Pinjarra Cogeneration Project

Alinta Cogeneration (Alcoa Pinjarra) 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 Alinta Cogeneration (Alcoa Pinjarra) Pty Ltd to construct a natural gas fired cogeneration facility within Alcoa's Pinjarra Alumina Refinery.

Based on the information provided in the 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.alintagas.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

Alinta Cogeneration (Alcoa Pinjarra) Pty Ltd proposes to construct a natural gas fired cogeneration facility on a 2.5ha site located within Alcoa's Pinjarra Alumina Refinery (Figures 1, 2, and 3).

Alinta Cogeneration (Alcoa Pinjarra) Pty Ltd will own the facility and will supply steam to Alcoa for refinery purposes. Alinta Cogeneration (Alcoa Pinjarra) Pty Ltd will sell the power generated to customers within the South-West Interconnected System (SWIS). Alcoa will operate the facility within the framework of the Pinjarra refinery operations.

The cogeneration facility will be built in two stages, each comprising a self-contained unit. It is envisaged that each unit will be capable of generating up to 160 megawatts of electricity and up to 222 tonnes per hour of high pressure steam. All of the electrical power generated will be sold to customers connected to the South-West Interconnected System (SWIS). Waste heat from the gas turbines will be used to generate steam that will be used within the refinery.

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	
	Stage 1	**Stages 1 & 2**
Project Purpose.	To supply steam to the Alcoa Pinjarra Refinery and electricity to the SWIS grid.	To supply steam to the Alcoa Pinjarra Refinery and electricity to the SWIS grid.
Plant Operation.	Base Load Plant - Continuous operation, only shut down for maintenance.	Base Load Plant - Continuous operation, only shut down for maintenance.
Project Life.	20 years	22 years
Power Generating Capacity.	160MW (sent out)	320MW
High Pressure Steam Production ($7.2MPa_{(g)}$ at 475^oC).	222tph	444tph
Facility Footprint.	$5,600m^2$	$11,000m^2$
Net Water Loss: • Condensate losses from stack (with GT evaporative inlet air cooling). • Condensate losses from polishing condensate supply. • Condensate losses from cooling tower (GT and HRSG).[1]	 29ML/yr 12ML/yr 58ML/yr	 58ML/yr 23ML/yr 117ML/yr
Natural Gas Input (maximum).	15PJ/yr	30PJ/yr
Natural Gas Pipeline Extension.	160m	160m
Transmission lines.	300m	300m
Plant Facilities: • Number of Stacks. • Height of Stacks. • Number of Cooling Towers.	 1 40m 1 (3 cells)	 2 40m 1 (4 cells)
Gaseous Emissions: NO_X [2] CO_2 - gross[3] CO_2 - net [4]	 593tpa 907,500tpa 516,000tpa	 1,186tpa 1,815,000tpa 1,032,000tpa
Noise.	Tender for equipment supply will require compliance with the *Environmental Protection (Noise) Regulations, 1997*.	Tender for equipment supply will require compliance with the *Environmental Protection (Noise) Regulations, 1997*.
Liquid Effluent Discharges (blowdown returned to refinery).	220ML/yr	440ML/yr
Solid Waste (construction).	<20tpa	<30tpa
Solid Waste (operations).	<10tpa	<15tpa
Construction Period.	15 months	27 months
Workforce: • Construction (peak). • Operation.	 60 No additional permanent employees.	 60 No additional permanent employees.

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

Cogeneration unit generating capacity of up to 160MW per unit under consideration. Table reflects key characteristics for generating capacity of 160MW per unit.

Notes for Table 1:

(1) Water losses may be significantly reduced by installation of plume abatement technology under evaluation.

(2) The cogeneration plant will use dry low NO_X burners and emit less than 25ppmv NO_X (expressed at 0°C, 1013.25hPa (dry) and 15% O_2).

(3) Gross emissions for both electricity and steam production, without apportionment of fuel energy to steam and electricity, nor accounting for refinery energy savings through reduced fuel consumption in the existing boilers and efficiencies in steam use.

(4) Net project emissions for both electricity and steam production, taking account of refinery energy efficiency improvements.

Abbreviations for Table 1:

°C	degrees Celsius
CO_2	carbon dioxide
(g)	gauge pressure
GT	gas turbine
hPa	hectopascals
HRSG	heat recovery steam generator
m	metres
m^2	square metres
m^3/yr	cubic metres per year
MW	megawatts
ML/yr	megalitres per year
MPa	megapascals
NO_X	nitrogen oxides
O_2	oxygen
PJ/yr	petajoules per year
ppmv	parts per million by volume
SWIS	South West Interconnected System
tpa	tonnes per annum
tph	tonnes per hour

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

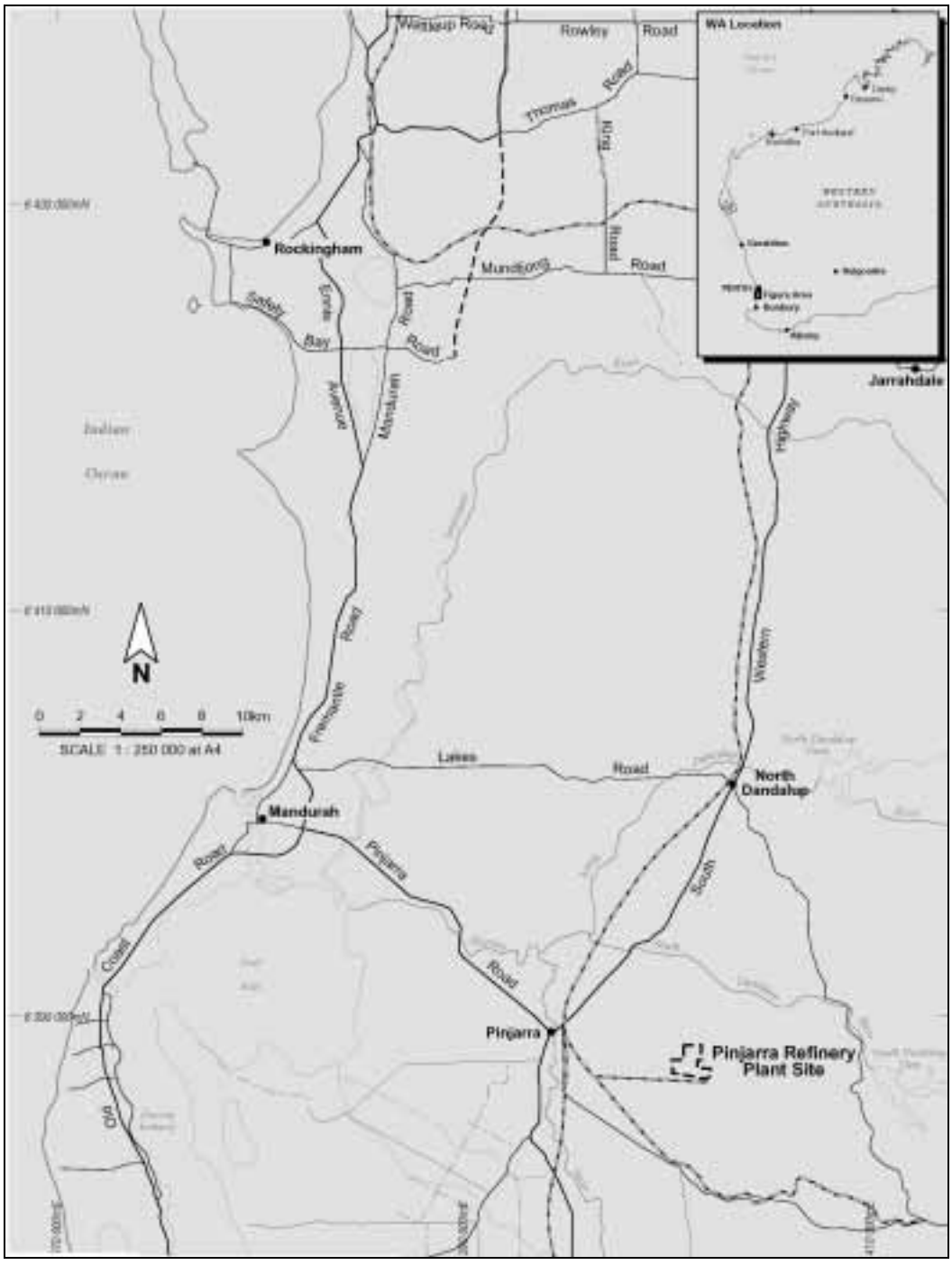

Figure 1: Regional location (Source: Figure 1 from ENVIRON Australia Pty Ltd, 2002)

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

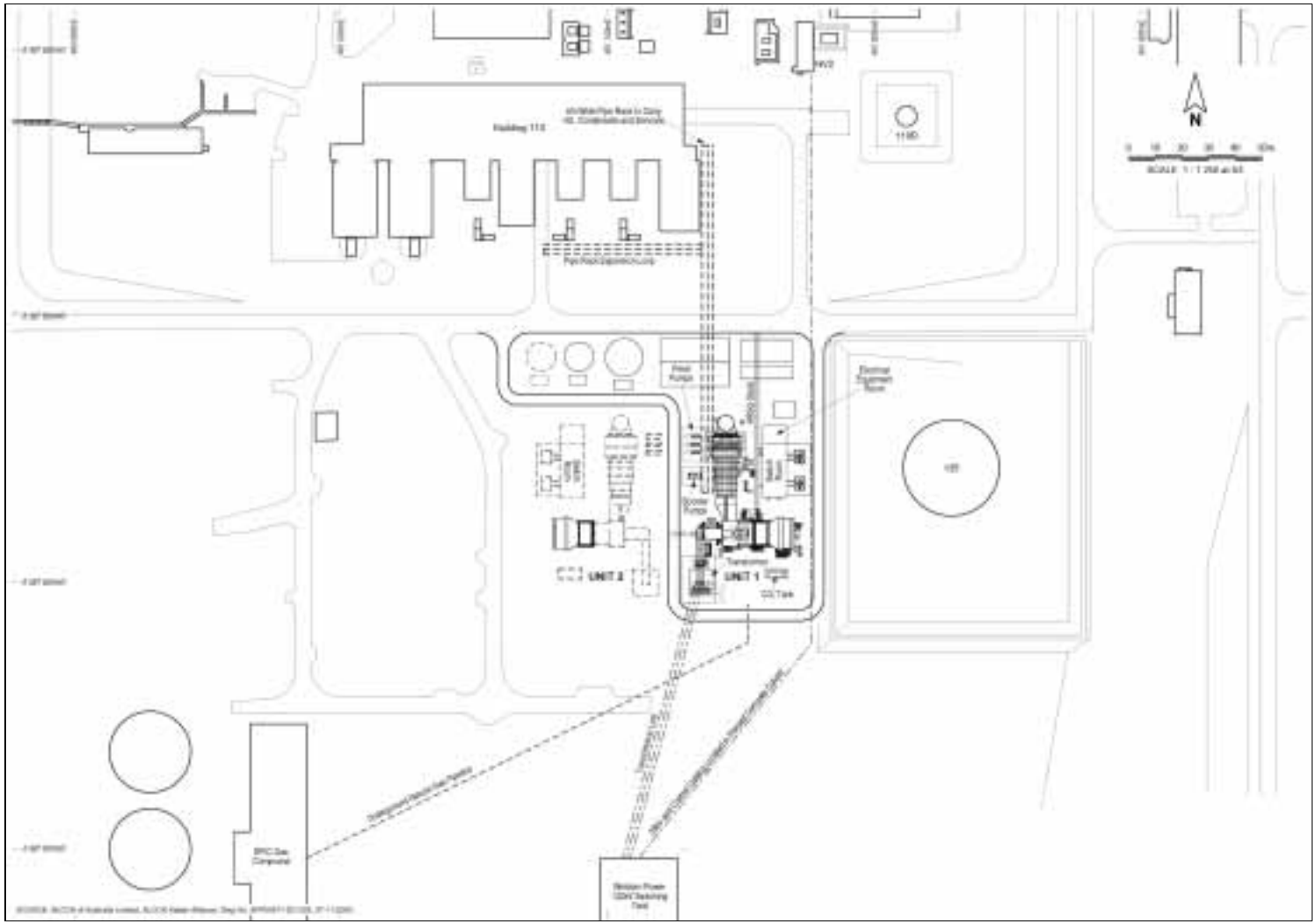

Figure 3: Proposed Stage 1 and Stage 2 cogeneration facility layout (Source: Figure 4 from ENVIRON Australia Pty Ltd, 2002)

3. Consultation

The first phase of community consultation has occurred with the following groups:

- Pinjarra refinery management - 11 September 2002.
- Pinjarra refinery powerhouse employees - 13 September 2002.
- Shire of Murray planning committee - 17 September 2002.
- Pinjarra refinery Community Consultative Network - 1 October 2002.
- Peel Chamber of Commerce - 16 October 2002.
- Peel Development Commission - 18 & 29 October 2002.

The second phase of consultation will involve:

- Pinjarra refinery neighbours - joint letter sent 20 November 2002.
- Local politicians - meetings scheduled based on availability in November 2002.
- John Bradshaw.
- David Templeman.
- Arthur Marshall.
- Don Randall.
- Murray Economic Development Unit - 28 November 2002.
- City of Mandurah CEO and Mayor - November 2002.
- Mandurah and Murray Shire residents - November media release.
- Pinjarra refinery contractors - early December 2002.
- Pinjarra refinery general workforce - December edition of Pinjarra News.
- Pinjarra residents - December edition of Pinjarra News.

Project updates also occur at regularly scheduled meetings with the:

- Shire of Murray, CEO and President - monthly meetings.
- Community Consultative Network - bi-monthly meeting.
- Murray Economic Development Unit - monthly meeting.

Meetings and presentations have been made to the following organisations:

- WA Greenhouse Taskforce - 12 August 2002.
- Environmental Protection Authority - 23 August 2002.
- Greens - July 2002 (MOU announcement), 30 October 2002.
- Conservation Council of WA and WA Cool Communities Coordinator - 17 October 2002.
- Department of Environment, Water and Catchment Protection (Environmental Assessment) - 12 November 2002.

Stakeholders in Government, both at the political and public service levels, and key industry organisations have been consulted. To date this has included:

- Eric Ripper, Minister for Energy - 20 September 2002.
- Department of Mineral and Petroleum Resources - 21 October 2002.
- Office of Energy - 7 November 2002.
- Office of the Minister for Energy - 15 November 2002.
- Treasury - 25 November 2002.
- Chamber of Commerce and Industry of WA - ongoing.

The stakeholder consultation performed to date has indicated a high level of interest in the project and many questions have been asked. So far, there has been no opposition to the project. However, the main areas of concern raised in discussions are outlined below:

- Will there be any additional emissions from the cogeneration plant?
- Will noise levels increase?
- Will local contractors be used in the construction?
- Will there be an increase in the number of employees required to run the cogeneration plant?
- How will project (electricity) attract local industry and small business development to the area?
- Will cheaper electricity be available to Pinjarra and Mandurah?
- Will Alinta provide natural gas to South Yunderup and Pinjarra light industrial area?

Noise and air emissions have been addressed in the proponent's referral document which indicates that they can be managed in an environmentally acceptable manner. In relation to the other issues raised above, these are not matters for the EPA to consider in this assessment.

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; and

(c) Noise and vibration.

Details on the relevant environmental factors and their assessment are contained in Sections 4.1 - 4.3. 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 both stages of the proposed cogeneration facility will produce approximately 1,186 tonnes of NO_X per year.

The proposed cogeneration facility will contribute a relatively minor amount to existing nitrogen dioxide (NO_2) levels in view of the results obtained from air dispersion modelling which indicate that the maximum 1-hour and annual average NO_2 concentrations at the nearest residence (near North Spur Road) will be about 13µg/m^3 and 0.1µg/m^3 (i.e. 5.3% and 0.16% of the NEPM standard), respectively during normal operation.

The predicted cumulative 1-hour and annual NO_2 concentrations at the nearest residence (near North Spur Road) will be about 40µg/m^3 and 0.8µg/m^3 (i.e. 16.3% and 1.3% of the NEPM standard), respectively. However, the predicted cumulative 1-hour and annual NO_2 concentrations will be about 50µg/m^3 and 0.3µg/m^3 (i.e. 20.3% and 0.48% of the NEPM standard), respectively at a slightly more distant residence near Napier Road.

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 consistent 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, the proposed cogeneration facility's specific NO_X emission rate of 0.3kg of NO_X per MWhr will be considerably less than that of 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 4 in the referral document). The specific NO_X emission rate of the Cockburn 1 - Replacement for Stage B at Kwinana Power Station (gas fired combined cycle portion) is predicted to be 0.29kg of NO_X per MWhr.

The proposed cogeneration facility'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 the following commitments to:

(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.

(2) 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

Operation of the proposed cogeneration facility will result in the net emission of approximately 1,032,000tpa of carbon dioxide (CO_2).

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 cogeneration facility will have a thermal efficiency of about 79%. The current average power supply thermal efficiency of the South West Interconnected System (SWIS) is approximately 31% (WPC, 2001). Table 8 in the referral document indicates that the cogeneration facility will have an average carbon intensity of 489kg of CO_2 per MWhr compared to the SWIS average of 888kg of CO_2 per MWhr for the year 2000. This represents an average reduction of about 45% over the SWIS average, and a significant reduction in greenhouse gas emissions per MW of electricity sent out. The proposed cogeneration facility will also lead to a substantial improvement in energy efficiency in Alcoa's refining operations, and will reduce greenhouse gas emissions from the refinery by approximately 267,000 tonnes per year (with both the Stage 1 and Stage 2 plants operating together) at the current alumina production rate.

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 ministerial condition 7 is applied to this proposal.

4.3 Noise and vibration

Operation of the proposed cogeneration facility will generate noise from numerous sources such as the gas turbines, heat recovery steam generators, cooling tower, fans, and pumps. The cogeneration facility is unlikely to generate significant levels of vibration.

The closest residences to the proposed cogeneration facility are located off North Spur Road 3.5km to the north-north-east and approximately 4.2km to the south, on the south side of Napier Road. Noise monitoring undertaken during a range of wind conditions has shown that the southern residences are more susceptible to noise propagation from the project site than those located to the north-north-east.

Preliminary noise modelling was completed for a cogeneration facility featuring two 120MW gas turbine units rather than the two 160MW units in this proposal. The results of the preliminary noise modelling indicate that operation of the proposed facility would increase noise levels at the Napier Road residences, and that noise attenuation needs to be included in the cogeneration facility's design to ensure compliance with the *Environmental Protection (Noise) Regulations, 1997*. The increase in total generating capacity from 240MW to 320MW will require close attention to be given to attenuation requirements and technology to ensure compliance with the *Environmental Protection (Noise) Regulations, 1997*. The proposal includes provision for the following noise attenuation elements to be incorporated into each cogeneration unit:

- acoustic treatment of the heat recovery steam generator (HRSG) casing and ductwork;
- silencers fitted to inlet and exhaust systems; and
- silencers fitted to safety valve outlets.

The EPA considers that attenuation elements may also need to be incorporated into the cooling tower and other significant noise sources within the proposed facility.

The tender package provided to prospective cogeneration equipment suppliers will include a requirement that the noise emissions from the cogeneration equipment will not result in any appreciable increase in noise impacts at nearby residences. Further noise modelling will be conducted during the project design phase using the actual noise specifications of the selected equipment to demonstrate that the operation of the proposed facility would not result in an increase in the noise levels at the Napier Road residences.

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

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

(2) Submit to the DEP for approval, relevant noise specifications for the detailed project design, and additional noise modelling based on these specifications.

(3) Implement the Australian Standard 2436-1981 'Guide to noise control on construction, maintenance and demolition sites' during construction, and schedule construction activities to minimise additional sources of noise outside the hours of 07.00-19.00. Communicate with potentially affected neighbours when exceptional circumstances require extension of noisy activities outside this period.

(4) Confirm compliance with the noise regulations through an appropriate monitoring and modelling program. Submit a noise monitoring and assessment report to the DEP for approval to demonstrate compliance with the *Environmental Protection (Noise) Regulations,* 1997.

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.

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 Alinta Cogeneration (Alcoa Pinjarra) Pty Ltd to construct a natural gas fired cogeneration facility within Alcoa's Pinjarra Alumina Refinery.

Nitrogen oxides (NO_X)

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

Greenhouse gas emissions

Operation of the proposed cogeneration facility will result in the net emission of approximately 1,032,000tpa of CO_2 per year. The cogeneration facility will have a thermal efficiency of about 79%. The current average power supply thermal efficiency of the South West Interconnected System (SWIS) is approximately 31% (WPC, 2001). The cogeneration facility will have an average carbon intensity of 489kg of CO_2 per MWhr compared to the SWIS average of 888kg of CO_2 per MWhr for the year 2000. This represents an average reduction of about 45% over the SWIS average, and a significant reduction in greenhouse gas emissions per MW of electricity sent out. The proposed cogeneration facility will also lead to a substantial improvement in energy efficiency in Alcoa's refining operations, and will reduce greenhouse gas emissions from the refinery by approximately 267,000 tonnes per year (with both the Stage 1 and Stage 2 plants operating together) at the current alumina production rate. 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 applied to the proposal.

Noise and vibration

Noise modelling has indicated that in order for the proposed cogeneration facility to comply with the most stringent criteria of the *Environmental Protection (Noise) Regulations, 1997*, close attention will need to be given to the application of appropriate noise attenuation measures within the facility. Vibration from the proposed facility is unlikely to impact on surrounding residences. Given the proponent's commitments, the EPA concludes that the proposal can be managed to meet the EPA's environmental objective for this factor.

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 of a natural gas fired cogeneration facility within Alcoa's Pinjarra Alumina Refinery;
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). Pinjarra Cogeneration Project - 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.

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)

PINJARRA COGENERATION PROJECT

Proposal: The construction of a natural gas fired cogeneration facility on a 2.5ha site located within Alcoa's Pinjarra Alumina Refinery. The proposal is documented in schedule 1 of this statement.

Proponent: Alinta Cogeneration (Alcoa Pinjarra) Pty Ltd

Proponent Address: Alinta Cogeneration (Alcoa Pinjarra) Pty Ltd
C/o AlintaGas Limited
GPO Box W2030
PERTH WA 6846

Assessment Number: 1462

Report of the Environmental Protection Authority: Bulletin 1081

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.

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. 1462)

Alinta Cogeneration (Alcoa Pinjarra) Pty Ltd proposes to construct a natural gas fired cogeneration facility on a 2.5ha site located within Alcoa's Pinjarra Alumina Refinery (Figures 1, 2, and 3).

Alinta Cogeneration (Alcoa Pinjarra) Pty Ltd will own the facility and will supply steam to Alcoa for refinery purposes. Alinta Cogeneration (Alcoa Pinjarra) Pty Ltd will sell the power generated to customers within the South-West Interconnected System (SWIS). Alcoa will operate the facility within the framework of the Pinjarra refinery operations.

The cogeneration facility will be built in two stages, each comprising a self-contained unit. It is envisaged that each unit will be capable of generating up to 160 megawatts of electricity and up to 222 tonnes per hour of high pressure steam. All of the electrical power generated will be sold to customers connected to the South-West Interconnected System (SWIS). Waste heat from the gas turbines will be used to generate steam that will be used within the refinery.

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

Table 1: Key proposal characteristics

Element	Description	
	Stage 1	**Stages 1 & 2**
Project Purpose.	To supply steam to the Alcoa Pinjarra Refinery and electricity to the SWIS grid.	To supply steam to the Alcoa Pinjarra Refinery and electricity to the SWIS grid.
Plant Operation.	Base Load Plant - Continuous operation, only shut down for maintenance.	Base Load Plant - Continuous operation, only shut down for maintenance.
Project Life.	20 years	22 years
Power Generating Capacity.	160MW (sent out)	320MW
High Pressure Steam Production ($7.2MPa_{(g)}$ at 475^oC).	222tph	444tph
Facility Footprint.	$5,600m^2$	$11,000m^2$
Net Water Loss: • Condensate losses from stack (with GT evaporative inlet air cooling). • Condensate losses from polishing condensate supply. • Condensate losses from cooling tower (GT and HRSG).(1)	 29ML/yr 12ML/yr 58ML/yr	 58ML/yr 23ML/yr 117ML/yr
Natural Gas Input (maximum).	15PJ/yr	30PJ/yr
Natural Gas Pipeline Extension.	160m	160m
Transmission lines.	300m	300m

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

Table 1: Key proposal characteristics (Continued)

Element	Description	
	Stage 1	**Stages 1 & 2**
Plant Facilities: • Number of Stacks. • Height of Stacks. • Number of Cooling Towers.	 1 40m 1 (3 cells)	 2 40m 1 (4 cells)
Gaseous Emissions: NO_X (2) CO_2 - gross(3) CO_2 - net (4)	 593tpa 907,500tpa 516,000tpa	 1186tpa 1,815,000tpa 1,032,000tpa
Noise.	Tender for equipment supply will require compliance with the *Environmental Protection (Noise) Regulations, 1997*.	Tender for equipment supply will require compliance with the *Environmental Protection (Noise) Regulations, 1997*.
Liquid Effluent Discharges (blowdown returned to refinery).	220ML/yr	440ML/yr
Solid Waste (construction).	<20tpa	<30tpa
Solid Waste (operations).	<10tpa	<15tpa
Construction Period.	15 months	27 months
Workforce: • Construction (peak). • Operation.	 60 No additional permanent employees.	 60 No additional permanent employees.

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

Cogeneration unit generating capacity of up to 160MW per unit under consideration. Table reflects key characteristics for generating capacity of 160MW per unit.

Notes for Table 1:

(1) Water losses may be significantly reduced by installation of plume abatement technology under evaluation.

(2) The cogeneration plant will use dry low NO_X burners and emit less than 25ppmv NO_X (expressed at 0°C, 1013.25hPa (dry) and 15% O_2).

(3) Gross emissions for both electricity and steam production, without apportionment of fuel energy to steam and electricity, nor accounting for refinery energy savings through reduced fuel consumption in the existing boilers and efficiencies in steam use.

(4) Net project emissions for both electricity and steam production, taking account of refinery energy efficiency improvements.

Abbreviations for Table 1:

°C	degrees Celsius
CO_2	carbon dioxide
(g)	gauge pressure
GT	gas turbine
hPa	hectopascals
HRSG	heat recovery steam generator
m	metres
m^2	square metres
m^3/yr	cubic metres per year
MW	megawatts
ML/yr	megalitres per year
MPa	megapascals
NO_X	nitrogen oxides
O_2	oxygen
PJ/yr	petajoules per year
ppmv	parts per million by volume
SWIS	South West Interconnected System
tpa	tonnes per annum
tph	tonnes per hour

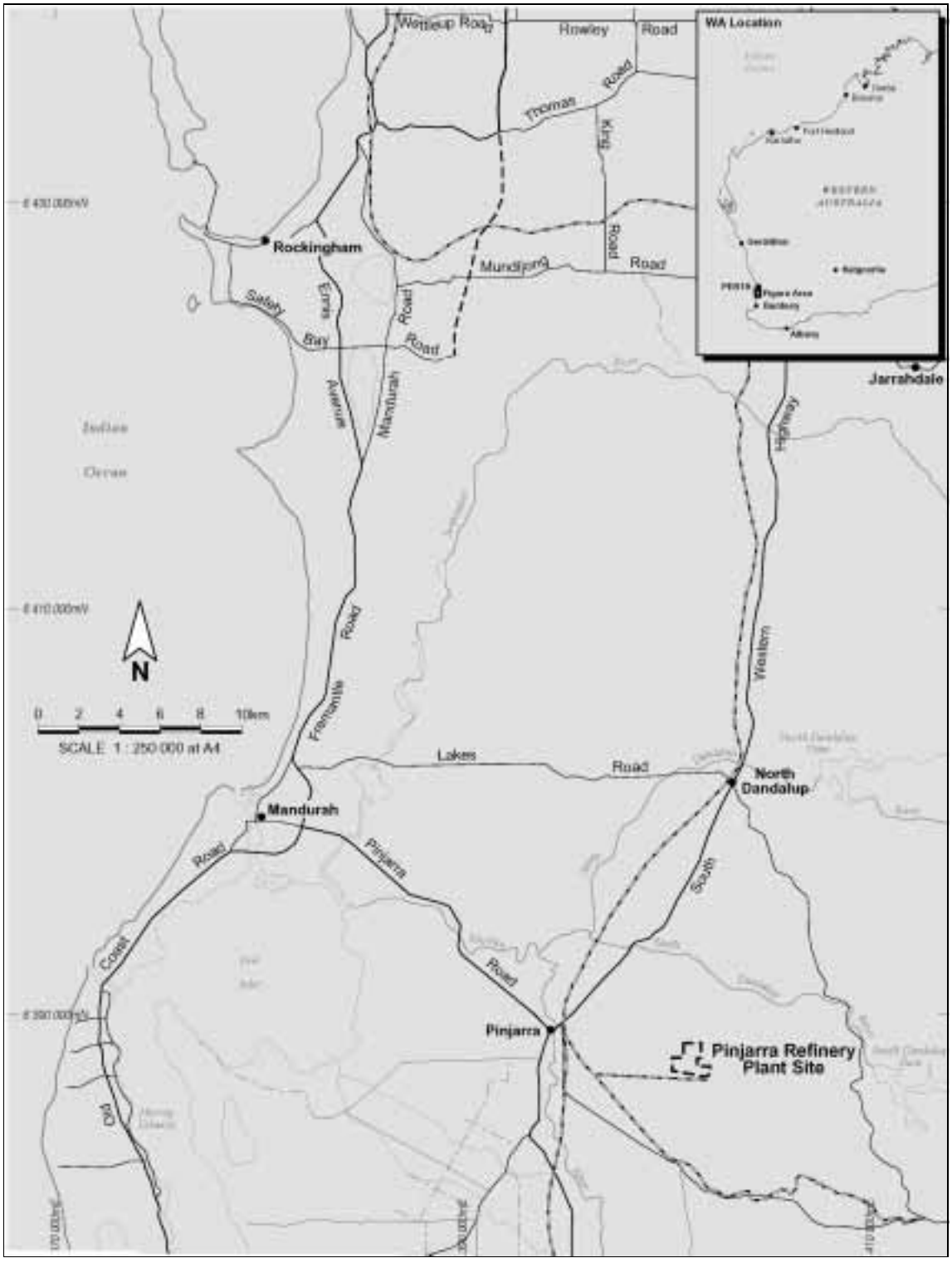

Figure 1: ***Regional location (Source: Figure 1 from ENVIRON Australia Pty Ltd, 2002)***

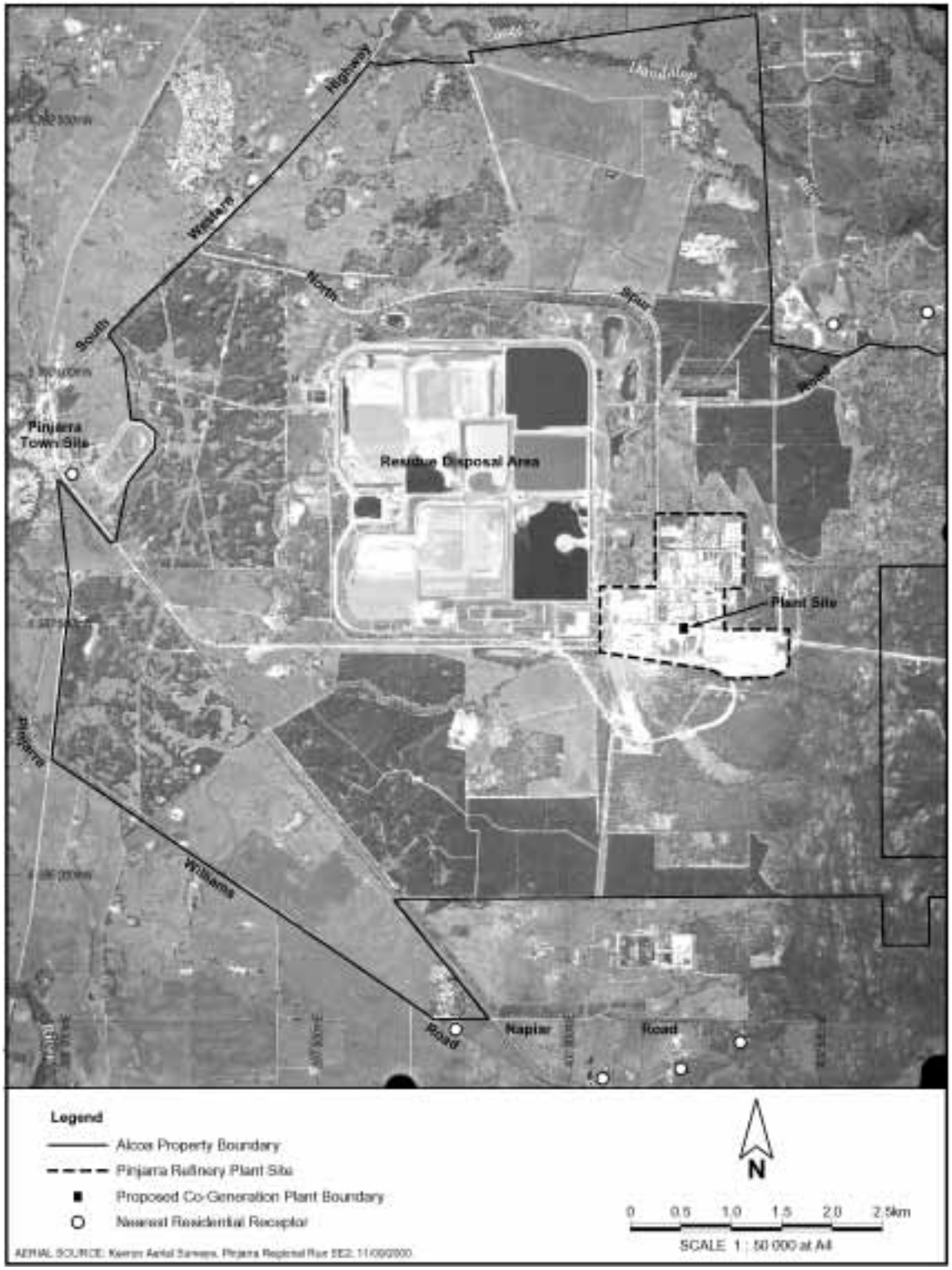

Figure 2: Location plan (Source: Figure 2 from ENVIRON Australia Pty Ltd, 2002)

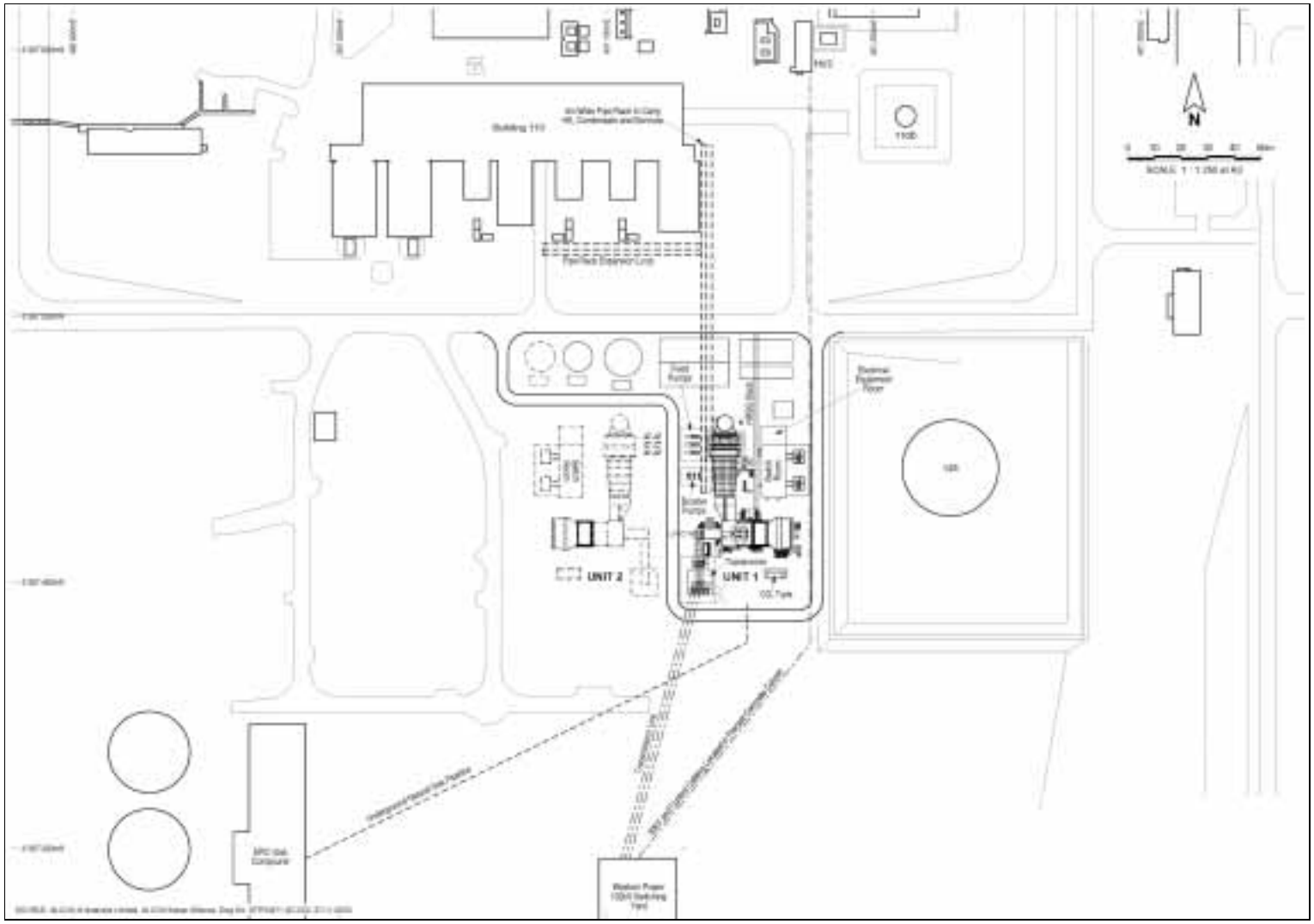

Figure 3: Proposed Stage 1 and Stage 2 cogeneration facility layout (Source: Figure 4 from ENVIRON Australia Pty Ltd, 2002)

Schedule 2

Proponent's Consolidated Environmental Management Commitments (Assessment No. 1462)

	Topic	Objective	Action	Timing	Advice
1	Noise	To protect the amenity of nearby residents from noise impacts.	1.1 Incorporate appropriate noise attenuation measures into project design to reduce noise levels from the proposed plant to as low as is reasonably practicable.	1.1 Project design and construction.	Gas turbine manufacturer, design engineers and noise consultant.
			1.2 Submit to the DEP for approval, relevant noise specifications for the detailed project design, and additional noise modelling based on these specifications.	1.2 Project design.	
		Acceptable noise impacts during construction.	1.3 Implement the Australian Standard 2436-1981 'Guide to noise control on construction, maintenance and demolition sites' during construction, and schedule construction activities to minimise additional sources of noise outside the house of 07.00-19.00. Communicate with potentially affected neighbours when exceptional circumstances require extension of noisy activities outside this period.	1.3 Project construction.	Noise consultant and neighbours.
		Confirm noise management objectives achieved.	1.4 Confirm compliance with the noise regulations through an appropriate monitoring and modelling program. Submit a noise monitoring and assessment report to the DEP for approval to demonstrate compliance with the *Environmental Protection (Noise) Regulations, 1997*.	1.4 On completion of Alcoa's current noise abatement program (end of 2002) and post-commissioning of cogeneration project	Noise consultant and Alcoa.
2	Water consumption	Optimise re-use of water within the project and the refinery.	2.1 Design water flows for the project to maximise water recycling and re-use.	2.1 Project design and operation.	Design engineers, Alcoa, Water Corporation and DEP.
		Confirm predicted water consumption.	2.2 Monitor project water consumption as part of the ongoing refinery water balance studies and fresh water use reduction plan.	2.2 Post-commissioning and ongoing periodic evaluation.	Design engineers and Alcoa.

Source: Modified version of Table 9 from proponent's referral document (ENVIRON Australia Pty Ltd, 2002)

Proponent's Consolidated Environmental Management Commitments (Assessment No. 1462) [Continued]

	Topic	Objective	Action	Timing	Advice
3	NO_X Emissions	Ensure that NO_x emissions are as low as is reasonably practicable and meet statutory requirement and recognised national standards including the NEPM for Ambient Air Quality and the requirements of Section 51 of the *Environmental Protection Act* 1986.	3.1 Incorporate dry low NO_X burners into the plant design which are capable of consistently achieving NO_X emission concentrations of 25ppmv or below.	3.1 Project design and construction.	Gas turbine manufacturer, Alcoa.
		Confirm NO_x management objectives are met and to meet licensing and NPI reporting requirements.	3.2 Sample, analyse and report on the stack emissions for NO_X on a six-monthly basis until performance is established and thereafter annually.	3.2 Post-commissioning six-monthly until performance is established and then annually thereafter.	Monitoring consultants, Alcoa.
4	Environmental Management	To ensure construction, operation and decommissioning phases of the project are managed to minimise environmental impacts and comply with relevant regulatory and company standards and guidelines.	4.1 Prepare an environmental management program for the project to be used within the framework of Alcoa's existing Environmental Management System (EMS) for the refinery.	4.1 Prior to construction.	Alcoa and accredited ISO 14001 certifier.
		Confirm the operational environmental performance objectives of the project and applicable standards and conditions are met and to promote continual improvement.	4.2 Implement the environmental management program.	4.2 During construction and operation of the project.	
			4.3 Audit the environmental performance of the project in the context of Alcoa's existing refinery.	4.3 Periodically throughout the life of the project, including annual reporting.	Alcoa Audit and accredited ISO 14001 certifier. Periodic DEP inspection/audit.
5	Community Consultation	Keep the local community and other interested stakeholders informed of the development and operation of the project and respond to concerns and input of ideas.	5.1 Ongoing community and stakeholder consultation program.	5.1 Throughout the life of the project, with particular emphasis during project planning, approval and design.	Relevant local and regional authorities, Pinjarra Refinery Community Consultative Network, neighbours, other interested community groups, elected representatives and relevant government agencies.
6	Risk Management	Ensure the cogeneration plant does not compromise existing occupational and public safety standards.	6.1 Undertake qualitative risk assessment for the project within the overall refinery context.	6.1 Detailed project design.	Alcoa and relevant government agencies.
		As above.	6.2 Incorporate results of risk assessment in project design, construction and operation.	6.2 Project design, construction and operation.	

Source: Modified version of Table 9 from proponent's referral document (ENVIRON Australia Pty Ltd, 2002)