

**Air Separation Unit  
Kwinana**

**Liquid Air Pty Ltd**

**Report and Recommendations  
of the  
Environmental Protection Authority**

Environmental Protection Authority

Perth Western Australia

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**Air Separation Unit  
Kwinana**

**Liquid Air WA Pty Ltd**

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## Summary and Recommendations

Liquid Air WA Pty Ltd proposes to establish an Air Separation Unit to produce liquid oxygen, nitrogen and argon, and gaseous oxygen and nitrogen at Lot 129 Leath Road, Naval Base, immediately north of Wesfarmers Ltd's LPG extraction plant, and adjacent to Mason Road. The proposed plant would supply oxygen and nitrogen to the Cooljarloo Joint Venture (CJV) pigment plant, and the local merchant market. The pigment plant will require up to 35,000 tonnes per annum (t/a) of oxygen and 30,000 t/a of nitrogen. Argon and additional liquid oxygen would be produced for the local domestic market. The Air Separation Unit has been designed with sufficient capacity and area to expand, so as to be capable of supplying additional major industry in the Kwinana area.

The proponent is Liquid Air WA Pty Ltd, a Western Australian based subsidiary of Liquid Air Australia Ltd, which is in turn a subsidiary of Air Liquide International, France. Liquid Air WA Pty Ltd is 40% owned by Wesfarmers Ltd, a Western Australian based company with rural, manufacturing and gas industry interests. Liquid Air Australia Ltd also has operations in Victoria, New South Wales, Queensland, South Australia and Tasmania.

This proposal is essentially a replacement for the air separation plant proposed by Cooljarloo Joint Venture as part of their pigment plant. That proposal was assessed by the Environmental Protection Authority and found to be environmentally acceptable. CJV subsequently decided not to produce their own nitrogen and oxygen, but to purchase it from another supplier.

The proposal has low potential for environmental impact, the relevant Decision-Making Authorities have already considered the new proposal in some detail, and the key environmental matters had been dealt with in the previous assessment. The level of assessment was set at Consultative Environmental Review (CER). The Environmental Protection Authority consulted with Department of Resources Development, Kwinana Town Council, Department of Urban Development and Planning, and Department of Mines. The advice from these agencies is incorporated in relevant sections of this assessment report.

The process involves the compression, cooling and drying of air, which is then passed through a series of vaporization and cooling steps to achieve separation into pure nitrogen and oxygen. These are delivered to their respective pipelines as gases. Part of the liquefied nitrogen and oxygen are sent to storage. From there they can be supplied to local markets by road tanker, or can be revaporized to provide a standby gaseous supply during periods of plant shutdown.

The production of argon commences with compression and cooling of crude argon from the main air liquefier.

Small quantities of hydrogen gas are then added and the oxygen in the crude argon is converted into water by catalytic reaction with hydrogen. The deoxygenated argon is then cooled and dried, liquefied and fed into the pure argon column where nitrogen is removed. Pure liquid argon from this column is then passed to the storage tank.

To allow for fluctuations in demand and for periods of shutdown of the air separation unit, it is proposed to provide storage adequate to maintain supplies for at least 10 days. Liquid oxygen would be stored in two 500 m<sup>3</sup> capacity liquid oxygen storage cylinders and held at -184°C at atmospheric pressure. Liquid nitrogen would be stored at -196°C at atmospheric pressure in two 500 m<sup>3</sup> capacity cylinders. The liquid argon would be stored in a 50 m<sup>3</sup> capacity liquid argon storage tank.

Gaseous oxygen, nitrogen and compressed air would be transported to the CJV facility via separate 150 mm diameter pipelines. These pipelines would cross under Mason Road directly west of the proposed air separation plant and would then be routed southward along Mason Road to the metering station of the pigment plant. For other parts of the local market the liquid oxygen, nitrogen and argon product would be transported separately in cryogenic tankers.

The estimated power requirements would be 6.5-7.0 MW. Due to evaporative losses, up to about 44 m<sup>3</sup>/h of water would be required as make-up to the cooling water in circulation. This water would be obtained from existing Water Authority water mains, via the Wesfarmers LPG Plant water treatment unit.

Once all approval requirements are met, the Air Separation Unit would be constructed in twelve months with a view to commissioning in early 1991.

The proposed Air Separation Unit would not produce atmospheric wastes during operations. In essence, the oxygen, nitrogen and argon components of the air are removed, allowing the remaining components to be returned to the atmosphere.

The Air Separation Unit would not produce water wastes.

The air separation process would produce no solid wastes. Domestic solid wastes would be disposed of to the satisfaction of the local authority.

It is proposed that the plant would be designed to comply with the requirements of the Noise Abatement (Neighbourhood Annoyance) Regulations, 1979 (as amended) of the Environmental Protection Act, 1986.

In carrying out this assessment, it has been recognised that it is unwarranted for the high level of environmental protection controls placed on the Cooljarloo Joint Venture pigment plant and chlor-alkali plant to be transferred to the Air Separation Unit. Therefore, the Environmental Protection Authority considers it appropriate that the number and complexity of the Conditions attached to the original Ministerial Statement that a Proposal May Be Implemented, dated 26 April 1989, for the air separation plant component of the CJV project could be reduced to those below without compromising the level of environmental protection.

## **Recommendation 1**

The Environmental Protection Authority concludes that the proposal to construct and operate an Air Separation Unit as described in the "Notification of Intention" is environmentally acceptable and recommends that it could proceed subject to the Environmental Protection Authority's recommendations in this report and environmental commitments made by the proponent in the "Notification of Intention".

The impact on the landscape of the proposed plant and associated facilities would be minor when compared with their immediate industrial context. However the Authority recognises that Kwinana Town Council is endeavouring to improve the aesthetic qualities of the industrial area.

## **Recommendation 2**

The Environmental Protection Authority recommends that the proponent carry out landscaping of the site to the satisfaction of Kwinana Town Council to a timetable agreed to by Kwinana Town Council.

The proponent has stated that, during the construction phase of the project, the necessary measures would be taken to ensure that noise and dust caused by construction activities are minimised. The Environmental Protection Authority believes that adequate controls exist under the Pollution Control Provisions of the Environmental Protection Act, 1986 to control dust and noise from these premises should a problem arise during plant construction or during operation.

In the documentation provided, the proponent has stated that a number of safety features will be incorporated into the design and operation of the air separation plant and associated facilities. However, for the regulation of public safety aspects of the proposal, the Authority makes the following recommendation.

## **Recommendation 3**

The Environmental Protection Authority recommends that, prior to commissioning, the proponent should prepare a comprehensive hazard identification and risk management programme for the Air Separation Unit to the satisfaction of the Environmental Protection Authority upon the advice of the Department of Mines. This should include, but not necessarily be limited to:

- a Total Hazard Control Plan;
- provision of adequate protection against the effects of possible fires on the LPG Plant site;
- development of on-site emergency procedures;
- co-operation in the Kwinana Integrated Emergency Management Scheme;

and

- safety review of the hydrogen gas supply and any storage.

As fulfilment of the above recommendation will ensure that there are no release events on this site which could have off-site consequences, development of this proposal would have no significant influence on cumulative risk levels in residential areas.

# Introduction

## 1.1 Background

Liquid Air WA Pty Ltd proposes to establish an Air Separation Unit to produce liquid oxygen, nitrogen and argon, and gaseous oxygen and nitrogen. The proposed site for the Air Separation Unit and associated facilities is Lot 129 Leath Road, Naval Base, immediately north of Wesfarmers Ltd's LPG extraction plant, and adjacent to Mason Road (Figure 1). The proposed plant would supply oxygen and nitrogen to the Cooljarloo Joint Venture (CJV) pigment plant, and the local merchant market. The 54,000 t/a titanium dioxide pigment plant will require up to 35,000 tonnes per annum (t/a) of oxygen and 30,000 t/a of nitrogen. The Air Separation Unit has been designed with sufficient capacity and area to expand so as to be capable of supplying additional major industry in the Kwinana area.

CJV has recently been granted environmental approval, in the form of Ministerial Statements, to establish a fully integrated mineral sands processing industry in Western Australia. This project involves three major components: mining at Cooljarloo, separation of the heavy minerals and ilmenite upgrading at Muchea, and production of titanium dioxide pigment at a plant located adjacent to the BP refinery, Kwinana.

The pigment plant itself was assessed by the Environmental Protection Authority as three units: a titanium dioxide pigment plant, a chlorine plant, and an air separation plant. The report on the assessment was published as EPA Bulletin 373 in February, 1989. Separate Ministerial Statements were issued for each unit because the overall proponent, CJV, anticipated that chlorine and air could be supplied by others. A special Ministerial Condition was incorporated in each Statement to allow for easy transfer of environmental conditions to new proponents should this be required.

Initial documentation for the transfer of responsibility for the air separation plant was received by the Environmental Protection Authority in May 1989, with Liquid Air as the new proponent. However, since the plant was to be located on another site, and because the storage capacity was to be increased substantially, the Authority determined that it was a new proposal requiring further assessment.

The Level of Assessment was set as Consultative Environmental Report on November 6, 1989. The proponent's documentation included a "Notification of Intention" and an updated layout plan.

## 1.2 The proponent

The proponent is Liquid Air WA Pty Ltd, a Western Australian based subsidiary of Liquid Air Australia Ltd, which is in turn a subsidiary of Air Liquide International, France. Liquid Air WA Pty Ltd is 40% owned by Wesfarmers Ltd, a Western Australian based company

with rural, manufacturing and gas industry interests. Liquid Air Australia Ltd also has operations in Victoria, New South Wales, Queensland, South Australia and Tasmania.

The primary activity of the proponent is the manufacture and distribution of a wide range of gases, such as oxygen, acetylene, carbon dioxide, argon, medical air and medical oxygen. Additional activities include the manufacture and installation of gas pipelines and bulk tanks, and the selling of welding plant, equipment and spare parts.

## 1.3 Assessment process

The proposal for an air separation plant on the CJV site was assessed at ERMP level as part of the pigment plant proposal. Setting of Ministerial Conditions for the new Air Separation Unit proposal is possible only if a new formal assessment is carried out.

However, the proposal has low potential for environmental effects, the relevant Decision-Making Authorities had already considered the new proposal in some detail, and all environmental matters had been dealt with in the previous assessment. Consequently, it was decided that the appropriate level of assessment was Consultative Environmental Review (CER). Consultation was with:

- Department of Resources Development because of its responsibilities under the Agreement Act for CJV;
- Kwinana Town Council as the Local Authority;
- Department of Urban Development and Planning because of its planning responsibilities for the Kwinana Industrial Area; and
- Department of Mines because of its role in public safety issues.

The advice from these agencies is incorporated in relevant sections of this assessment report.

## 1.4 Previous statement

The previous air separation plant proposal was assessed as part of the pigment plant and, as a result, when Ministerial Conditions were set, some additional conditions were imposed which were applicable in that context for consistency, but are unnecessary for an air separation plant in isolation. Consequently a number of those original Conditions are considered inappropriate to the present proposal.

A copy of the Ministerial Statement is attached to this report as Appendix 1. The reason for not transferring certain Conditions are as follows:

Condition 2 - Construction stage impacts can be adequately handled by existing pollution control requirements.

Condition 3 - There is no potential for additional impact during startup.

Condition 4 - This can be simplified due to low intrinsic risk levels.

Condition 5 - This can be included in the Total Hazard Control Plan under a simplified Condition 4.

Condition 6 - As for Condition 5.

Condition 7 - The plant is not a significant user of water.

Condition 8 - The only gases emitted are unextracted portions of the intake air.

Condition 9 - Noise is controllable under the Environmental Protection Act, 1986.

Condition 10 - An Environmental Management Programme is not necessary.

An appropriate set of environmental commitments made by the proponent would be attached to any Ministerial Statement for this proposal.

## 2 The proposal

### 2.1 Scope

It is proposed to establish an air separation plant, containing a single air column and air compressor, to produce liquid oxygen, nitrogen and argon, and gaseous oxygen and nitrogen.

Negotiations between CJV and the proponent have resulted in contracts for the supply of:

- 120 tonnes per day (t/d) of gaseous oxygen;  
and
- 100 t/d of gaseous nitrogen.

Argon and an additional 50 t/d of liquid oxygen would be produced for the local domestic market.

To produce high purity argon, a hydrogen source would be required. Negotiations are in progress for supply of hydrogen from the chlorine plant to be operated on the pigment plant site. The hydrogen would be piped to the Air Separation Unit via a 50 mm diameter line.

### 2.2 The plant

The proposed site layout of the air separation plant and associated facilities is shown in Figure 2.

The height of the tallest component, the air column, would be approximately 40 metres. The four initial storage cylinders would be 40 metres long and 4.9 metres in diameter.

Some of the features of the plant would be:

- all pressure vessels and piping used for cryogenic service would be constructed with stainless steel or aluminium;
- most pipe connections would be welded, with flanged connections used only for certain control valves and expansion turbines for ease of maintenance;

- the air separation plant would be automatic in normal steady state operations, with manual control required only for product flow re-adjustment;
- all critical components would be duplicated;  
and
- the plant would contain a number of safety features including appropriate safety valves, purges, de frosting and monitoring devices.

### 2.3 Process description

A simplified process flow chart is shown in Figure 3. Air is compressed, cooled and dried, then passes through a series of vaporization and cooling steps to achieve separation into pure nitrogen and oxygen. These are delivered to their respective pipelines as gases.

Part of the liquefied nitrogen and oxygen are sent to storage. From there they can be supplied to local markets by road tanker, or can be revaporized to provide a standby gaseous supply during periods of plant shutdown.

The production of argon commences with compression and cooling of crude argon from the main air liquefier. Small quantities of hydrogen gas are then added and the oxygen in the crude argon is converted into water by catalytic reaction with hydrogen. The deoxygenated argon is then cooled to 5°C and dried. It is then further cooled, liquefied and fed into the pure argon column where nitrogen is removed. Pure liquid argon from this column is then passed to storage tank.

### 2.4 Waste products and disposal

Cooling in the plant would be by water evaporation. The circulating water flow rate would be 887 cubic metres per hour (m<sup>3</sup>/h), with blowdown for maintenance of Total Dissolved Solids (TDS) levels being approximately 5%, or 44 m<sup>3</sup>/h. Blowdown water would be treated and reused for cooling.

Components of the incoming air which would be vented back into the atmosphere during air purification operations include:

- carbon dioxide;
- water vapour; and
- any hydrocarbons.

### 2.5 Product handling

#### 2.5.1 Product storage

To allow for fluctuations in demand and for periods of shutdown of the air separation unit, it is proposed to provide storage adequate to maintain supplies to CJV for at least 10 days. It should be noted that this is the major change in specifications for the plant, as the proposed plant on the the CJV site allowed for only about one day's storage.

Liquid oxygen would be stored in two 500 m<sup>3</sup> capacity liquid oxygen storage cylinders and held at minus 184°C at atmospheric pressure.

Liquid nitrogen would be stored at minus 196°C at atmospheric pressure in two 500 m<sup>3</sup> capacity cylinders.

The liquid argon would be stored in a 50 m<sup>3</sup> capacity liquid argon storage tank.

All storage vessels would be double-walled, with a vacuum in the space between the walls to provide insulation. These vessels must be approved by the Department of Occupational Health Safety and Welfare.

### 2.5.2 Product transport

Gaseous oxygen, nitrogen and compressed air would be transported to the CJV facility via separate 150 mm diameter pipelines. These pipelines would cross under Mason Road directly west of the proposed air separation plant and would then be routed southward along Mason Road to the metering station of the pigment plant.

For other parts of the local market the liquid oxygen, nitrogen and argon products would be transported separately in cryogenic tankers. During the initial stages, an average of one tanker per day would transport these products for distribution in the domestic market. In the long term, it is anticipated that an average of 2.5 tankers per day would be required on a similar basis. Design and construction of the tankers would comply with the appropriate legislation pertaining to the transportation of dangerous goods.

## 2.6 Power and water requirements

The estimated power requirements would be 6.5-7.0 MW. This would be obtained from the existing power grid in the Kwinana area established by the State Energy Commission of Western Australia (SECWA).

Due to evaporative losses, up to about 44 m<sup>3</sup>/h of water would be required as make-up to the cooling water in circulation. This water would be obtained from existing Water Authority water mains, via the Wesfarmers LPG Plant water treatment unit.

## 2.7 Construction

The construction of the plant, involving principally the assembly of prefabricated pipelines and tankage, would require a temporary workforce of twenty-five to thirty people.

All construction materials and practices would comply strictly with relevant Australian or, where Australian codes do not exist, internationally accepted codes of practice.

## 2.8 Operation

The plant would be designed to operate continuously. Plant employees (approximately four) would be en-

gaged in operating and maintaining the plant. Work would be carried out on a shift basis.

The efficiency of the plant's operation would be maximized by the use of computer control systems, regular preventative maintenance, duplication of major equipment items and safeguards, such as fire protection, monitoring, back-up systems and provisions for emergency shutdowns.

## 2.9 Project schedule

Once all approval requirements are met, the air separation plant could be constructed in twelve months. The proponent anticipates that the plant would be commissioned in early 1991.

# 3 Environmental impact

## 3.1 Introduction

In carrying out this assessment, it has been recognised that it is unwarranted for the high level of environmental protection controls placed on the Cooljarloo Joint Venture pigment plant and chlor-alkali plant to be transferred to the Air Separation Unit. Therefore, the Environmental Protection Authority considers it appropriate that the number and complexity of the Conditions attached to the original Ministerial Statement that a Proposal May Be Implemented, dated 26 April 1989, for the air separation plant component of the CJV project could be reduced to those below without compromising the level of environmental protection.

## Recommendation 1

**The Environmental Protection Authority concludes that the proposal to construct and operate an Air Separation Unit as described in the "Notification of Intention" is environmentally acceptable and recommends that it could proceed subject to the Environmental Protection Authority's recommendations in this report and environmental commitments made by the proponent in the "Notification of Intention".**

## 3.2 Atmospheric discharges

The proposed Air Separation Unit would not produce atmospheric wastes during operations. Instead, the process returns unused components of the air. In essence, only the oxygen, nitrogen and argon components are removed, allowing the remaining components to be returned to the atmosphere.

Carbon dioxide is not normally regarded as an atmospheric contaminant and, due to the nature, quantity and method of discharging of this emission, no significant impact on the surrounding area would occur. The plant would have no influence on the level of Greenhouse gases.

The discharge of water vapour into the atmosphere would not constitute any impact on the surrounding area.

### 3.3 Liquid and solid wastes

The proponent has stated that the Air Separation Unit would not produce aqueous wastes.

Surface runoff from the process area would increase due to the impervious paving. Stormwater and wash-water runoff would be channelled to a holding area, preventing runoff containing spilled oil or sediment from reaching Cockburn Sound. Handling of any collected material would be under the statutory control of the local authority.

The air separation process would produce no solid wastes. Domestic solid wastes would be disposed of by sanitary landfill to the satisfaction of the local authority.

### 3.4 Noise

The design of the plant would comply with the requirements of the Noise Abatement (Neighbourhood Annoyance) Regulations of the Environmental Protection Act, 1986 where applicable to plant workforce noise levels.

Most noise emissions would originate from the air compressors. However noise from this source would not exceed 85 dBA at a distance of one metre. The proponent has indicated that this maximum noise level and the distance to residences would ensure that, under no circumstances, would there be noise impacts on residential areas.

### 3.5 Aesthetics

The impact on the landscape of the proposed plant and associated facilities would be minor when compared with their immediate industrial context.

The 40 m high air column would be the most visible structure of the air separation plant. This structure would be seen from Rockingham Road against an industrial backdrop, which includes the BP refinery, the BHP blast furnace, Wesfarmers LPG extraction plant, the approved CJV pigment plant, and a range of other existing industrial facilities.

Since Rockingham Road has elevated views over the general area, landscape screens or mounds would be of little value in screening the air column. However the Authority recognises that Kwinana Town Council is endeavouring to improve the aesthetic qualities of the industrial area and generally supports this effort.

## Recommendation 2

**The Environmental Protection Authority recommends that the proponent carry out landscaping of the site to the satisfaction of Kwinana Town Council to a timetable agreed to by Kwinana Town Council.**

### 3.6 Traffic

The increase in traffic in the Kwinana area during the construction and operating phases would be negligible. Rockingham Road is well suited for existing traffic and has ample capacity to accommodate any future increase in regional traffic movements as a consequence of establishment of the proposed plant and associated facilities.

### 3.7 Odours

The air separation plant would not produce any odours.

### 3.8 Site clearing

The area of the proposed air separation plant would be approximately 5,000 m<sup>2</sup>. The plant site is severely degraded through the establishment of industry in adjacent areas. Site levelling would be required over most of the area. The Environmental Protection Authority believes that this is not a significant environmental effect.

## 4 Environmental management

### 4.1 Construction

The proponent has stated that, during the construction phase of the project, the necessary measures would be taken to ensure that noise and dust caused by construction activities are minimised. Appropriate noise suppression devices would be fitted to all machinery likely to exceed noise criteria specified in the relevant legislation. Dust suppression through regular watering would also be adopted.

All construction materials and practices would be in accordance with the relevant Australian or international codes.

The Environmental Protection Authority believes that adequate controls exist under the pollution control provisions of the Environmental Protection Act, 1986 to control dust and noise from these premises should a problem arise during plant construction. No special recommendation is considered warranted.

### 4.2 Operation

The proponent has made the following commitments to environmental management during operation of the air separation process:

- ongoing control of dust will be implemented;
- noise levels will be in accordance with statutory requirements;
- all plant components will undergo regular preventative maintenance;
- all waste products will be disposed of in an environ

mentally safe manner and in accordance with requirements of statutory authorities; and

- the proponent will join and participate in the fire fighting cooperative already established by industrial operators in the Kwinana area.

Should a problem arise during plant operation, the Environmental Protection Authority believes that adequate controls exist under the pollution control provisions of the Environmental Protection Act, 1986 to control dust and noise from these premises. Matters of plant maintenance and fire fighting are relevant to safety as discussed below.

### 4.3 Safety Features

In the documentation provided, the proponent has stated that the following safety features would be incorporated into the design and operation of the air separation plant and associated facilities:

- all components will comply with the relevant Australian design standards;
- installation of all electrical, instrumentation and mechanical items will be in accordance with relevant codes;
- a mechanism for a failsafe mode will be installed, which will involve a strategy of automatic valving shutdown in the unlikely event of an emergency; and
- the plant will be fitted with all the necessary and appropriate safety valves, purges, defrosting and monitoring devices to ensure maximum safety for both the workforce and nearby areas.

This matter is under the statutory control of the Department of Mines. Their concern is to protect public safety, in this case in two ways:

- there should be no impact on the LPG plant and pipeline from any incident at the Air Separation Unit; and
- there should be acceptable risk levels for Air Separation Unit workers from the LPG Plant.

New Dangerous Goods Regulations are currently being drafted, but until these are in place, the Department of Mines does not have an adequate direct level of control. The Authority considers it appropriate that certain requirements, such as separation distances for items of plant, be on the advice of the Department of Mines under a Ministerial Condition.

The Authority considers it appropriate that the proponent, in addition to contributing to the existing fire fighting co-operative, should be involved in the Kwinana Integrated Emergency Management Scheme (KIEMS). KIEMS is expected to be operational in 1991. The Authority has been making recommendations on the need for a regional emergency response scheme since 1986. The Authority is concerned about the rate of development of KIEMS, which does not appear to be keeping pace with industrial developments to which it

relates. However the Authority does not consider that approval of this project should be delayed due to difficulties in emergency response planning, since the proposal will not have potential for off-site consequences and because environmental approval has already been given to the pigment plant of which this was initially a part.

### Recommendation 3

The Environmental Protection Authority recommends that, prior to commissioning, the proponent should prepare a comprehensive hazard identification and risk management programme for the Air Separation Unit to the satisfaction of the Environmental Protection Authority upon the advice of the Department of Mines. This should include, but not necessarily be limited to:

- a Total Hazard Control Plan;
- provision of adequate protection against the effects of possible fires on the LPG Plant site;
- development of on-site emergency procedures;
- co-operation in the Kwinana Integrated Emergency Management Scheme; and
- safety review of the hydrogen gas supply and any storage.

Because the above recommendation will ensure that there are no release events on this site which could have off-site consequences, development of this proposal would have no significant influence on cumulative risk levels in residential areas.

### 4.4 Summary

The Environmental Protection Authority has assessed the proposal by Liquid Air WA Pty Ltd to construct and operate an Air Separation Unit at Kwinana, immediately north of the LPG Plant. The Authority concludes that the proposal is environmentally acceptable, subject to the recommendations in this report and the commitments made by the proponent. The potential environmental impacts are of low significance, and can generally be controlled adequately under existing legislation, particularly the pollution control provisions of the Environmental Protection Act, 1986. The only areas where an adequate level of control is not available is for landscaping and for safety, and Recommendations are made to cover these.

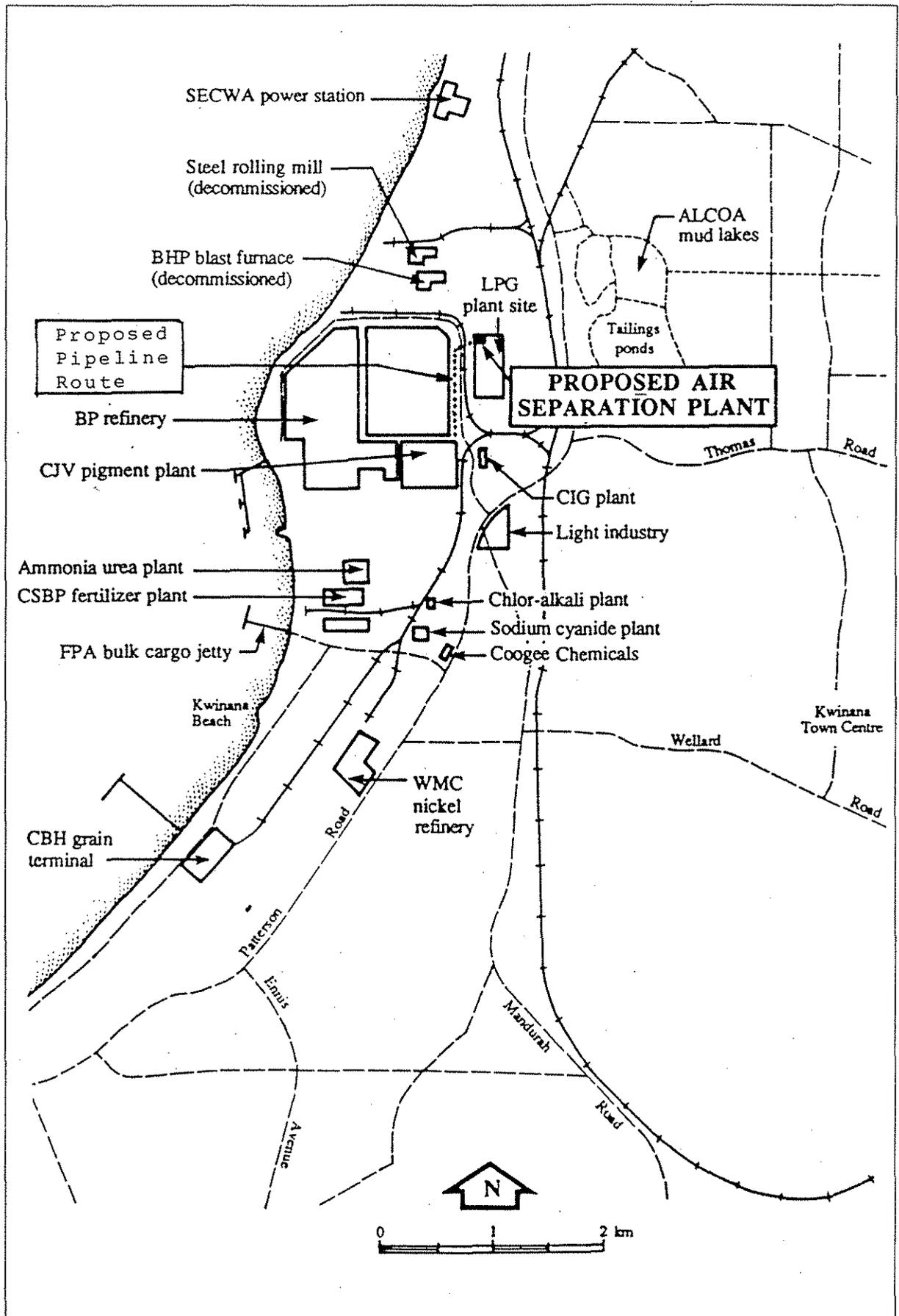


Figure 1: Location of the proposed Air Separation Plant

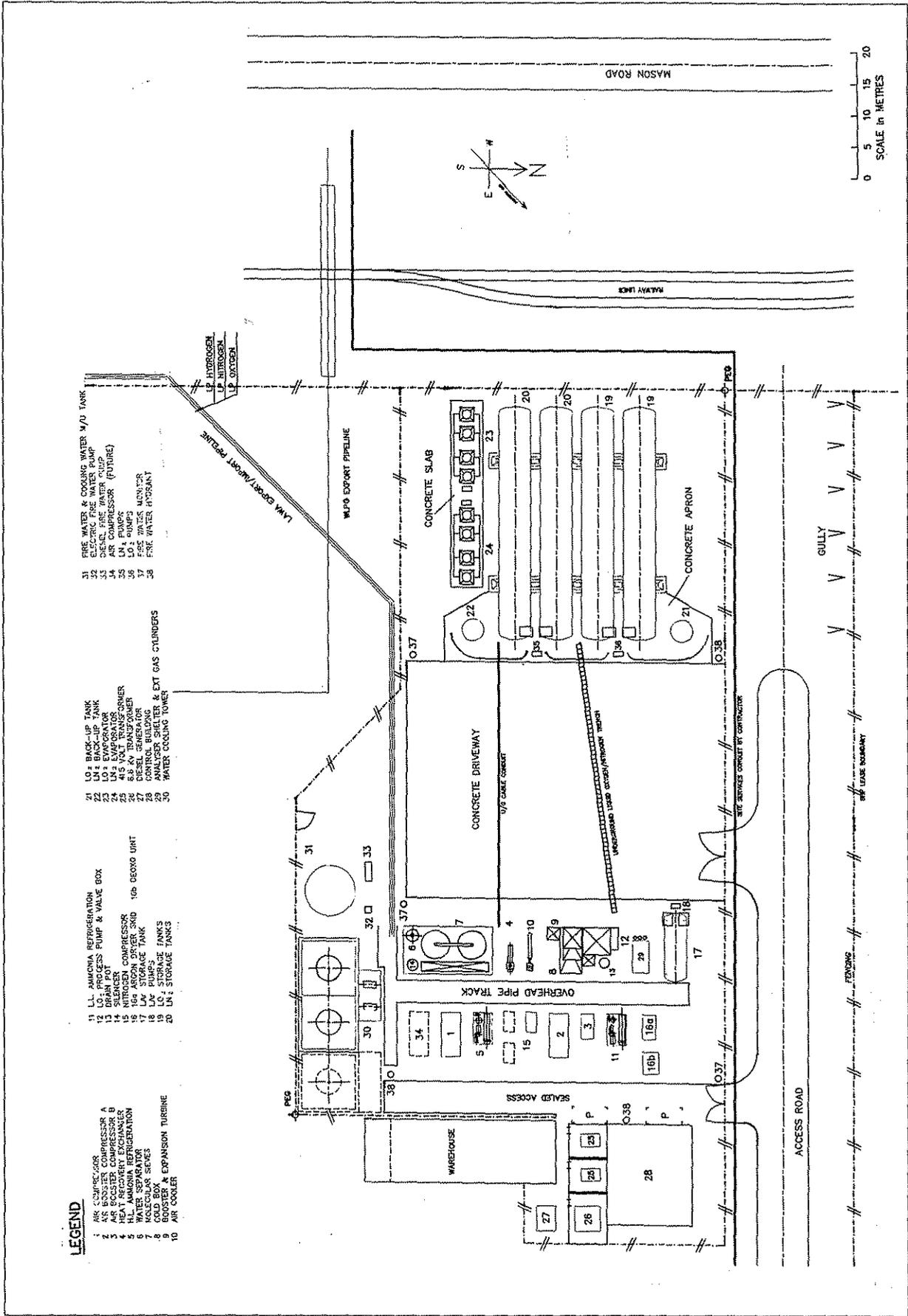


Figure 2: Site Layout



**Appendix 1 - Ministerial Conditions**  
**Titanium Dioxide Pigment Plant - Air Separation Plant, Kwinana**

**Cooljarloo Joint Venture**



## MINISTER FOR ENVIRONMENT

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

Titanium Dioxide Pigment Plant -  
Air Separation Plant, Kwinana

Cooljarloo Joint Venture

This proposal may be implemented subject to the following conditions:

1. The proponent shall adhere to the proposal as assessed by the Environmental Protection Authority and shall fulfil those commitments applicable to the Air Separation Plant made and listed in appendix 2 of EPA Bulletin 373 (copy of commitments attached).
2. The proponent shall include in the Environmental Management Programme required under condition 10, a plan to minimise construction stage impacts, including noise, dust from site works and site run-off, to the satisfaction of the Environmental Protection Authority before construction begins.
3. The proponent shall not allow any unacceptable environmental impacts resulting from, for example, air emissions, during start-up of the plant. The proponent shall include in the Environmental Management Programme details of management provisions which will be used to minimise start-up impacts. This programme shall be to the satisfaction of the Environmental Protection Authority before commissioning.
4. The proponent shall include in the Environmental Management Programme a comprehensive hazard identification and risk management programme to the satisfaction of the Environmental Protection Authority on advice from the Department of Mines.

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The comprehensive hazard identification and risk management programme shall include, but shall not be limited to, the following:

- (1) safety engineering design;
- (2) quantified risk assessments;
- (3) hazard and operability studies (HAZOP) of the facilities;
- (4) implementation systems; and
- (5) safety reviews during the life of the plant.

The on-going results shall be forwarded to the Environmental Protection Authority for assessment and to the Department of Mines.

In the event that the Environmental Protection Authority finds that the results of the programme are unacceptable, the proponent shall modify the process and/or operations as required.

5. From design to decommissioning the proponent shall:

- (1) maintain the process equipment, instrumentation and alarm systems consistent with the safety and reliability assessment of the plant; and
- (2) install very high integrity instrumentation for the control of the plant and for the detection of and response to any unplanned releases,

to the satisfaction of the Environmental Protection Authority on advice from the Department of Mines.

6. Prior to commissioning, the proponent shall develop and implement, to the satisfaction of the Environmental Protection Authority and other relevant agencies, a plant emergency plan which takes into account all relevant events, including "plant upset" conditions. This plan shall be fully integrated with the requirements of the Kwinana Integrated Emergency Management System (KIEMS).

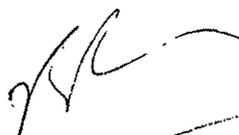
7. During the detailed design stage, the proponent shall examine ways of reducing water consumption and shall submit a report of this examination to the Environmental Protection Authority and the Water Authority of WA for their assessment, prior to commissioning of the plant. In the event of a major water recycling project commencing in the Kwinana area, the proponent shall utilise the recycled water produced if required to do so by the Ministers for Environment and Water Resources and the Minister administering the Mineral Sands (Cooljarloo) Mining and Processing Act 1988.

8. During the detailed design stage, the proponent shall provide details of:
  - (1) the characteristics of emitted gas streams; and
  - (2) the final emission stack heights and design, to the satisfaction of the Environmental Protection Authority.
9. To achieve acceptable noise levels the proponent shall:
  - (1) incorporate noise control as a fundamental criterion in the design of the plant, and shall ensure that all attenuation measures considered necessary to address the tonality of the plant noise emissions and to meet the noise levels deemed acceptable by the Environmental Protection Authority are incorporated during construction;
  - (2) prior to commissioning, include a noise level monitoring programme in the Environmental Management Programme, to the satisfaction of the Environmental Protection Authority; and
  - (3) after commissioning, undertake monitoring to determine the effectiveness of the attenuation measures designed and built into the plant, to the satisfaction of the Environmental Protection Authority.
10. The proponent shall prepare, in stages as appropriate, an Environmental Management Programme which deals with specific aspects of the proposal including, but not limited to:
  - (1) construction and commissioning impacts (see conditions 2 and 3);
  - (2) reduction in water use (see condition 7);
  - (3) air emissions and air quality monitoring (see condition 8); and
  - (4) noise level measurement and control (see condition 9).

The Environmental Management Programme shall include the requirement for submission of brief annual and comprehensive triennial reports to the Environmental Protection Authority and shall be to the satisfaction of the Environmental Protection Authority.

11. The proponent shall be responsible for decommissioning the plant and rehabilitating the site and its environs to the satisfaction of the Environmental Protection Authority.
12. The proponent shall, at least six months prior to decommissioning, prepare a decommissioning and rehabilitation plan to the satisfaction of the Environmental Protection Authority.

13. No transfer of ownership, control or management of the project which would give rise to a need for the replacement of the proponent shall take place until the Minister has advised the proponent that approval has been given for the nomination of a replacement proponent. Any request for the exercise of that power of the Minister shall be accompanied by a copy of this statement endorsed with an undertaking by the proposed replacement proponent to carry out the project in accordance with the conditions and procedures set out in the statement.



Bob Pearce, MLA  
MINISTER FOR ENVIRONMENT

26 APR 1989

## COOLJARLOO JOINT VENTURE

### AIR SEPARATION PLANT

#### COMMITMENTS

##### INTRODUCTION

1. The proponent will prepare an Environmental Management Plan (EMP) for the air separation plant site.

The EMP will include a Hazard and Operability Study (HAZOP) and a Total Hazard Control Plan (THCP). The EMP will be completed and submitted to the Environmental Protection Authority (EPA) prior to the commissioning of the plant.

2. The proponent will prepare a plant emergency procedures plan which will be prepared in conjunction with and, co-ordinated into the proposed Kwinana Emergency Plan. The plan will be prepared and submitted to EPA prior to plant commissioning.

##### LANDSCAPING

3. The proponent will prepare a landscape and planting programme for the site.

##### PLANT EMISSIONS

4. The proponent will engage the services of a Manager, Environmental, Health and Safety Affairs, to manage the environmental health and safety concerns of the site.

##### ATMOSPHERIC EMISSIONS

5. Atmospheric emissions will be maintained to levels and standards agreed with the EPA.

##### NOISE

6. The proponent is committed to remain within the EPA guidelines for noise emissions. Monitoring of noise levels, during construction and operations will be undertaken on site and off site.

The results of the monitoring will be reported to the EPA.

The noise monitoring programme will be developed in consultation with the EPA and detailed in the EMP.

DECOMMISSIONING

7. When operations cease and no further use for the air separation plant facilities can be identified, buildings and equipment will be dismantled, sold or disposed of. The general plant area will then be cleaned up to a tidy condition.

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