Kwinana Combined Cycle Power Plant

Perth Energy Pty Ltd

Report and recommendations
of the Environmental Protection Authority

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Contents

1. Introduction and background

This report provides the advice and recommendations of the Environmental Protection Authority (EPA) to the Minister for the Environment and Heritage on the environmental factors relevant to the proposal by Perth Energy Pty Ltd to construct, operate, and maintain a 120MW combined cycle gas turbine (CCGT) power plant on a site located in Kwinana, Western Australia.

The CCGT power plant has been proposed by the proponent in response to a demand for an independent, cleaner, more efficient and cost competitive energy supply. The proposed power plant will generate and sell electricity into the electricity market, which will include all customers with an average load greater than 300MWhr per year (average load of 34kW) from 1 January 2003.

Based on the information provided in referral document the EPA considered that, while the proposal has the potential to affect the environment, it could be readily managed to meet the EPA's environmental objectives. Consequently, it was notified in the *West Australian* newspaper on 2 December 2002 that the EPA intended to assess the proposal at the level of Assessment on Referral Information (ARI).

The proponent has submitted a referral document setting out the details of the proposal, potential environmental impacts and appropriate commitments to manage those impacts. The referral documentation can be viewed on the proponent's website at www.perthenergy.com.au. The EPA considers that the proposal as described can be managed in an acceptable manner, subject to these commitments and the EPA's recommended conditions being made legally binding.

The EPA has therefore determined under Section 40(1) of the Environmental Protection Act that the level of assessment for the proposal is Assessment on Referral Information, and this report provides the EPA advice and recommendations in accordance with Section 44(1).

2. The proposal

Perth Energy Pty Ltd proposes to construct, operate, and maintain a natural gas fired combined cycle gas turbine (CCGT) power plant with a nominal generation capacity of 120 megawatts (MW) on a site located at Part Lot 131 Mason Road, on the south-western corner of Donaldson Road and Burton Place, off Mason Road, Kwinana (Figures 1, 2, and 3). The plant will provide approximately 1,045 gigawatt hours (GWhr) of electricity annually into the South West Interconnected System (SWIS) electricity market.

The main components of the CCGT power plant will be:

- two natural gas fired 40MW turbine generator units;
- two heat recovery steam generators (HRSGs);
- one 40MW steam turbine and generator unit;

- condenser;
- four mechanical draft water cooling towers;
- water treatment plant to produce demineralised water;
- transformers and switch yard; and
- administration, control room, warehouse and workshop buildings.

A detailed description of the proposal can be found in the proponent's referral document (ENVIRON Australia Pty Ltd, 2002). The main characteristics of the proposal are summarised in the Table 1 below.

Table 1: Key proposal characteristics

Element	Description
Project purpose	To produce electricity to supply to contestable customers on the SWIS grid in an efficient manner
Life of the Project	25 years
Power Generating Capacity	120MW nominal
Facility footprint Site area	1.8 hectares 3.6 hectares
Natural gas pipeline: Source Length Diameter Pressure	 DBNGP (adjacent block to east of site) or the Parmelia Pipeline (35m south-east of site) Approximately 250m from supply point (responsibility of supplier) 152.4mm nominal Approximately 3MPa from the metering skid
Plant facilities: No. and size of gas turbines No. and size of steam turbines No. of stacks Height of stacks No. of cooling towers No. of liquid fuel tanks Transmission line length	 2 x 40MW nominal 1 x 40MW nominal 2 heat recovery steam generator stacks and 2 (optional) Bypass stacks 25m 4 1 x 10,000L tank (optional - for emergency start up) Approximately 500m (responsibility of Western Power Networks)
Plant operation	Baseload
Water Source	Water Corporation Kwinana Wastewater Recycling Plant (KWRP)
Emergency discharge evaporation ponds	Designed to hold up to three days of wastewater discharge. Lined with HDPE.
Vegetation disturbance	Negligible - already cleared
Estimated off-site individual risk level	Negligible increase to existing off-site risk due to low inherent risk and short length of gas pipeline
Construction period	18 months
Operating Hours	24 hours/day 351 days/year.
INPUTS	
Natural gas	204 million m^3/yr (Higher heating value 8.4PJ/yr)
Cooling water	1,053ML/yr
Water to demineralisation plant	28ML/yr
General water	1ML/yr, inclusive of domestic, cleaning/wash down, landscape, reticulation etc.
OUTPUTS	
Wastewater	35ML/yr (100kL/day) returned to the Cape Peron Outlet Pipeline (currently being negotiated) with emergency backup discharge to on-site evaporation ponds.

Source: Modified version of Table 1 of the referral document (ENVIRON Australia Pty Ltd, 2002)

Table 1: Key proposal characteristics (Continued)

Element	Description
Solid waste	Minimal - approximately 5tpa disposed of to an approved landfill site.
Air emissions: Oxides of nitrogen (NO_X) Sulphur dioxide (SO_2) Particulate matter Carbon dioxide (CO_2) Carbon monoxide (CO) Polycyclic aromatic hydrocarbons (PAHs) Non-methane volatile organic compounds (NMVOCs)	 327tpa (10.9g/s) (<25ppmv, dry, 15% O_2) 0.54tpa (0.018g/s) 9.6tpa 410,780tpa 49.5tpa 0.003tpa 0.3tpa
Predicted noise at closest residences: Hope Valley Medina	 Less than 40dB(A) - "not significantly contributing" Less than 35dB(A) - "not significantly contributing"

Source: Modified version of Table 1 of the referral document (ENVIRON Australia Pty Ltd, 2002)

Abbreviations for Table 1:

dB(A)	decibels (A weighted)
DBNGP	Dampier to Bunbury Natural Gas Pipeline
g/s	grams per second
HDPE	high density polyethylene
KL/day	kilolitres per day
KL/yr	kilolitres per year
L	litres
m	metres
m^3/yr	cubic metres per year
mm	millimetres
MW	megawatts
ML/yr	megalitres per year
MPa	megapascals
O_2	oxygen
PJ/yr	petajoules per year
ppmv	parts per million by volume
SWIS	South West Interconnected System
tpa	tonnes per annum

The potential impacts of the proposal are discussed by the proponent in the referral document (ENVIRON Australia Pty Ltd, 2002).

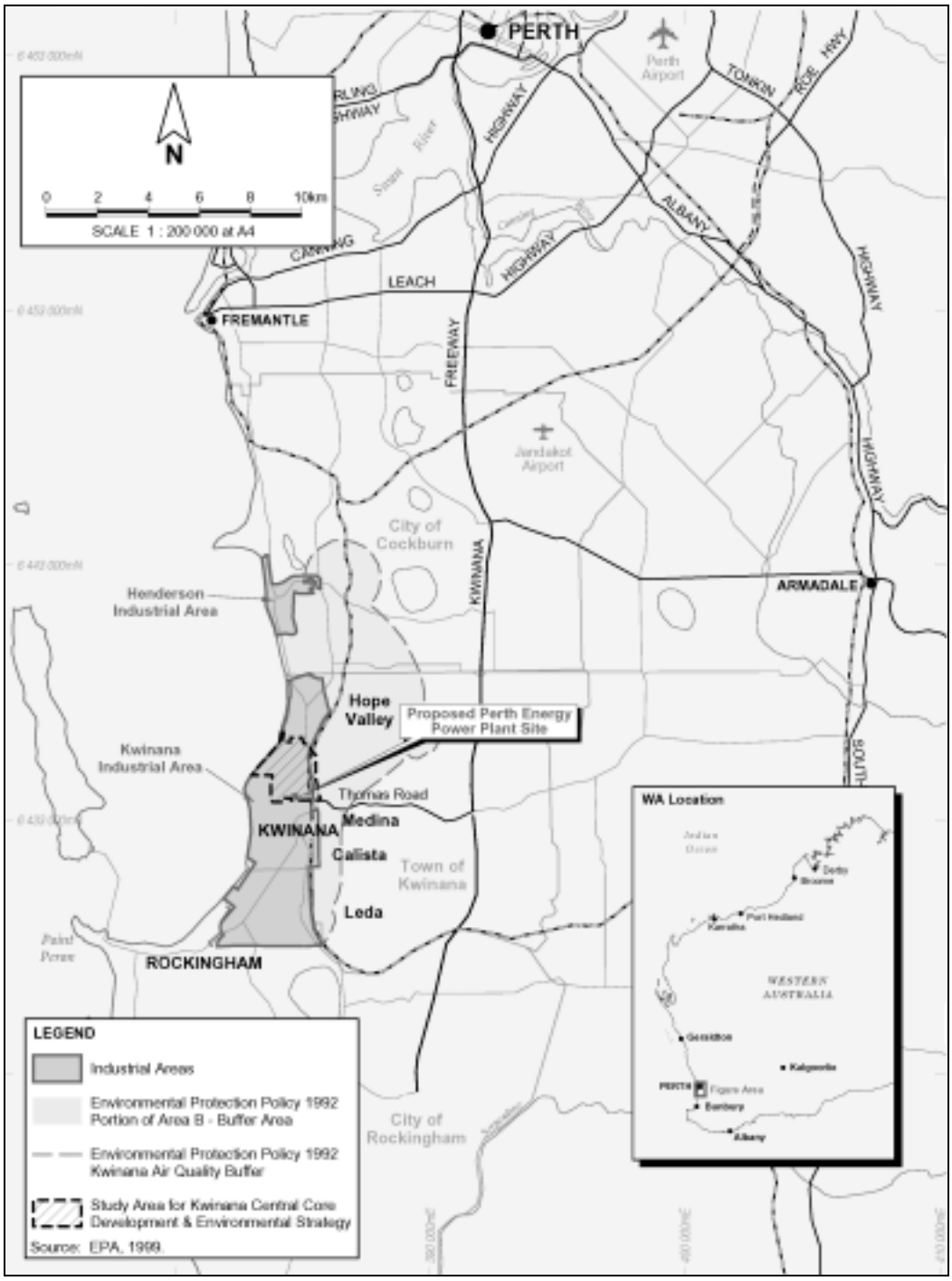

Figure 1: Regional location (Source: Figure 1 from ENVIRON Australia Pty Ltd, 2002)

Figure 2: Location plan (Source: Figure 2 from ENVIRON Australia Pty Ltd, 2002)

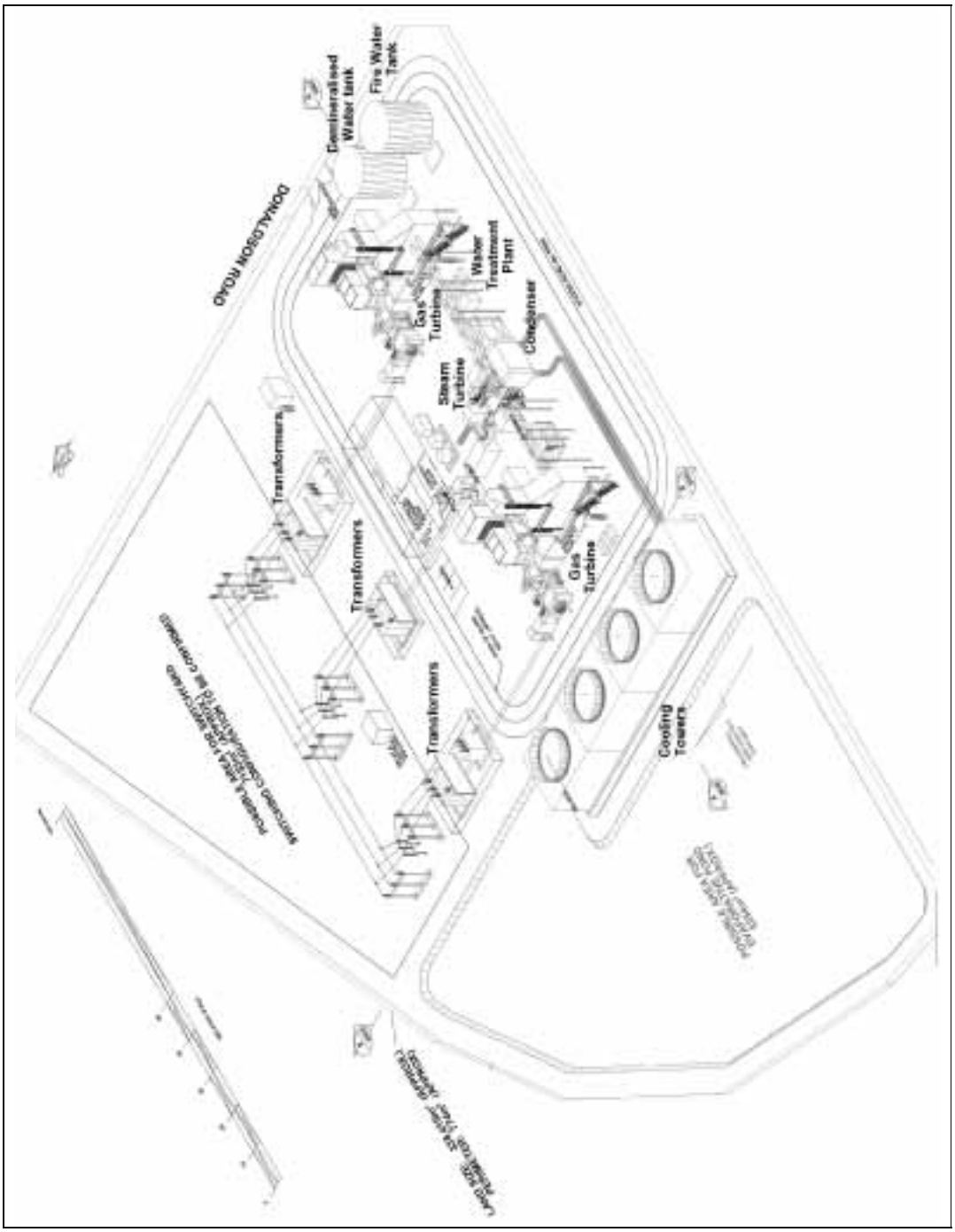

Figure 3: ***Proposed power plant layout (Source: Figure 3 from ENVIRON Australia Pty Ltd, 2002)***

3. Consultation

The proponent has advised that the consultation process commenced in May 2002 and that it will be on-going. The consultation undertaken to date, with the community and Government agencies, has allowed the proponent to identify and address the environmental issues of concern to all stakeholders. It has also enabled stakeholder involvement and feedback at the earliest possible stage of the project. Consultation has included individual discussions, community presentations and briefing notes, media releases, phone contact and site visits. The briefing notes included key information such as:

- information about the proponent and the project description;
- contribution of the proposed plant to the State's greenhouse gas emissions;
- potential impacts on Cockburn Sound;
- relation to the Public Power Procurement Process;
- flow-on economic benefits from the project;
- noise emissions;
- air emissions;
- water supply and management;
- public risk; and
- length of construction period.

Decision making authorities consulted by the proponent during the development of the project include:

- Environmental Protection Authority;
- Department of Environmental Protection;
- Water Corporation;
- Department of Mineral and Petroleum Resources (MPR);
- Town of Kwinana; and
- Department of Planning and Infrastructure (DPI).

Other stakeholders consulted to date are primarily those with a direct interest such as local community, environment and progress groups, local and State government agencies, nearby companies and members of Parliament and include:

- councillors and staff from the City of Rockingham;
- general community of the Town of Kwinana and the City of Rockingham;
- Kwinana and Rockingham based action groups;
- landowners and businesses adjoining the site;
- Kwinana Industries Council and Community Forum;

- Conservation Council of WA;
- local members of Parliament;
- members of Parliament with an interest in power supply planning; and
- Cockburn Sound Management Council (CSMC).

The proponent has developed a database of community groups, stakeholders and interested parties and will keep these parties informed and involved as the project progresses. Details of the consultation undertaken and issues discussed are summarised in Appendix E of the referral document.

The referral document indicated that the following environmental issues were raised during consultation undertaken to date:

- impacts on air quality in the Kwinana region;
- greenhouse gas emissions;
- potential noise impacts; and
- use of recycled water from KWRP and disposal to Point Peron Outlet Pipeline (CPOP).

4. Relevant environmental factors

Section 44 of the *Environmental Protection Act, 1986* requires the EPA to report to the Minister for the Environment and Heritage on the environmental factors relevant to the proposal and the conditions and procedures, if any, to which the proposal should be subject. In addition, the EPA may make recommendations as it sees fit.

It is the EPA's opinion that the following environmental factors relevant to the proposal require evaluation in this report:

(a) Nitrogen oxides (NO_X);

(b) Greenhouse gas emissions;

(c) Noise and vibration;

(d) Liquid waste disposal; and

(e) Water supply.

Details on the relevant environmental factors and their assessment are contained in Sections 4.1 - 4.5. The description of each factor shows why it is relevant to the proposal and how it will be affected by the proposal. The assessment of each factor is where the EPA decides whether or not a proposal meets the environmental objective set for that factor.

4.1 Nitrogen oxides (NO_X)

The combustion of natural gas in the proposed CCGT power plant will produce approximately 327 tonnes of NO_X per year. NO_X emissions from the combustion of diesel fuel will be negligible as it will only be used in on-site auxiliary generator sets for emergency start-ups and to provide back-up electrical power for the plant.

The proposed plant will contribute a relatively minor amount to existing NO_2 levels in view of the results obtained from air dispersion modelling which indicate that the maximum 1-hour NO_2 concentration at residential areas will be 14µg/m^3 (i.e. 5.7% of the NEPM standard), and that the annual average NO_2 concentration in residential areas will be 0.34µg/m^3 (i.e. 0.55% of the NEPM standard).

The cumulative impact of the proposed plant was also evaluated by combining its predicted NO_X emissions with those from existing industries, the proposed Commercial HIsmelt Plant, and the proposed Global Olivine Western Australia (GOWA) Waste to Energy Plant. The predicted cumulative 1-hour NO_2 concentrations at Hope Valley and North Rockingham will be 136.5µg/m^3 and 93.4µg/m^3 (i.e. 55.5% and 38% of the NEPM), respectively. The cumulative annual average NO_2 concentrations at Hope Valley and North Rockingham will be 10.4µg/m^3 and 10.1µg/m^3 (i.e. 16.8% and 16.3% of the NEPM), respectively.

Stack monitoring of NO_X emissions will be undertaken as part of the post commissioning performance testing to ensure that NO_X emission levels are below the allowable limits and in line with technical specifications. NO_X emissions will be monitored six monthly until performance is established, and then annually for the life of the project.

With the exception of the Cockburn 1 - Replacement for Stage B at Kwinana Power Station, and the proposed Western Power Kwinana Mason Road Power Station (gas fired combined cycle portion), the proposed CCGT power plant's specific NO_X emission rate of 0.327kg of NO_X per MWhr will be considerably less than other large scale existing or proposed power generating facilities in Western Australia, which range from 1.04 to 3.9kg of NO_X per MWhr (see Table 6 in the referral document). The specific NO_X emission rates of the Cockburn 1 - Replacement for Stage B at Kwinana Power Station and the proposed Western Power Kwinana Mason Road Power Station (gas fired combined cycle portion) are predicted to be 0.29kg of NO_X per MWhr and 0.3kg of NO_X per MWhr, respectively.

The proposed CCGT power plant's gas turbines will have state-of-the-art dry low NO_X (DLN) burners that are designed to minimise NO_X emissions to less than 25ppmv (expressed at 0°C, 101.325kPa, 15% O_2, dry), which is consistent with the requirements of EPA Guidance Statement No.15 (EPA, 2000). The EPA considers that the use of DLN burners aptly demonstrates the implementation of best available technology by the proponent.

The EPA notes that the proponent has made a commitment to:

- Incorporate dry low NO_X burners into the plant design which are capable of consistently achieving NO_X emission concentrations of 25ppmv or below; and
- sample, analyse and report on the stack emissions for NO_X on a six monthly basis until performance is established and thereafter annually.

In view of the above, it is the EPA's opinion that the proposal can be managed to meet the EPA's environmental objective for this factor.

4.2 Greenhouse gas emissions

The proposed CCGT power plant will emit approximately 410,780tpa of carbon dioxide (CO_2) (based on an 80% load factor). The emission of other greenhouse gases is expected to be negligible.

The EPA considers this proposal to be a reasonably significant contributor to Western Australia's greenhouse gas emissions, and its objective in regard to this environmental factor is to ensure that potential greenhouse gas emissions emitted from proposed projects are adequately addressed in the planning/design and operation of projects, and that:

- best practicable measures are applied to maximise energy efficiency and minimise emissions;
- comprehensive analysis is undertaken to identify and implement appropriate offsets; and
- proponents undertake an on-going programme to monitor and report emissions and periodically assess opportunities to further reduce greenhouse gas emissions over time.

The proposed plant will have an energy efficiency of between 45% and 50%. The current average power supply energy efficiency of the South West Interconnected System (SWIS) is approximately 31% (WPC, 2001).

CO_2 emissions from the proposed plant would be well below (34% to 67%) most other plants on the SWIS on an electricity sent out basis as illustrated in Table 6 and Figure 7 in the referral document. Table 6 in the referral document also indicates that the CCGT power plant will have an average carbon intensity of 411kg of CO_2 per MWhr compared to the SWIS average of 890kg of CO_2 per MWhr for the year 2000. This represents an average reduction of about 54% over the SWIS average, and a significant reduction in greenhouse gas emissions per MW of electricity sent out.

The EPA understands that the proponent, as the only independent retailer of renewable energy in the SWIS, would use the proposed CCGT power plant to support renewable generators coming on stream in the SWIS, which would result in further greenhouse gas reductions.

The EPA recommends that the standard ministerial condition (i.e. condition 7 in Appendix 2 of this report) applied to all proposals with large greenhouse gas inventories, which requires a greenhouse gas emissions management plan to be prepared an implemented, should be imposed on the proponent.

Having particular regard to the higher energy efficiency of the proposed CCGT power plant in comparison to the current average efficiency of the existing SWIS, and the potential for the overall quantity of greenhouse gas emissions generated in Western Australia to be reduced given that the proposed plant will serve existing Western Power customers; it is the EPA's opinion that the proposal can be managed to meet the EPA's environmental objective for this factor provided that ministerial condition 7 is imposed on the proponent.

4.3 Noise and vibration

The proposed CCGT power plant will be located within 2.5km of residences in Medina (to the south-east) and 2.5km from Hope Valley (to the north-west). Operation of the proposed plant will generate noise from numerous sources such as gas turbines, steam turbines, cooling towers, blowers, fans, and compressors. The EPA notes that noise modelling undertaken for the proposed plant demonstrated that it would comply with the most stringent criteria of the *Environmental Protection (Noise) Regulations, 1997* with the use of basic noise control measures. However, modelled noise levels will be confirmed by monitoring at the plant boundary as soon as practical after commissioning.

Vibration from the proposed plant is not expected to be significant, as machinery will be placed on concrete footings to ensure that any vibrations are dampened.

The EPA notes that the proponent has made the following commitments in relation to the management of noise emissions:

(1) Incorporate noise attenuation packages into design criteria to reduce noise levels from the proposed plant to as low as is reasonably practicable.

(2) Submit to the DEP for approval, additional noise modelling following the detailed design of the proposed plant.

(3) Submit to the DEP for approval, relevant sections of the contract specification for the proposed plant.

(4) Prepare and Implement Construction and Operation Noise Management Plans as part of the EMS. These will include The Australian Standard 2436-1981 "Guide to Noise Control on Construction, Maintenance and Demolition Sites".

(5) Confirm compliance with regulations and predictive modelling with a noise monitoring program during construction and operation. Submit a noise monitoring and assessment report to the DEP for approval that demonstrates compliance with the Noise Regulations.

(6) All noise modelling information will be made available to the Kwinana Industries Council so that they can update their cumulative noise model.

In view of the above, it is the EPA's opinion that the proposal can be managed to meet the EPA's environmental objective for this factor.

4.4 Liquid waste disposal

The main sources of wastewater from the proposed CCGT power plant will be:

- blowdown water from the cooling water towers;
- blowdown water from the HRSG units;
- discharge from the demineralisation (water treatment) system;
- surface run-off around the plant site; and
- other stormwater drainage.

Blowdown water would contain anti-scale and biocide chemicals in quantities not exceeding 200mg/L for the anti-scalent and 25mg/L for the biocide. Typical substances present in anti-scale are sodium salts of carboxyalkylidene, phosphonates and potassium hydroxide. Biocide contains hydroxyalkyl methylphosphonium sulphate.

All wastewater from the proposed CCGT power plant (approximately 35ML/yr) will be returned to the proposed Kwinana Wastewater Recycling Plant (KWRP) for recycling and/or discharge via the Cape Peron Outlet Pipeline (CPOP). In the event of an emergency closure of the CPOP, wastewater would be disposed of in emergency evaporation ponds. The ponds will be located to the south of the proposed CCGT power plant and are expected to cover an area of approximately 1,500m^2. The evaporation ponds would be lined with high density polyethylene (HDPE) and a groundwater monitoring programme would be implemented around the ponds to detect any leakage.

The referral document indicated that there will be containment drainage systems that will collect and treat oily and contaminated water spills or leaks from the plant site. It is proposed that all surface drainage from the hardstand areas of the proposed CCGT power plant will enter a series of strip drains which will carry the run-off via pipes to a triple interceptor basin, which will trap settleable material, grease and oil. Hydrocarbons will be separated and the run-off will pass through sand filtration before being returned to the main effluent flow. The proponent will have procedures in place to clean spills from the hardstand area and prevent pollutants from entering the groundwater and surface water systems. Clean storm water drainage would be directed to soaks. Small quantities of sewerage will also be discharged to an approved nutrient retentive sewerage system.

All wastewater from the proposed plant will be returned to the proposed KWRP for recycling and/or discharge via the CPOP. This option is currently being negotiated with the Water Corporation, and should negotiations fail, the proposal will be re-referred with an alternative wastewater discharge option. The EPA supports the establishment of the KWRP by the Water Corporation and would strongly encourage the proponent and other existing and future industries to utilise the facility as it would benefit the marine environment of Cockburn Sound, and reduce the demand on Perth's water resources.

The Water Corporation has indicated to the proponent that the anti-scalents and biocides do not pose operational and environmental issues at these concentrations and quantities, and that the discharge will be acceptable to the Water Corporation.

In the event of an emergency closure of the CPOP, wastewater would be disposed of in emergency evaporation ponds, and that they would be lined with high density polyethylene (HDPE). A groundwater monitoring programme would be implemented around the ponds to detect any leakage. The EPA considers that the above arrangement would be acceptable given that it is unlikely that the CPOP would be unavailable for a considerable length of time, which in turn would significantly reduce the need for the long term storage of large quantities of wastewater. Nevertheless, the EPA considers that the proponent should design, construct and operate the evaporation ponds in a manner consistent with the requirements of the Water and Rivers Commission's Water Quality Protection Note titled, "Lining Systems (Non-rigid) to Contain Polluting Matter" (WRC, 2002).

The EPA considers that the measures that will be employed by the proponent to manage spills, leaks, and both contaminated and clean surface water run-off are adequate in terms of ensuring that there will minimal impact on groundwater quality.

The EPA notes that the proponent has made the following commitments in relation to the management of liquid waste:

(1) Saline wastewater will be routinely monitored to meet Water Corporation environmental acceptance criteria. This will include analysis of a range of relevant parameters in the wastewater. Results will also be made available to the DEP.

(2) Evaporation ponds will be included into the Project design to enable the emergency disposal of the wastewater in the event that the water cannot be discharged to the Point Peron pipeline.

(3) Prepare and implement a Water Management Plan as part of the EMS to address stormwater management and any potentially contaminated run-off.

(4) Dispose of sewage via an advanced package nutrient retentive wastewater treatment unit.

Notwithstanding the above, the EPA considers that the proponent should be required to design the plant such that wastewater can be disposed of via the KWRP, refer alternative wastewater disposal options to the EPA in the event that the KWRP is not available, and utilise the KWRP for wastewater disposal as soon as it is operational. Accordingly, the EPA considers that the following ministerial conditions should be imposed on the proponent.

8-1 The proponent shall design the Kwinana Combined Cycle Power Plant such that it can readily dispose of all wastewater to the Water Corporation's Kwinana Wastewater Recycling Plant, to the requirements of the Minister for the Environment and Heritage on advice from the Environmental Protection Authority.

8-2 The proponent shall refer alternative wastewater disposal options for the Kwinana Combined Cycle Power Plant to the EPA in the event that the Water Corporation's Kwinana Wastewater Recycling Plant is not available, to the requirements of the Minister for the Environment and Heritage on advice from the Environmental Protection Authority.

8-3 The proponent shall utilise the Water Corporation's Kwinana Wastewater Recycling Plant (KWRP) for the disposal of all wastewater from the Kwinana Combined Cycle Power Plant as soon as the former is operational, to the requirements of the Minister for the Environment and Heritage on advice from the Environmental Protection Authority.

In view of the above, it is the EPA's opinion that the proposal can be managed to meet the EPA's environmental objective for this factor provided that the recommended ministerial conditions outlined above are imposed on the proponent.

4.5 Water supply

The proposed CCGT power plant will consume about 1,082ML of water per year. Approximately 28ML per year of demineralised water (80kL/day based on 351 days of operation) and 1,053ML per year of cooling water (3,000kL/day based on 351 days of operation) will be required for steam generation and condensing within the CCGT power plant. Approximately 1ML per year of water supplied from the KWRP will be required for general use such as cleaning and wash down, domestic purposes, landscaping and reticulation. Potable water will be provided from the water treatment plant or scheme water. Water for fire-fighting purposes will be stored in a 150kL fire water tank located next to the demineralised water tank.

The proponent intends to source water from the Water Corporation's proposed Kwinana Wastewater Recycling Plant (KWRP), which will use water from the Cape Peron Outlet pipeline (CPOP). Negotiations to source water from the KWRP are still underway, and should these negotiations fail, the proponent will need to reconsider their options with regards to water supply. Any alternative source of water would need to be referred to the EPA for consideration. The EPA recommends that ministerial conditions 9-1 and 9-2 should be adopted in order to facilitate the use of recycled water in the proposed plant in preference to scheme water.

In view of the above, it is the EPA's opinion that the proposal can be managed to meet the EPA's environmental objective for this factor provided that the recommended ministerial conditions outlined above are imposed on the proponent.

5. Conditions and Commitments

Section 44 of the *Environmental Protection Act, 1986* requires the EPA to report to the Minister for the Environment and Heritage on the environmental factors relevant to the proposal and on the conditions and procedures to which the proposal should be subject, if implemented. In addition, the EPA may make recommendations as it sees fit.

In developing recommended conditions for each project, the EPA's preferred course of action is to have the proponent provide an array of commitments to ameliorate the impacts of the proposal on the environment. The commitments are considered by the EPA as part of its assessment of the proposal and, following discussion with the proponent, the EPA may seek additional commitments.

The EPA recognises that not all of the commitments are written in a form which makes them readily enforceable, but they do provide a clear statement of the action to be taken as part of the proponent's responsibility for, and commitment to, continuous improvement in environmental performance. The commitments, modified if necessary to ensure enforceability, then form part of the conditions to which the proposal should be subject, if it is to be implemented.

5.1 Proponent's commitments

The proponent's commitments as set out in the referral document and subsequently modified, as shown in Appendix 2, should be made enforceable.

6. Conclusions

The EPA has considered the proposal by Perth Energy Pty Ltd to construct, operate, and maintain a 120MW combined cycle gas turbine (CCGT) power plant on a site located in Kwinana, Western Australia.

Nitrogen oxides (NO_X)

Predicted NO_X ground level concentrations obtained from cumulative impact air quality modelling for the proposed CCGT power plant are below the relevant National Environmental Protection Measure (NEPM) standards. Dry low NO_X (DLN) burners will be used in the proposed plant. The EPA concludes that the proposal can be managed to meet the EPA's environmental objective for this factor.

Greenhouse gas emissions

The CCGT power plant will produce approximately 410,780tpa of CO_2 per year when in operation. The proposed plant will have an energy efficiency of between 45% and 50%, which is significantly greater than the current average power supply energy efficiency of about 31% for the South West Interconnected System (SWIS), and as a result, CO_2 emissions from the proposed plant would be well below (34% to 67%) most other plants on the SWIS on an electricity sent out basis. The CCGT power plant will have an average carbon intensity of 411kg of CO_2 per MWhr compared to the SWIS average of 890kg of CO_2 per MWhr for the year 2000. This represents an average reduction of about 54% over the SWIS average, and a significant reduction in greenhouse gas emissions per MW of electricity sent out. The EPA concludes that the proposal can be managed to meet the EPA's environmental objective for this factor provided that ministerial condition 7 is imposed on the proponent.

Noise and vibration

Noise modelling for the proposed plant has demonstrated that it will not be a significant noise contributor in the Kwinana area, and that it would comply with the most stringent criteria of the *Environmental Protection (Noise) Regulations, 1997* with the use of basic noise control measures. Vibration from the proposed plant is unlikely to impact on surrounding residences. The EPA concludes that the proposal can be managed to meet the EPA's environmental objective for this factor.

Liquid waste disposal

All wastewater from the proposed CCGT power plant will be returned to the proposed KWRP for recycling and/or discharge via the CPOP. The EPA supports the establishment of the KWRP by the Water Corporation and would strongly encourage the proponent and other existing and future industries to utilise the facility as it would benefit the marine environment of Cockburn Sound, and reduce the demand on Perth's water resources. In the event of an emergency closure of the CPOP, wastewater would be disposed of in emergency evaporation ponds located within the plant boundary. The evaporation ponds would be lined with high density polyethylene (HDPE) and a groundwater monitoring programme will be implemented around the ponds to detect any leakage. The EPA concludes that the proposal can be managed to meet the EPA's environmental objective for this factor provided that the recommended ministerial conditions are imposed on the proponent.

Water supply

The proponent has indicated that they intend to source recycled water for the proposed CCGT power plant from the Water Corporation's proposed KWRP. This arrangement is subject to on-going negotiations between the proponent and the Water Corporation. Should these negotiations fail, the proponent would need to reconsider their options with regard to water supply. This scenario may subsequently result in the proposed plant utilising significant quantities of scheme water. The EPA concludes that the proposal can be managed to meet the EPA's environmental objective for this factor provided that the recommended ministerial conditions are adopted.

In view of the above, the EPA has concluded that the proposal is capable of being managed in an environmentally acceptable manner such that it is most unlikely that the EPA's objectives would be compromised, provided there is satisfactory implementation of the recommended conditions and proponent's commitments set out in Section 5.

7. Recommendations

The EPA submits the following recommendations to the Minister for the Environment and Heritage:

1. That the Minister notes that the proposal being assessed is for the construction, operation, and maintenance of a 120MW combined cycle gas turbine (CCGT) power plant on a site located in Kwinana, Western Australia;
2. That the Minister considers the report on the relevant environmental factors as set out in Section 4;
3. That the Minister notes that the EPA has concluded that it is unlikely that the EPA's objectives would be compromised, provided there is satisfactory implementation by the proponent of the recommended conditions set out in Appendix 2, including the proponent's commitments; and
4. That the Minister imposes the conditions and procedures recommended in Appendix 2 of this report.

Appendix 1

References

ENVIRON Australia Pty Ltd (2002). Kwinana Combined Cycle Plant - Proponent's referral document to the Environmental Protection Authority.

Environmental Protection Authority (2000). Guidance Statement for Emissions of Oxides of Nitrogen from Gas Turbines No. 15.

Environmental Protection Authority (2002). Guidance Statement for Minimising Greenhouse Gas Emissions No. 12.

National Environment Protection Council (1998). National Environmental Protection Measures for Ambient Air Quality.

Water and Rivers Commission (2002). Water Quality Protection Note - Lining Systems (Non-rigid) to Contain Polluting Matter.

Western Power Corporation (2001). Annual Report 2000-2001, Statistical Summary-Electricity Generation, page 68.

Appendix 2

Recommended Environmental Conditions and Proponent's Consolidated Commitments

Statement No.

RECOMMENDED CONDITIONS AND PROCEDURES

STATEMENT THAT A PROPOSAL MAY BE IMPLEMENTED (PURSUANT TO THE PROVISIONS OF THE ENVIRONMENTAL PROTECTION ACT 1986)

KWINANA COMBINED CYCLE POWER PLANT

Proposal: The construction, operation, and maintenance of a nominal 120 megawatt combined cycle gas turbine power plant on a site located in Kwinana. The proposal is documented in schedule 1 of this statement.

Proponent: Perth Energy Pty Ltd

Proponent Address: Perth Energy Pty Ltd
Level 29, 221 St Georges Terrace,
PERTH WA 6000

Assessment Number: 1460

Report of the Environmental Protection Authority: Bulletin 1080

The proposal referred to above may be implemented subject to the following conditions and procedures:

Procedural conditions

1 Implementation and Changes

1-1 The proponent shall implement the proposal as documented in schedule 1 of this statement subject to the conditions of this statement.

1-2 Where the proponent seeks to change any aspect of the proposal as documented in schedule 1 of this statement in any way that the Minister for the Environment and Heritage determines, on advice of the Environmental Protection Authority, is substantial, the proponent shall refer the matter to the Environmental Protection Authority.

1-3 Where the proponent seeks to change any aspect of the proposal as documented in schedule 1 of this statement in any way that the Minister for the Environment and Heritage determines, on advice of the Environmental Protection Authority, is not substantial, the proponent may implement those changes upon receipt of written advice.

2 Proponent Commitments

2-1 The proponent shall implement the environmental management commitments documented in schedule 2 of this statement.

2-2 The proponent shall implement subsequent environmental management commitments which the proponent makes as part of the fulfilment of the conditions in this statement.

3 Proponent Nomination and Contact Details

3-1 The proponent for the time being nominated by the Minister for the Environment and Heritage under section 38(6) or (7) of the *Environmental Protection Act, 1986* is responsible for the implementation of the proposal until such time as the Minister for the Environment and Heritage has exercised the Minister's power under section 38(7) of the Act to revoke the nomination of that proponent and nominate another person as the proponent for the proposal.

3-2 If the proponent wishes to relinquish the nomination, the proponent shall apply for the transfer of proponent and provide a letter with a copy of this statement endorsed by the proposed replacement proponent that the proposal will be carried out in accordance with this statement. Contact details and appropriate documentation on the capability of the proposed replacement proponent to carry out the proposal shall also be provided.

3-3 The nominated proponent shall notify the Department of Environmental Protection of any change of contact name and address within 60 days of such change.

4 Commencement and Time Limit of Approval

4-1 The proponent shall provide evidence to the Minister for the Environment and Heritage within five years of the date of this statement that the proposal has been substantially commenced or the approval granted in this statement shall lapse and be void.

Note: The Minister for the Environment and Heritage will determine any dispute as to whether the proposal has been substantially commenced.

4-2 The proponent shall make application for any extension of approval for the substantial commencement of the proposal beyond five years from the date of this statement to the Minister for the Environment and Heritage, prior to the expiration of the five-year period referred to in condition 4-1.

The application shall demonstrate that:

- the environmental factors of the proposal have not changed significantly;

- new, significant, environmental issues have not arisen; and
- all relevant government authorities have been consulted.

Note: The Minister for the Environment and Heritage may consider the grant of an extension of the time limit of approval not exceeding five years for the substantial commencement of the proposal.

Environmental conditions

5 Compliance Audit and Performance Review

5-1 The proponent shall prepare an audit program in consultation with and submit compliance reports to the Department of Environmental Protection which address:

- the implementation of the proposal as defined in schedule 1 of this statement;
- evidence of compliance with the conditions and commitments; and
- the performance of the environmental management plans and programs.

Note: Under sections 48(1) and 47(2) of the *Environmental Protection Act, 1986*, the Chief Executive Officer of the Department of Environmental Protection is empowered to audit the compliance of the proponent with the statement and should directly receive the compliance documentation, including environmental management plans, related to the conditions, procedures and commitments contained in this statement.

Usually, the Department of Environmental Protection prepares an audit table which can be utilised by the proponent, if required, to prepare an audit program to ensure the proposal is implemented as required. The Chief Executive Officer is responsible for the preparation of written advice to the proponent, which is signed off by either the Minister or, under an endorsed condition clearance process, a delegate within the Environmental Protection Authority or the Department of Environmental Protection that the requirements have been met.

5-2 The proponent shall submit a performance review report every five years after the start of the operations phase to the requirements of the Minister for the Environment and Heritage on advice of the Environmental Protection Authority, which addresses:

- the major environmental issues associated with the project; the targets for those issues; the methodologies used to achieve these; and the key indicators of environmental performance measured against those targets;

- the level of progress in the achievement of sound environmental performance, including industry benchmarking, and the use of best available technology where practicable;

- significant improvements gained in environmental management, including the use of external peer reviews;

- stakeholder and community consultation about environmental performance and the outcomes of that consultation, including a report of any on-going concerns being expressed; and

- the proposed environmental targets over the next five years, including improvements in technology and management processes.

6 Decommissioning

6-1 Prior to construction, the proponent shall prepare, and subsequently implement, a Preliminary Decommissioning Plan, which provides the framework to ensure that the site is left in an environmentally acceptable condition to the requirements of the Minister for the Environment and Heritage on advice of the Environmental Protection Authority.

The Preliminary Commissioning Plan shall address:

(1) rationale for the siting and design of plant and infrastructure as relevant to environmental protection, and conceptual plans for the removal or, if appropriate, retention of plant and infrastructure;

(2) a conceptual rehabilitation plan for all disturbed areas and a description of a process to agree on the end land use(s) with all stakeholders;

(3) a conceptual plan for a care and maintenance phase; and

(4) management of noxious materials to avoid the creation of contaminated areas.

6-2 At least six months prior to the anticipated date of decommissioning, or at a time agreed with the Environmental Protection Authority, the proponent shall prepare a Final Decommissioning Plan designed to ensure that the site is left in an environmentally acceptable condition to the requirements of the Minister for the Environment and Heritage on advice of the Environmental Protection Authority.

The Final Decommissioning Plan shall address:

(1) removal or, if appropriate, retention of plant and infrastructure in consultation with relevant stakeholders;

(2) rehabilitation of all disturbed areas to a standard suitable for the agreed new land use(s); and

(3) identification of contaminated areas, including provision of evidence of notification and proposed management measures to relevant statutory authorities.

6-3 The proponent shall implement the Final Decommissioning Plan required by condition 6-2 until such time as the Minister for the Environment and Heritage determines, on advice of the Environmental Protection Authority, that the proponent's decommissioning responsibilities have been fulfilled.

6-4 The proponent shall make the Final Closure Plan required by condition 6-2 publicly available, to the requirements of the Minister for the Environment and Heritage on advice of the Environmental Protection Authority.

7 Greenhouse Gas Emissions

7-1 Prior to commencement of construction of the power plant, the proponent shall prepare a Greenhouse Gas Emissions Management Plan to:

- ensure that "greenhouse gas" emissions from the project are adequately addressed and best available efficient technologies are used to minimise total net "greenhouse gas" emissions and/or "greenhouse gas" emissions per unit of product; and

- mitigate "greenhouse gas" emissions in accordance with the Framework Convention on Climate Change 1992, and consistent with the National Greenhouse Strategy;

to the requirements of the Minister for the Environment and Heritage on advice of the Environmental Protection Authority.

This Plan shall include:

(1) calculation of the "greenhouse gas" emissions associated with the proposal, as indicated in *Minimising Greenhouse Gas Emissions, Guidance for the Assessment of Environmental Factors, No. 12* published by the Environmental Protection Authority;

(2) specific measures to minimise the total net "greenhouse gas" emissions and/or the "greenhouse gas" emissions per unit of product associated with the proposal;

(3) monitoring of "greenhouse gas" emissions;

(4) estimation of the "greenhouse gas" efficiency of the project (per unit of product and/or other agreed performance indicators) and comparison with the efficiencies of other comparable projects producing a similar product;

(5) analysis of the extent to which the proposal meets the requirements of the National Greenhouse Strategy using a combination of:

- "no regrets" measures;
- "beyond no regrets" measures;
- land use change or forestry offsets; and
- international flexibility mechanisms.

(6) a target set by the proponent for the reduction of total net "greenhouse gas" emissions and/or "greenhouse gas" emissions per unit of product over time, and annual reporting of progress made in achieving this target.

Note: In part 5 above, the following definitions apply:

(1) "no regrets" measures are those that can be implemented by a proponent which are effectively cost-neutral and provide the proponent with returns in savings which offset the initial capital expenditure that may be incurred; and

(2) "beyond no regrets" measures are those that can be implemented by a proponent which involve some additional cost that is not expected to be recovered.

7-2 The proponent shall implement the Greenhouse Gas Emissions Management Plan required by condition 7-1 to the requirements of the Minister for the Environment on advice of the Environmental Protection Authority.

7-3 The proponent shall make the Greenhouse Gas Emissions Management Plan required by condition 7-1 publicly available, to the requirements of the Minister for the Environment and Heritage on advice of the Environmental Protection Authority.

8 Wastewater disposal

8-1 The proponent shall design the Kwinana Combined Cycle Power Plant such that it can readily dispose of all wastewater to the Water Corporation's Kwinana Wastewater Recycling Plant, to the requirements of the Minister for the Environment and Heritage on advice from the Environmental Protection Authority.

8-2 The proponent shall refer alternative wastewater disposal options for the Kwinana Combined Cycle Power Plant to the EPA in the event that the Water Corporation's Kwinana Wastewater Recycling Plant is not available, to the requirements of the Minister for the Environment and Heritage on advice from the Environmental Protection Authority.

8-3 The proponent shall utilise the Water Corporation's Kwinana Wastewater Recycling Plant (KWRP) for the disposal of all wastewater from the Kwinana Combined Cycle Power Plant as soon as the former is operational, to the requirements of the Minister for the Environment and Heritage on advice from the Environmental Protection Authority.

9 Water Supply

9-1 The proponent shall design the Kwinana Combined Cycle Power Plant such that it can readily source water from the Water Corporation's Kwinana Wastewater Recycling Plant, to the requirements of the Minister for the Environment and Heritage on advice from the Environmental Protection Authority.

9-2 The proponent shall source water for the Kwinana Combined Cycle Power Plant from the Water Corporation's Kwinana Wastewater Recycling Plant (KWRP) as soon as the latter is operational, to the requirements of the Minister for the Environment and Heritage on advice from the Environmental Protection Authority.

Procedures

1 Where a condition states "to the requirements of the Minister for the Environment and Heritage on advice of the Environmental Protection Authority", the Chief Executive Officer of the Department of Environmental Protection will obtain that advice for the preparation of written advice to the proponent.

2 The Environmental Protection Authority may seek advice from other agencies, as required, in order to provide its advice to the Chief Executive Officer of the Department of Environmental Protection.

Notes

1 The Minister for the Environment and Heritage will determine any dispute between the proponent and the Environmental Protection Authority or the Department of Environmental Protection over the fulfilment of the requirements of the conditions.

2 The proponent is required to apply for a Works Approval and Licence for this project under the provisions of Part V of the *Environmental Protection Act, 1986*.

Schedule 1

The Proposal (Assessment No. 1460)

The proposal is to construct, operate, and maintain a natural gas fired combined cycle gas turbine power plant with a nominal generation capacity of 120 megawatts on a site located at Part Lot 131 Mason Road, LandCorp Proposed Lot 3, on the south-western corner of Donaldson Road and Burton Place, off Mason Road, Kwinana, (Figures 1, 2, and 3). The plant will provide approximately 1,045 gigawatt hours of electricity annually into the South West Interconnected System.

The main components of the plant are:

- two natural gas fired 40 megawatt turbine generator units;
- two heat recovery steam generators;
- one 40 megawatt steam turbine and generator unit;
- condenser;
- four mechanical draft water cooling towers;
- water treatment plant to produce demineralised water;
- transformers and switch yard; and
- administration, control room, warehouse and workshop buildings.

The main characteristics of the proposal are summarised in Table 1 below.

Table 1: Key proposal characteristics

Element	Description
Project purpose	To produce electricity to supply to contestable customers on the SWIS grid in an efficient manner
Life of the Project	25 years
Power Generating Capacity	120MW nominal
Facility footprint Site area	1.8 hectares 3.6 hectares
Natural gas pipeline: Source Length Diameter Pressure	 DBNGP (adjacent block to east of site) or the Parmelia Pipeline (35m south-east of site) Approximately 250m from supply point (responsibility of supplier) 152.4mm nominal Approximately 3MPa from the metering skid
Plant facilities: No. and size of gas turbines No. and size of steam turbines No. of stacks Height of stacks No. of cooling towers No. of liquid fuel tanks Transmission line length	 2 x 40MW nominal 1 x 40MW nominal 2 heat recovery steam generator stacks and 2 (optional) Bypass stacks 25m 4 1 x 10,000L tank (optional - for emergency start up) Approximately 500m (responsibility of Western Power Networks)

Source: Modified version of Table 1 of the referral document (ENVIRON Australia Pty Ltd, 2002)

Table 1: Key proposal characteristics (Continued)

Element	Description
Plant operation	Baseload
Water Source	Water Corporation Kwinana Wastewater Recycling Plant (KWRP)
Emergency discharge evaporation ponds	Designed to hold up to three days of wastewater discharge. Lined with HDPE.
Vegetation disturbance	Negligible - already cleared
Estimated off-site individual risk level	Negligible increase to existing off-site risk due to low inherent risk and short length of gas pipeline
Construction period	18 months
Operating Hours	24 hours/day 351 days/year.
INPUTS	
Natural gas	204 million m^3/yr (Higher heating value 8.4PJ/yr)
Cooling water	1,053ML/yr
Water to demineralisation plant	28ML/yr
General water	1ML/yr, inclusive of domestic, cleaning/wash down, landscape, reticulation etc.
OUTPUTS	
Wastewater	35ML/yr (100kL/day) returned to the Cape Peron Outlet Pipeline (currently being negotiated) with emergency backup discharge to on-site evaporation ponds.
Solid waste	Minimal - approximately 5tpa disposed of to an approved landfill site.
Air emissions: Oxides of nitrogen (NO_X) Sulphur dioxide (SO_2) Particulate matter Carbon dioxide (CO_2) Carbon monoxide (CO) Polycyclic aromatic hydrocarbons (PAHs) Non-methane volatile organic compounds (NMVOCs)	 327tpa (10.9g/s) (less than 25ppmv, dry, 15% O_2) 0.54tpa (0.018g/s) 9.6tpa 410,780tpa 49.5tpa 0.003tpa 0.3tpa
Predicted noise at closest residences: Hope Valley Medina	 Less than 40dB(A) - “not significantly contributing” Less than 35dB(A) - “not significantly contributing”

Source: Modified version of Table 1 of the referral document (ENVIRON Australia Pty Ltd, 2002)

Abbreviations for Table 1:

dB(A)	decibels (A weighted)
DBNGP	Dampier to Bunbury Natural Gas Pipeline
g/s	grams per second
HDPE	high density polyethylene
KL/day	kilolitres per day
KL/yr	kilolitres per year
L	litres
m	metres
m^3/yr	cubic metres per year
mm	millimetres
MW	megawatts
ML/yr	megalitres per year
MPa	megapascals
O_2	oxygen
PJ/yr	petajoules per year
ppmv	parts per million by volume
SWIS	South West Interconnected System
tpa	tonnes per annum

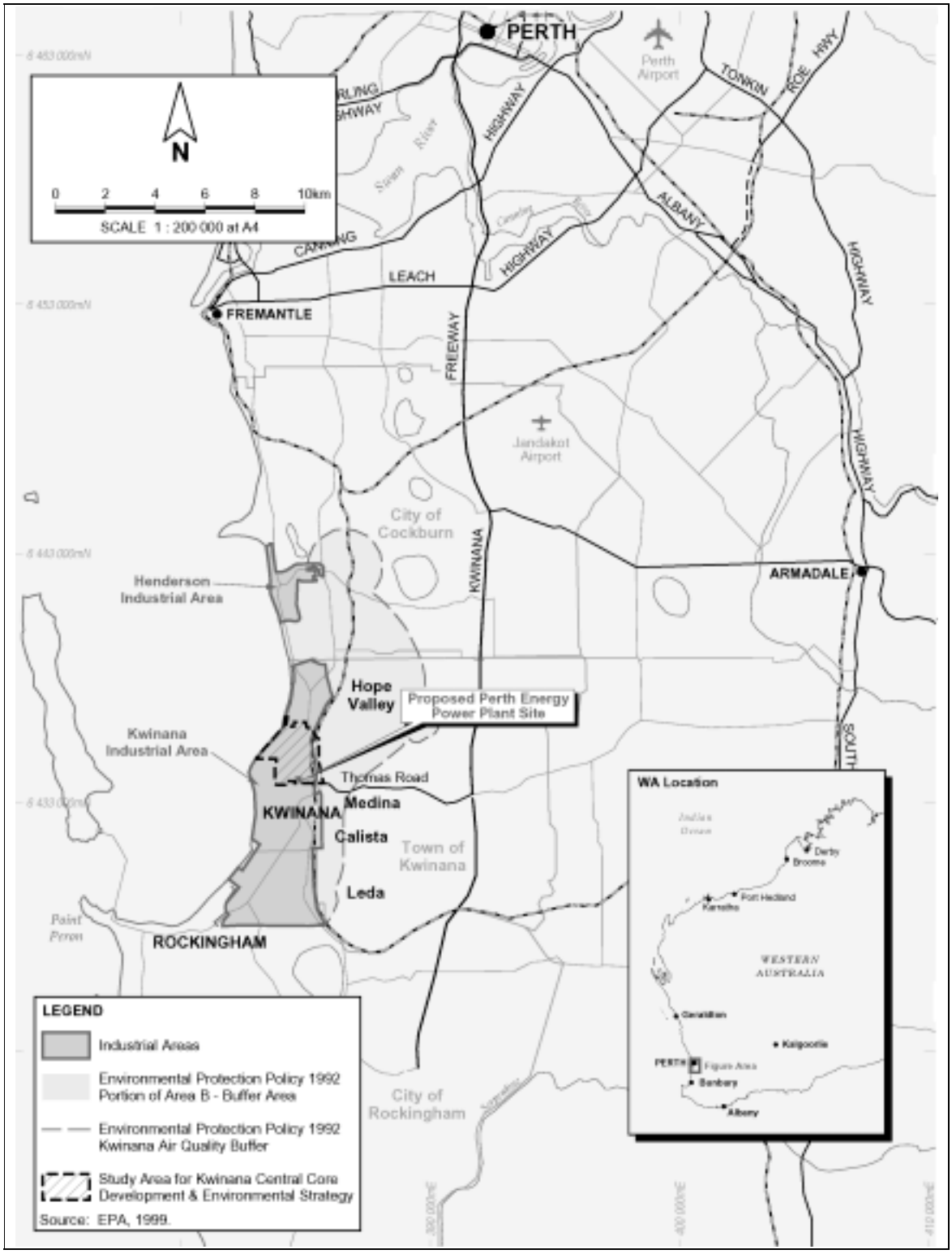

Figure 1: ***Regional location (Source: Figure 1 from*** *ENVIRON Australia Pty Ltd, 2002)*

Figure 2: Location plan (Source: Figure 2 from** ENVIRON Australia Pty Ltd, 2002**)

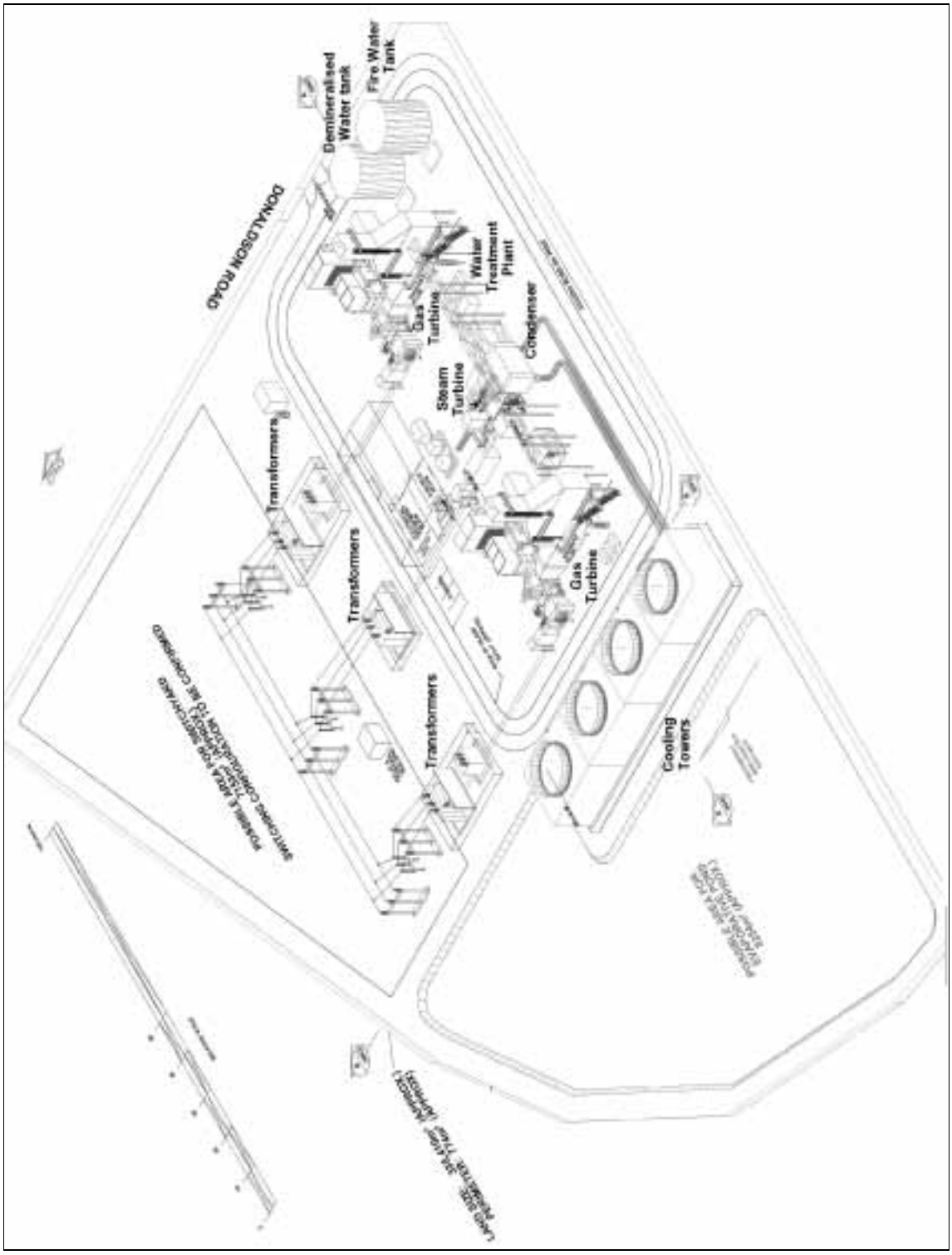

Figure 3: ***Proposed power plant layout (Source: Figure 3 from*** *ENVIRON Australia Pty Ltd, 2002****)***

Schedule 2

Proponent's Consolidated Environmental Management Commitments (Assessment No. 1460)

	Topic	Objective	Action	Timing	Advice
1	Environmental management approach	To ensure construction, operation and decommissioning phases of the Project are managed to minimise environmental impacts.	1.1 Prepare and implement an environmental management system (EMS) in line with recognised national standards.	1.1 Pre-commissioning, construction, operation and decommissioning.	
2	Community consultation	Keep the local community and other interested stakeholders well informed of the development and operation of the Project.	2.1 Continue with the Consultation Programme.	2.1 Throughout the life of the Project.	Relevant local authorities & community groups.
3	Air quality	To ensure that emissions meet statutory requirements and acceptable standards.	3.1 Design the plant such that the maximum building height will be less than 10m if a stack height of 25m is used. 3.2 Periodically monitor and report on relevant emissions to ensure that the plant is operating at or better than its design.	3.1 Project design. 3.2 Operation.	
4	NO_X emissions	Ensure that NO_X emissions are as low as is reasonably practicable, and meet acceptable standards including the NEPM for Ambient Air Quality and the requirements of Section 51 of the *Environmental Protection Act, 1986*.	4.1 Incorporate dry low NO_X burners into the plant design which are capable of consistently achieving NO_X emission concentrations of 25ppmv or below. 4.2 Sample, analyse and report on the stack emissions for NO_X on a six-monthly basis until performance is established and thereafter annually.	4.1 Project design. 4.2 During operations, 6 monthly and then annually thereafter.	
5	Water quality	To maintain the quantity of surface and groundwater so that existing and potential environmental values, including ecosystem maintenance, are protected.	5.1 Prepare and implement a Water Management Plan as part of the EMS to address stormwater management and any potentially contaminated run-off. 5.2 Design any hazardous storage facilities in accordance with all relevant legislation and guidelines. 5.3 Develop a Site Emergency Plan as part of the EMS to ensure any potential spills do not compromise surface or groundwater quality.	5.1 Pre-commissioning, construction and operation. 5.2 Pre-commissioning. 5.3 Construction, operation and decommissioning.	

Source: Modified version of Table 10 from proponent's referral document (ENVIRON Australia Pty Ltd, 2002)

Proponent's Consolidated Environmental Management Commitments (Assessment No. 1460) [Continued]

	Topic	Objective	Action	Timing	Advice
6	Noise	To protect the amenity of nearby residents from noise impacts resulting from activities associated with the proposal by ensuring the noise levels meet the statutory requirements and acceptable standards.	6.1 Incorporate noise attenuation packages into design criteria to reduce noise levels from the proposed plant to as low as is reasonably practicable.	6.1 Project design.	
			6.2 Submit to the DEP for approval, additional noise modelling following the detailed design of the proposed plant.	6.2 Project design.	
			6.3 Submit to the DEP for approval, relevant sections of the contract specification for the proposed plant.	6.3 Project design.	
			6.4 Prepare and Implement Construction and Operation Noise Management Plans as part of the EMS. These will include The Australian Standard 2436-1981 "Guide to Noise Control on Construction, Maintenance and Demolition Sites".	6.4 Pre-commissioning, construction and operation.	
			6.5 Confirm compliance with regulations and predictive modelling with a noise monitoring program during construction and operation. Submit a noise monitoring and assessment report to the DEP for approval that demonstrates compliance with the Noise Regulations.	6.5 Post-commissioning.	
			6.6 All noise modelling information will be made available to the Kwinana Industries Council so that they can update their cumulative noise model.	6.6 Post-commissioning.	
7	Liquid waste management	Where possible, liquid waste will be minimised, reused or recycled. Wastewaters will be treated on-site or disposed of off-site. Where this is not feasible, wastewater will be managed on-site to prevent groundwater and surface water contamination.	7.1 Saline wastewater will be routinely monitored to meet Water Corporation environmental acceptance criteria. This will include analysis of a range of relevant parameters in the wastewater. Results will also be made available to the Department of Environmental Protection.	7.1 Operation	Water Corporation.
			7.2 Evaporation ponds will be included into the Project design to enable the emergency disposal of the wastewater in the event that the water cannot be discharged to the Cape Peron Outlet Pipeline.	7.2 Project design stage and throughout operational life of facility.	Water and Rivers Commission.
8	Particulates and dust	Protect the surrounding land users such that dust emissions do not create a nuisance.	8.1 Implement the guidelines "Land development sites and impacts on air quality - a guideline for the prevention of dust and smoke pollution from land development sites in Western Australia" (DEP, 1996) as part of the Project's Dust Management Plan.	8.1 Pre-commissioning and construction.	
			8.2 Use all reasonable and practicable measures to minimise the generation of dust, especially during the construction phase.	8.2 Construction and operation.	

Source: Modified version of Table 10 from proponent's referral document (ENVIRON Australia Pty Ltd, 2002)

Proponent's Consolidated Environmental Management Commitments (Assessment No. 1460) [Continued]

	Topic	Objective	Action	Timing	Advice
9	Soil contamination	To ensure that any previous on-site contamination is managed and no further contamination takes place.	9.1 A Phase II site assessment will be undertaken prior to purchase of site to delineate the extent and nature of any contamination. 9.2 An appropriate remediation plan will be implemented if required. 9.3 The EMS will be developed and complemented to reduce the likelihood of any further contamination occurring. 9.4 All potentially contaminating materials will be appropriately handled, stored and transported to prevent any further contamination.	9.1 Prior to construction. 9.2 Prior to construction. 9.3 Pre-commissioning, construction, operation and decommissioning. 9.4 Construction, operation and decommissioning.	LandCorp. LandCorp.
10	Solid waste management	To ensure that solid waste is minimised using the principles of reduce, reuse, recycle and that it does not impact on the surrounding environment.	10.1 Prepare and implement a Hydrocarbon and Hazardous Materials Management Plan as part of the EMS, incorporating the reduce, reuse, recycle principles.	10.1 Pre-commissioning, construction and operation.	Local government authorities.
11	Sewage	To minimise the potential for nutrients from sewage to enter the environment.	11.1 Dispose of sewage via an advanced package nutrient retentive wastewater treatment unit. 11.2 Install an appropriate sewage system on site.	11.1 Design stage, pre-commissioning. 11.2 Construction.	Department of Health WA, Town of Kwinana.
12	Visual amenity	To ensure the visual amenity of the region is not impacted by the Project.	12.1 Provide buffer plantings to screen the facility.	12.1 Pre-commissioning, construction and operation.	Town of Kwinana.
13	Aboriginal heritage	To ensure the requirements of the *Aboriginal Heritage Act, 1972*, are met.	13.1 Notify the Department of Indigenous Affairs if any indigenous artefacts or remains are uncovered during construction, as required by the *Aboriginal Heritage Act, 1972*.	13.1 Construction.	Department of Indigenous Affairs.
14	Risk and hazards	To ensure that at all stages of the plant's life it is managed and operated to minimise risk.	14.1 Hazard and Operability (HAZOP) studies will be completed as part of the plant design, construction and operation. 14.2 A Site Safety Plan will be prepared and implemented. This will include emergency response procedures as part of the overall Emergency Response Plan. Details will be provided to the Fire and Emergency Services Authority of WA and the Kwinana Industries Mutual Aid Group.	14.1 Design, construction and operation. 14.2 Pre-construction and commissioning. During operation.	Fire and Emergency Services Authority of WA and the Kwinana Industries Mutual Aid Group.

Source: Modified version of Table 10 from proponent's referral document (ENVIRON Australia Pty Ltd, 2002)