricity is the combustion of gas liberated from the coal during the coking process. Thus, the electricity produced will have greenhouse gas (CO_2/MWh) intensity typical of a simple gas fired generator.

4.6 Emissions Management

The expected emission levels from the heat recovery coke making process are significantly lower than conventional by-product coke oven emissions. This is based on preliminary information on the combustion process using Queensland coals. This is due to the nature of the coking process in which gaseous products are in part combusted at the top of the oven chamber in a negative pressure environment. The remaining uncombusted gases are then burned in two further stages to ensure virtually all hydrocarbons are consumed in a manner that reduces Nitrous Oxides (NO_x).

Nonetheless, potential emission sources for the coke plant are:

- Coal handling operations (particulates)
- Oven charging (particulates, Carbon Monoxide (CO), Volatile Organic Carbons (VOC))
- Oven pushing (Sulphur Dioxide (SO_2), particulates, NO_x, CO, VOC)
- Coke quenching (particulates)
- Waste gases exhaust stack (SO_2, NO_x, CO, VOC, particulates)
- Coke product handling (particulates)
- Internal roads (particulates).

A discussion on the possible need for treatment and mitigation measures is presented in Section 6.6 of this document.

4.7 Waste Management

The proponents intend to apply the principles of best practice industrial ecology to the design, construction and operation of both the coke plant and power generating facility to minimise wastes.

Stormwater runoff may contain some coke and coal fines. This water will be directed to settling ponds for disposal. The proponents will pursue the dewatering and reuse of the sludge as a fuel stock for the SPS.

Blowdown water from any new power station and the coke plant's heat recovery units may be reused. The proponents will pursue the reuse of this water as part of the project water supply.

Sewage generated by the project will be directed to the SPS system for treatment and disposal.

Miscellaneous chemical, oil, and general garbage will be disposed of using appropriate waste disposal systems and contractors.

4.8 Project Workforce and Housing

As indicated previously, it is probable that the project construction workforce will require an average of 1200 workers per year over the two year construction period for stage 1. The operational phase will involve some 300 full time equivalent workers once full production is reached. Of the full time workers, it is estimated that approximately 40 will be located at the port facility in Gladstone.

The construction workforce for the SEP component of the project is likely to be drawn in the first instance from the Rockhampton region. However, it is anticipated that additional labour from outside the region will be required.

It is anticipated that any necessary imported labour will be accommodated locally. The construction workforce for the Gladstone port site will more than likely be sourced from the resident labour pool. Imported workers will be housed in existing short-term accommodation in the Gladstone area.

At the operational phase it is probable that the bulk of the full time equivalent workforce will be privately housed in the Rockhampton and Gladstone region. Buses and private vehicles will be used to transport the workforce.

The final decision on accommodating the workforce will be subject to public consultation. The proponents do not perceive this to be a major hurdle given previous development activities of this scale at both Fisherman's Landing and the SEP.

4.9 Project Schedule

The current project schedule is outlined below in Table 4.

Table 4. Project Schedule

Key Tasks	Indicative Completion Dates
1. Technology Selection	January, 2005
2. Environmental Impact Statement	August, 2005
3. Detailed Feasibility Study	October, 2005
4. Final Project Approvals	December, 2005
5. First Coke (Stage 1)	October, 2007
6. Full Coke Production (Stage 1)	January, 2008

Note: If Stage 2 is considered feasible an allowance of an additional 12 to 18 months will be required.

4.10 Hazard and Safety Issues

The project will involve the normal hazards and safety risks commonly associated with the construction of industrial plant. Management of these risks during construction will be the responsibility of the engineering contractors engaged to carry out project construction. The contractor's ability to manage these risks will be a key factor in the contractor selection process.

All construction materials and practices will be in accordance with relevant Australian standards.

Project operational hazards will be identified as part of the detailed feasibility for the project. It is intended that a comprehensive hazard and operability study (HAZOP) will be undertaken. As a consequence safety features will be designed into the plant to address the identified risks where possible.

Given the relatively simple nature of the manufacturing process no major hazards are expected to be identified. It is expected that issues associated with the handling of hot coke, steam and the malfunction of coke ovens will be addressed in the EIS.

The development will comply with the requirements of the Queensland Workplace Health and Safety Act 1995 and associated regulations.

5.0 COMMUNITY CONSULTATION

5.1 Public Awareness and Communication Strategy

The proponents believe in the principles of good corporate citizenry in their business activities. Accordingly, the proponents view constructive stakeholder and community consultation processes as essential to the success and long-term viability of this project.

To this end, the community consultation component of the project is intended to be based on the guiding principles of proactive information sharing and relationship building with key stakeholders. Stakeholder participation in the development of the EIS is actively encouraged.

The consultation strategy will involve a number of key activities. The first key activity involves identifying stakeholders who may be impacted or have an interest in the project. These stakeholders may include landowners and citizens of communities, business and industry groups such as Chambers of Commerce and regional development organisations and non-government organisations such as environmental groups. Relevant agencies throughout the three tiers of government will also be extensively consulted as will elected government officials.

Another critical activity involves informing stakeholders about the project. This objective will be achieved through a range of initiatives including:

- Development of a dedicated project web site and fact sheets;
- Development and distribution of a project newsletter;
- Newspaper advertisements;
- Letterbox drops;
- Establishment of a community liaison group;
- Establishment of a project office in Rockhampton to distribute information and host visual displays of the project; and
- Establishment of an 1800 number for general enquiries.

These information sharing activities will be supported by a range of public information and discussion meetings in the community. It is envisaged that these will commence after the public announcement of the project to ensure stakeholder input at the earliest possible opportunity and be held at regular intervals, where practicable. In addition, stakeholders may also be consulted through one-on-one meetings.

6.0 POTENTIAL ENVIRONMENTAL IMPACTS

6.1 Introduction

The development areas within the SEP have been mostly cleared and are used for power station facilities and cattle grazing. It is intended that the proposed coke plant and associated power station will be located to the east and in close proximity to the existing power station between Brickworks Road and Power Station Road. A specific location within the Park for each facility has not yet been determined. Hence the following discussion provides information relative to the SEP in general. Figure 6 provides a graphical presentation of the SEP looking west to the SPS.

Figure 6. View of the SEP Land Looking West to the Stanwell Power Station

Source: Stanwell Corporation Limited

Substantial areas are preserved for open space and conservation purposes. A sizeable part of the SEP environment has already been disturbed by earthworks. The Stanwell plant site can be seen in Figure 7.

The proposed port site at Fisherman's Landing is to be established on reclaimed land and on disturbed land associated with the Cement Australia rail loop. No data on the existing environmental conditions at these locations is currently available. However, this will be assessed as part of the EIS

The information presented below on existing site conditions has been drawn from previous relevant environmental studies (refer section 9 for details).

6.2 Topography, Geology and Soils

6.2.1 Existing Environment

The geology of the area has been mapped by the Geological Survey of Queensland as part of the Rockhampton 1:250,000 Geological Series (sheet SF56-13) and the Port Clinton 1:250,000 Geological Series (Sheet SF56-9).

This mapping indicates the SEP site is underlain by rocks of the Stanwell Coal Measures, comprising Early Cretaceous mudstone, arenite, claystone and coal. Weathering in these rocks generally extends to depths of 8 to 10 m. Quaternary alluvium, comprising clay, silt, sand and gravel beds occurs on the floodplains of Neerkol and Quarry Creeks. Minor occurrences of colluvial and slopewash deposits have also been mapped within the SEP locality.

The terrain of the area comprises generally flat and locally stepped alluvial terraces adjacent to Neerkol and Quarry Creeks. It also includes undulating lands with low broadly rounded rises with slopes in the range 2-5% and gently inclined foot slopes and drainage flats with slopes mostly <2%. Flagstaff Hill is the main elevated area within the SEP and exhibits foot slopes of 5-15% and steep to very steep midslopes and escarpments.

The main soil types evident are:

- Uniform or gradational coarse to medium textured (sandy to loamy) alluvial soils along the creeks;
- Loamy surface duplex soils with medium to heavy sodic clay subsoils and dark-coloured uniform (cracking) clays on the alluvial backplains and higher alluvial terraces;
- Coarse clayey gravels and gravelly (sodic) duplex soils, and cracking clays on the ridge slopes;
- Sandy to loamy surface reddish brown and brown (non-sodic) duplex soils and gradational structured reddish brown earthy soils on the undulating plains and footslopes;
- Loamy surface yellow mottled duplex soils on some near level to erosional footslopes and drainage flats; and
- Gravelly loams and shallow lithosols, in rocky outcrop areas and steeper slopes.

6.2.2 Potential Effects and Mitigation

The majority of the locality's soils are erosion prone exhibiting high to moderate erosion potential ratings. Further, approximately a third of the area's soils are dispersive. Dispersive soils may erode if exposed and left unprotected. Erosion control measures will be put in place to control erosion.

The land capability of the majority of the area's soils is marginal for cropping use. However, it is suitable for improved or native pasture. As part of the site earthworks, topsoil will be stripped separately and stored for later use in site rehabilitation. Most of the topsoil is suitable for rehabilitation uses.

6.3 Hydrology and Water Quality

6.3.1 Existing Environment

(a) Surface Water

The SEP is located within the Neerkol Creek catchment which is a subcatchment of the Fitzroy River. Quarry Creek is a tributary of Neerkol Creek. The Neerkol Creek catchment has an area of 625 sq km, and drains the Native Cat Range, Westwood and Mount Morgan. It flows to the Fitzroy River floodplain to the north-east. Upstream of its confluence with Quarry Creek, Neerkol Creek is ephemeral. Continuous flow in Neerkol Creek in areas downstream of the SPS is due to the 3-4 Ml/day discharge into Quarry Creek from the power station. The power station is licensed by the Environmental Protection Agency (EPA) to discharge up to 18Ml/day of water from its northern stormwater dam into Quarry Creek.

Development areas within the vicinity of the SPS are not generally prone to flood inundation. Substantial flow in creeks in the area is generally of a short duration.

The SPS monitors water quality both upstream and downstream of the proposed plant site locality. The data shows that the conductivity upstream of the power station discharge is significantly higher and subject to greater variations than the conductivity downstream of the power station where continuous flow occurs. The higher concentrations and higher fluctuations in conductivity are common for ephemeral creek systems. Downstream of the power station, conductivity concentrations average 1,900 µS/cm. Mean pH and dissolved oxygen levels are within Australian and New Zealand Environment and Conservation Council (ANZECC) guidelines.

(b) Groundwater

The main aquifers at the SEP are associated with the alluvial deposits of Stony, Neerkol and Quarry Creeks and with the Stanwell Coal Measures. Groundwater is used locally primarily for livestock watering and irrigation purposes. The groundwater has a high salinity making it marginal for drinking purposes.

6.3.2 Potential Effects and Mitigation

(a) Surface Water

During construction of the plant, potential impacts on receiving water quality may include increased levels of suspended solids and turbidity associated with stormwater runoff entraining sediments by coming into contact with bare or disturbed ground surfaces, or by the action of runoff on erosion-prone soils.

Measures will be put in place to manage erosion and the discharge of sediment into waterways. Such measures include:

- Installation of sediment containment measures such as sediment dams, silt traps, silt fences and hay bales;
- Minimal clearing at any one time;
- Prompt revegetation of any cleared areas;
- Covering and/or wind-rowing of soil stockpiles; and
- Diversion of clean run-off away from any disturbed areas.

In addition, the drainage systems for the plant area will treat stormwater runoff as necessary from the disturbed areas prior to discharge off-site.

During the operational phase of the project there will be some blowdown water generated. Subject to EPA approval cooling system blowdown will be added to the existing power station system for treatment and subsequent discharge to Quarry Creek in accordance with existing EPA discharge licence conditions. The coke plant's dirty stormwater runoff and residual water from the coke quenching process will be collected and sent to the existing power station settlement ponds or new settlement ponds will be constructed to remove coal and coke fines prior to water discharge.

As a result, it is expected that water quality in the Neerkol Creek system will not be substantially changed by the project.

(b) Groundwater

Groundwater removal to assist in foundation excavation is not anticipated during the construction phase. In the unlikely event that some dewatering is required, the groundwater would not be discharged to the local drainage system but would be used for dust control and/or rehabilitation. As there will be no use of groundwater for the operational phase, there will be no interference with the existing groundwater resources and no direct impact on the local groundwater flow regime.

6.4 Ecological Values

6.4.1 Terrestrial Ecology

(a) Flora

(i) Existing Environment

Vegetation in the plant site locality predominantly consists of grassland and shrubland regrowth. Of the remnant vegetation, the major vegetation communities are:

- Narrow-leaved Ironbark (Eucalyptus crebra) Woodland/Open Woodland;
- Narrow-leaved Ironbark (Eucalyptus crebra) with Rosewood (Acacia rhodoxylon) Open Forest/ Woodland;

- Narrow-leaved Ironbark (Eucalyptus crebra)/ Silver-leaved Ironbark (Eucaluptus Melanophloia)/ Gum-Topped Bloodwood (Corgmbra erythrophloia) Woodland
- Ridgeline Narrow-leaved Ironbark (Eucalyptus crebra)/ Queensland Peppermint (Eucalyptus exserta) Woodland/Open Forest;
- Poplar Box (Eucalyptus populnea)/ Narrowleaved Ironbark (Eucalyptus crebra) Open Forest/Woodland;
- Mixed Eucalypt (Eucalyptus populnea/ Eucalyptus teriticornis/Corymbia tessellaris/ Eucalyptus crebra) Open Forest;
- Forest Red Gum (Eucalyptus teriticornis)/ Ironbox (Eucalyptus raveretiana) Riparian Forest;
- Forest Red Gum (Eucalyptus teriticornis)/ Moreton Bay Ash (Corymbia tessellaris) Woodland/Open Forest;
- Pastoral Grassland;
- Shrubland Regrowth;
- Cultivated Land;
- Semi-Evergreen Vine Thicket; and
- Coolabah (Eucalyptus coolabah) Open Forest Woodland.

Of the above communities, the Semi-evergreen Vine Thicket, is considered to be an “endangered” regional ecosystem by the Queensland Herbarium.

Two of the communities - Forest Red Gum (Eucalyptus teriticornis)/ Ironbox (Eucalyptus raveretiana) Riparian Forest and Forest Red Gum (Eucalyptus teriticornis)/ Moreton Bay Ash (Corymbia tessellaris) Woodland/Open Forest – are classed as an “of concern” regional ecosystem. The remainder of the communities are “not of concern” regional ecosystems.

One species - Eucalyptus raveretiana (schedule 3, vulnerable) - is considered threatened at the State level and is subject to special provisions under the *Nature Conservation Regulation, 1994*. This species also carries the same listing under the provisions of Schedule 2 of the Commonwealth’s *Endangered Species Protection Act, 1992.* It is typically associated with communities fringing creeks and rivers and occurs in the Riparian Forest vegetation community (Forest Red Gum / Ironbox).

(ii) Potential Effects and Mitigation

The construction of the coke plant and power station will result in the clearance of all existing vegetation over the selected construction sites. However, the “endangered” semi-evergreen vine scrub community should not be affected as it is situated on Flagstaff Hill. It is not known at this stage of the project if the development will affect the riparian forest community.

(b) Fauna

(i) Existing Environment

Previous studies indicate that the vegetation communities described above support a relatively high number of fauna species. In particular, the numbers of amphibians, birds and mammals were high but the number of ground mammal fauna was low. Six bird species previously recorded in the study area are listed under the *Nature Conservation Act 1992*, and the *Nature Conservation (Wildlife) Regulation 1994* as either Threatened or Significant. Several species are also listed under the Commonwealth's *Endangered Species Protection Act 1992.*

(ii) Potential Effects and Mitigation

The habitat of the SEP area supports only one species (Squatter Pigeon) which is listed as "threatened" under State and Commonwealth legislation. This species is relatively common in central Queensland with large areas of suitable Woodland habitat. It is considered that the potential loss of habitat occasioned by the project's construction will not have any significant effect on local populations of this species in the region. The remaining species covered by relevant legislation are wide ranging species and are unlikely to be impacted on by the loss of the vegetation to be cleared by this project. It is intended that natural bushland in plant vegetation buffer areas will be managed to continue to support populations of existing species.

6.5 Noise

6.5.1 Existing Environment

Within the study area, there are several existing noise sources which influence the existing ambient noise levels. The major existing noise sources include:

- The Capricorn Highway;
- The existing railway line;
- Stanwell Power Station;
- The local road network;
- Bird and animal noise sources; and
- Localised noise sources associated with human occupation.

Previous background noise level monitoring in the locality has indicated that the background noise level at a residential receptor some 850m from the possible project site area was about 35 dB(A) at night. During the day the background noise level typically increased to 40 dB(A) to 42 dB(A).

6.5.2 Potential Effects and Mitigation

The coke plant and power station will have noise sources including conveyors, machinery, mobile equipment, pumps, motors, fans, compressors and cooling towers.

To manage potential noise effects, noise controls will be installed on all significant noise sources. This would include locating noisy equipment in enclosures and positioning enclosures and buildings close to noise sources to act as screens.

Following commissioning it is intended to carry out a noise survey at the nearest residences to confirm noise emissions meet the *Environmental Protection (Noise) Policy 1997* guidelines.

Construction noise is expected to comply with relevant EPA standards.

Road and railway noise levels generated by the project should be similar to the existing situation and be within current noise level goals. The frequency of rail noise emissions, however, will increase given the substantially higher frequency of train movements that will occur.

6.6 Air Quality

6.6.1 Existing Environment

Existing meteorological and air quality conditions at the SEP have been monitored for some time by the SPS. All measured air quality parameters are well below the relevant Queensland air quality guidelines and those put forward in the National Environment Protection Measure (NEPM) adopted by the National Environment Protection Council for major urban population centres in Australia.

6.6.2 Potential Effects and Mitigation

During the construction phase the principal emissions will be dust from activities such as ground clearing, road making, levelling and building activities. Such emissions will be controlled by watering and by limiting the area of disturbed surfaces at any one time.

During the operational phase, the coke plant will generate a number of air emissions. Those with potential environmental impact are particulates, sulphur dioxide, nitrogen oxides, carbon monoxide, gaseous hazardous air pollutants (eg. benzene, PAH, phenol), and volatile organic compounds.

Potential emission sources for the coke plant are:

- Coal handling operations (particulates)
- Oven charging (particulates, CO, VOC)
- Oven pushing (SO_2, particulates, NO_x, CO, VOC)
- Coke quenching (particulates)
- Waste gases exhaust stack (SO_2, NO_x, CO, VOC, particulates)

- Coke product handling (particulates)
- Internal roads (particulates).

The emissions from oven pushing and coke quenching operations, and gases directed to the waste gases exhaust stack, may be collected and treated to reduce pollutant loads if this proves necessary. At the present time it is understood that emissions from these sources will not be of sufficient magnitude to warrant capture and treatment. It is proposed to undertake pollutant dispersion modelling once combustion emission data are available. This is to assess the effect of release of gaseous and particulate emissions to the atmosphere and to confirm the need or otherwise for treatment of emissions.

In addition to the above-mentioned emissions, the combustion process will produce carbon dioxide emissions. Studies of potential plant emissions from new heat recovery coke plants being built in Brazil and the United States of America suggest that CO_2 production from this technology will be 50% less than that resulting from coal combustion in a conventional coal fired power station. Hence the proponents understand that CO_2 emissions will be consistent with a simple gas-fired power station.

Dust originating from coal and coke handling operations may be reduced by the use of covered conveyors and dust suppression water sprays.

6.7 Socio-economic Issues

6.7.1 Existing Environment

The Rockhampton and Gladstone workforces contain many of the skills needed for the construction and operation of the project. The availability of such workers for employment on the project is likely to be limited as many are currently gainfully employed. Past experience with the SPS project suggests that some 30% of the workforce will come from the local labour pool and that the remainder will be newcomers to the community.

Both the Gladstone and Rockhampton communities contain a wide range of community facilities and services. The ability of such facilities and services to accommodate increased demand will be studied as part of the project. Mitigating actions will be developed and implemented where appropriate.

6.7.2 Potential Effects and Mitigation

The construction and operation of the project will promote both direct and indirect employment and business opportunities in both project locations. As indicated above, given previous experience a large percentage of the construction and operational workforces (and their families) may be sourced from outside the Rockhampton and Gladstone areas.

This outsourcing will create a demand for housing, goods and services and government facilities and services. The EIS will assess the effects of this additional demand for housing and services and identify measures to overcome supply problems. Previous studies on similar sized industrial projects in the region have provided solutions to accommodation, transport and demand on infrastructure which were acceptable to stakeholders. The proponents intend to build on this previous work.

6.8 Transport and Infrastructure

6.8.1 Existing Provision

Both the coke plant and port facility locations are well serviced by road and rail. As discussed above, rail will be used for the transport of coal to the site, and for the transport of coke to the port for export. Good road access is available to both locations and is capable of handling the transport of heavy construction material loads to each site as well as workforce transport.

Each site can be provided with access to the normal range of utility services as they are available in close proximity to each site.

6.8.2 Potential Effects and Mitigation

Project engineering studies to date have not identified any substantive impediments to the transport of construction materials, raw materials or product or the provision of utility services.

6.9 Cultural Heritage Issues

6.9.1 Existing Environment

Two cultural heritage surveys of the SEP area have been previously undertaken by the Darumbal Noolar Murree Aboriginal Corporation for Land and Culture (DNMACLC) in 1999. The findings of these surveys, together with other studies of the area, indicate that the only cultural material in the area is likely to take the form of stone artefacts as scatters or isolated finds. The 1999 surveys revealed the presence of two large areas and one smaller area containing concentrations of Aboriginal cultural material. The two larger areas were located at the northern and southern ends of Flagstaff Hill. Both of these areas have been substantially impacted upon by previous land use activities.

The smaller area of Aboriginal cultural material exists on the SPS site. It has also been impacted by past land use. It is understood that there are several areas which have the potential to contain unrecorded cultural material within the SEP that have not been surveyed in the past.

6.9.2 Potential Effects and Mitigation

As the SEP site is known to contain Aboriginal cultural heritage material, the project proposes to undertake further cultural heritage investigations in association with the traditional owners to determine if further heritage sites exist in the SEP. These investigations will target areas not previously surveyed and not disturbed by previous construction activities.

It is proposed that a Cultural Heritage Management Plan will be prepared for the project in accordance with the requirements of the *Aboriginal Cultural Heritage Act 2003*. This Plan will provide the basis for the management of Aboriginal cultural heritage issues in the project's zone of influence.

6.10 Visual Environment

The visual character of the SEP locality is created by the lightly timbered Flagstaff Hill. This includes open space and infrastructure associated with the power station, timbered hills which are retained by the SPS as an environmental buffer to the south and agricultural land uses including rural residential properties to the north.

Owing to the size of the various elements and the character of the local setting dominated by SPS the visual effect of the new coke plant and power station would be minimal. The project constitutes an addition to an already established industrial landscape.

It is proposed that site landscaping will be employed in the detailed project design to screen the plant from public viewing points as much as is practicable. In addition, plant colours will be selected to assist the development to blend into its visual setting. Highly reflective and bright colours will be avoided, unless required for plant operational or safety purposes.

7.0 ENVIRONMENTAL MANAGEMENT

The proponents are committed to best practice environmental management. Their approach is to design, construct and operate the project to minimise the project's environment impact.

The project currently proposes to implement an Environmental Management System consistent with the approach outlined in relevant Australian Standards.

It is intended that an integral component of the management system will involve the preparation and implementation of a number of environmental management plans, particularly in relation to:

- Ground and surface water;
- Flora and fauna;
- Air quality (including greenhouse gases);
- Noise;
- Waste management;
- Infrastructure, workplace and health issues;
- Cultural heritage;
- Health and safety matters.

It is envisaged that the environmental management plans for each of the above issues will cover performance, monitoring, reporting, remedial actions, and continuous improvement strategies.

8.0 PROJECT APPROVALS

8.1 State and Local Government Approvals

The proponents are seeking to have the project declared a "significant project" under the SDPWOA 1971. If it is declared as a "significant project" under this Act, the DSDI would manage the EIS process on behalf of the Coordinator-General in accordance with the Act. The process concludes when the Coordinator-General evaluates the EIS, public submissions and other relevant material and prepares a report. The Coordinator-General provides a report and this is made available to the public, the proponent, relevant Government Departments and Local Authorities.

The SEP is owned by SCL and is located in the Fitzroy Shire. The SEP site has some covenants which determine land use and these will be subject to negotiations should it be the preferred site to locate the coke plant. In addition to the Coordinator-General's environmental evaluation, development approval under the *Integrated Planning Act* (IPA) *1997* will be required from the Fitzroy and Calliope Shire Councils with respect to a Material Change of Use, building, plumbing and drainage, operational works, and subdivision (if required).

Approval to undertake an Environmentally Relevant Activity (ERA) 74 (stockpiling, loading and unloading goods in bulk) will be necessary to enable this activity to be undertaken at the Fisherman's Landing site.

Approvals under the *Environmental Protection Act 1994, Vegetation Management Act 1999, Water Act 2000, Nature Conservation Act 1992, Fisheries Act 1994* and *Aboriginal Cultural Heritage Act 2003* are also likely to be required.

8.2 Commonwealth Approvals

Under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC) the project will require Commonwealth approval if the project is shown to have a significant impact on matters of national environmental significance. In this instance, the development might trigger this Act in respect of listed threatened species or communities previously identified on the site.

The CQPA has advised that development in the Fisherman's Landing port area is not considered by the Department of Environment and Heritage to be a controlled action under the EPBC Act.

With respect to the construction and operation of the coke handling, storage and transport facilities at the port, however, there may be a potential for stormwater runoff, material spills, and dust to affect the Commonwealth marine environment or the Great Barrier Reef World Heritage Area. It is proposed to submit a referral to the Department of Environment and Heritage to determine if the project's port activities constitute a controlled action under the EPBC Act.

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10.0 GLOSSARY

Ash: Inorganic residue after incineration of coal.

Blast furnace: The receptacle for iron ore, coke and other raw materials used in the processing of iron ore into pig iron. Pig iron is subsequently processed into steel.

Blends: A mixture of 2 or more coal types or brands. In the case of coke making, blending provides the manufacturer with the potential to mix lower cost poorer coking coals with higher cost hard coking coals and thereby reduce the overall cost of the coke oven feed.

Breeze: Coke fines generated during handling and screening, generally less than 5mm.

By-product coke oven: Produces coke, liquid and gaseous by- products. This type of oven is typically used in integrated steel production.

Carbonisation: The process of converting coking coal into coke.

Coke making: Coke is produced by heating coal in the absence of air resulting in the “carbonisation” of the coal. During the process the volatile components of the coal(s) are driven off. Heating temperatures are generally of the order of 1,100 to 1,200 degrees C and the heating time can vary from 2 to 4 days depending on the coke making technology employed.

Carbonisation results in a product which differs both physically and chemically from the coal. Two major groupings of the products can be made depending on their physical or molecular structure. They are chars and coke. Chars are formed when the coal that is carbonised shows little or no viscosity during the carbonisation process and the charred material shrinks. The so called “inert” components of coals react in this way. If the coal develops plasticity during carbonisation then the characteristic vesicular structure of coke is formed. The reactive components of the coal (generally the vitrinite and semi-fusinite components) typically react in this way. The texture (and strength) of the walls of the vesicles is generally related to the rank and type (proportion of reactive and inert components and thermal history) of the coal.

In simple terms, the strength of coke produced is influenced by the proportion of reactives and inerts in the coal and the rank of the coal, just as concrete strength is influenced by the ratio of cement and aggregate.

Coke making technology can be placed into the following categories.

- Non-recovery coke ovens where the only product is coke. Typically these are based on the original beehive configuration but modern versions are generally cleaner and more efficient.
- Heat recovery coke ovens which produce coke and utilise waste heat for steam raising for power and industrial applications.
- By-product ovens which produce coke and a range of chemical and gaseous products. This type of coke production is generally associated with an integrated steel plant and comprise slot oven configuration.

Carbon content: The amount of carbon in coal.

Coke: The end product of the carbonisation of coal. Coke products can be categorised as sized coke (includes coke of 25 x 100mm for blast furnace use and foundry coke at +100mm) and coke fines (breeze), produced from the screening and handling of coke.

Coke oven: Compartments into which coking coal is charged and subsequently heated to about 1,100 to 1,200 degrees Celsius.

Coke strength indices: The cold strength of metallurgical coke is traditionally determined by subjecting a standard sample of coke to a standard mechanical action in a rotating drum. The strength indices quoted reflect the degree to which the coke is degraded by this mechanical action.

Coking coal: Coal that is used in the production of metallurgical coke.

Crude steel: The molten end product after the processing of pig iron in steel making furnaces to remove excess carbon. Steel making furnaces comprise basic oxygen furnaces, electric arc (EAF) furnaces and open-hearth furnaces.

CSR: Mechanical test conducted on coke lumps in a heated environment designed to simulate the blast furnace environments. Coke is sized after tumbling and an index determined based on amount of coke retained at a specified screen size. The higher the index, the stronger the coke.

Effective capacity: The maximum production possible under normal working conditions.

EPBC Act: Commonwealth *Environment Protection and Biodiversity Conservation Act 1999.*

FGD plant: Flue gas desulphurisation utilising lime slurry. The slurry is atomised and reacts with SO2. Fabric filters remove the FGD dust. By-products include calcium sulphite, calcium sulphate and un-reacted lime.

Hard coking coal: Coals which make hard coke when carbonised in the coke oven.

Heat recovery coke oven: Process for making coke and collecting heat to generate steam for power generation and other industrial applications. By products from the carbonisation process are combusted in the top of the ovens.

HRSG: Heat recovery steam generator.

IAS: Initial Advice Statement as defined by the Queensland *State Development and Public Works Organisation Act 1971.*

Integrated steel making: The steel making process ranging from the production of pig iron in a blast furnace through to the making of steel in a basic oxygen furnace. It is normally assumed that coke production forms part of an integrated process.

kt: Thousands of tonnes.

Merchant coke works: A coke works which sells its products to a variety of markets unlike an integrated coke works which is attached to a steel plant and produces coke mainly for its own use.

Metallurgical coal: Coals, which are consumed in the production of pig iron, either via the coke oven process, direct injection (PCI) or by direct reduction.

Mt: Million tonnes.

Mtpa: Million tonnes per annum.

Non recovery coke oven: As for heat recovery coke oven but without the facility to collect and utilise waste heat.

Panamax vessel: Vessel capable of carrying about 60,000t of coal or about 40,000t of coke.

PCI coal: Coals, which are suitable for direct injection into the blast furnace in a pulverised state. PCI replaces oil and displaces some quantity of coke. Traditionally, the PCI coal price is closely linked to thermal coal which will allow the blast furnace operator to reduce the overall cost of raw material by reducing the volume of coke needed to produce each tonne of hot metal.

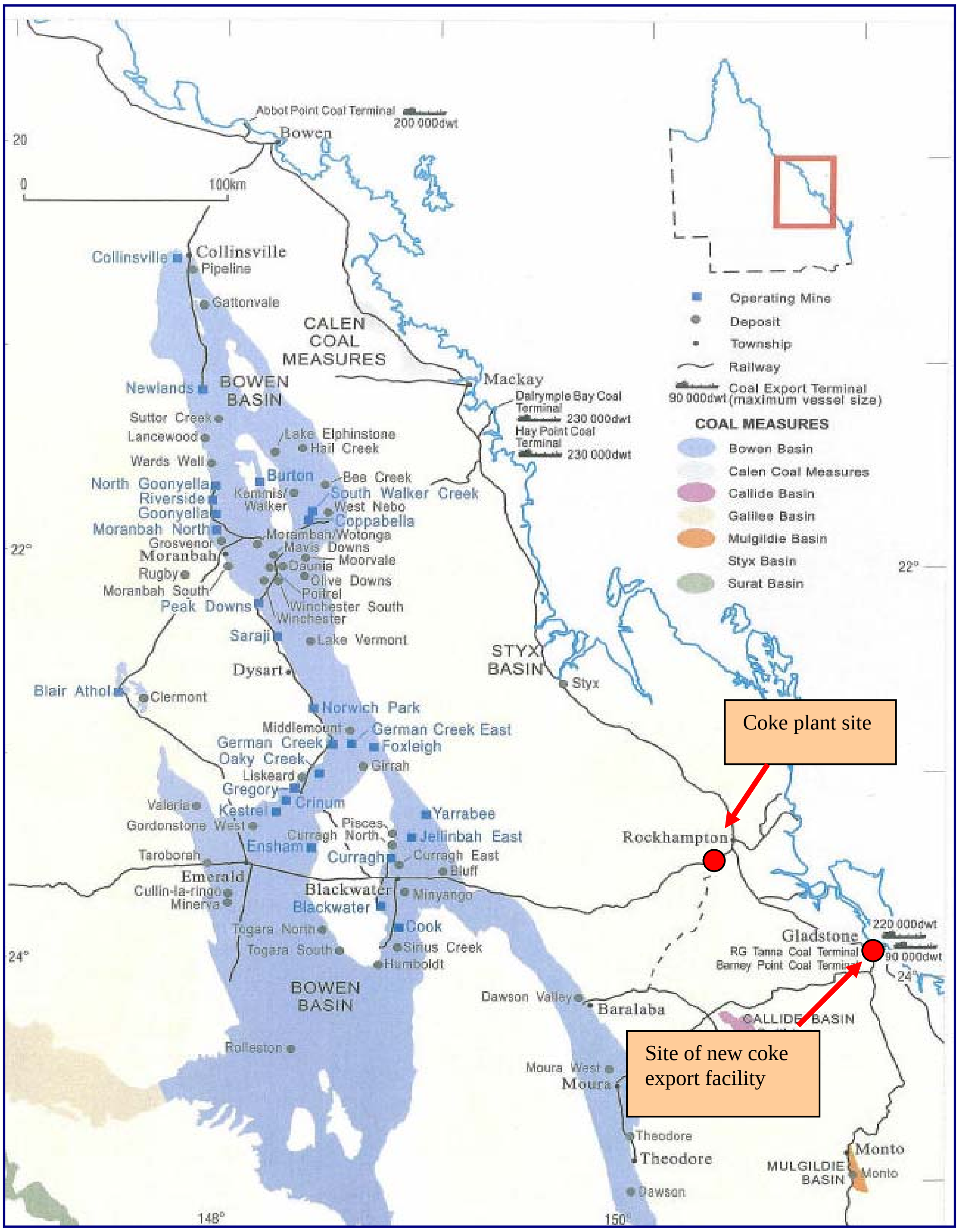
Sulphur: A chemical impurity which carries over into blast furnace hot metal and results in deleterious mechanical properties of steel.

Specific energy: The energy in kilocalories released per kg of coal burned.

Sensible Heat: Is defined as the heat energy stored in a substance as a result of an increase in temperature.

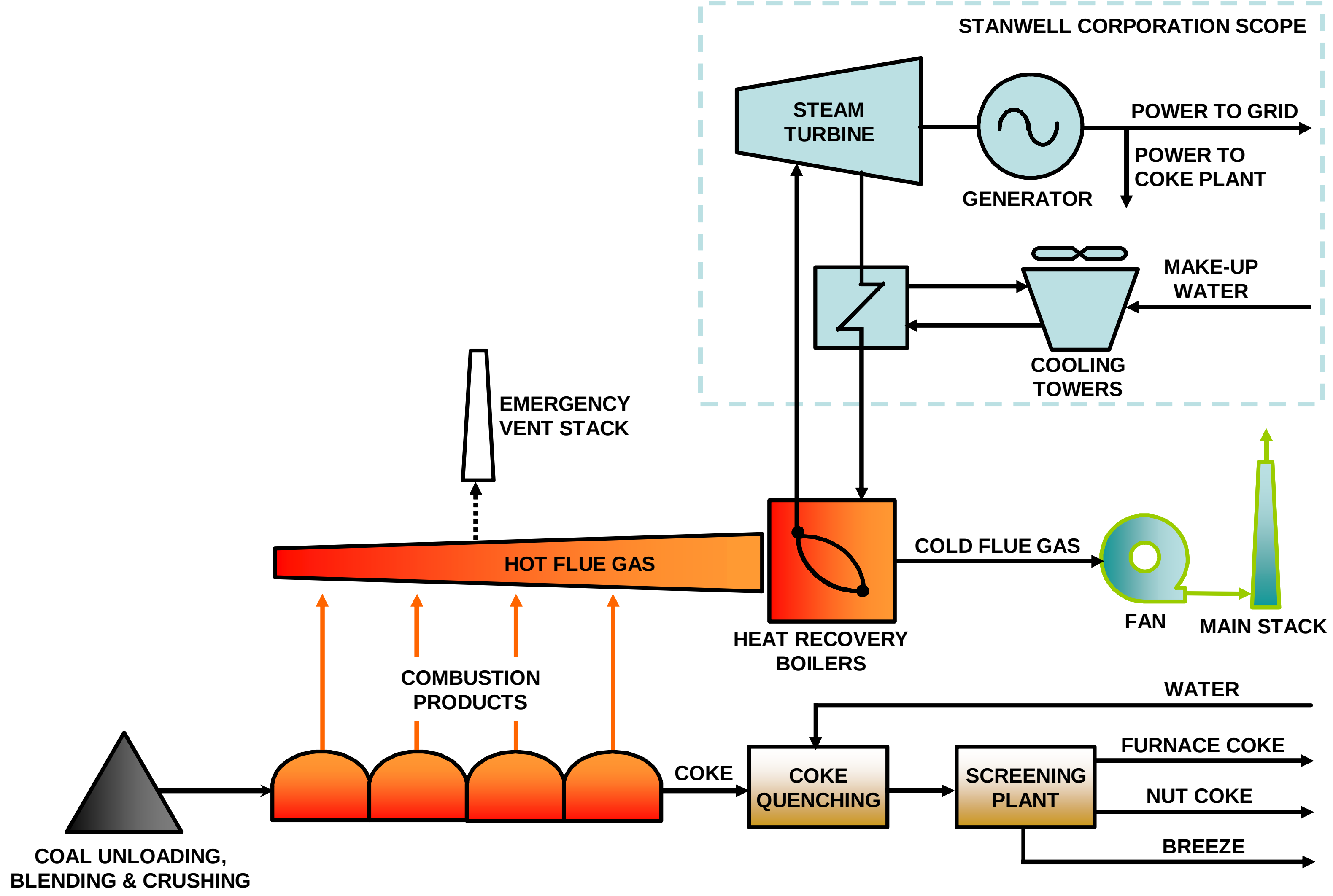
VM (volatile matter): The percentage of coal which is lost as volatile matter (gases) when coal is incinerated under standard conditions.

Figure 3: Proposed Project Site Locations



Map source: Queensland Government Natural Resources and Mines

Figure 4: Coke Power Project Simplified Process

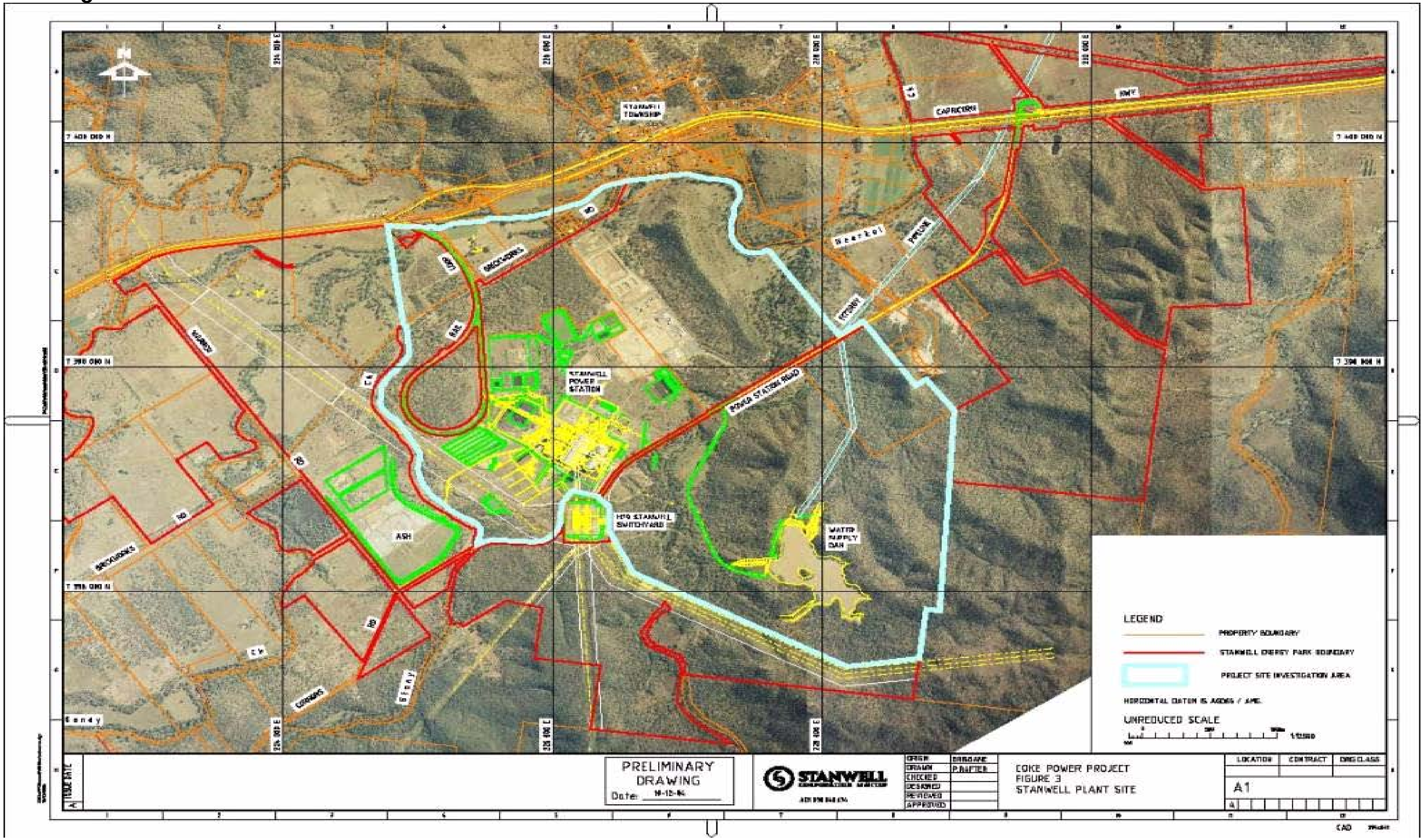


Source: Modified from Suncoke coke plant schematic, Seminar on Iron Ore Reduction

Figure 5: Gladstone Port Site

Source: Central Queensland Port Authority

Figure 7: Stanwell Power Plant Site



Source: Stanwell Corporation Limited