# Methanol Plant and Product Export, Burrup Peninsula

## Australian Methanol Company Pty Ltd

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

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# Summary and recommendations

Australian Methanol Co Pty Ltd proposes to build and operate a methanol plant of 1.05 million tonnes per annum (Mt/a) nominal capacity and associated infrastructure. This report provides the Environmental Protection Authority's (EPA's) advice and recommendations to the Minister for the Environment and Heritage on the environmental factors relevant to the proposal.

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.

**Relevant environmental factors**

The EPA decided that the following environmental factors relevant to the proposal required detailed evaluation in the report:

(a) Flora and Vegetation Communities

(b) Fauna

(c) Atmospheric Emissions

(d) Greenhouse Gases

(e) Water and Liquid Waste

(f) Noise

(g) Risk

(h) Culture and Heritage

(i) Amenity

There were a number of other factors which were very relevant to the proposal, but the EPA is of the view that the information set out in Appendix 3 provides sufficient evaluation.

**Conclusion**

The EPA has considered the proposal by Australian Methanol Co Pty Ltd to build and operate a methanol plant of 1.05Mt/a nominal capacity and associated infrastructure. The EPA notes that as yet only preliminary design for the plant has been carried out and that details of the proposal will not be finalised before front end engineering designs are completed. The EPA expects the proponent to provide further information specified in commitments and conditions prior to the granting of a works approval, or as required.

The EPA further notes that a regional wet season flora survey, some aspects of the fauna survey and an ethnographical survey are still to be completed and these should be done prior to works approval application. However, the EPA recognizes that the ability to undertake a wet season flora survey depends on there being adequate rainfall, thus such a survey may not be possible prior to construction but should be undertaken at the earliest opportunity.

Infrastructure corridors have not been considered in this proposal and are the responsibility of other proponents. The construction and operation of supply and export pipelines are included in the proposal and are the responsibility of this proponent.

The EPA has concluded that the proposal is capable of being managed in an environmentally acceptable manner such 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 Section 4, including the proponent's commitments.

Particular attention is drawn to the Other Advice section of this report where consideration is given to the wider issues of development and cumulative impacts on the Burrup.

**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 and operation of a methanol plant of 1.05Mt/a nominal capacity and associated infrastructure.
2. That the Minister considers the report on the relevant environmental factors as set out in Section 3.
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 4, and summarised in Section 4, including the proponent's commitments.
4. That the Minister imposes the conditions and procedures recommended in Appendix 4 of this report.
5. That the Minister notes the EPA's other advice on management of cumulative impacts from industrial development on the Burrup Peninsula.

**Conditions**

Having considered the proponent's commitments and the information provided in this report, the EPA has developed a set of conditions that the EPA recommends be imposed if the proposal by Australian Methanol Co Pty Ltd to build and operate a methanol plant of 1.05Mt/a nominal capacity and associated infrastructure, is approved for implementation.

These conditions are presented in Appendix 4. Matters addressed in the conditions include the following:

(a) that the proponent be required to fulfil the commitments in the Consolidated Commitments statement set out as an attachment to the recommended conditions in Appendix 4;

(b) the undertaking of a wet season vegetation survey and a survey to establish the occurrence of identifiable Priority flora on site;

(c) the supply of seawater and the discharge of brine and wastewater via the Water Corporation marine outfall;

(d) the management of surface water and stormwater on the site and discharge from the site;

(e) the management of air emissions from the plant, monitoring of impact of these on vegetation and the effect of salt water mist on vegetation;

(f) greenhouse gas management;

(g) noise minimisation and management;

(h) pipeline construction and operation;

(i) work practices; and

(j) decommissioning plans.

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# 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 Australian Methanol Co Pty Ltd, a subsidiary of GTL Resources PLC, to construct and operate a methanol plant of 1.05 million tones per annum (Mt/a) nominal capacity, at Withnell East industrial area on the Burrup Peninsula, which includes infrastructure for the export of product through the Port of Dampier. The plant will convert natural gas to methanol using the proven, proprietary Combined Reforming Technology of Lurgi Oel-Gas-Chemie GmbH (Lurgi).

The Withnell East industrial area was identified as suitable for industrial use by the Burrup Land Use Plan which was endorsed by Cabinet in 1996. The plant site is in close proximity to the Woodside facility for gas supply and approximately 4km from the Port of Dampier. The proposal was referred to the EPA in November 2001 and was originally advertised as having the potential to be assessed as an Environmental Protection Statement. However, at the proponent's request this was upgraded to a Public Environmental Review (PER) in July 2002.

The proposal requires formal assessment as it is situated on a greenfields site in a sensitive environment. Vegetation clearing, atmospheric emissions, including greenhouse gases, and discharge of wastewater to the marine environment have potentially significant environmental impacts.

Further details of the proposal are presented in Section 2 of this report. Section 3 discusses the environmental factors relevant to the proposal. The Conditions and Commitments to which the proposal should be subject, if the Minister determines that it may be implemented, are set out in Section 4. Section 5 provides Other Advice by the EPA, Section 6 presents the EPA's conclusions and Section 7, the EPA's Recommendations.

Appendix 5 contains a summary of submissions and the proponent's response to submissions and is included as a matter of information only and does not form part of the EPA's report and recommendations. Issues arising from this process and which have been taken into account by the EPA appear in the report itself.

# 2. The proposal

The proponent for the proposal was previously GTL Resources PLC is now Australian Methanol Co Pty Ltd (AMC), a subsidiary of GTL Resources PLC. AMC proposes to construct and operate a methanol plant of 1.05 million tonnes per annum (Mt/a) nominal capacity, at Withnell East industrial area on the Burrup Peninsula (Figure 1). The proposal includes the installation of a gas supply pipeline, product pipeline, seawater supply pipeline and wastewater discharge pipeline to be situated in infrastructure corridors for which the Department of Mineral and Petroleum Resources (MPR) will be proponent. The plant footprint will occupy approximately 16 ha of the 35 ha site (Figure 2).

The main components of the plant will be:
- feed gas conditioning,
- gas purification,
- steam reforming,
- autothermal reforming,
- gas compression and synthesis,
- methanol purification,
- air separation,
- product storage tanks,
- plant infrastructure, including a mechanical vapour compression desalination plant, and
- utilities.

The proposal includes shiploading operations at the Port of Dampier to methanol tanker ships. The proposal does not include any modification to the Port or wharves, which would be sought by the Dampier Port Authority (DPA), if necessary.

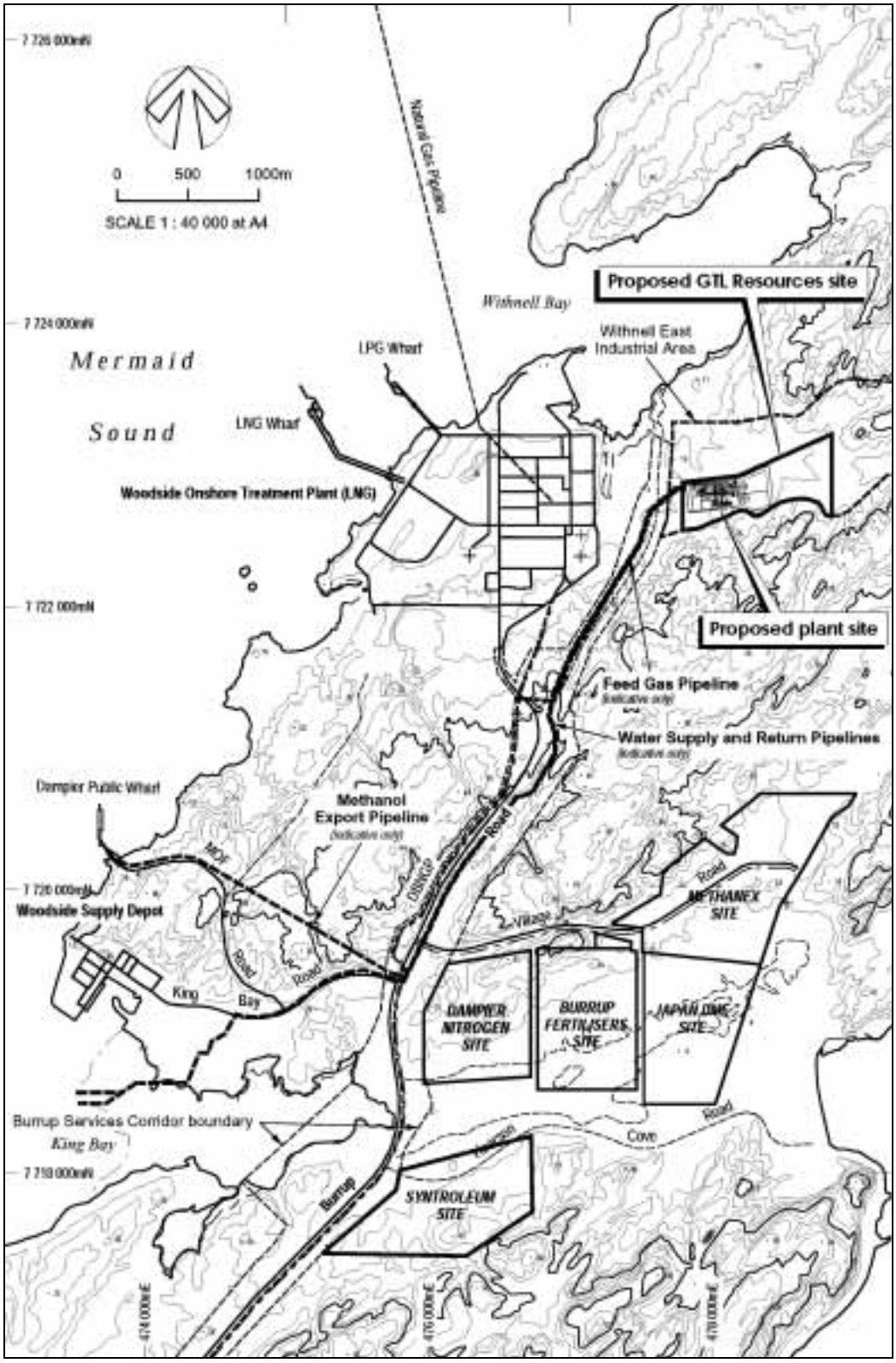


***Figure 1: Location plan. (Source: URS, 2002, amended Figure 2)***

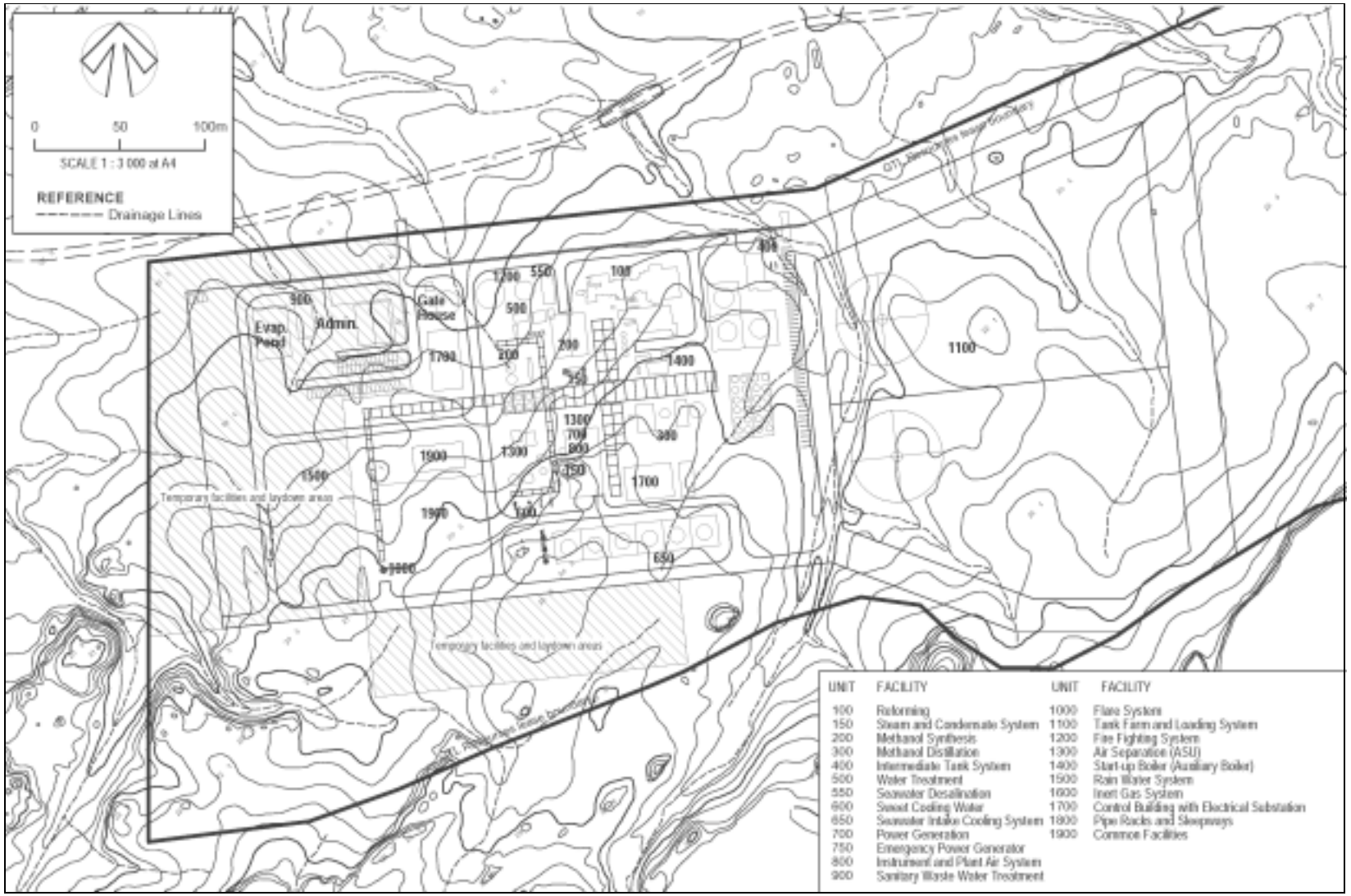


***Figure 2: Site layout plan (Source: URS, 2002, amended Figure 4)***

The main characteristics of the proposal are summarised in Table 1 below. Information is based on a generic plant using Lurgi technology with some allowances for local site conditions. More detailed front end engineering designs for the plant have not been completed at this stage.

**Table 1: Summary of key proposal characteristics**

| Element | Description |
|---|---|
| Project life | Over 25 years |
| Complex capacity | Up to 1.05 Mt/a of methanol from one production plant (nominal) |
| Lease area | Approx. 35 ha |
| Site area | Approx. 16 ha |
| Complex facilities<br><br>Process plant | <br><br>1 x 3,000 tonnes per day (tpd) methanol production plant |
| Air separation unit | 1 x 1,240 tpd of oxygen from cryogenic air separation unit |
| Product storage | 2 x 47,708 t pure methanol storage tanks (each 60,000 $m^3$ capacity), within lined earthen bunds<br>2 x 1,350 t pure methanol intermediate storage tanks<br>1 x 1,350 t raw methanol tank |
| Power generation | Onsite electrical power generation will be via 8 MW steam turbine generator (primary) and 600 kVA emergency diesel power generator. |
| Water systems | Supply of up to 36 ML/day of raw seawater for operation of the seawater cooling (tower) system and for operation of the desalination plant<br>Desalination plant using mechanical vapour compression to provide up to 1.7 ML/day of fresh water for steam systems, potable water and sweet water cooling system make-up |
| Steam generation | Three level steam system (110 bar, 38 bar and 5 bar) with high pressure steam generated from heat recovery from the process and auxiliary boiler, and medium pressure steam generated from heat recovery from the process |
| Utilities | Instrument and plant air systems<br>Wastewater systems for process, contaminated storm and domestic water<br>Nitrogen reticulation for inerting and purging purposes from the air separation unit |
| Support facilities | Administration, maintenance, laboratory, emergency response & control room facilities |
| Complex operation | 24 hours/day for 7 days/week for 52 weeks/year |
| Complex reliability | The plant will require a shutdown for catalyst replacement and predictive and preventative maintenance once each 3-4 years for approx. 21 days. Additional shutdowns for process upsets and mechanical breakdowns are allowed for, to achieve an average of 350 operating days per year. |
| Natural gas pipeline | 200 mm nominal diameter pipeline from the Dampier to Bunbury gas export pipeline to the AMC facility boundary |
| Product export pipeline | 500 mm nominal diameter pipeline from the AMC plant tank farm to the ship loading facilities |
| Seawater pipeline | From Water Corporation main pipeline to AMC facility boundary. Nominal 500mm diameter, subject to detail design verification |
| Brine return pipeline | From AMC facility boundary to Water Corporation main brine return pipeline<br>Nominal 400mm diameter, subject to detail design verification |
| Port facilities | One berth, provided by the Dampier Port Authority |
| Complex efficiency | Approx. 34.56 GJ/t of methanol [High Heating Value (hhv)] |
| Construction period | Approx 23 months |

| | |
|---|---|
| Feed gas | Approx 4.33 TJ/h (approx 65 tph) from the Dampier to Bunbury gas pipeline |
| Catalysts | Cobalt, nickel, molybdenum zinc and copper compounds |
| Approximate gaseous emissions under normal operations | NOx: Up to 48 kg/h or 403 t/a, using low $NO_X$ burners<br>CO: Up to 9 kg/h or 76 t/a<br>VOC: Up to 1 kg/h or 8.4 t/a.<br>$SO_X$: Up to 0.25 kg/h or 2.1 t/a.<br>$CO_2$: Up to 0.404 kg/kg methanol or 442,550 t/a |
| Wastewater discharge<br>Brine<br><br>Cooling tower blowdown<br><br>Process<br><br>Demineralisation column regeneration | <br>Up to 9.0 ML/day from desalination plant to brine return line<br><br>Up to 14.6 ML/day from the cooling tower to brine return line<br><br>Up to 130 KL/day from the methanol production plant to evaporation pond<br>Approx 100kL/day |
| Total seawater return | Up to 24 ML/day to brine return line |
| Domestic wastewater | Up to 7 KL/day. To be irrigated on landscaped areas of the plant or disposed in an alternative manner in accordance with DEP requirements |
| Stormwater | The plant will have separate contaminated and clean stormwater systems.<br>Run-off from areas designated potentially contaminated will be directed to an evaporation pond.<br>Run-off from areas designated uncontaminated will be collected via a drainage system that directs water through a corrugated plate interceptor prior to release into natural watercourses.<br>Stormwater accumulated in the bunded areas of the storage tanks will be analysed prior to discharge. If contaminated, it is to be directed to the evaporation pond and if clean, to the clean stormwater system. |
| Wastewater specification | Brine Up to 55,000 mg/L (TDS), temperature to be within $2^{o}$ C of 24 hour ambient seawater temperature for 80% of the time with a maximum exceedence of $5^{o}$C and zero free biocides<br>Water treatment chemicals to be agreed with appropriate authorities<br>6-9 (pH), zero (free chlorine), 28 mg/L (TSS)<br>Up to 2 tpa (0.23 mg/L)ammonia. |
| Stormwater | Up to 10 mg/L (TDS) |
| Solid wastes | Collected by contractor for recycle/reuse: batteries, paper, cardboard, scrap metal<br>Collected by contractor for disposal: waste oil, sludge from evaporation pond<br>Returned to vendor: catalyst waste<br>Landfill: fluorescent tubes, HID lamps, general refuse, ceramic fibres<br>Recycled: glass, plastics and chemical<br>Composted: organic wastes |
| Noise | To be further considered by acoustical engineer during engineering design |
| Risk | 50 in a million risk contour within site boundary<br>10 in a million risk contour to extend no more that 100m north and south of plant boundary |

A detailed description of the proposal and the process is provided in Section 2.1 and Appendix M of the PER (URS, 2002). Figure 3 provides a simplified process flow diagram.

Since the release of the PER a number of modifications to the proposal have been made by the proponent. These include:

- revision of the plant site plan to include laydown areas and larger tank bunds;
- inclusion of seawater supply and brine return pipelines in the proposal, as these will be built and owned by the proponent in the infrastructure corridors being proposed by the Department of Mineral and Petroleum Resources (MPR);
- steam stripping of ammonia from process condensate thereby reducing ammonia and nutrient discharge to the marine environment;
- amendment of the Aboriginal Heritage survey. Re-survey has found 14 previously unlisted sites, 11 of which are within the plant footprint;

The potential impacts of the proposal initially predicted by the proponent and their proposed management are summarised in Table 8.1 of the PER document (URS,2002).

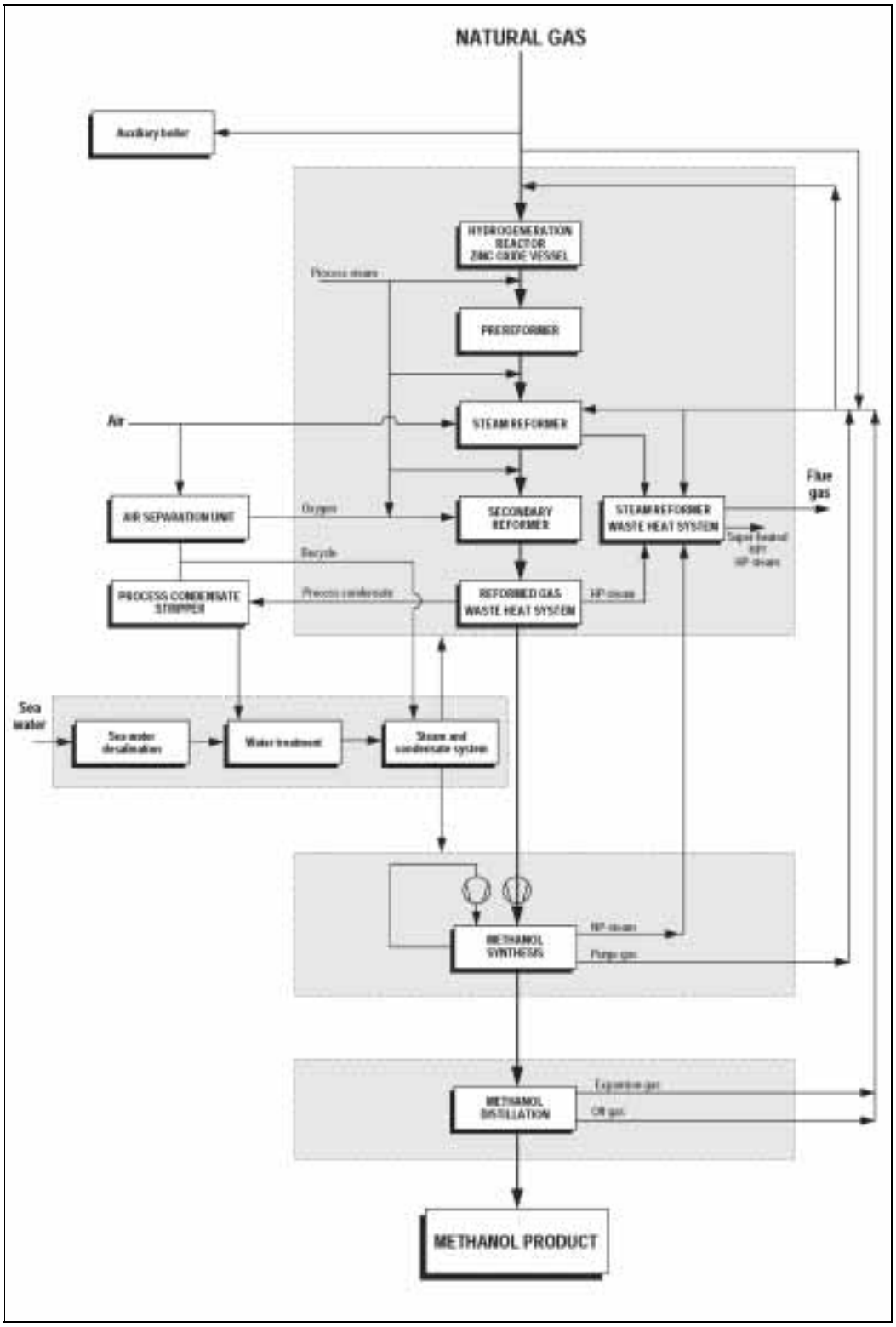


***Figure 3: Process flow diagram (Source: URS,2002, amended Figure 6)***

# 3. 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.

The identification process for the relevant factors selected for detailed evaluation in this report is summarised in Appendix 3. The reader is referred to Appendix 3 for the evaluation of factors not discussed below. A number of these factors, such as solid waste, are relevant to the proposal, but the EPA is of the view that the information set out in Appendix 3 provides sufficient evaluation.

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

(a) Flora and Vegetation Communities

(b) Fauna

(c) Atmospheric Emissions

(d) Greenhouse Gases

(e) Water and Liquid Waste

(f) Noise

(g) Risk

(h) Culture and Heritage

(i) Amenity

The above relevant factors were identified from the EPA's consideration and review of all environmental factors generated from the PER document and the submissions received, in conjunction with the proposal characteristics.

Details on the relevant environmental factors and their assessment are contained in Sections 3.1 - 3.9. 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.

## 3.1 Flora and Vegetation Communities

**Description**

The proposal will have a direct impact on approximately 16 ha of vegetation. Figure 11 in the PER (URS, 2002) has been amended (Figure 4) to show the location of laydown areas and more accurate bund sizes and the vegetation communities impacted.

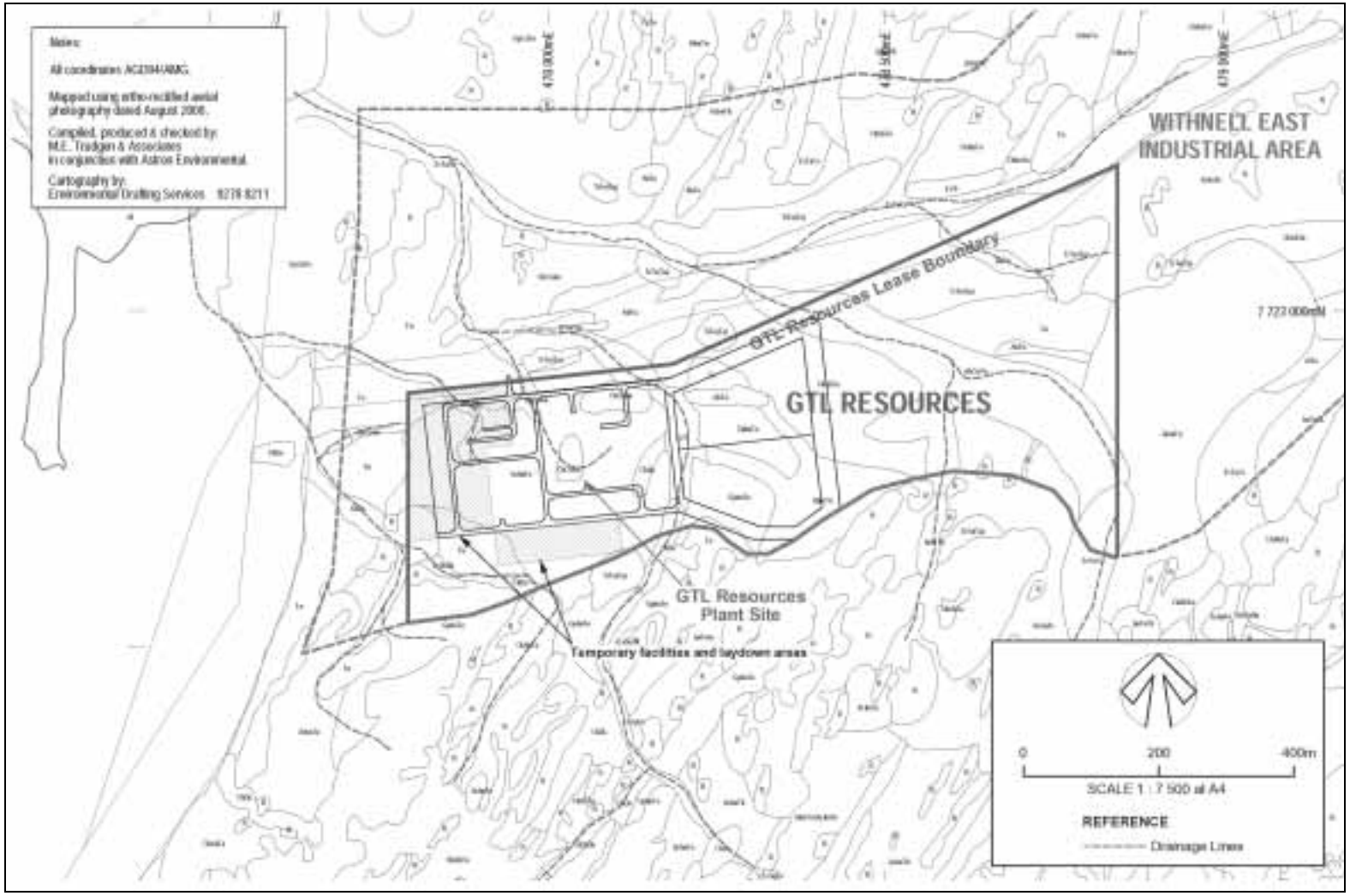


***Figure 4: Vegetation communities and plant layout (Source: URS, 2002, amended Figure 11. Referenced from Trudgen, 2002)***

A preliminary flora and vegetation survey of the site was carried out in October 2001 for referral documentation (refer Appendix D of PER document) and it was planned to undertake a detailed survey following significant rainfall. However, adequate rainfall did not eventuate and it has not been possible to undertake a detailed survey of the site that would provide more information on ephemeral and currently dormant perennial plants.

In order to progress the assessment a review of the flora and vegetation on the site was undertaken with regard to the Welker (2002) and Trudgen (2001, 2002) reports to consider the vegetation in a regional context. Based on the Trudgen study the assessment identified five potentially threatened communities on-site. Of these one (identified as EvTeCv, *Eucalyptus victrix, Triodia epactia, Cyperus vaginatus*) will not be impacted by the plant footprint. Of the remaining four, one community (identified as AbCwTe, *Acacia bivenosa, Corchorus walcottii, Triodia epactia)* will have less than 1% (0.08ha) of its total area removed; a second community (identified as TrTe(Ta), Tephrosia rosea, *Triodia epactia (Triodia angusta)* will also be impacted by less than 1% (0.03ha) of its total area; 67% (9.1ha) of a third community (identified as GpImTe, *Grevillea pyramidalis, Indigofera monophylla, Triodia epactia*) is in the Conservation, Heritage and Recreation Area (CHRA) and the plant site will not impact more than 15% of the total area of this community. Of the other community (identified as ChCwIm, *Corymbia hamersleyana, Corchorus walcottii, Indigofera monophylla*) only 33% (1.8ha) is in the CHRA and the community is considered potentially threatened, although it is not formally listed as such, because of its naturally limited distribution and poor representation on the Burrup and in the CHRA. The plant site impacts 16% of the total area of this community. Table 2 summarises the impacts on potentially threatened vegetation communities (URS, Update 22 October 2002). The updated figures, based on approximately 16ha of the site being disturbed, are show in brackets.

**Table 2: Potentially Threatened Communities within the lease area**

| **Vegetation Type** | **Proportion of Total[1] in Withnell East Industrial Area (WEIA)[2]** | **Area Retained in CHRA[3] (ha)** | **Proportion of Total[1] that will be destroyed by AMC Plant[4]** | **Comments (Updated from PER)** |
|---|---|---|---|---|
| AbCwTe | 63% | 3.3 | (<1%)[5] 0% | A very minor area (0.08ha) of this vegetation type will be destroyed by the plant site. Approximately 93% of the WEIA area of this type is within the AMC lease. |
| ChCwIm | 67% | 1.8 | (16%) 16% | Most of this vegetation type occurs within the WEIA. The AMC plant will destroy ~16% of the total. This vegetation has a naturally limited distribution and is very poorly represented on the Burrup and within the CHRA. |
| EvTeCv | 53% | 1.0 | (0%) 0% | This vegetation type is extremely limited in distribution, with that in the AMC lease being 44% of that found in the CHRA. It will not be disturbed by the plant itself. |
| GpImTe | 33% | 9.1 | (15%) 10% | Although a substantial portion will be destroyed by the plant (2.0 ha), there is 9.1 ha protected in the CHRA. |

| Vegetation Type | Proportion of Total[1] in Withnell East Industrial Area (WEIA)[2] | Area Retained in CHRA[3] (ha) | Proportion of Total[1] that will be destroyed by AMC Plant[4] | Comments (Updated from PER) |
|---|---|---|---|---|
| TrTe(Ta) | 91% | 0.7 | (<1%) 0% | A very minor area (0.03ha) may potentially be disturbed by the laydown area. As this occurs along the southern boundary of the lease (and occurs largely outside of the lease to the south) it is anticipated that direct impact can be avoided through prudent construction management. Most of this vegetation type is in the WEIA and 33% of the current total area is within the AMC lease. |

1. "Total" refers to the total area of vegetation in the Withnell East Industrial Area (WEIA) region and the Conservation Area. It excludes possible areas in other industrial zones.
2. This column gives the proportion of the total area of the vegetation type which may be destroyed by industry. Threatened proportions are defined as those where over 70% is cleared and "critical" proportions, those over 90%.
3. This is the total area in hectares, of each vegetation type which will definitely remain. Threatened areas are those under 10 ha, (though Trudgen (2002) states areas less than 600 ha are threatened) and critical areas, those under 3 ha.
4. This gives the proportion of the total that will definitely be destroyed by AMC's plant site alone, as part of this project. It does not include potential future clearing on the AMC lease, nor that due to other developments in the WEIA area.
5. Updated figures, based on 16ha of disturbance, shown in brackets.

It is unlikely that any individual flora species will be endangered by the proposal. However it is not possible to substantiate this until the detailed wet season survey has been carried out. Some Priority 1 *Terminalia supranitifolia* and Priority 3 *Eriachne tenuiculmis* plants are likely to be impacted and a further five species identified as significant by Trudgen are known to occur on site.

No weeds were recorded on site, however this may be because of dormancy or senescence of the plants due to the lack of rain.

**Submissions**

Public submissions stated that due to the characteristics of vegetation communities on the Burrup, the Peninsula should be a Conservation area, vegetation types ChCwIm and GpImTe should not be cleared and other threatened ecological communities should be preserved.

It was also stated that the proposal should not be allowed to proceed before an adequate flora survey, including wet season survey or before cumulative assessment for vegetation should all Burrup developments proceed and demonstration of how this proposal meets EPA Position Statement 2.

It was considered that representation levels of vegetation complexes should be presented in the context of the local (15km) area and that discussion of representation of genetic diversity of species was needed. Submissions suggested that destruction of any vegetation type with less than 30% of original extent remaining should not be allowed.

It was further stated that the EPA should have a Position Statement on the appropriate extent of environmental benefits to be achieved for proposals (environmental offsets) and that with the uncertainties involved with the proposal, the precautionary approach should be applied.

The Department of Conservation and Land Management (CALM) requested additional analysis of the flora data.

The Department of Planning and Infrastructure (DPI) stated that the proposal will enable people to reach northern Burrup and the long term impact of greater visitor numbers on vegetation needs to be considered.

**Assessment**

The area considered for assessment of this factor is the proposal site situated in the Withnell East Industrial area off Burrup and Mt Wongama Roads.

The EPA's environmental objective for this factor is to protect Declared Rare and Priority Flora, consistent with the provisions of the *Wildlife Conservation Act 1950*, and to maintain the abundance, species diversity, geographic distribution and productivity of vegetation communities.

It is important that a wet season survey is carried out to identify priority species and other species of conservation interest and to confirm the distribution of vegetation communities in a regional context. However, due to the lack of rain in the 2001/2 season the proponent has not had an opportunity to carry out this survey. The EPA notes that the proponent has made a commitment to undertake an additional vegetation/flora survey at the earliest opportunity following wet season rains and to incorporate the locations of vegetation communities and identification of areas not to be disturbed through optimisation of plant layout into a Vegetation and Flora Management Plan. The EPA has also included the requirement for a wet season survey if feasible, as part of recommended Condition 6 (Appendix 4). The wet season survey should also be used to update the results of the regional vegetation assessment should vegetation units be found to be substantially different to those expected. The EPA notes the opinion of the proponent's consultant that it is unlikely that the proposal will endanger any individual flora species.

The EPA notes that on the definition of vegetation communities, based on the Trudgen (Trudgen 2002) mapping of vegetation associations, applied to the site survey, some communities found on the site will be impacted in a regional context. This arises, not because a large proportion of the community is being destroyed by the plant site, but because of the naturally restricted area typical of vegetation communities found on the Burrup and because of the amount of the community found within areas set aside for industrial development. No vegetation community will be reduced below 30% of its total extent by this proposal. There is the potential for the community TrTe(Ta) to be reduced below 30% of its original extent by continued development in the industrial area and future developers should be aware of this.

The EPA endorses the proponent's commitments to establishing and implementing Flora and Vegetation Management Plans to address site clearance procedures, procedures for rehabilitating areas of temporary disturbance, seed collection of any prominent flora species present, including Priority Flora species, to ensure the availability of species for rehabilitation, germination trials prior to and following construction, with a particular focus on the Priority 1 species *Terminalia supranitifolia* and restoration of Priority Flora species disturbed by the project.

It is noted that the proponent has made commitments to weed management in the Construction and Operational Environmental Management Plans (EMPs) (commitments 7 and 19).

The management of the CHRA of the Burrup Peninsula is addressed further in Other Advice (Section 5).

**Summary**

Having particular regard to the:

(a) fact that it is unlikely that any individual flora species will be endangered by this proposal;

(b) the fact that no vegetation association will be reduced to less than 30% of its original extent by this proposal;

(c) recommended condition; and

(d) proponent's commitments,

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

## 3.2 Fauna

**Description**

A desktop literature study (Astron, 2002) and a snail survey (Enzer Marine, 2002) has been done. A further on-ground fauna survey is planned for a future wet season. Four species protected under the *Wildlife Conservation Act 1950* or listed on the CALM Reserve listing, *Hydromys chrysogaster* (Water Rat), *Pseudomys chapmani* (Western Pebble-mound Mouse), *Liasis olivaceus barroni*, (Pilbara Olive Python) and *Notoscincus butleri* and two of conservation value, *Rhagada sp.* (Camaenid land snail) and *Petrogale rothschildi* (Rothschild's Rock Wallaby) may occur on the site. *Quistrachia legendrei*, another species of camaenid land snail, that may be expected on the site was not found during the survey. Twenty three Western Pebble-mound Mouse nests were found on the site but were assessed as being vacant. Twenty nine birds likely to be found on the Burrup Peninsula are listed under migratory bird agreements. These are mostly waders and seabirds unlikely to utilise the proposed site.

The proposed plant location avoids the rock piles on the site which are likely to be home to small mammals, reptiles, land snails and a number of macropod species. However, one of the major drainage lines on the site will be modified with loss of habitat that provides canopy shade, nesting hollows and a source of food for a variety of fauna species. Most of the plant will be constructed over habitat areas of stony, gentle sloping hummock grassed plains. This habitat is the area most suitable for industrial development and therefore there is the potential for cumulative loss of the habitat.

Two semi-permanent waterholes to the north and south of the site have been identified as being of potential importance to fauna.

**Submissions**

Public submissions stated that the location of the site in the north of Burrup will disrupt flow of species between north and south.
CALM requested that actions are taken in "agreement" with CALM.
DPI pointed out that the proposal will enable people to reach northern Burrup and the long term impact of greater visitor numbers on fauna needs to be considered.

**Assessment**

The area considered for assessment of this factor is the proposal site in the Withnell East industrial area and the wider Burrup Peninsula.

The EPA's environmental objective for this factor is to protect Specially Protected (Threatened) Fauna consistent with the provisions of the *Wildlife Conservation Act 1950,* and to maintain the abundance, species diversity and geographic distribution of terrestrial fauna.

The EPA notes that the proposal will not impact on the rocky hills and ridges, which provide habitat to fauna species requiring shelter close to semi-permanent waterholes. The EPA acknowledges the proponent's commitment to "incorporating drainage design features aimed at maintaining water flows to major drainage lines" (commitment 8, Appendix 4). The quality and quantity of water entering these waterholes is also of importance and this will need to be considered when discharging surface water from the site. Accordingly the EPA recommends condition 8 (Appendix 4) to ensure this is taken into account when designing the plant.

The EPA endorses the proponent's commitment to undertake a fauna survey to further investigate the occurrence of protected and priority fauna species prior to construction (commitment 8, Appendix 4). The four species of conservation significance potentially to be found on the site should be included in this survey. In response to a request from CALM, the proponent has agreed that fauna actions should be taken in agreement with CALM, rather than only in consultation.

It is noted that the snail survey concluded that the three species recorded on the plant site had been found widely in other surveys conducted on the Burrup. The *Rhagada* sp. is thought to have the most restricted range, being limited to the Dampier region, but has been found in previous studies in the King Bay-Hearson Cove industrial area and the Dampier wharf area.

It is also noted that the fauna survey has concluded that it is unlikely that the proposal will impact directly on any birds, protected under Australian legislation or international agreements, that inhabit or visit the area. However the proponent should be aware that some raptors use man-made structures for nesting sites and the plant should be designed to discourage this.

In reply to concerns about the proposal limiting the mobility of fauna the proponent has stated that only the plant site and not the entire lease area will be fenced.

The EPA notes the proponent's further commitments to progressive rehabilitation of disturbed sites to maximise fauna habitat, establishment of procedures, monitoring requirements, workforce training and responsibilities to minimise disturbance of significant terrestrial fauna, support for collaborative research programmes investigating the Pilbara Olive Python on the Burrup Peninsula and meeting CALM requirements regarding the Rock Wallaby Protection Programme (commitment 8, Appendix 4).

The proponent will also prevent and control the introduction of exotic fauna on their site.

**Summary**

Having particular regard to the:

(a) commitment to the undertaking of a fauna survey ;

(b) recommended condition for the protection of waterholes; and

(c) proponents other commitments listed above,

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

## 3.3 Atmospheric Emissions

**Description**

The following atmospheric emissions (Table 3) are predicted under normal operating conditions (URS 2002).

**Table 3: Stack Emission Data (Normal Operation)**

| Source | Height | Diam | $NO_X$[1] | | $SO_2$[2] | | CO | | VOCs | |
|---|---|---|---|---|---|---|---|---|---|---|
| | (m) | (m) | $mg/Nm^3$ | kg/hr | $mg/Nm^3$ | kg/hr | $mg/Nm^3$ | kg/hr | $mg/Nm^3$ | kg/hr |
| Auxiliary Boiler (Partial Load) | 30 | 1.5 | 66 | 8.7 | 0.38 | 0.05 | 15 | 2.0 | - | - |
| Reformer Waste Heat Stack | 35 | 2.7 | 60 | 38.6 | 0.31 | 0.2 | 10 | 6.5 | - | - |
| Pilot Burner Flare | 65 | - | 198 | 0.01 | Traces | | Traces | | Traces | |
| Diesel Generator | 10 | 0.5 | 78 | 0.9 | 8.7 | 0.2 | 26 | 6.5 | 3.0 | - |
| Process Condensate Stripper | 15 | 0.6 | - | - | - | - | 18 | 0.4 | 18 | 0.4 |

Notes: (1) Concentrations corrected to 15% $O_2$. Boiler emissions at 7% $O_2$ are 154 $mg/Nm^3$.

(2) $SO_2$ emission rates are based on current design of 10ppm sulphur content in feed gas. Actual $SO_2$ emissions are anticipated to be lower as the characteristic sulphur content in North West Shelf gas is significantly lower than this value, therefore the above represents a conservative overestimate.

Under start-up and upset conditions emissions would be greater. During start-up the boiler would be operated for approximately 50 hours at design load and the emissions are estimated to be: $NO_X$ 28.5 kilograms per hour (kg/hr), $SO_X$ 0.13 kg/hr and CO 7.0 kg/hr. Under emergency conditions, the plant safety system provides for a blowdown condition in the worst case when the inventory of the plant is released under controlled conditions to the flare. This event will discharge less than one day's normal emissions to the atmosphere in the form of a typical flare discharge composition.

Oxides of Nitrogen ($NO_x$)

Estimated $NO_X$ emissions under normal operating conditions are 403t/a. The proposal does not have gas turbines, but has a steam boiler. The majority of $NO_X$ emissions will come from the reformer burners. Reformer burners and boiler burners will be of low $NO_X$ design. The emissions have been compared to Tassie Shoals which is a proposal under assessment by the Commonwealth, where $NO_X$ emissions are predicted to be 0.32 kg/t methanol compared to 0.38 kg/t methanol for this proposal.

Modelling of $NO_X$ emissions under normal operating conditions and at start up has been carried out. The modelling of current sources (Hamersley Power Station, Woodside Trains 1-3, Syntroleum, Burrup Fertilisers and Dampier Nitrogen Ammonia-Urea plant) combined with this proposal predicts a maximum one hour average ground level concentration of nitrogen dioxide ($NO_2$) 143 micrograms per cubic metre ($\mu g/m^3$) (Figure 5). This proposal without other sources of emission would result in a maximum one hour average $NO_2$ concentration of 59 $\mu g/m^3$. The National Environmental Protection Measure (NEPM) standard for $NO_2$ of 246 $\mu g/m3$ will not be exceeded in residential areas.

A smog study has been undertaken by the CSIRO (CSIRO 2002) for the proposal to determine the impacts on regional air quality. The study found that:

- the proposed AMC plant emissions do not materially change the maximum predicted ground level concentrations of nitrogen dioxide ($NO_2$) or ozone ($O_3$) in the region from their current levels of:
  - $NO_2$ (1-hour average) 65 parts per billion (ppb) (approximately $130\mu g/m^3$),
  - $O_3$ (1-hour average) 89 ppb (approximately $190\mu g/m^3$),
  - $O_3$ (4-hour average) 70 ppb (approximately $150\mu g/m^3$);
- these predicted regional maximum ground level concentrations of $NO_2$ and $O_3$ do not exceed the NEPM standards of 120ppb $NO_2$ (1-hour average), 100ppb $O_3$ (1-hour average) and 80ppb $O_3$ (4-hour average);
- the proposed AMC plant emissions contribute 1 ppb to the maximum 1-hour average $NO_2$ ground level concentration at Dampier;
- the proposed AMC plant emissions do not enhance the maximum 4-hour average $O_3$ ground level concentration at Karratha; and
- the proposed AMC plant emissions do not contribute to other maximum ground level concentrations (1-hour $NO_2$, 1-hour $O_3$, or 4-hour average $O_3$ concentrations) at Dampier or Karratha.

Other emissions

There will be emissions of sulphur dioxide ($SO_2$), carbon monoxide (CO), volatile organic compounds (VOC), saltwater mist and particulates.

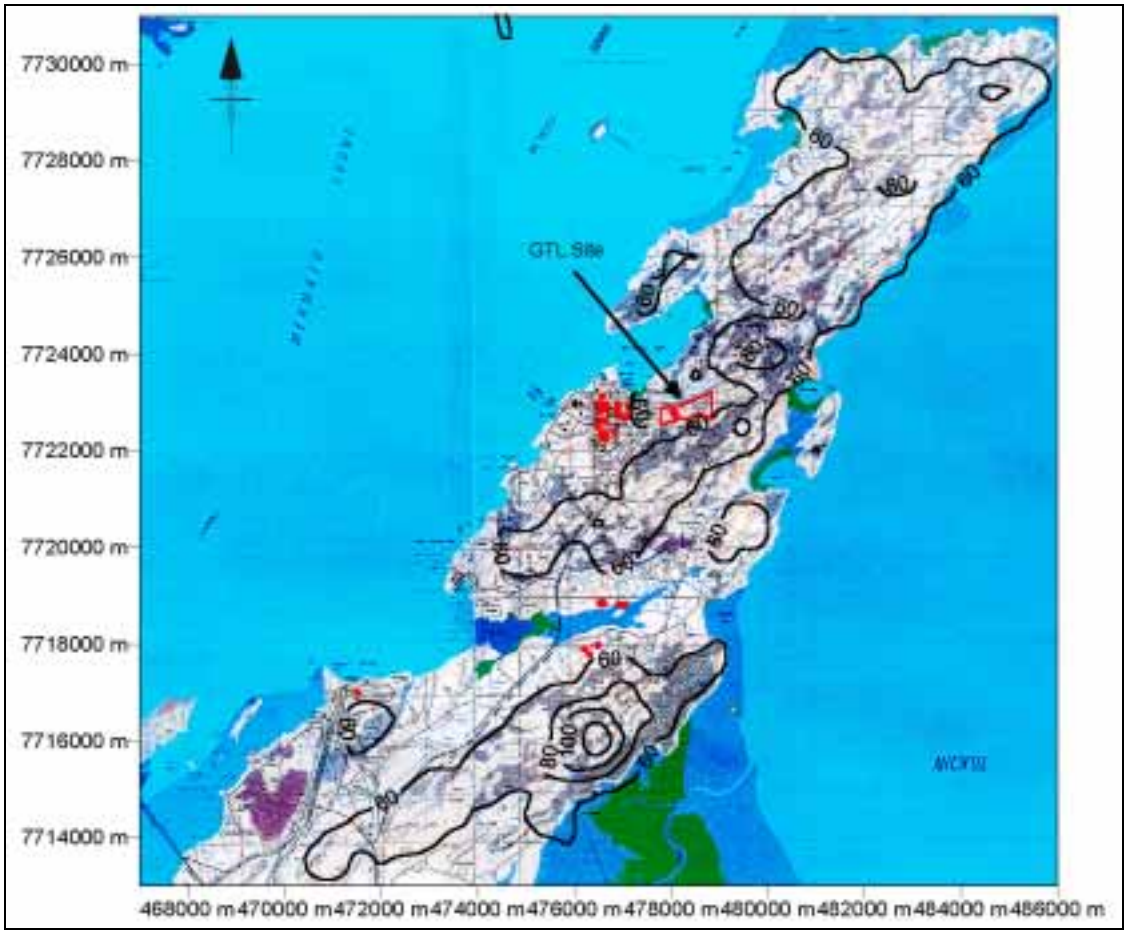


***Figure 5:*** ***Maximum predicted ground level $NO_2$ concentrations ($\mu g/m^3$, 1 hour average) from existing sources plus this proposal (Source: URS, 2002, Figure 7-2, Appendix G)***

$SO_2$ emissions are estimated at approximately 2.1t/a under normal operating conditions. All process gas, but not fuel gas, will be desulphurised and due to the low sulphur content of Northwest Shelf gas, $SO_X$ emissions are expected to be low. Modelling of predicted emissions has shown ground level concentrations well below the NEPM standard.

CO emissions under normal operating conditions are estimated at 76t/a. Modelling of these emissions results in a ground level concentrations well below NEPM standards.

VOC emissions under normal operating conditions are estimated at 8.4 t/a due to fugitive emissions and emissions from scrubbers, the process condensate stripper and the diesel generator. VOC emissions from shiploading will be captured in a scrubber at the wharf and scrubber water will be trucked to the plant for recycling, thus reducing VOC emissions.

Salt water mist will be emitted from the seawater cooling towers which are situated in the south of the plant site. This could be at a rate between 150kg/h and 3.5t/h depending on the design features of the cooling tower. Best available measures will be incorporated into the design of the tower to control mist emissions.

Particulate emissions are predicted to be negligible during normal operation of the plant. There will be some particulates generated by the diesel generator, which will only be used for emergency power under upset conditions and for start-up.

Dust particles will be generated during construction on the site. Dust will be managed through the implementation of an EMP and standard dust control measures will be adopted.

Under normal operating conditions, there should be no emissions from the plant that would give rise to off-site odours.

Cumulative impacts

This proposal on its own generates relatively low ground level concentrations of $NO_X$ and $SO_2$. However there are potential secondary impacts on soil, vegetation, fauna, rock pools and rock art due to the cumulative impacts from industry on the Burrup Peninsula.

**Submissions**

One public submission supported the desulphurisation of feed gas, low CO concentrations to be emitted, and vapour blankets and recovery systems for tanks and shiploading.

Another submission stated that air quality impacts associated with the proposal must be assessed through Environmental Impact Assessment and Cumulative Impact Assessment and that the precautionary approach should be applied.

**Assessment**

The area considered for assessment of this factor is the Burrup Peninsula and surrounding area, including the townships of Dampier and Karratha.

The EPA's environmental objective for this factor is to:

(i) Ensure that gaseous emissions, from this proposal in isolation and in combination with emissions from neighbouring sources and background concentrations, do not cause ambient ground level concentrations to exceed appropriate criteria, (including the NEPM for Ambient Air Quality), or cause an environmental or human health/ amenity problem; and

(ii) Use all reasonable and practicable measures to minimize the discharge of significant atmospheric wastes such as NOx, SOx, greenhouse gases, toxic gases, particulates and smoke.

Oxides of Nitrogen ($NO_X$)

The EPA notes the proposal will incorporate low $NO_X$ burners in the reformer and boiler units. Furthermore this proposal is not a major emitter of $NO_X$ in the region with total emission estimated at 403t/a in comparison to the current existing emissions of 7 200t/a due to industry and in comparison to the projected emissions of 18 000t/a should all proposed projects on the Burrup Peninsula go ahead (SKM, 2002). It is however important to keep emissions as low as reasonably practicable to avoid contributing unnecessarily to cumulative loads.

The estimated $NO_X$ emissions have been compared with another proposal, which is not as yet operating and therefore the figures cannot be confirmed. No information has been made available from operating plants using similar technology. It is understood from Lurgi, the technology provider, that $NO_X$ emissions represent best practicable technology for this type of plant.

The proponent has, however, made commitment 2 (Appendix 4) to demonstrate best practicable technology will be applied to reduce pollutants in atmospheric emissions at the detailed design phase.

Modelling of expected ground level concentrations of $NO_2$ has shown that levels significantly below NEPM standards are predicted in residential areas. However the EPA is cognisant of the fact that the AUSPLUME model used does not completely accurately predict ground level concentrations when applied to meteorological and terrain conditions of the Burrup Peninsula so modelling results need to be considered conservatively. Given that modelling results are significantly below NEPM standards the EPA is satisfied that this issue can be adequately managed.

As detailed engineering designs have yet to be done and it is possible that some aspects of the plant equipment and layout may change in the final design, with some effect on the emission of $NO_X$, the EPA feels that it is appropriate for the proponent to confirm engineering design details for emissions, demonstrate that these are best practicable $NO_X$ control, estimate non-normal operating condition emissions and remodel to confirm previous predictions prior to submitting a works approval application. The EPA has recommended condition 9-1 accordingly. Remodelling at this later date will also allow the incorporation of up to date emission figures from other currently proposed industries in the region and modelling to more accurately take into account the meteorological and terrain conditions of the Burrup Peninsula. The Department of Environmental Protection should be consulted regarding appropriate modelling methodology. The EPA encourages industry, together with the Department of Environmental Protection and the Department of Mineral and Petroleum Resources, to develop a more appropriate air quality model for the Burrup.

The EPA notes that the smog study carried out by the CSIRO found that the predicted regional maximum ground level concentrations of $NO_2$ and $O_3$ do not exceed the NEPM standards.

Other emissions

The EPA acknowledges the predicted emissions of $SO_2$, CO and VOC are low and commends the proponent for proposing to capture VOC emissions during shiploading. The EPA notes the proponent's commitments to demonstrate that best practicable technology is being applied to reduce pollutants in atmospheric emissions, to undertake all practicable measures to minimise atmospheric emissions and to the preparation and implementation of a dust management plan during construction.

However, the potential for salt water to impact on vegetation in the Conservation area beyond the plant boundary due to the positioning of the salt water cooling towers near the southern boundary of the plant requires attention. Therefore the EPA has recommended condition 9-3 (Appendix 4) such that the extent of impact and likely deposition rate of salt water spray is determined in the detailed design stage so as to demonstrate that there will be no significant impact on vegetation in the CHRA.

Cumulative impacts on conservation values

$NO_X$ in air may impact vegetation by uptake through plant stomata. Exposure to nitric oxide and nitrogen dioxide, existing in the atmosphere, as dry deposition, or nitrate existing as wet deposition, can have direct effects on some species (World Health Organisation, 2000). Air quality guidelines for Europe for impacts on vegetation (World Health Organisation, 2000) suggest 75μg/m$^3$ for $NO_X$ as a 24 hour mean as a critical level for short term exposures. For long term effects 30μg/m$^3$ of $NO_X$ as an annual mean may be appropriate. Whether these guidelines are appropriate for vegetation found on the Burrup has not been determined. However the proposal's modelling of $NO_X$ has shown that the cumulative emissions of existing sources plus the proposed Woodside expansion, Syntroleum, Burrup Fertilisers and Dampier Nitrogen plants, is predicted to be a maximum 24-hour average of 96μg/m$^3$, which already exceeds the recommended guideline for short term exposures. The annual average is predicted to be a maximum of 19μg/m$^3$ from the same sources, which is less than the long-term guideline for Europe. The addition of this proposal will increase the predicted maximums by 3μg/m$^3$.

Cumulative loads of nitrogen deposition are not known although Methanex (Methanex 2002) has estimated an average annual deposition rate of 4.8g $NO_x$/m$^2$ (48kg/ha) from existing and proposed industry. This level is at the upper limits of the guidelines for many vegetation types in Europe for total nitrogen deposition recommended by the World Health Organisation (WHO,2000). The estimation made by Methanex does not include the additional nitrogen sources of ammonia and urea from the Dampier Nitrogen proposal and $NO_X$ from this proposal.

Other potential environmental impacts of cumulative atmospheric emissions include acidification and nitrification of freshwater rock pools and soil, impact on fauna, and impact on rock art. A study has been commenced through the Department of Mineral and Petroleum Resources to investigate the impacts of air emissions on rock art. Deposition of atmospheric nitrogen into the marine environment is also possible. Further advice on cumulative impacts is provided in Other Advice (Section 5).

The proponent has indicated in the PER document willingness to monitor for secondary impacts on vegetation in collaboration with other industries and to contribute to a cumulative air quality study. Condition 9-2 (Appendix 4) has been recommended so that the proponent undertakes monitoring of vegetation and rock pools. This proposal is not a large contributor to atmospheric emissions compared to other proposals.

**Summary**

Having particular regard to the:

(a) proponent's management measures and commitments to minimize atmospheric emissions;

(b) results of modelling studies that show that the NEPM standards will not be exceeded at residential areas;

(c) the small relative contribution of the proposal to atmospheric emissions in the area and

(d) recommended conditions,

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

## 3.4 Greenhouse Gases

**Description**

Predicted greenhouse gas emissions are shown in Table 4 below (URS, 2002):

**Table 4: Summary of GHG Emission Estimates**

| | **kg $CO_2$-eq per hour** | **Tonnes $CO_2$-eq per year** |
|---|---|---|
| Carbon Dioxide | 50,520 | 442,550 |
| Methane | 10 | 92 |
| Nitrous Oxide | 1,023 | 8,960 |
| Total | *51,550* | *451,600* |

Energy input that is required for the process is supplied by the combustion of gas in the reformer and an auxiliary gas fired, high-pressure, steam boiler. The methanol manufacturing process uses a highly integrated and optimised process design in which all purged gases are used as fuel and includes heat exchange and heat recovery into an integrated steam cycle. Under normal operating conditions no import of power is required.

Increasing energy efficiency and reducing the amount of gas consumed per unit product is one way of reducing the amount of greenhouse gases produced. The energy efficiency of the proposal is estimated as 34 Gigajoules per tonne (GJ/t) of methanol. This compares with the Methanex proposal (Methanex, 2002) estimate of between 33 and 34GJ/t of methanol and with Tassie Shoals proposal estimate of 35GJ/t of methanol.

Estimated carbon dioxide ($CO_{2)}$ emission per tonne of methanol is 0.404 t/t. This estimate has been compared with the Tassie Shoals proposal estimate of 0.96 t/t. However, the gas to be used by Tassie Shoals has a 25% $CO_2$ content which influences energy efficiency of the conversion of natural gas to methanol.

As there were no Australian methanol plants in 1990, comparison cannot be made with a plant built at that time. Comparison with the Methanex plant in New Zealand built in the mid-1980's shows an improved greenhouse gas efficiency for this proposal, due to lower $CO_2$ content in the gas and increased energy efficiency.

It is proposed to minimise natural gas consumption through the adoption of energy saving measures and thus minimise greenhouse gas emissions. Specific "no regrets" measures that will be included in the plant design include:

- efficient reforming process;
- recovery of waste heat;
- no fugitive emissions or flaring;
- steam turbine drives;
- power recovery turbines; and
- self-contained utilities systems.

The proponent has committed to considering a number of future greenhouse gas emission reduction strategies. These include considering funding capital investment projects which have a long pay back period, but which have significant greenhouse gas emission reduction potential, evaluating greenhouse gas reduction opportunities involving minor increases in direct operating costs (e.g. the integration use of renewable energy sources) and assessing in terms of $/tonne of $CO_2$ emission avoided, potential greenhouse gas reduction opportunities that are uneconomic without an external source of finance. As a carbon trading market develops, in accordance with State and Commonwealth greenhouse gas policy and legislative requirements, such projects will be considered in the light of the price of carbon on that market.

**Submissions**

Public submissions suggested that large greenhouse gas emitters should contribute a tax or levy to fund reductions in greenhouse gas emissions.

It was also suggested that there is ambiguity over the amount of greenhouse gas emitted and discrepancy with Methanex, that the project would jeopardise Australia's international commitments, and that Greenhouse gas and energy required for the desalination plant has not been taken into account. It was considered that the proponent should develop a comprehensive, legally binding program for carbon sequestration though plantations.

**Assessment**

The area considered for assessment of this factor is global, Australia and the local region.

The EPA's environmental objective for this factor is to minimise greenhouse gas emissions in absolute terms, to reduce emissions per unit product to as low as reasonably practicable and to mitigate greenhouse gas emissions in accordance with the Framework Convention on Climate Change 1992, consistent with established Commonwealth and State policies.

The estimated energy efficiency of the proposal compares closely with that of the Methanex and Tassie Shoals proposals, demonstrating that the proposal is on a par with other new plants. However, no data from operating plants have been made available for comparison. Similarly the $CO_2$ emissions compare closely with Methanex and, due to the low $CO_2$ content of North West Shelf gas, very favourably with Tassie Shoals. The proposal is a small plant compared to these proposals and overall the emission of greenhouse gases will be less than half a million tonnes per year.

The proponent has made commitments to develop a greenhouse gas framework agreement as part of joining the Greenhouse Challenge and the Australian Industry Greenhouse Network and to manage greenhouse gases through ongoing monitoring of emissions and implementation of practicable measures to reduce gas usage and reduce or mitigate emissions.

The EPA notes that, while the PER document says that the proponent will only consider specific on-site measures for the reduction of greenhouse gases, the proponent in responses to submissions (Appendix 5) has indicated a willingness to further consider off-site activities, although such compensatory measures are outside their core business area. This is in line with the EPA's Guidance Note 12 (EPA, 2002) which encourages proponents to consider carbon sequestration options including off-site activities. The EPA recommends that the standard greenhouse gas condition is applied to this proposal.

**Summary**

Having particular regard to the:

(a) predicted energy and $CO_2$ efficiencies;

(b) proponent's commitments; and

(c) recommended greenhouse gas condition,

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

## 3.5 Water and Liquid Waste

**Description**

Wastewater will be generated by the seawater cooling system, from the desalination plant, from the demineralisation plant and from the process (Figure 6). Treated wastewater will also be produced from the sewage treatment plant. Stormwater will be diverted around the plant and from clean plant areas and potentially contaminated stormwater will be collected and retained.

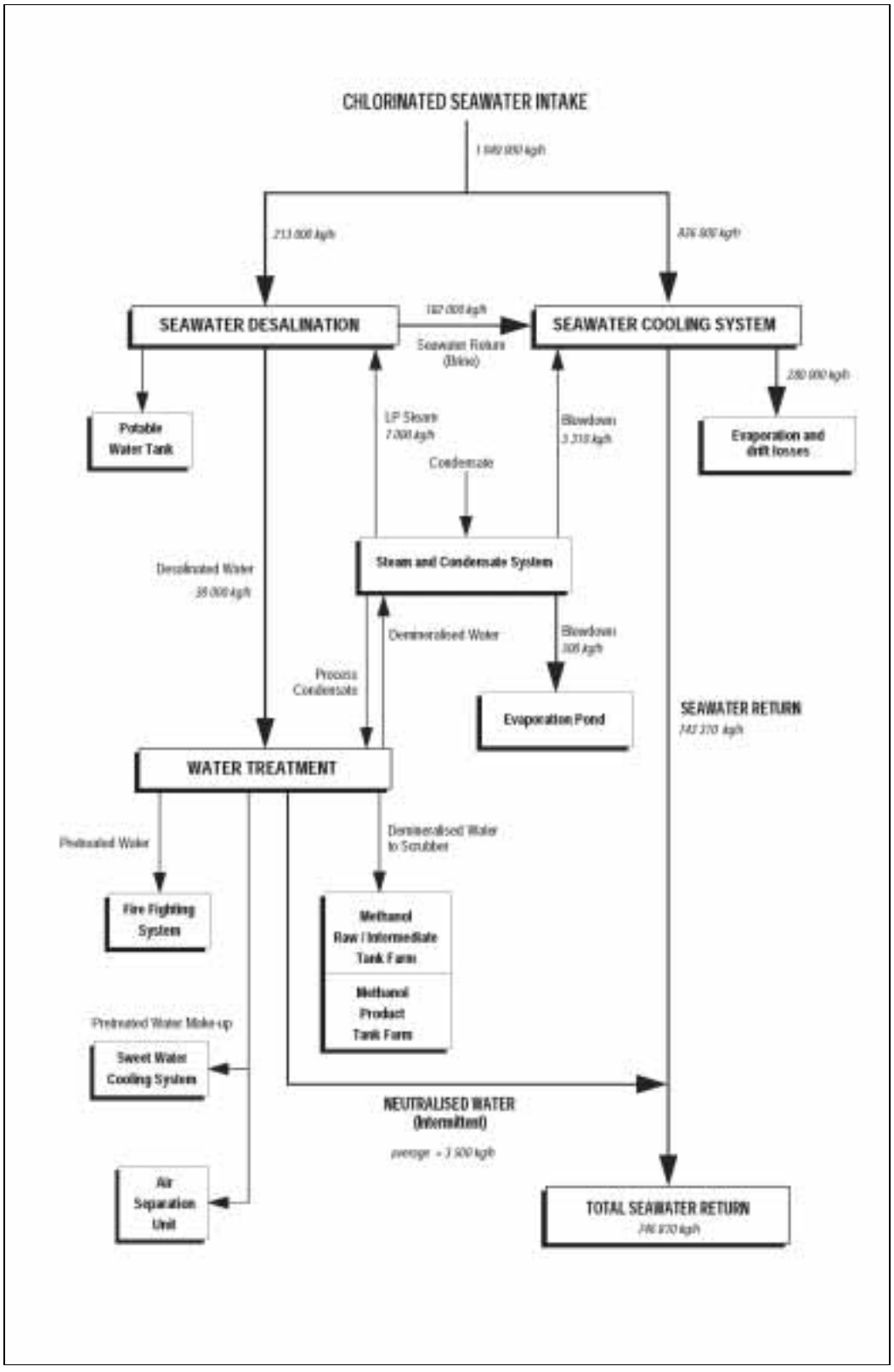


***Figure 6: Water systems flow diagram (Source: URS, 2002, Figure 7)***

Discharge to marine outfall

Discharge to the outfall will be of concentrated seawater containing chlorite, biocides, foam controls and antiscalant residues from the desalination plant and cooling system, wastewater from the demineralisation plant containing ammonia, residue from treatment chemicals such as sodium and sulphate and possibly treated domestic wastewater. No metals except sodium will be added to the return water. No loss of metals from catalysts to the wastewater stream is predicted. It is anticipated that the brine return water will have a salinity of up to 55,000 milligrams per litre (mg/L) (TDS), temperature within $2^{o}$ C of 24 hour ambient seawater temperature for 80% of the time with a maximum exceedence of $5^{o}$C and zero free biocides.

Ammonia is both a toxicant and a nutrient. The original proposal in the PER (URS, 2002) was to discharge all ammonia from the process to the outfall. This would have resulted in an ammonia concentration exceeding the ANZECC 99% species protection trigger level at the edge of the outfall mixing zone and a contribution of 50t/a of nitrogen to the marine environment. The proposal has now been amended to include steam stripping of process condensate, which will remove most of the ammonia from the process condensate and return the ammonia as steam to the steam reformer. It is estimated for the amended proposal that at the point of discharge the concentration of the remaining ammonia after dilution with return seawater will be 0.23mg/L as nitrogen which is below the ANZECC 99% species protection trigger level of 500 µg/L. After dilution at the edge of the mixing zone the concentration will be approximately 20µg/L. The ammonia discharge will add approximately 2t/a of nitrogen to the marine environment.

Treated sewage wastewater may be discharged through the Water Corporation outfall or may be used on site if suitable.

Discharge to evaporation pond

Blowdown from the steam and condensate system of 0.5 $m^3$/h containing 0.01% (approximately 100mg/L) of methanol will be directed to a lined evaporation pond on-site. The pond will also retain any contaminated stormwater that is not of good enough quality to discharge off site.

Discharge offsite

It is proposed to discharge uncontaminated and diverted stormwater off-site into natural drainage lines through a rectification system.

**Submissions**

Department of Planning and Infrastructure stated that the potential for ecological changes due to nitrogen discharge had not been considered and should be dealt with at this point in the process and that there was no description of the affected area upon which to base any judgement of impact.

**Assessment**

The area considered for assessment of this factor is the marine environment of Mermaid Sound, Withnell Bay and surface and groundwater discharge from the plant site.

The EPA's environmental objective for this factor is to maintain marine ecological integrity and biodiversity and ensure that any impacts on locally significant marine communities are avoided and to maintain or improve the quality of surface and groundwater to ensure that existing and potential uses, including ecosystem maintenance are protected, consistent with the Australian and New Zealand Guidelines for Fresh and Marine Water Quality.

Discharge to marine outfall

Discharge of wastewater to the marine environment will be via the Water Corporation outfall. It will be the Water Corporation's responsibility to monitor for marine impact. For acceptance of wastewater to the outfall, the proponent is required to demonstrate through the environment approvals process that "best practice" and waste minimisation principles have been applied, that cumulative impacts on the marine environment are acceptable and to monitor the constituents of wastewater and brine prior to entry to the outfall system. To achieve this the EPA has recommended condition 7.

The EPA commends the proponent for amending the proposal to significantly reduce the amount of ammonia proposed for discharge to the marine environment and for committing to demonstrating best practicable technology. The discharge of nitrogen compares to the current Methanex proposal which will also discharge approximately 2t/a of nitrogen for a five times greater production. If further reductions are found to be practicable during the design stage of the plant, the EPA would encourage the proponent to implement these.

The EPA notes that the proponent has advised that there will be no detectable traces of catalyst, including nickel and copper, present in the wastewater discharged to the marine outfall. This needs to be confirmed thorough recommended condition 7-5 (Appendix 4).

Discharge to evaporation pond

The EPA notes that methanol contaminated wastewater will be discharged to a lined evaporation pond. This is acceptable provided the pond is sufficiently sized to contain discharge and rainfall and managed to prevent leakage.

Discharge offsite

The EPA notes that the proposal does not include sedimentation or retention basins, and there is the potential for sediment or increased flow to impact on downstream vegetation and mangroves and rock pools or cause erosion. The proponent should assess the potential environmental impacts of stormwater discharge on the mangrove system at Withnell Bay and provide further details of stormwater management, criteria for discharge and how these will be monitored. To this end, condition 8 (Appendix 4) has been recommended to ensure this is considered in the detailed design stage for the proposal, prior to works approval.

Pipeline management

To reach Withnell East salt water supply and brine return pipelines will have to travel some 4km over upland terrain that could be severely impacted by a major leak. Particularly careful attention to the monitoring, management and containment of salt water lines will be required on these upland areas where vegetation is likely to be much less well adapted to salt water flooding than that on the King Bay-Hearson Cove floodway. The EPA has therefore recommended condition 12 (Appendix 4) for the construction and management of pipelines including salt water lines.

**Summary**

Having particular regard to the:

(a) amendment to the proposal to reduce the discharge of ammonia;

(b) proponent's commitments; and

(c) recommended conditions,

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

## 3.6 Noise

**Description**

At this stage detailed engineering design of the plant is not available. Preliminary noise modelling was carried out based on a total plant sound power level of 122dB(A), which would allow the plant to achieve a sound pressure level contribution not exceeding 65 dB(A) at the plant boundary. Modelling was based on information provided by Lurgi, which included seven noise sources for each of the cooling system cells and another nominal source, representing remaining components with potential noise impacts. Mitigation measures, such as installation of sound hoods on all compressors and large turbine drives, and low noise design cooling towers have been incorporated to achieve this sound power level.

The following sound pressure levels have been predicted (URS, 2002):

**Table 5: Predicted Sound Pressure Level Contributions**

| Noise Receiver | Acoustically 'Neutral' Conditions (dBA) | Default Adverse Daytime Conditions (dBA) * | Default Adverse Night-time Conditions (dBA) |
|---|---|---|---|
| Dampier (nearest residential area) | 3 | 13 (wind from north) | 11 |
| Hearson Cove (end of track) | 10 | 20 (wind from west) | 23 |
| LPG Jetty at NWSVP Plant | 36 | 45 (wind from east) | 45 (drainage wind to west) |
| Withnell Bay Boat Ramp | 39 | 48 (wind from south) | 46 (drainage wind to west) |

* Wind direction source to receiver

It is noted that the current modelling indicates the 65 dB(A) noise contour projecting slightly beyond the proposal lease boundary to the north and south. This result is due to assigning the total plant noise emissions, excluding the cooling towers, to a single building. At the current stage of development there is insufficient information to refine the modelling further and this will be done at the detailed design phase.

Cumulative noise expected at Withnell Bay as a result of the North West Shelf Venture Project (NWSVP) facility and the proposed plant has been calculated as 46 to 52 dB(A). This was calculated from the predicted noise levels of 39 to 48 dB(A)from the proposed facility and the typical noise levels of 45 to 50 dB(A) from the operating NWSVP plant.

The worst case noise contribution predicted for the proposed plant is less than the 25 – 30 dBA range of background noise levels reported for Hearson Cove. Therefore, the AMC plant is predicted to be an insignificant contributor to noise at Hearson Cove. Should other industrial developments take place in the King Bay-Hearson Cove Industrial Area, it is likely that noise from these industries will dominate at Hearson Cove.

The worst case noise contribution estimated for the proposed plant is predicted to be inaudible at Dampier assuming other planned industries go ahead.

**Submissions**

Pilbara Development Commission suggested that the proponent should analyse and report on the impact of increased noise levels on amenity at Withnell Bay. It was also stated that is not reasonable to assume other proposed developments will dominate cumulative noise levels at Hearson Cove and that a sound level up to 10dB(A) lower than background is discernable in some conditions. The Commission suggested that recreational and environmental amenity will be lost and suitable offsets should be considered.

**Assessment**

The area considered for assessment of this factor is the neighbouring industries, the recreational areas of Withnell Bay, Hearson Cove and Conzinc Bay and residential areas of Dampier and Karratha.

The EPA's environmental objective for this factor is to ensure that noise impacts emanating from the proposed plant comply with statutory requirements specified in the Environmental Protection (Noise) Regulations 1997 and to minimise the impact on the amenity of recreational areas as far as practicable.

The EPA recognises that detailed engineering designs for the plant have yet to be done and therefore it is difficult to obtain an accurate forecast of the noise levels expected from the plant. The modelling done to date shows that, with the incorporation of noise reduction measures, it will be possible to meet the *Environmental Protection (Noise) Regulations, 1997*. Due to the location of the plant to the north of the Burrup Peninsula, noise impacts at the townships of Dampier and Karratha will be not discernable.

The EPA considers it important to preserve recreational areas, such as Hearson Cove and Conzinc Bay, for the local population and for tourists to the region. Accessible sandy beaches are limited in the area and the natural attributes of the area, i.e. visual uniqueness, remoteness, peacefulness and cultural associations, are valuable. It is in this context that the EPA requires all industries establishing on the Burrup to minimise their noise emissions to the best practicable extent. The EPA therefore recommends condition 11 (Appendix 4) to ensure all practicable noise minimisation measures are taken.

**Summary**

Having particular regard to the:

(a) manageable noise levels predicted at residential areas and at Hearson Cove and Conzinc Bay;

(b) fact that the requirements of *Environmental Protection (Noise) Regulations, 1997* will be able to be met with the incorporation of noise reduction measures; and

(c) recommended condition 11,

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

## 3.7 Risk and Public Safety

**Description**

A Preliminary Risk Assessment (PRA) has been undertaken for the proposal. As detailed engineering designs have not been completed the PRA is based on preliminary drawings with limited information.

The identified hazards considered as having the potential to impact offsite and therefore evaluated in the risk analysis studies are presented in Table 6 (Qest, 2002).

**Table 6: Potential Hazardous Events Examined in Risk Analysis**

| Location | Event | Release |
|---|---|---|
| Natural Gas Feed Line | Major leak or rupture | Methane |
| Unit 100 – Reforming | Major leak or rupture | Methane, Hydrogen, Carbon Monoxide |
| Unit 200 – Methanol Synthesis | Major leak or rupture | Methane, Hydrogen, Carbon Monoxide, Methanol (gas) |
| Unit 300 – Methanol Distillation | Major leak or rupture | Methanol (liquid) |
| Unit 400 – Intermediate Methanol Tank Farm | Major leak or rupture | Methanol (liquid) |
| Unit 1100 – Methanol Product Farm & Ship Loading | Major leak or rupture | Methanol (liquid) |
| Unit 1170 – Methanol Pipeline Corridor | Major leak or rupture | Methanol (liquid) |
| Shipping Channel | • Ship to ship collision.<br>• Grounding.<br>• Collision with fixed structure.<br>• Fire/explosion onboard.<br>• Tank material failure | Methanol (liquid) |

The PRA found that:

- the one in a million risk contour does not extend to residential areas;
- the 50 in a million risk contour from the AMC Methanol Plant does not extend beyond the site boundary;
- the 10 in a million risk contour extends for a distance of approximately 110m to the north and 60m to the south;
- the one in a million risk contour for the Woodside Onshore Treatment Plant does not enter into the Withnell East Industrial Area. The 0.5 in a million contour for the proposal does not extend beyond the Withnell East Industrial Area boundary of the western side and therefore the two sites pose negligible risk to each other; and
- the societal risk posed by the plant is below the maximum level previously recommended for new plants in Western Australia based on a study done for industries in Kwinana.

A number of risk reduction measures were recommended, including:

- develop a Safety Management Plan;
- put in place an Emergency Response Plan that provides a rapid response to identified releases that would facilitate early manual isolation of any leaking equipment;
- develop a Joint Industrial Integrated Emergency Management Plan with Woodside;
- ensure fire fighting measures such as deluge systems are addressed and incorporated in the final design;
- ensure the gas detection systems in the final design include sensors for the fuel gas and $CO_2$ in areas that are both enclosed and open to increase likelihood of the detection of leaks;
- ensure the final design of the offloading systems incorporate shutdown systems that can be controlled by the operator at the loading point; and

- designate an exclusion zone during loading of the export tankers at the wharf. This will be assessed when the final wharf and offloading system are designed.

Bushfires

The fire protection system within the AMC plant will be sufficient to prevent any threat from fires in the surrounding conservation estate. In the event of fire in the conservation estate outside the Withnell East Industrial Area, the proponent is aware that the plant operators will not be permitted to extinguish these fires, nor will they be permitted to request that local Fire and Emergency Services Authority (FESA) personnel extinguish them.

Traffic Safety

During construction, portions of the plant will be shipped to Dampier in modular form and offloaded at the Mermaid Marine facility for transport to the plant site by truck. Traffic loads on Burrup Road are therefore anticipated to increase due to the construction workforce and transport of plant components and materials. Temporary access restrictions along Burrup Road may occur during transport of some plant components.

During operation of the plant there will be no significant increase in traffic on Burrup Road.

**Submissions**

Public submissions stated that the 10 in million risk contour extends beyond the industrial area and appears to be in contradiction of EPA's guidelines and that the potential for an explosion in the air separation unit appears to have been overlooked in the Risk Assessment.

FESA asked a number of questions regarding whether the facility would be a Major Hazards Facility, what provisions would be made with respect to off-site emergencies involving gas, water and methanol pipelines, how many personnel will be on-site to respond to emergencies, the risk of airborne embers from a fire in the neighbouring conservation estate, assistance in responding to a fire in the conservation estate and provision of firewater and compatibility of emergency response equipment and emergency response procedures with those of FESA.

FESA also commented that the proposed Emergency Services Levy may have implications for emergency services, FESA should be invited to become involved in the Development of a Joint Integrated Emergency Management Plan with Woodside, all fire fighting systems should be designed according to AS 1940 and in consultation with FESA in the planning stages and that emergency fire fighting services at Dampier consist of a private volunteer Fire Brigade.

MPR stated that areas outside the plant boundary in the 10 in a million risk contour should not be used for any purpose for which a lower risk level criteria is applicable, the plant site would be a Major Hazards Facility requiring a Safety Case/Report, that the Safety Case/Report needs to demonstrate the appropriateness of isolation valves only at the ends of the methanol pipeline and that the QRA needs to address detailed knock-on effects, risk of loading and exclusion zone, risk from actual inventory likely to be released, possibility of catastrophic failures, response time for manual shut down and a list of credible scenarios.

The Pilbara Development Commission stated that the proponent should work with Dampier emergency services to establish a detailed strategy to coordinate responses and provide support for community emergency response teams.

The Pilbara Development Commission also stated that the proponent had failed to address potentially significant impact of traffic during the 30 month construction period and should develop a strategy to manage construction workforce traffic in conjunction with the Shire and the Accommodation Taskforce.

Another submission stated that the PRA had not fully addressed the issue of 'fire-lobs' from the Woodside flare.

**Assessment**

The area considered for assessment of this factor is areas including and surrounding the plant site including the pipeline corridor and port area.

The EPA's environmental objective for this factor is to ensure that risk is managed to meet the EPA's criteria for off-site individual fatality risk (Interim Guidance Statement No.2), that the "as low as reasonably practicable" principle (ALARP) is demonstrated, and the MPR/EPA requirements in respect of public safety are met. The EPA's objective for road safety is to ensure that road traffic is managed to meet an adequate standard of service and safety and Department of Planning and Infrastructure requirements.

The EPA notes the MPR has identified a number of risk factors that will need to be addressed further in the QRA and Safety Case/Report. The proponent has made a commitment 5 (Appendix 4) to undertake a QRA to MPR's satisfaction and to incorporate appropriate risk and hazard reduction measures at the plant design stage. The proponent should also consider the recommended risk reduction measures identified in their consultant's report and show that risk is as low as reasonably practicable. A Safety Case/Report is required under the National Standard for the Control of Major Hazard Facilities [NOHSC:1014(1996)] which will become applicable under the *Explosives and Dangerous Goods Act 1961* as the facility is a Major Hazards Facility.

The 10 in a million risk contour extends beyond the site boundary to the north and south of the site. This risk level is considered by the EPA (EPA 2000) as being acceptable for areas of non-industrial activity and active open spaces in buffer areas between industrial facilities and residential areas. The area where the 10 in a million risk level is exceeded to the north of the site is within the industrial estate and will encompass a service corridor and road which services Woodside's facilities at Mt Wongama. It is therefore an area of industrial activity and the guidance is not applicable. The area where the 10 in a million risk level is exceeded to the south

extends into the CHRA. The CHRA has not been identified as an industrial buffer area and there are no recommended risk criteria for conservation areas. The proponent has advised that there are no significant Aboriginal sites in this area and the area should not attract congregations of people. It is therefore not considered to be an active open space. It is suggested that the proponent should be responsible for signposting the area to advise people not to remain there longer than is necessary. Further examination of risk reduction measures during the detailed design stage may lead to the contraction of the 10 in a million contour and the proponent is encouraged to try to meet this risk level at the southern boundary.

The EPA's individual risk criterion for residential areas will be easily met.

In response to the query regarding an explosion in the air separation unit the proponent advises that oxygen is not being stored onsite, but is being produced on demand by the air separation unit. An oxygen release would increase the thermal effects of any existing flammable scenario. However, a release in its own right would not be likely to result in an explosive or toxic atmosphere as an ignition source would be required to cause an explosion.

The EPA advises that the size and possible impact of methanol spills from the plant, pipeline and loading facility needs to be further addressed in the design of the plant and QRA and Emergency Management Plan and the proponent has committed to preparing and implementing Safety and Emergency Management and Response Plans to include management of methanol spills (commitment 24, Appendix 4).

Bushfires

The proponent is aware of the danger of bushfires in the area and has undertaken to design the plant to withstand fire in the adjacent CHRA. The proponent has advised that Woodside has taken steps to prevent further fire-lobs from their stack.

The EPA recommends that the proponent consults with both CALM and the Fire and Emergency Services regarding fire management for the plant.

Traffic Safety

The EPA notes that the proponent will prepare and implement a traffic management plan as part of its Safety plan (commitment 15, Appendix 4), and that the proponent has undertaken to consult with appropriate authorities in the preparation of the plan (Response to Submissions).

**Summary**

Having particular regard to the:

(a) proponent's commitments; and

(b) requirements under the *Explosives and Dangerous Goods Act 1961* and the National Standard for Control of Major Hazard Facilities, and

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

## 3.8 Culture and Heritage

**Description**

Initial archaeological surveys of the site identified five rock engraving sites in the general vicinity of the proposed lease area. Only one would possibly be impacted by the construction of the AMC plant. This site, which consists of several small rock engravings, is located just to the north of the proposed project lease area (URS,2002).

Further survey work has now been carried out and a further 14 sites found. These sites consist of petroglyphs, artefact scatters, stone arrangements, shell fragments and grinding patches. Eleven of the sites will be impacted by the proposal and the proponent is seeking a Section 18 clearance for these under the *Aboriginal Heritage Act 1972*. While these sites are considered significant enough to require Section 18 approval, they are not major sites.

Ethnographic surveys have been carried out with the Yaburara Mardudhunera and the Ngarluma Yindjibarndi people, two of the three Native title claimant groups. However the other group advised that they are not prepared to undertake ethnographic surveys until native title negotiations are completed. The reports from these surveys are not yet available but verbal advice from the proponent's consultant is that no ethnographical sites have been identified.

**Submissions**

Public submissions stated that the location in the heart of Conservation Area will cause addition risk to heritage values and that the standard of archaeological survey and ethnographic consultation does not appear to be adequate. It was considered that the proponent should demonstrate that the Aboriginal people are adequately equipped with necessary environmental information for consultation.

It was stated that the proponent had failed to acknowledge that the proposal is likely to impact on area proposed for World Heritage listing and that the proponent had failed to provide documented advice from the International Rock Art Federation.

The Pilbara Development Commission suggested that the construction and operational workforce should undertake a Cross Cultural induction program to develop broader knowledge of Pilbara indigenous culture and heritage.

Department of Indigenous Affairs considered that Heritage issues are being adequately addressed through the proponent's actions and intentions.

**Assessment**

The area considered for assessment of this factor is the proposal area at the Withnell East Industrial Area.

The EPA's environmental objective for this factor is to ensure that the proposal complies with the requirements of the *Aboriginal Heritage Act* 1972 and to ensure that changes to the biological and physical environment resulting from the project do not adversely affect cultural associations with the area.

The EPA notes that the proponent intends to apply under Section 18 of the *Aboriginal Heritage Act* 1972 for the disturbance of 11 archaeological sites. The EPA further acknowledges that the Department of Indigenous Affairs is satisfied that through the proponent's actions and intentions Heritage issues will be adequately addressed.

The EPA notes the proponent's commitment 14 (Appendix 4) to complete archaeological and ethnographical surveys of the project site. The EPA also notes the proponent's intention to consult further with the Ngarluma Yindjibarndi people regarding the Section 18 application.

**Summary**

Having particular regard to the:

(a) proponent's commitments; and

(b) existing legislation,

it is the EPA's opinion that the proposal can be managed to meet the EPA's environmental objective for this factor

## 3.9 Amenity

**Description**

A visual impact assessment was undertaken to predict the impacts on visual amenity as a result of the proposed development (URS, 2002, Appendix J). Computer generated models in combination with photographs from public viewpoints were developed to enable the proposed plant to be viewed in the context of the existing landscape and infrastructure. It was concluded that views of the proposed plant from the most commonly visited public recreation site in the vicinity (Withnell Bay boat ramp) would be either partly or fully obscured by intervening landforms. The plant is near the Woodside Onshore Treatment Plant which has an existing visual impact on the area.

Light glow and light overspill is likely to be observable from Withnell Bay and will add to that already caused by the Woodside plant and its flare.

The impact of noise from the proposal on amenity is considered under the factor of Noise.

**Submissions**

The Pilbara Development Commission commented that Withnell Bay is a popular public recreational area and further alteration to the landscape is a significant issue. It was suggested that the proponent work in conjunction with government and the community regarding alternative recreational areas and in conjunction with the Shire and others to determine the impact of improved access to Withnell Bay (traffic and parking and protection of the northern area). It was suggested that the proponent should contribute to the cost of upgrading recreational infrastructure on the Burrup.

CALM stated that access to Withnell Bay would not be improved by the proposal as access is difficult in the section beyond the site and recommended that the proponent upgrade access to Withnell Bay, boat ramp and parking areas.

DPI commented that the impacts of the workforce on recreational infrastructure was not well handled. It was considered that the EPA's objectives in respect to aesthetic impacts can be met by the proposal. However, a number of inadequacies with the visual impact assessment were outlined. There was no comprehensive strategy for minimising visual impacts and no discussion of impacts on the landscape beyond the site e.g. due to creek rerouting or weeds.

DPI also considered that the cumulative impact of light overspill from the proposal and Woodside on recreational users of Withnell Bay had not been considered.

**Assessment**

The area considered for assessment of this factor is Withnell and Conzinc Bays and Hearson Cove and the general area surrounding the plant.

The EPA's environmental objective for this factor is that visual amenity of the plant and facilities from adjacent public areas should not be unduly adverse and the recreational uses of Withnell and Conzinc Bays, as developed by local authority and planning agencies, should not be compromised.

The EPA acknowledges that there will be some impact on the visual amenity of the area and some light overspill from the plant. However, these impacts cannot be entirely avoided. The plant is situated in proximity to the Woodside facility which already impacts visually on the surrounding area. The proponent has responded that with respect to light overspill that the proposed methanol plant will not significantly contribute to existing light levels from the much larger Woodside facility, due to its small size, positioning of the plant away from Withnell Bay towards the southern end of the Withnell East Industrial Area, and proposed measures to minimise light overspill in accordance with best practice consistent with site safety and security requirements. The plant will be a minimum of 750 m from Withnell Bay and at this distance light intensity is anticipated to be low and not unduly influence recreational users at the Bay. The plant site is also situated within a valley, therefore light will be ameliorated to some extent by shrouding afforded by terrain features that occur between the proposed plant site and Withnell Bay.

The EPA notes the proponent's commitments made in the PER (URS, 2002) to managing visual impacts with appropriate colour schemes and revegetation of temporary disturbances with local species and commitments to operating lighting to best practice, consistent with site safety and security requirements. Lighting will conform with guidelines presented in Australian Standard AS 4282.

The EPA further notes the proponent's response (Response to Submissions) that in the spirit of good corporate citizenship the proponent will consider supporting proposals to upgrade public recreational structures in the area but does not wish to commit to this at this stage.

**Summary**

Having particular regard to the:

(a) proponents commitments;

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

# 4. 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. In some cases the EPA may consider an issue to be of such environmental importance as to require a condition, even if the proponent's commitment partially duplicates the condition.

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.

## 4.1 Proponent's commitments

The proponent's commitments as set in the PER and subsequently modified, as shown in Appendix 4, should be made enforceable.

## 4.2 Recommended conditions

Having considered the proponent's commitments and the information provided in this report, the EPA has developed a set of conditions that the EPA recommends be imposed if the proposal by Australian Methanol Co Pty Ltd to build and operate a methanol plant of 1.05Mt/a nominal capacity and associated infrastructure, is approved for implementation.

These conditions are presented in Appendix 4. Matters addressed in the conditions include the following:

(a) that the proponent be required to fulfil the commitments in the Consolidated Commitments statement set out as an attachment to the recommended conditions in Appendix 4;

(b) the undertaking of a wet season vegetation survey and a survey to establish the occurrence of identifiable Priority flora on site;

(c) the supply of seawater and the discharge of brine and wastewater via the Water Corporation marine outfall;

(d) the management of surface water and stormwater on the site and discharge from the site;

(e) the management of air emissions from the plant, monitoring of impact of these on vegetation and the effect of salt water mist on vegetation;

(f) greenhouse gas management;

(g) noise minimisation and management;

(h) pipeline construction and operation;

(i) work practices; and

(j) decommissioning plans.

It should be noted that other regulatory mechanisms relevant to the proposal are:

- works approval under Part V of the *Environmental Protection Act 1986*;
- licensing under Part V of the *Environmental Protection Act 1986;*
- regulation under Major Hazard's Facility legislation;
- the *Aboriginal Heritage Act 1972.*

# 5. Other Advice

While the Woodside LNG facility is still the only major industrial plant on the Burrup Peninsula, there has been considerable activity in the last two years on the assessment of proposals for the area and the following new projects are proposed for the Burrup:

Methanol Plant – Australian Methanol Co Pty Ltd
Export Ammonia Plant – Burrup Fertilizers Pty Ltd
Dimethyl Ether Project – Japan DME
Ammonia Urea Plant - Dampier Nitrogen Pty Ltd
Methanol Complex – Methanex Australia Pty Ltd
Pilbara Ammonium Nitrate Project
Gas to Synthetic Hydrocarbons Plant – Syntroleum Ltd
Extension to Nickol Bay Quarry
Multi-user Seawater Supply System and Wastewater Outfall - Water Corporation
Dampier Public Wharf Expansion.

The above group of projects represents a significant planned addition to the level of industrial development on the Burrup. When combined with the existing and planned expansions to Woodside LNG this group of projects would take up much of the available land zoned for industry on the Burrup.

The EPA recognizes the attractions of the Burrup Peninsula to industrial development focused around the supply of natural gas. However, the EPA encourages Government to commit to a long term plan for the establishment of infrastructure so as to have available the Maitland Industrial Estate for future development projects.

The Burrup is a special place, and on-going planning is required to ensure the orderly use of the areas available for industry, taking into account the community's increasing understanding of the environmental and social values of the Burrup Peninsula.

Clearly the level of potential cumulative impacts on the Burrup would increase significantly if all these projects were built. A discussion of the range of issues raised follows. This discussion applies to the Burrup as a whole and not all items necessarily apply to every industry.

**Vegetation**

Most vegetation on the Burrup Peninsula is limited in extent because of the large number of vegetation types forming the mosaic on the peninsula. At present what seems the most significant vegetation is less impacted by avoiding rockpiles. However, the combined area of vegetation allocated for the development of industry on the Burrup is significant compared to the amount of vegetated area in the Conservation area. Further work is needed on cumulative effects of vegetation loss and what action may be taken to ensure the survival of a representative proportion of vegetation communities. Although some individual assessments have been completed, most proposals have plans for future expansion of the plant site and therefore all vegetation in industrial areas has the potential to be lost.

**Fauna**

Various studies have identified the need for further snail surveys to ascertain cumulative impacts of industrial development and for co-ordinated action to protect the Olive python and feeding areas for this species. Cumulative loss of stony gently sloping hummock grass plain habitat found in the areas allocated to industrial development is of concern. These matters need to be addressed in a co-operative manner by industries on the Burrup with advice from CALM.

**Marine**

The limited background data on seawater quality around the Burrup is currently an issue. A program to acquire this data should be instigated to assist in the assessment of proposals and the setting of appropriate conditions on works approvals issued for developments on the Burrup.

Work is also urgently required to develop a better understanding of what constitutes an environmentally safe load of nutrients to Mermaid Sound and Nickol Bay. That understanding presently does not exist. A similar review of cumulative phosphorus inputs should be carried out for Mermaid Sound and Nickol Bay.

Due to lack of information about nitrogen impact on corals it is recommended that the Water Corporation be requested to include a coral monitoring program in their management program, with agreed indicators and management response by the participating industries if these indicators are exceeded. The Water Corporation could require management action from the companies, if the coral impact indicators were exceeded.

**Air Quality**

Air emissions from individual projects and as cumulative impacts have been assessed, using available NEPM limits. These limits were largely developed for the protection of human health. Effects on other organisms or natural processes can occur at lower concentrations of pollutants but no data on these effects are known for the range of native plants, animals and heritage items, such as rock art, that exist on the Burrup.

Air emission studies generally concentrate on the so called “criteria pollutants” including NOx, SOx and particulates. In some circumstances, other pollutants such as VOCs, PAHs and heavy metals may require consideration.

Photochemical smog and ozone may be of concern as the number of industries increases. While acid rain is a more familiar concern in other places, dry deposition is the more likely mechanism of pollutant deposition most of the time on the Burrup. Ammonia and urea may have deleterious effects on native plant growth and ecosystem composition in a naturally nutrient poor environment.

Some systems that may plausibly be affected by air emissions are plants, fresh water rock pools, land snail species know to have very limited distributions and petroglyphs (rock art).

The EPA notes that OMP, on behalf of the WA Government, has recently commenced a four year study to establish a baseline for petroglyph condition and investigate potential threats to them from air emissions on the Burrup. In addition to this, the EPA considers there is a need for government/industry to develop and implement a management plan to monitor, evaluate and manage impacts on other conservation values, including vegetation, fauna and ephemeral pools. The EPA considers there is a need to:

- determine the deposition rates of acidic gases and nutrients (especially nitrogen) from proposed and existing industry on the Burrup; and
- establish criteria that would be protective of the Burrup vegetation, fauna, ephemeral pools and rock art.

The EPA understands that additional information would be required to achieve the above including more accurate dispersion and deposition modelling for the Burrup and appropriate monitoring of the health and growth of vegetation and fauna.

As more developments are placed on the Burrup, cumulative impacts and co-ordinated management will need to be carefully considered. As little is known about specific impacts in this environment, research, monitoring and management of cumulative impacts is essential. This applies particularly to the issue of ensuring that all the available air-shed capacity is not taken up by one or two industries. In this regard, the EPA encourages new and existing industry on the Burrup to minimise all emissions to the environment by utilising best practice management and best practicable technology/measures.

**Noise and other Amenity Issues at recreational areas**

All industries are required to meet the *Environmental Protection (Noise) Regulations 1997* which stipulate a 65dBA limit at the plant boundary. They are also required to take all reasonable and practicable measures to further reduce impacts. The principle of "all reasonable and practicable measures" under the *Environmental Protection Act 1986* requires proponents to get impacts down as low as reasonably practicable within the definition in the Act. Control of potential impacts at source is obviously an important and usual means of managing effects on recreational areas.

There is currently no noise level criterion associated with recreational areas. The EPA has 45 dBA as an aspirational goal to help maintain the amenity at Hearson Cove. While this aspirational goal is not mandatory, it provides some guidance on a target for all proponents to strive to achieve there. Elsewhere noise levels should be kept as low as practicable, recognizing that the Burrup is extensively used for recreation and has an important conservation function.

With regard to amenity issues, industry and government should be encouraged to work with the community to increase mutual understanding and acceptance of what are desirable and tolerable levels of amenity. Such an approach has commenced with work commissioned by the Office of Major Projects to define what some members of the community regard as acceptable noise levels at Hearson Cove.

Conzinc Bay, on the northwestern side of the Burrup is an important recreational beach to which better access may be provided in the future. Conzinc Bay is an attractive, sandy beach with much to recommend it as a recreation site, although it is not entirely screened from existing industry. As development proceeds at Withnell East industrial area impacts on Conzinc Bay need to be considered if this is to be retained as a recreational facility. Potential noise impacts on Conzinc Bay deserve particular attention.

Careful consideration would, however, need to be given to opening up this site because a readily accessible road there could significantly increase recreational pressure on a greater proportion of the northern end of the Burrup, which is difficult to access at present. It is understood that there are petroglyphs and other conservation features on the northern half of the Burrup which could come under increased pressure from increased visitation. If access to Conzinc Bay were to be improved, then it should be done on the basis of careful expert planning and with concomitant attention to an appropriate plan to manage the range of impacts that could be expected on a wider area of the northern Burrup.

**Risk Management**

At present there is no policy position on the acceptable risk levels that apply to a conservation and recreation zone such as that proposed for much of the Burrup. During the environmental impact assessment of projects, an interim risk level of $1 \times 10^{-5}$ has been used as being acceptable for the non-industrial areas and for this proposal in the conservation zone where there is little probability of people congregating. It is recommended that the area where the $1 \times 10^{-5}$ risk contour extends into the conservation zone is signposted by the managers of the land to advise of the level of risk in that area. There is a need to clarify the tenure and zoning of the balance of the non-industrial land on the Burrup to give certainty to the issue of safety management.

There is also a need to manage the cumulative risk associated with the multi-user service corridors, during the construction of individual pipelines, as well as during the operation of those pipelines. There is likely to be a number of pipelines carrying different substances including hazardous materials, and plans need to be in place to ensure events or knock-on effects which can lead to a release of hazardous materials are managed within acceptable limits.

An integrated emergency response management plan will also be required for the Burrup industrial area, as is the case now at Kwinana. The proposed Burrup Industrial Council may be the appropriate vehicle for such a plan.

**Drainage and Flooding**

Should more industries be proposed for the Withnell East industrial area the cumulative impact of the alteration of drainage lines may require investigation. Also, the supply of seawater for cooling and the return of brine from Withnell East is potentially more problematic than at King Bay-Hearson Cove. To reach Withnell East salty water will have to be piped some 4km over upland terrain that could be severely impacted by a major leak. Particularly careful attention to the monitoring, management and containment of salt water lines will be required on these upland areas where vegetation is likely to be much less well adapted to salt water flooding than that on the King Bay-Hearson Cove floodway.

# 6. Conclusions

The EPA has considered the proposal by Australian Methanol Co Pty Ltd to build and operate a methanol plant of 1.05Mt/a nominal capacity and associated infrastructure. The EPA notes that as yet only preliminary design for the plant has been carried out and that details of the proposal will not be finalised before front end engineering designs are completed. The EPA expects the proponent to provide further information specified in commitments and conditions prior to the granting of a works approval, or as required.

The EPA further notes that a regional wet season flora survey, some aspects of the fauna survey and an ethnographical survey are still to be completed and these should be done prior to works approval application. However, the EPA recognizes that the ability to undertake a wet season flora survey depends on there being adequate rainfall, thus such a survey may not be possible prior to construction but should be undertaken at the earliest opportunity.

Infrastructure corridors have not been considered in this proposal and are the responsibility of other proponents. The construction and operation of supply and export pipelines are included in the proposal and are the responsibility of this proponent.

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 by the proponent of the recommended conditions set out in Section 4, including the proponent's commitments.

Particular attention is drawn to the Other Advice section of this report where consideration is given to the wider issues of development and cumulative impacts on the Burrup.

# 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 and operation of a methanol plant of 1.05Mt/a nominal capacity and associated infrastructure.
2. That the Minister considers the report on the relevant environmental factors as set out in Section 3.
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 4, and summarised in Section 4, including the proponent's commitments.
4. That the Minister imposes the conditions and procedures recommended in Appendix 4 of this report.
5. That the Minister notes the EPA's other advice on management of cumulative impacts from industrial development on the Burrup Peninsula.

# Appendix 1

**List of submitters**

**Organisations:**

Conservation Council of WA
Department of Conservation and Land Management
Department of Indigenous Affairs
Department of Mineral and Petroleum Resources
Department of Planning and Infrastructure
Fire and Emergency Services Authority
Pilbara Development Commission
Wildflower Society
Woodside Energy Ltd

# Appendix 2

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# Appendix 3

**Summary of identification of relevant environmental factors**

## Summary of identification of relevant environmental factors

| Preliminary Environmental Factors | Proposal Characteristics | Potential Impact/Government Agency and Public Comments | Identification of Relevant Environmental Factors |
|---|---|---|---|
| **BIOPHYSICAL** | | | |
| Flora/Vegetation communities | Removal of approximately 15 ha of vegetation. Occupation of site. | **Potential Impact**<br>Vegetation communities diverse and generally limited to small area, loss of vegetation may cause community to become threatened.<br>Loss of biodiversity on local and regional scale.<br>Introduction and spread of weeds.<br>**Public Comments**<br>• Due to characteristics of vegetation communities on Burrup, the Peninsula should be Conservation area<br>• Vegetation types ChCwIm and GpImTe should not be cleared. Other TEC's should be preserved<br>• Proposal should not be allowed to proceed before an adequate flora survey, including wet season survey.<br>• Proposal should not be allowed to proceed before cumulative assessment for vegetation should all Burrup developments proceed and demonstration of how this proposal meets EPA Pos. Statement 2.<br>• Representation levels of vegetation complexes should be presented in context of local (15km) area. Discussion of representation of genetic diversity of species needed. No destruction of any veg type with less than 30% of original extent remaining.<br>• The EPA should have a Position Statement on the appropriate extent of environmental benefits to be achieved for proposals (environmental offsets).<br>• With the uncertainties involved with the proposal, the Precautionary Approach should be applied.<br>**CALM**: Requested for • Tables 7.1, 7.2, 7.3 and 7.4 to be completed again on 50 group level, and<br>• an analysis of the information in the above tables.<br>• asks where temporary water pipeline will be located.<br>**DPI •**: Proposal will enable people to reach northern Burrup and the long term impact of greater visitor numbers on vegetation needs to be considered. | Flora and vegetation communities considered to be a relevant environmental factor |
| Fauna | Removal of vegetation. Occupation of the site. | **Potential Impact**<br>Loss of habitat and feeding areas for threatened and protected species.<br>Introduction of feral animals.<br>Disturbance by human occupation.<br>**Public Comments**<br>• Location in the north of Burrup will disrupt flow of species between north and south.<br>**CALM:** • Requests that actions are taken in "agreement" with CALM.<br>**DPI**: • Proposal will enable people to reach northern Burrup and the long term impact of greater visitor numbers on fauna needs to be considered. | Fauna considered to be a relevant environmental factor |

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| Marine ecology | Shipping movements and potential discharge of ballast water.<br>Installation of loading pipeline.<br>Product loading | **Potential Impact**<br>Risk of introduction of marine species due to shipping movements and discharge of ballast water | Impacts of ballast water and shipping are regulated by AQIS and the Dampier Port Authority. |
| Landform, drainage and site hydrology | Levelling of site.<br>Diversion of surface water flows. | **Potential Impact**<br>Interference to natural drainage causing downstream impacts on vegetation and ecosystems. | Landform, drainage and site hydrology are considered to be a relevant environmental factor and are considered further under the factor of Water and Liquid Waste. |
| Water usage | Requirement of up to 20 $m^3$/h of potable water required for construction stage | **Public Comments**<br>**CALM**: • Concerned only current supply of water for Karratha-Dampier is from Millstream aquifer and current draw down exceeds Water Corporation licence conditions.<br>• Further development should not be approved until Harding Dam supplies or other resources are available. | Although this may be a relevant issue, the provision of water is an issue for the Water Corporation to address and they are aware of the current constraints. |
| **POLLUTION** | | | |
| Air Emissions | Emissions of:<br>NOx: 48 kg/h or 403 t/a<br>CO: 9 kg/h or 76 t/a<br>VOC: 1 kg/h or 8.4 t/a.<br>. | **Potential Impact**<br>Impact on human health.<br>Impact on native vegetation and freshwater systems through air-borne contaminants and acid deposition.<br>Impact on soil characteristics through nutrient deposition and secondary terrestrial system impacts.<br>Impact on rock art through acid deposition.<br>**Public Comments**<br>• Support for desulphurisation, low CO concentrations, and vapour blankets and recovery systems for tanks and shiploading<br>• Air Quality impacts associated with proposal must be assessed through EIA and CIA.<br>• The Precautionary Approach should be applied. | Air emissions are considered to be relevant environmental factors. |
| Greenhouse gases | Emission of:<br>$CO_2$: 0.404 kg/kg methanol or 424,000 t/a<br>Other greenhouse gases: 9052t/a $CO_2$ eq | **Potential Impact**<br>Increase in Australia's greenhouse gas emissions total. Global warming.<br>**Public Comments**<br>• Large greenhouse gas emitters should contribute a tax or levy to fund for reducing greenhouse gas emissions.<br>• There is ambiguity over the amount of greenhouse gas emitted and discrepancy with Methanex.<br>• Project would jeopardise Australia's international commitments.<br>• Greenhouse Gas Challenge is an inadequate response to critical issue.<br>• Greenhouse gas and energy required for desalination plant has not been taken into account.<br>• Proponent must develop comprehensive, legally binding program for carbon sequestration though plantations. | Greenhouse gases are considered to be a relevant environmental factor. |

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| Wastewater | Discharge of wastewater via Water Corporation marine outfall, of increased salinity and temperature and containing nutrients and other contaminants | **Potential Impact**<br>Impact on marine environment, change of species populations, loss of species.<br>**Public Comments**<br>**DPI**: • Potential for ecological changes due to N discharge has not been considered and should be dealt with at this point in process.<br>• No description of the affected area upon which to base any judgement of impact. | Wastewater discharge is considered to be a relevant environmental factor and is considered under the factor Water and Liquid Waste. |
| Surface and groundwater quality | Contaminated stormwater run-off from plant site, increased uncontaminated stormwater flow, disposal of sewage effluent | **Potential Impact**<br>Decrease of surface and groundwater quality, with adverse impact on downstream vegetation and mangal communities. | Water quality is considered to be a relevant environmental factor and is considered under the factor Water and Liquid Waste. |
| Waste | Solid wastes from plant | **Potential Impact**<br>Disposal of solid waste causing adverse environmental impact. | While this is a relevant factor it can be managed through appropriate disposal of waste materials and the Part V process. |
| Noise | Noise emissions of maximum 65 dB(A) at boundary, 39-48 dB(A) at Withnell Bay, and 23 dB(A) at Hearson Cove. | **Potential Impact**<br>Impact of noise on amenity of Withnell Bay and Hearson Cove.<br>**Public Comments**<br>**Pilbara Dev. Commission**:• Proponent should analyse and report on impact of increased noise levels on amenity at Withnell Bay.<br>• It is not reasonable to assume other proposed developments will dominate cumulative noise levels at Hearson Cove.<br>• A sound level up to 10dB(A) lower than background is discernable in some conditions.<br>• Recreational and environmental amenity will be lost and suitable offsets should be considered. | Noise is considered to be a relevant environmental factor. |
| Light | Overspill from plant site. | **Potential Impact**<br>Impact on amenity and fauna.<br>**Public Comments**<br>**DPI**: • Cumulative impact of light overspill from proposal and Woodside on recreational users of Withnell Bay not considered. | While this is a relevant issue, light overspill can be managed by good design and adoption of standards. |
| **SOCIAL SURROUNDINGS** | | | |
| Risk | Risk to public safety from plant, methanol storage, product and raw material pipelines and shiploading | **Potential Impact**<br>Risk to public safety<br>Risk to the marine environment from spillage of methanol.<br>**Public Comments**<br>• The 10 in million risk contour extends beyond industrial area and appears to be in contradiction of EPA's guidelines.<br>• Potential for explosion in air separation unit appears to be overlooked in Risk Assessment.<br>**FESA**: • Will the facility be a Major Hazards Facility under the National Standard for the Control of Major Hazard Facilities?<br>• What provisions will the proponent make with respect to off-site emergencies that may either directly or potentially involve the pipelines that deliver gas or water to, or methanol from, the proposed facility?<br>• The proposed Emergency Services Levy may have implications for emergency | Public Safety is considered to be a relevant environmental factor. |

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| | | services. The proponent should discuss this with FESA.<br>• FESA should be invited to become involved in the Development of a Joint Integrated Emergency Management Plan with Woodside.<br>• All fire fighting systems should be designed according to AS 1940 and in consultation with FESA in the planning stages.<br>• Emergency fire fighting services at Dampier consist of a private volunteer Fire Brigade. While they are registered under the Fire Brigades Act, any response may be very limited.<br>• How many personnel will be on-site to respond to emergencies during normal operations (day, night, weekends)? Will they be sufficient for emergency situations?<br>• If there is a fire in the neighbouring conservation estate, has the proponent considered the risks to the facility from airborne embers.<br>• Would the proponent consider arrangements to assist the relevant authority in responding to a fire in the conservation estate? Would such arrangements include some provision of firewater from its reserves?<br>• Will the proponent ensure compatibility of emergency response equipment and emergency response procedures with those of FESA?<br>**MPR** : • Areas outside plant boundary in 10 in a million risk contour should not be used in manner contrary to risk level.<br>• Major Hazards Facility requiring Safety Case/Report<br>• Safety Case/Report needs to demonstrate appropriateness of only isolation valves at ends of methanol pipeline<br>• QRA needs to address detailed knock-on effects, risk of loading and exclusion zone, risk from actual inventory likely to be released, possibility of catastrophic failures, response time for manual shut down and list of credible scenarios.<br>**Pilbara Dev. Commission** • The proponent should work with Dampier emergency services to establish a detailed strategy to coordinate responses.<br>• Proponent should provide support for community emergency response teams. | |
| | Increased road traffic | **Potential Impact**<br>Risk to public safety<br>**Public Comments**<br>**Pilbara Dev. Commission**: • Proponent has failed to address potentially significant impact of traffic during 30 month construction period and should develop a strategy to manage construction workforce traffic in conjunction with Shire and Accommodation Taskforce. | |
| | Bushfires | **Potential Impact**<br>Difficulty of controlling fires in adjacent Conservation Areas<br>**Public Comments**<br>• The PRA has not fully addressed the issue of 'fire-lobs' from the Woodside flare. | |

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| Culture and Heritage | One known archaeological site potentially impacted. No ethnographic sites identified as yet (to be completed). | **Potential Impact**<br>Loss of heritage and ethnographic sites.<br>**Public Comments**<br>• Location in the heart of Conservation Area will cause addition risk to heritage values.<br>• GTL should demonstrate that the Aboriginal people are adequately equipped with necessary environmental information for consultation.<br>• The standard of archaeological survey and ethnographic consultation does not appear to be adequate.<br>• The proponent has failed to acknowledge that the proposal is likely to impact on area proposed for World Heritage listing.<br>• The proponent has failed to provide documented advice from the International Rock Art Federation.<br>**Pilbara Dev. Commission**: • Construction and operational workforce should undertaken Cross Cultural induction program to develop broader knowledge of Pilbara indigenous culture and heritage.<br>**DIA**:• Heritage issues are being adequately address through proponent's actions and intentions. | Heritage is considered to be a relevant environmental factor. |
| Amenity | Impact to Withnell Bay of noise and visual amenity. Impact on visual amenity of area. Impact on recreational values. Impact of light overspill (Noise and Light Overspill addressed as separate pollution factors). | **Potential Impact**<br>Impact on visual amenity.(see noise section also).<br>**Public Comments**<br>**Pilbara Dev Commission**: • Withnell Bay is a popular public recreational area and further alteration to landscape is significant.<br>• Proponent should work in conjunction with government and community regarding alternative recreational areas.<br>• Proponent should work in conjunction with Shire and others to determine the impact of improved access to Withnell Bay (traffic and parking and protection of northern area).<br>• Proponent should contribute to cost of upgrading recreational infrastructure on the Burrup.<br>**CALM**: • Access to Withnell Bay will not be improved by proposal as access is difficult in section passed the site.<br>• Recommends that the proponent upgrade access to Withnell Bay, boat ramp and parking areas.<br>**DPI**: • Impacts of workforce on recreational infrastructure not well handled.<br>• It is considered that the EPA's objectives in respect to aesthetic impacts can be met by the proposal. However the visual impact assessment had a number of inadequacies (outlined).<br>• No comprehensive strategy for minimising visual impacts.<br>• No discussion of impacts on landscape beyond the site eg due to creek rerouting or weeds. | Amenity is considered to be a relevant environmental factor. |

| **OTHER** | | | |
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| Plant siting | Situated on Burrup Peninsula. | **Potential Impact**<br>Impact on environmentally sensitive area.<br>**Public Comments**<br>• Alternative locations should be discussed proving why these do not provide a better environmental alternative.<br>• Location in the heart of Conservation Area will cause addition risk to environmental values.<br>• Viability of Maitland Estate has not been discussed.<br>• By arguing siting on the Burrup, the proponent has demonstrated an inability to understand the impacts proposal will have on this unique area. | Should be addressed in Other Advice |
| Cumulative impact assessment | | **Potential Impact**<br>Due to assessments progressing simultaneously and lack of knowledge concerning some potential impacts, cumulative impacts need further investigation and consideration to predict impact.<br>**Public Comments**<br>• It is vital that the process of CIA be followed for marine, terrestrial ecology and $CO_2$, $NO_x$ and $SO_X$ emission impacts prior to further consideration of proposals on the Burrup. Noise impacts should also be assessed through CIA. | Should be addressed in Other Advice |
| Infrastructure corridors | | **Public Comments**<br>**CALM**: • concerned about restricted space in infrastructure corridor.<br>Recommend • Priority use of corridor must be supply of gas to south of Woodside plant.<br>• No expansion of the corridor into the adjacent proposed Conservation , Recreation and Heritage zones.<br>• Approval of GTL project not be given until detailed surveys and design of corridor is complete.<br>• All pipelines installed in corridor must be largest practical size for product being transported. | Infrastructure corridor is not part of this assessment and being undertaken by different proponent. |
| Accommodation | | **Public Comments**<br>**Pibara Dev. Commission**: • Of critical importance that accommodation information is provided to Accommodation Task Farce as soon as possible.<br>• The proponent has not assessed the impact of development on social and physical infrastructure of Dampier and Karratha.<br>**DPI**: • Impacts of workforce on housing not well handled | Not considered an environmental factor but the proponent is encouraged to consider this issue in their planning and consult with the Shire and the Pilbara Development Commission. |
| Employment and local economy | | **Public Comments**<br>**Pilbara Dev. Commission**: • The proponent should conduct seminars for local businesses on likely supply requirements and employment opportunities.<br>• Proponent should make a “buy local” commitment.<br>• Proponent should identify employment opportunities for Aboriginal people and develop workable strategies to achieve this. | Not considered an environmental factor but the proponent is encouraged to consider this issue in their planning and consult with the Shire and the Pilbara Development Commission and other relevant bodies such as the Chamber of Commerce and Industry, ATSIC, TAFE and Office of Aboriginal Economic Development and Dept of Training.. |

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| Methyl tertiary butyl ether (MTBE) | | **Public Comments**<br>Through the PER process GTL could be allowed to produce MTBE.<br>38% of methanol is likely to be for MTBE.<br>Production of MTBE should be an environmental factor. | There is no proposal for the manufacture of MTBE at this site. Methanol production is to be exported. The EPA cannot assess the possible use of the product after it leaves WA shores. This is considered to be beyond the scope of the EPA's assessment. |

# Appendix 4

**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)

METHANOL PLANT AND PRODUCT EXPORT
WITHIN THE WITHNELL EAST INDUSTRIAL AREA AND DAMPIER PORT, BURRUP PENINSULA

**Proposal:** The construction and operation of a nominal 1.05 million tonnes per annum methanol plant, desalination plant, utilities, pipelines and port load-out facilities in the Withnell East Industrial Area and Dampier Port, and in infrastructure corridors, which are not included as part of this proposal, as documented in schedule 1 of this statement.

**Proponent:** Australian Methanol Company Propriety Limited

**Proponent Address:** Level 23, St Martin's Tower, 46 St George's Terrace, PERTH WA 6000

**Assessment Number:** 1438

**Report of the Environmental Protection Authority:** Bulletin 1075

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 that 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 six 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:

1 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;

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

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

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

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

## 6 Vegetation

6-1 Prior to submitting a Works Approval application for the methanol plant, the proponent shall determine the number and distribution of identifiable Priority species that will be impacted by construction to the requirements of the Minister for the Environment and Heritage on advice of the Environmental Protection Authority.

6-2 At the first opportunity when appropriate conditions prevail, the proponent shall:

1 complete a wet season flora survey; and
2 update the analysis of the results of the survey in a regional context, should the results of the wet season survey be significantly different to those predicted,

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

Note: In the preparation of advice to the Minister for the Environment and Heritage, the Environmental Protection Authority expects to obtain the advice of Department of Conservation and Land Management.

## 7 Brine and Wastewater Discharge

7-1 Prior to submitting a Works Approval application for the methanol plant, the proponent shall:

1 characterise the physico-chemical composition and flow rates of all wastewater streams within the site, including the desalination plant;
2 determine, for all non-negligible contaminants and nutrients, the total annual loads of contaminants and nutrients in the combined brine and wastewater discharge exiting the site; and
3 determine, for normal and worst-case conditions, the concentrations of contaminants and nutrients (for agreed averaging periods) in the combined brine and wastewater discharge exiting the site,

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

7-2 Prior to submitting a Works Approval application for the methanol plant, the proponent shall demonstrate that the brine and wastewater discharge will meet best practicable technology and waste minimisation principles for contaminants and nutrients, to the requirements of the Minister for the Environment and Heritage on advice of the Environmental Protection Authority.

7-3 Prior to submitting a Works Approval application for the methanol plant, the proponent shall design, and subsequently operate plant and equipment on the site such that:

1. the contaminant concentrations in the combined brine and wastewater effluent from the site, just prior to entry to the multi-user brine and wastewater discharge system, meet (in order of preference):

   - the ANZECC/ARMCANZ (2000) 99% species protection level; or
   - the ANZECC/ARMCANZ (2000) 99% species protection level at the edge of the approved mixing zone (currently 0.01 square kilometre), without any subsidy or pre-dilution from the main brine return line; or
   - other acceptable limits, if the Environmental Protection Authority determines the regional background concentration of a given contaminant in seawater to be significant;

2. mass balances and inventories of toxicants (i.e. catalysts and process chemicals) can be maintained throughout the life of the plant so that their fate can be traced; and

3. the load of nutrients causes no resultant detectable change beyond natural variation in the diversity of the species and biological communities and abundance/biomass of marine life, beyond the designated mixing zone,

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

7-4 Prior to submitting a Works Approval application for the methanol plant, the proponent shall conduct "whole-of-effluent" toxicological studies on a *simulated effluent*, including treatment chemicals, or provide acceptable alternative information such as risk assessment, to the requirements of the Minister for the Environment and Heritage on advice of the Environmental Protection Authority.

These studies shall be consistent with ANZECC requirements.

7-5 Within three months following commissioning and stabilizing of the plant operations, the proponent shall conduct an analysis demonstrating that effluent properties are substantially consistent with predictions, to the requirements of the Minister for the Environment and Heritage on advice of the Environmental Protection Authority.

7-6 In the event that effluent properties are not substantially consistent with predictions, the proponent shall conduct toxicological studies on the *actual effluent*, or provide acceptable alternative information such as risk assessment, to the timing and other requirements of the Minister for the Environment and Heritage on advice of the Environmental Protection Authority.

These studies and/or information shall be consistent with ANZECC requirements.

7-7 In the event that the findings resulting from condition 7-6 indicate that the effluent poses a significant risk to the diversity of the species and biological communities and abundance/biomass of marine life, the proponent shall modify the brine and wastewater effluent to the requirements of the Minister for the Environment and Heritage on advice of the Environmental Protection Authority.

## 8 Surface and Stormwater

8-1 Prior to submitting a Works Approval application for the methanol plant, the proponent shall demonstrate that practicable stormwater and surface water management systems have been designed to prevent significant off-site impacts, including:

1 impact on mangroves or vegetation downstream of the plant site;
2 reduction of the quality or quantity of water or sedimentation of semi-permanent rock pools located on drainage lines affected by the plant construction;
3 erosion of drainage lines or flooding of vegetation; and
4 significant contamination of soil or groundwater downstream of the plant site.

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

8-2 Prior to submitting a Works Approval application for the methanol plant, the proponent shall design, and subsequently, implement a monitoring programme to include:

1 monitoring to establish baseline conditions for water quality and vegetation condition, as practicable;
2 monitoring the quality of surface water leaving the site; and
3 monitoring of vegetation, rock pools, drainage lines and groundwater impacted by the surface and stormwater associated with the plant site.

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

## 9 Air Emissions

9-1 Prior to submitting a Works Approval application for the methanol plant, the proponent shall:

1 confirm the engineering design details for the emission of gaseous pollutants, including stack heights, stack diameters, exit temperatures and exit velocities;

2 estimate the concentration of oxides of nitrogen, and other major gaseous pollutants, under normal and worst-case conditions, including start-up and upset emissions;

3 demonstrate best practicable oxides of nitrogen control and measures to reduce oxides of nitrogen emissions from the plant;

4 remodel the oxides of nitrogen emissions to determine building wake effects and verify previous predictions,

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

Note: The Environmental Protection Authority requires stack heights to be such that the downwash of emissions in the lee of buildings or other structures is practicably minimised or preferably avoided.

9-2 At least three months prior to submitting a Works Approval application for the methanol plant, the proponent shall provide evidence of its intention to participate in a collaborative monitoring programme, and subsequently participate in the programme, or alternatively prepare and subsequently implement a monitoring programme to identify the impacts of acid gas emissions on the surrounding areas, to include:

1 Identification of preliminary warning indicators and "trigger levels" to indicate impacts of acid gases on systems, including soil condition, rockpools, vegetation and mangal communities;
2 Design and implementation of a monitoring programme to establish baseline conditions prior to commissioning of the plant; and
3 Identification of practicable management or contingency measures, as it relates to this proposal, to be implemented in the event that the "trigger levels"(point one above) are exceeded,

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

9-3 Prior to submitting a Works Approval application for the methanol plant, the proponent shall investigate and implement a practicable management program to:

- determine the extent of the area of impact and likely deposition rate of salt water mist from the cooling towers;
- determine the naturally occurring background levels of salt water mist in air;
- determine the tolerance of vegetation in the area to impact of the effects of salt at the likely deposition rate;
- demonstrate that all practicable measures have been taken to prevent vegetation within the Conservation, Heritage and Recreation Area being significantly adversely impacted by salt water mist; and
- demonstrate that best practicable technology has been used to minimise the impact of salt water mist on vegetation within the industrial area,

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

## 10 Greenhouse Gas Emissions

10-1 Prior to commencement of construction of the processing 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 up-to-date 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 up-to-date 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; and

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.

10-2 The proponent shall implement the Greenhouse Gas Emissions Management Plan required by Condition 10-1, to the requirements of the Minister for the Environment and Heritage on the advice of the Environmental Protection Authority.

10-3 The proponent shall make the Greenhouse Gas Emissions Management Plan, required by Condition 10-1, publicly available, to the requirements of the Minister for the Environment and Heritage on advice of the Environmental Protection Authority.

## 11 Noise

11-1 Prior to submitting a Works Approval application for the methanol plant, the proponent shall prepare a Noise Management Plan to:

- Minimise to the extent practicable the impacts on the amenity of recreational areas and
- ensure compliance with prescribed standards,

in relation to noise resulting from activities associated with the proposal, to the requirements of the Minister for the Environment and Heritage on advice of the Environmental Protection Authority.

This Plan shall include detailed descriptions of:

1 the acoustical model of the plant;
2 best practicable measures to minimise noise emissions;
3 operating procedures to be adopted for particular routine activities to minimise noise impacts on amenity at recreational areas;
4 the noise monitoring programme; and
5 the complaint management procedure.

11-2 The proponent shall implement the Noise Management Plan required by condition 11-1 to the requirements of the Minister for the Environment and Heritage on advice of the Environmental Protection Authority.

11-3 The proponent shall make the Noise Management Plan required by condition 11-1 publicly available to the requirements of the Minister for the Environment and Heritage on advice of the Environmental Protection Authority.

11-4 Prior to construction, the proponent shall employ a mutually agreed independent acoustical engineer to:

1 review the design of the plant;
2 review the Noise Management Plan, required by condition 11-1; and
3 demonstrate that the design and Plan incorporate best practicable measures to:
   - minimise the impacts on the amenity of recreational areas; and
   - ensure compliance with prescribed standards,

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

## 12 Pipeline Construction and Operation

12-1. Prior to submitting a Works Approval application for the methanol plant, the proponent shall prepare an Environmental Management Plan for the construction and operation of the pipelines, to include:

1 the position of the pipelines within an approved infrastructure corridor;
2 risk study where appropriate;
3 design of the pipelines including measures to prevent and detect leakage;
4 design of spill containment measures where appropriate;
5 Vegetation and Flora, Fauna Protection, Drainage and Groundwater Management, Noise and Vibration, Construction Spills Management and Aboriginal Heritage Site Management Plans for construction and management where appropriate; and
6 operational procedures and safeguards,

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

Note: In the preparation of advice to the Minister for the Environment and Heritage, the Environmental Protection Authority expects to obtain the advice of Department of Mineral and Petroleum Resources.

## 13 Work Practices

13-1 Prior to commencement of construction, the proponent shall submit a written prescription for contractor work practices covering plant and pipeline construction and operation, to ensure that work practices are carried out at the level of international best practice, to the requirements of the Minister for the Environment and Heritage on advice of the Environmental Protection Authority.

13-2 The proponent shall ensure that the prescription of work practices required by condition 13-1 is implemented, to the requirements of the Minister for the Environment and Heritage on advice of the Environmental Protection Authority.

## 14 Decommissioning Plans

14-1 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 Decommissioning 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 long-term management of ground and surface water systems affected by the plant;

3 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;

4 a conceptual plan for a care and maintenance phase; and

5 management of noxious materials to avoid the creation of contaminated areas.

14-2 At least 12 months prior to the anticipated date of closure, 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 long-term management of ground and surface water systems affected by the plant;

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

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

14-3 The proponent shall implement the Final Decommissioning Plan required by condition 14-2 until such time as the Minister for the Environment and Heritage determines, on the advice of the Environmental Protection Authority, that the proponent's decommissioning responsibilities have been fulfilled.

14-4 The proponent shall make the Final Decommissioning Plan required by condition 14-2 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 Licence for this project under the provisions of Part V of the *Environmental Protection Act 1986.*

3 Following detailed engineering design of the plant, the proponent will be in a position to meet the requirements of conditions 7 (brine and wastewater discharge), 8 (surface and stormwater), 9 (gaseous emissions), 11 (noise) and 12 (pipelines).

# Schedule 1

**The Proposal (Assessment No. 1438)**

Australian Methanol Co Pty Ltd proposes to construct and operate a methanol plant of one million tonnes per annum (Mtpa) nominal capacity, at Withnell East industrial area on the Burrup Peninsula (Figure 1). The plant will use Lurgi Oel Gas Chemie GmbH technology. The proposal includes the installation and operation of a gas supply pipeline, product pipeline, seawater supply pipeline and wastewater discharge pipeline to be situated in infrastructure corridors for which the Department of Mineral and Petroleum Resources will be proponent.

The main components of the plant will be:

- methanol production plant
- plant infrastructure, including air separation unit, seawater and sweetwater cooling systems, product storage tanks, flare system, and
- utilities, including power generation, a mechanical vapour compression desalination plant, water treatment plant, sanitary wastewater treatment plant.

The proposal includes shiploading operations at the Port of Dampier to methanol tanker ships. The proposal does not include any changes to the Port or wharves, which will be sought by the Dampier Port Authority, if necessary.

The plant footprint will occupy approximately 16 hectares of the 35 hectares site (Figure 2). This proposal will not impact on the following vegetation community identified in the Public Environmental Review document as EvTeCv, and the communities identified as AbCwTe, TrTe(Ta) will not be impacted by more than 0.08 hectares and 0.03 hectares respectively.

Reformer and boiler burners will be of low oxides of nitrogen design.

All practicable "no regrets" measures for the reduction of greenhouse gases will be included in the plant design.

The shiploading system will include a vapour recovery system.

## Table 1 – Key Proposal Characteristics

| Element | Description |
|---|---|
| Project life | Over 25 years |
| Complex capacity | Up to 1.05 Mt/a of methanol from one production plant (nominal) |
| Lease area | Approx. 35 ha |
| Site area | Approx. 16 ha |
| Complex facilities<br><br>Process plant | <br><br>1 x 3,000 tonnes per day (tpd) methanol production plant |
| Air separation unit | 1 x 1,240 tpd of oxygen from cryogenic air separation unit |
| Product storage | 2 x 47,708 t pure methanol storage tanks (each 60,000 $m^3$ capacity), within lined earthen bunds<br>2 x 1,350 t pure methanol intermediate storage tanks<br>1 x 1,350 t raw methanol tank |
| Power generation | Onsite electrical power generation will be via 8 MW steam turbine generator (primary) and 600 kVA emergency diesel power generator |
| Water systems | Supply of up to 36 ML/day of raw seawater for operation of the seawater cooling (tower) system and for operation of the desalination plant<br>Desalination plant using mechanical vapour compression to provide up to 1.7 ML/day of fresh water for steam systems, potable water and sweet water cooling system make-up |
| Steam generation | Three level steam system (110 bar, 38 bar and 5 bar) with high pressure steam generated from heat recovery from the process and auxiliary boiler, and medium pressure steam generated from heat recovery from the process. |
| Utilities | Instrument and plant air systems.<br>Wastewater systems for process, contaminated storm and domestic water.<br>Nitrogen reticulation for inerting and purging purposes from the air separation unit. |
| Support facilities | Administration, maintenance, laboratory, emergency response & control room facilities. |
| Complex operation | 24 hours/day for 7 days/week for 52 weeks/year |
| Complex reliability | The plant will require a shutdown for catalyst replacement and predictive and preventative maintenance once each 3-4 years for approx. 21 days. Additional shutdowns for process upsets and mechanical breakdowns are allowed for, to achieve an average of 350 operating days per year. |
| Natural gas pipeline | 200 mm nominal diameter pipeline from the Dampier to Bunbury gas export pipeline to the AMC facility boundary. |
| Product export pipeline | 500 mm nominal diameter pipeline from the AMC plant tank farm to the ship loading facilities. |
| Seawater pipeline | From Water Corporation main pipeline to AMC facility boundary. Nominal 500mm diameter, subject to detail design verification. |
| Brine return pipeline | From AMC facility boundary to Water Corporation main brine return pipeline. Nominal 400mm diameter, subject to detail design verification |
| Port facilities | One berth, provided by the Dampier Port Authority |
| Complex efficiency | Approx. 34.56 GJ/t of methanol [High Heating Value (hhv)] |
| Construction period | Approx 23 months |
| Feed gas | Approx 4.33 TJ/h (approx 65 tph) from the Dampier to Bunbury gas pipeline. |
| Catalysts | Cobalt, nickel, molybdenum zinc and copper compounds. |

| | |
|---|---|
| Approximate gaseous emissions under normal operations | NOx: Up to 48 kg/h or 403 t/a, using low $NO_x$ burners<br>CO: Up to 9 kg/h or 76 t/a<br>VOC: Up to 1 kg/h or 8.4 t/a.<br>$SO_x$: Up to 0.25 kg/h or 2.1 t/a.<br>$CO_2$: Up to 0.404 kg/kg methanol or 442,550 t/a |
| Wastewater discharge<br>Brine<br><br>Cooling tower blowdown<br><br>Process<br><br>Demineralisation column regeneration | <br>Up to 9.0 ML/day from desalination plant to brine return line.<br><br>Up to 14.6 ML/day from the cooling tower to brine return line.<br><br>Up to 130 KL/day from the methanol production plant to evaporation pond.<br>Approx 100kL/day |
| Total seawater return | Up to 24 ML/day to brine return line. |
| Domestic wastewater | Up to 7 KL/day. To be irrigated on landscaped areas of the plant or disposed in an alternative manner in accordance with DEP requirements |
| Stormwater | The plant will have separate contaminated and clean stormwater systems.<br>Run-off from areas designated potentially contaminated will be directed to an evaporation pond.<br>Run-off from areas designated uncontaminated will be collected via a drainage system that directs water through a corrugated plate interceptor prior to release into natural watercourses.<br>Stormwater accumulated in the bunded areas of the storage tanks will be analysed prior to discharge. If contaminated, it is to be directed to the evaporation pond and if clean, to the clean stormwater system. |
| Wastewater specification | Brine Up to 55,000 mg/L (TDS), temperature to be within 2° C of 24 hour ambient seawater temperature for 80% of the time with a maximum exceedence of 5°C and zero free biocides.<br>Water treatment chemicals to be agreed with appropriate authorities.<br>6-9 (pH), zero (free chlorine), 28 mg/L (TSS)<br>Up to 2 tpa (0.23 mg/L)ammonia. |
| Stormwater | Up to 10 mg/L (TDS). |
| Solid wastes | Collected by contractor for recycle/reuse: batteries, paper, cardboard, scrap metal.<br>Collected by contractor for disposal: waste oil, sludge from evaporation pond.<br>Returned to vendor: catalyst waste.<br>Landfill: fluorescent tubes, HID lamps, general refuse, ceramic fibres.<br>Recycled: glass, plastics and chemical<br>Composted: organic wastes |
| Noise | To be further considered by acoustical engineer during engineering design. |
| Risk | 50 in a million risk contour within site boundary<br>10 in a million risk contour to extend no more that 100m north and south of plant boundary |

## Figures (attached)

Figure 1 – Location plan. (Source: URS, 2002, amended Figure 2)
Figure 2 – Site layout plan (Source: URS, 2002, amended Figure 4)
Figure 3 – Process flow diagram (Source: URS,2002, amended Figure 6
Figure 4 – Water systems flow diagram (Source: URS, 2002, Figure 7)

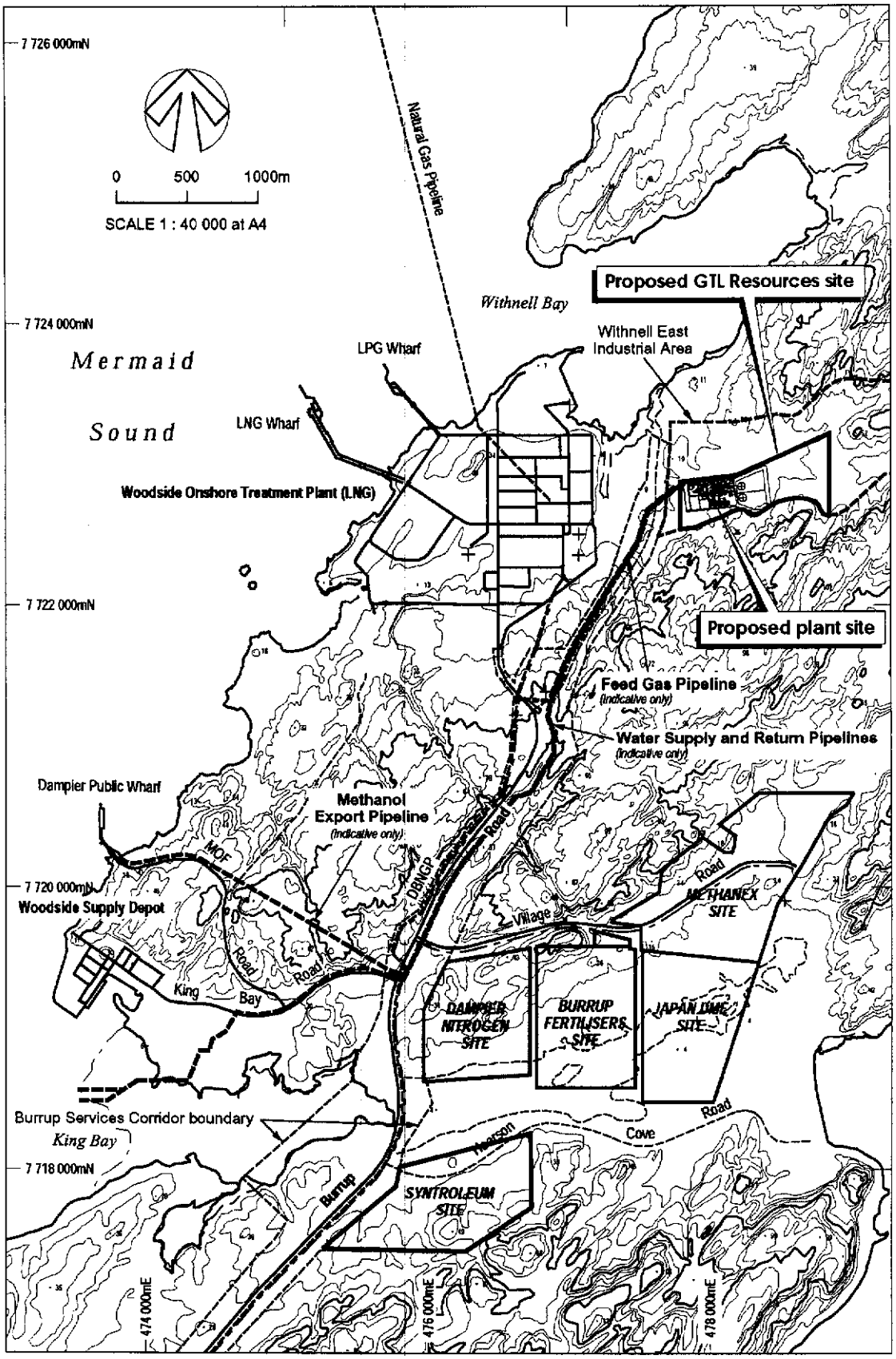


*Figure 1: Location plan. (Source: URS, 2002, amended Figure 2)*

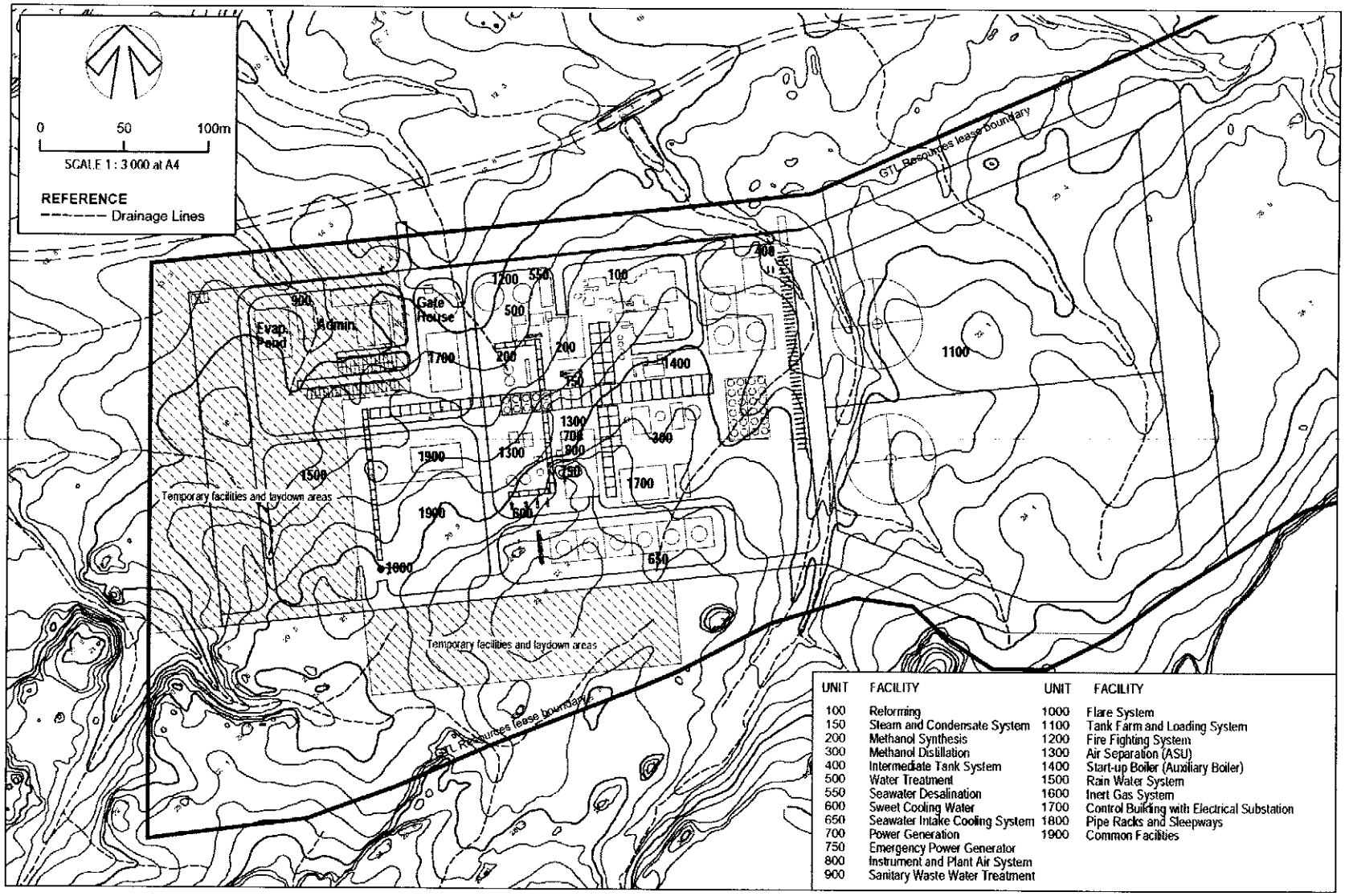


***Figure 2: Site layout plan (Source: URS, 2002, amended Figure 4)***

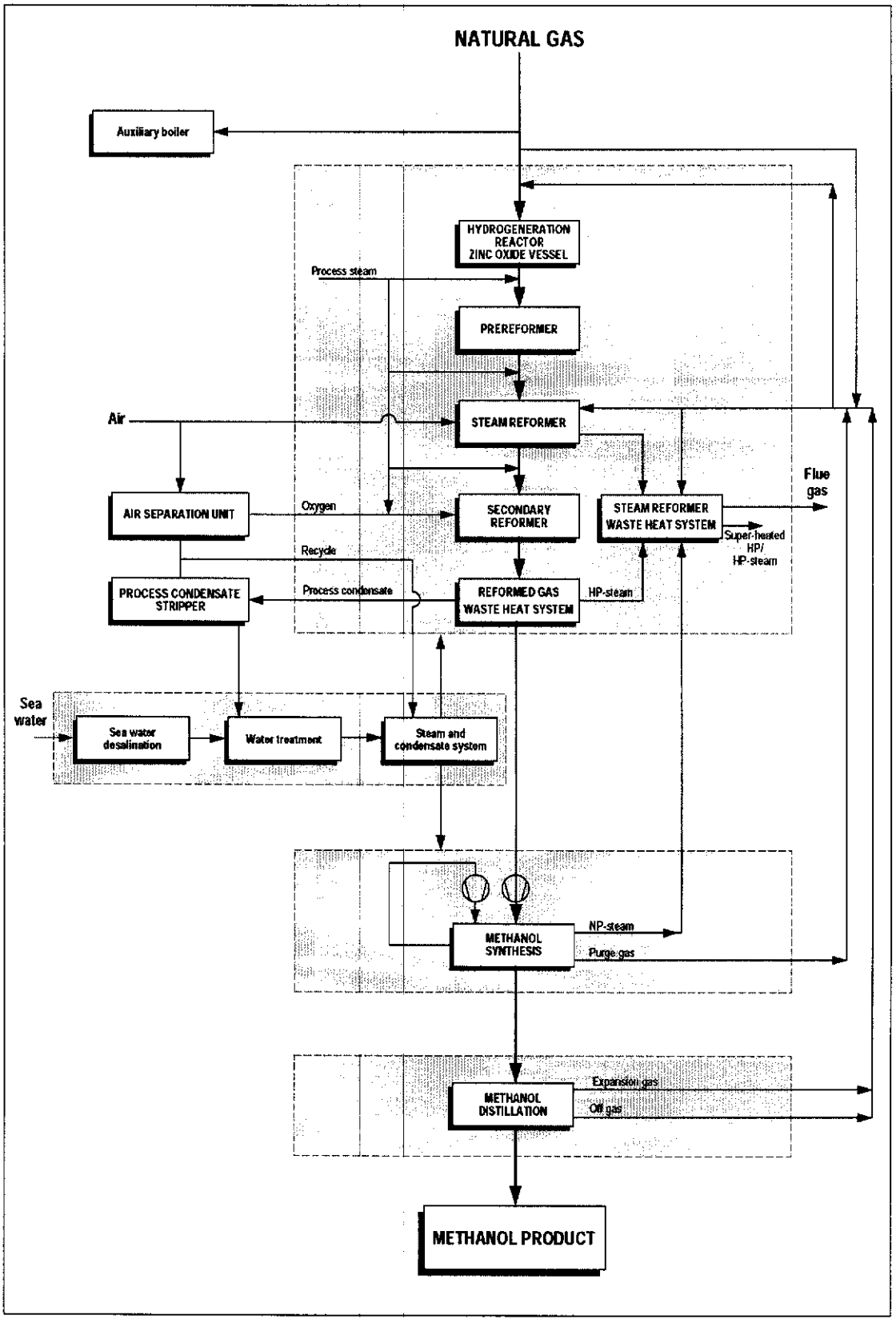


*Figure 3: Process flow diagram (Source: URS,2002, amended Figure 6)*

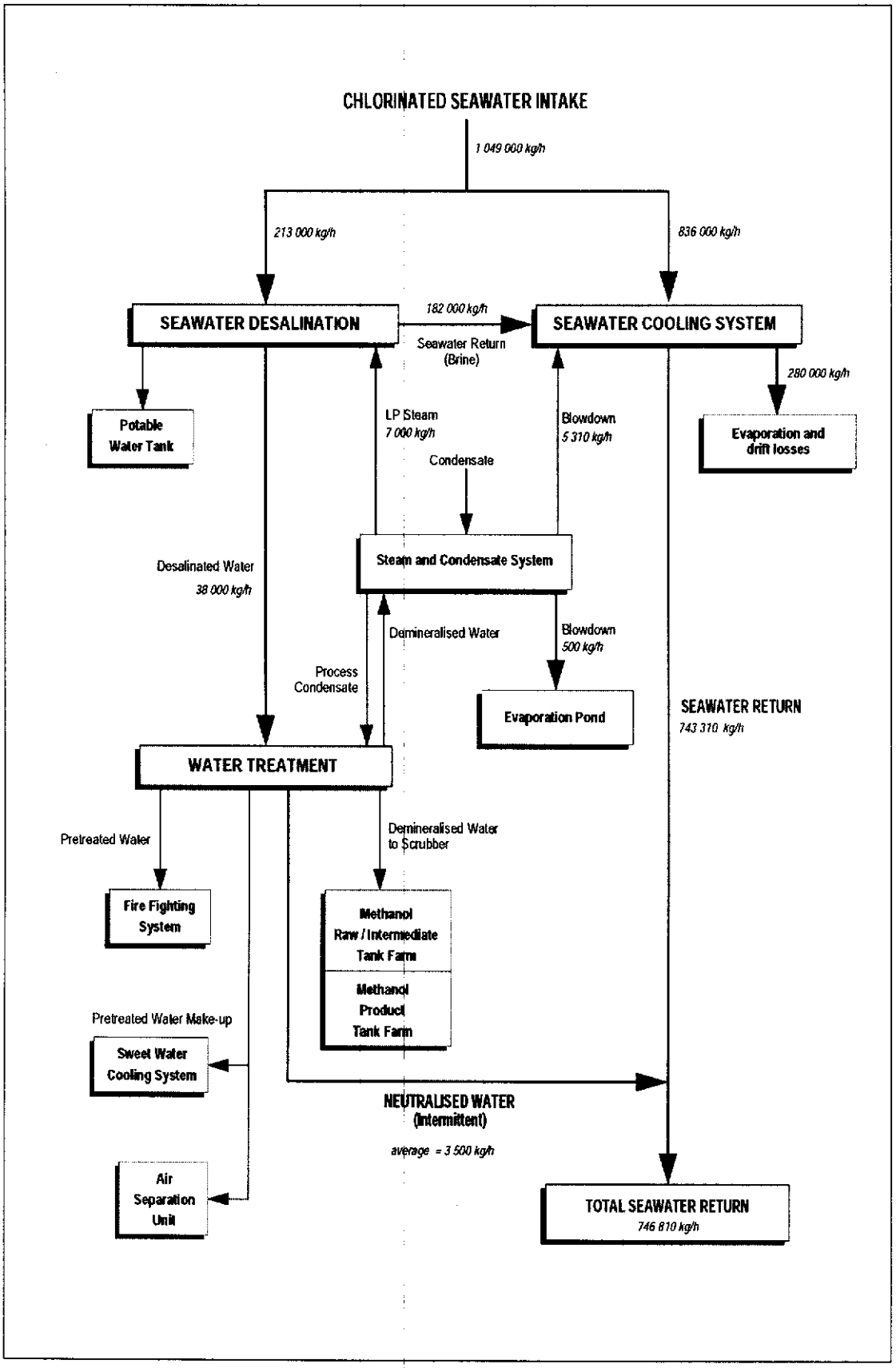


*Figure 4: Water systems flow diagram (Source: URS, 2002, Figure 7)*

# Schedule 2

## Environmental Management Commitments

8 November 2002

METHANOL PLANT AND PRODUCT EXPORT
WITHIN THE WITHNELL EAST INDUSTRIAL AREA AND
DAMPIER PORT, BURRUP PENINSULA
(Assessment No. 1438)

Australian Methanol Co Pty ltd

# PROPONENT'S ENVIRONMENTAL MANAGEMENT COMMITMENTS 8 NOVEMBER 2002

| No. | Topic | Action | Objective | Timing | Advice |
|---|---|---|---|---|---|
| 1 | Wastewater | • Characterise the physico-chemical composition and flow rate of wastewater streams.<br>• Confirm the annual loads of all non-negligible contaminants and nutrients in the wastewater streams.<br>• Demonstrate that best practicable technology is being applied to reduce pollutants in wastewater discharges. | To more accurately define the plant design details and emissions characteristics. | During detail design, prior to submitting Works Approval application | Water Corporation |
| 2 | Atmospheric Emissions | • Confirm the engineering design details for the emission of gaseous pollutants, including stack heights and diameters, exit temperatures and exit velocities.<br>• Confirm the estimated concentrations and loads of gaseous emissions.<br>• Demonstrate that best practicable technology is being applied to reduce pollutants in atmospheric emissions. | To more accurately define the plant design details and emissions characteristics.. | During detail design, prior to submitting Works Approval application | |
| 3 | Greenhouse Gases | Incorporate in the plant design 'no regrets' measures, including:<br>• efficient reforming process;<br>• recovery of waste heat;<br>• no fugitive emissions or flaring;<br>• steam turbine drives;<br>• power recovery turbines; and<br>• self contained utility systems. | To minimise greenhouse gas emissions in absolute terms and to reduce emissions per unit product to as low as reasonably practicable. | During detail design | Australian Greenhouse Office |
| 4 | Noise | • Incorporate in the plant design measures to minimise plant noise levels;<br>• Further investigate additional noise mitigation measures;<br>• Utilise the expertise of an acoustical engineer to ensure noise level criteria are met and , where practicable, reduced further. | To ensure compliance with boundary noise criteria and to reduce noise emissions to as low as reasonably practicable. | During detail design | |
| 5 | Risk Assessment | • Incorporate appropriate risk and hazard reduction measures in the plant design; and<br>• Undertake a Quantitative Risk Assessment, based upon final plant design, to assess all risks and hazards associated with plant operation and product export to the satisfaction of MPR. | To ensure all risks and hazards are reduced to as low as reasonably practicable. | During detail design<br><br>Prior to commissioning | MPR |

| No. | Topic | Action | Objective | Timing | Advice |
|---|---|---|---|---|---|
| 6 | Construction EMP | 1) Develop a Construction Environmental Management Programme comprised of a series of management plans including:<br>• Vegetation and Flora Management Plan (including Weeds) (commitment 7);<br>• Fauna Management Plan (commitment 8);<br>• Erosion and Surface Water Management Plan (commitment 9);<br>• Dust Management Plan (commitment 10);<br>• Noise Management Plan (commitment 11);<br>• Solid Waste Management Plan (commitment 12);<br>• Cultural Heritage Plan (commitment14); and<br>• Safety and Emergency Management & Response Plan (including Cyclone Contingency Plan and Traffic Management Plan) (commitment 15).<br><br>2) Implement the Construction Environmental Management Programme | To manage all relevant environmental factors associated with the construction phase of the project. | Prior to construction<br><br>Prior to or during construction, as appropriate | CALM<br><br>Mineral and Petroleum Resources<br><br>WA Museum<br><br>Commissioner of Soil & Land Conservation |
| 7 | Vegetation and Flora (Construction) | 1) Prepare a Vegetation and Flora Management Plan addressing:<br>• conduct of an additional vegetation/flora survey of the lease area and surrounding area (plant site and laydown areas will only be included if there is sufficient rainfall for seed germination prior to commencement of construction)*;<br>• locations of vegetation communities and identification of areas not to be disturbed, through optimisation of plant layout;<br>• site clearance procedures;<br>• procedures for rehabilitating areas of temporary disturbance;<br>• seed collection of any prominent flora species present, including Priority Flora species, to ensure the availability of species for rehabilitation;<br>• germination trials, with a particular focus on the Priority 1 species *Terminalia supranitifolia*;<br>• restoration of Priority Flora species disturbed by the project; and<br>• best practice weed management procedures.<br><br>2) Implement the Vegetation and Flora Management Plan. | To manage construction works to minimise disturbance to significant vegetation communities and priority flora.<br><br>To confirm actual rarity of vegetation associations currently defined as threatened in the Withnell East industrial area.<br><br>To maintain the abundance, species diversity, geographic distribution and productivity of vegetation communities.<br><br>To prevent the spread of weeds and the introduction of new weed species. | Prior to construction<br>*At earliest opportunity following wet season rains<br><br>Prior to or during construction, as appropriate | CALM |

| No. | Topic | Action | Objective | Timing | Advice |
|---|---|---|---|---|---|
| 8 | Fauna (Construction) | 1) Prepare a Terrestrial Fauna Management Plan that includes:<br>• results of an additional survey to further investigate the occurrence of Priority Fauna species (which, if required, will be updated on a regular basis)*;<br>• ensuring physical disturbance is kept within designated areas;<br>• incorporating drainage design features aimed at maintaining water flows to major drainage lines;<br>• progressive rehabilitation of disturbed sites to maximise fauna habitat;<br>• establishment of procedures, monitoring requirements, workforce training and responsibilities to minimise disturbance of significant terrestrial fauna;<br>• support for collaborative research programmes investigating the presence of the Pilbara Olive Python on the Burrup Peninsula*;<br>• CALM requirements regarding the Rock Wallaby Protection Programme*.<br><br>2) Implement the Terrestrial Fauna Management Plan. | To maintain the abundance, species diversity and geographical distribution of terrestrial fauna.<br><br>To protect Specially Protected (Threatened) Fauna, consistent with the provisions of the *Wildlife Conservation Act 1950*.<br><br>To protect fauna listed on the Schedules of the *EPBC Act*.<br><br>To undertake fauna management actions in agreement with CALM. | Prior to construction<br><br>*Prior to construction should conditions be favourable and ongoing (if required).<br><br>* Prior to construction and ongoing.<br><br>* Prior to construction and ongoing.<br><br>Prior to and during construction | CALM |
| 9 | Surface Water (Construction) | 1) Prepare a comprehensive Erosion and Surface Water Management Plan, which addresses the following:<br>• vegetation clearing and stockpiling;<br>• diversion of drainage lines;<br>• surface water management and monitoring programme; and<br>• stormwater management.<br><br>2) Implement the Erosion and Surface Water Management Plan. | To minimise erosion and impacts on downstream environments | Prior to construction<br><br>During construction | Commissioner of Soil & Land Conservation<br>Water and Rivers Commission |

| No. | Topic | Action | Objective | Timing | Advice |
|---|---|---|---|---|---|
| 10 | Dust (Construction) | 1) Prepare a Dust Management Plan, which includes measures such as:<br>• the use of water sprays to wet the site during windy conditions;<br>• the use of speed limits to minimise dust generated by vehicle movements;<br>• the use of minimum drop heights when loading and unloading soils and other excavated materials; and<br>• minimise areas of disturbed, exposed soils.<br><br>2) Implement the Dust Management Plan. | To minimise environmental or human health problem or significantly impact on amenity. | Prior to construction<br><br>During construction | Commissioner of Soil & Land Conservation |
| 11 | Noise (Construction) | 1) Prepare a Noise Management Plan for construction activities to minimise noise generation, including:<br>• the use of low noise equipment where practicable;<br>• ~~use of silencers where necessary; and~~<br>• noise monitoring and reporting.<br><br>2) Implement the Noise Management Plan. | To minimise construction noise emissions and comply with Noise Regulations. | Prior to construction<br><br>During construction | |
| 12 | Solid Waste (Construction) | 1) Prepare a Solid Waste Management Plan, including the following management measures.<br>• Recyclable wastes will be periodically removed by a contractor.<br>• General refuse (domestic and industrial solid waste) and putrescible wastes will be disposed of at a Karratha Class II landfill.<br>• No wastes will be burned on site.<br>2) Implement the Solid Waste Management Plan. | To minimise potential contamination to the receiving environment. | Prior to construction<br><br>During construction | Shire of Roebourne |

| No. | Topic | Action | Objective | Timing | Advice |
|---|---|---|---|---|---|
| 14 | Aboriginal Heritage (Construction) | 1) Prepare an Aboriginal Cultural and Heritage Management Plan addressing:<br>• completion of archaeological and ethnographical surveys of the project site;<br>• development of a management strategy for any known heritage sites susceptible to disturbance during construction;<br>• development of a management strategy for any presently unrecorded sites uncovered during construction; and<br>• provide cultural awareness training to the construction workforce.<br><br>2) Implement the Aboriginal Cultural and Heritage Management Plan. | To protect known heritage sites from inadvertent damage or preserve the items of significance (e.g. petroglyphs) at an appropriate alternative location.<br>To identify any unrecorded sites of significance to local Aboriginal groups.<br>To minimise disturbance to areas of Aboriginal cultural significance.<br>To increase personnel awareness of any Aboriginal sites of significance that may be uncovered during construction. | Prior to construction<br><br>During construction | Department of Indigenous Affairs<br>Appropriate Aboriginal Groups<br><br>Department of Indigenous Affairs |
| 15 | Safety (Construction) | 1) Prepare Safety and Emergency Management & Response Plans to address:<br>• management of hazardous materials;<br>• traffic management;<br>• fire management; and<br>• cyclone procedures.<br><br>2) Implement the Safety and Emergency Management & Response Plans. | To ensure that the risk to public safety and the environment is as low as reasonably practicable and to minimise the potential creation of hazardous working environments. | Prior to construction<br><br>During construction | Shire of Roebourne<br>Main Roads Western Australia<br>Fire and Emergency Services Authority<br>MPR<br><br>MPR<br>Fire and Emergency Services Authority |

| No. | Topic | Action | Objective | Timing | Advice |
|---|---|---|---|---|---|
| 16 | Operations EMP | 1) Develop an Operations Environmental Management Programme comprised of a series of management plans including:<br>• Greenhouse Gas Management Plan (commitment 17);<br>• Atmospheric Emissions Management Plan (commitment 18);<br>• Flora and Vegetation Management Plan (commitment 19);<br>• Fauna Management Plan (commitment 20);<br>• Noise Management Plan (commitment 21);<br>• Liquid Waste Management Plan (commitment 22);<br>• Solid Waste Management Plan (commitment 23); and<br>• Hazardous Materials Management Plan (including Methanol Spill Contingency Plan) (commitment 24);<br>• Lighting Management Plan (commitment 25);<br>• Aboriginal Heritage Management Plant(commitment 26).<br>2) Implement Operations Environmental Management Programme | To manage all relevant environmental factors associated with the operation phase of the project. | Prior to commissioning<br>During commissioning and operation | CALM<br>MPR<br>WA Museum<br>Commissioner of Soil & Land Conservation<br>Shire of Roebourne<br>Dampier Port Authority |
| 17 | Greenhouse Gases (Operations) | 1) Develop a Greenhouse Gas Management Plan to include:<br>• development and implementation of a framework agreement as part of joining the Greenhouse Challenge and the Australian Industry Greenhouse Network;<br>• management of greenhouse gases through ongoing monitoring of emissions and implementation of practicable measures to reduce gas usage and reduce or mitigate emissions. This will be supported by accessing the results of research and development of the methanol process in order to improve efficiency (through avenues such as the Lurgi Methanol Club);<br>• participate in studies and investigations into remedies for greenhouse gas emissions (such as alternative fuel technology); and<br>• further consider off-site activities to mitigate greenhouse gas emission.<br>2) Implement the Greenhouse Gas Management Plan. | To participate in the national programme of managing greenhouse gas emissions with the aim of minimising emissions where practicable.<br>To minimise greenhouse gas emissions to as low as practicable. | Prior to commissioning and during operation | Australian Greenhouse Office |

| No. | Topic | Action | Objective | Timing | Advice |
|---|---|---|---|---|---|
| 18 | Atmospheric Emissions (Operations) | 1) Develop an Atmospheric Emissions Management Plan to include:<br>• stack emission monitoring, including stack parameters such as gas velocity, flow rate and temperature; and concentrations and mass emissions of oxygen, carbon dioxide, NOx, SOx, volatile organic carbon and minor emissions;<br>• all practicable measures to minimise atmospheric emissions based on investigations of optimum solutions for fuel, energy, handling of vapours during vessel loading and other parameters of relevance.<br>2) Implement the Atmospheric Emissions Management Plan. | To verify emissions estimates<br>To minimise atmospheric emissions where practicable and comply with relevant guidelines. | During commissioning and operation<br><br>During commissioning and operation. | |
| 19 | Vegetation and Flora (Operations) | 1) Prepare a Vegetation and Flora Management Plan addressing details of ongoing management of terrestrial flora, vegetation, weeds and landscaped areas within the lease area.<br>2) Implement the Vegetation and Flora Management Plan. | To maintain species abundance and visual amenity and to minimise operation impacts on vegetation and flora. | Pre-commissioning<br>Commissioning and on-going | CALM<br>CALM |
| 20 | Terrestrial Fauna (Operations) | 1) Prepare a Terrestrial Fauna Management Plan addressing details of ongoing management of terrestrial fauna, including fauna observation, handling and translocating procedures.<br>2) Implement the Terrestrial Fauna Management Plan. | To maintain species abundance and minimise operation impacts on terrestrial fauna<br>To undertake fauna management actions in agreement with CALM.. | Pre-commissioning<br>Commissioning and on-going | CALM<br>CALM |
| 21 | Noise (Operations) | 1) Prepare a Noise Management Plan, including:<br>• an assessment of the noise contribution of the plant; and<br>• compliance monitoring of the plant noise contribution.<br>2) Implement the Noise Management Plan. | To minimise the potential for exceedence of statutory guidelines.<br>To confirm compliance with statutory guidelines. | Pre-commissioning<br>Commissioning and on-going | |

| No. | Topic | Action | Objective | Timing | Advice |
|---|---|---|---|---|---|
| 22 | Liquid Waste (Operations) | 1) Prepare a Liquid Waste Management Plan, including the following management measures.<br>• uncontaminated stormwater will be discharged into existing drainage lines;<br>• contaminated water will be routed to an evaporation pond.<br>• treated sanitary wastewater will be disposed in accordance with DEP recommendations;<br>• testing of stormwater for contaminants; and<br>• monitoring of drainage lines for erosion or flooding.<br><br>2) Implement the Liquid Waste Management Plan. | To maintain water flow to rock pools and vegetation downstream from the site.<br><br>To minimise potential contamination to the receiving environment. | Pre-commissioning<br><br>Commissioning and on-going | CALM<br>Water Corporation<br><br>CALM<br>Water Corporation |
| 23 | Solid Waste (Operations) | 1) Prepare a Solid Waste Management Plan, including the following management measures.<br>• recyclable wastes will be periodically removed by a contractor.<br>• general refuse (domestic and industrial solid waste) and putrescible wastes will be disposed of at a Karratha Class II landfill;<br>• spent catalysts and adsorption masses will be disposed of by specialist companies;<br>• no wastes will be burned on site.<br><br>2) Implement the Solid Waste Management Plan. | To minimise potential contamination to the receiving environment. | Pre-commissioning<br><br>During operation | Shire of Roebourne |

| No. | Topic | Action | Objective | Timing | Advice |
|---|---|---|---|---|---|
| 24 | Safety (Operations) | 1) Prepare Safety and Emergency Management & Response Plan, to include:<br>• management of hazardous materials (including methanol spills);<br>• pipelines management plans;<br>• fire management;<br>• alarms, communication signals, muster points and evacuation procedures; and<br>• preparedness and procedures for cyclones.<br><br>2) Implement the Safety and Emergency Management & Response Plans. | To ensure that the risk to public and personnel safety and to the environment is as low as reasonably practicable and to minimise the potential creation of hazardous working environments. | Pre-commissioning<br><br>Commissioning and on-going | MPR<br>Shire of Roebourne<br>Fire and Emergency Services Authority<br>CALM |
| 25 | Lighting (Operations) | 1) Prepare Lighting Management Plan, to include:<br>• ~~conformance with guidelines presented in Australian Standard~~ AS 4282; and<br>• operation of lighting to best practice, as consistent with site safety and security requirements<br>2) Implement the Lighting Management Plan. | To minimise impact by light ~~overspill to nearby sensitive~~ receptors (e.g. public, turtles, etc.). | Commissioning and on-~~going~~ | CALM |
| 26 | Aboriginal Heritage (Operations) | 1) Prepare an Aboriginal Heritage Management Plan, to include<br>• the provision of cultural awareness training to the operational workforce.<br>2)Implement the Aboriginal Heritage Management Plan. | To increase personnel awareness of any Aboriginal sites of significance in the vicinity of the plant. | Commissioning and on-going | Department of Indigenous Affairs<br>Appropriate Aboriginal Groups |

**Note:** Several of the above commitments contain elements which are duplicated in Ministerial Conditions. This duplication will be resolved during the process of condition setting.

## ABBREVIATIONS

| | |
|---|---|
| CALM | Department of Conservation and Land Management |
| DEP | Department of Environmental Protection |
| EPBC Act | Environment Protection and Biodiversity Conservation Act 1999 |
| MPR | Department of Mineral and Petroleum Resources |
| PER | Public Environmental Review |

## NON-ENVIRONMENTAL COMMITMENTS (not auditable by the Department of Environmental Protection)

| No. | Topic | Action | Objective | Timing | Advice |
|---|---|---|---|---|---|
| 1 | Accommodation and Social issues | • Accommodation requirements will be determined as soon as possible.<br>• The impact of the project on the operational cost of delivery of social, educational and recreational services to the towns of Karratha and Dampier will be assessed during detailed design of the project. | To consider and plan for the social impacts of the proposal on infrastructure of the region | Prior to construction | Nickol Bay Accommodation Task Force<br>Pilbara Development Commission |

# Appendix 5

**Summary of Submissions and**
**Proponent's Response to Submissions**

# GTL METHANOL PLANT, BURRUP PENINSULA
# PUBLIC ENVIRONMENTAL REVIEW (PER)

# RESPONSE TO SUBMISSIONS

## ***COMMENTS FROM FIRE AND EMERGENCY SERVICES OF WA (FESA)***

***(dated 24 September 2002)***

1. *Will the facility qualify as a Major Hazards Facility under the National Standard for the Control of Major Hazard Facilities [NOHSC:1014(1996)]. There is a requirement for the proponent to prepare both an on-site and off-site emergency response plan in conjunction with FESA. Under the Standard these plans need to be approved by FESA 3 months before plant commissioning?*

   The Department of Minerals and Petroleum Resources (MPR) has advised that the facility will be designated as a Major Hazards Facility (see MPR response below). GTL is therefore required to prepare and submit a Safety Case/Report for the operation of the facility, including the plant, export pipeline and loading facilities. The Safety Case will be prepared in accordance with NOHSC:1014(1996) and submitted to the Chief Inspector of Explosives and Dangerous Goods for approval prior to commissioning of the plant. The Safety Case will include both on-site and off-site emergency response plans that will be prepared in conjunction with FESA.

2. *What provisions will the proponent make with respect to off-site emergencies that may either directly or potentially involve the pipelines that deliver gas or water to, or methanol from, the proposed facility?*

   The procedures and training to deal with offsite emergencies involving GTL,s gas, water and product pipelines will be addressed in the Emergency Procedures Manual, Operations Environmental Management Plan and Pipeline Procedures.

   During detailed design, the pipelines will be subject to a quantified risk assessment, the outputs from this study will form the basis of emergency training scenarios and form part of the Emergency response Team competence assessment.

   At all times the plant will have a full competent emergency response team present.

3. *The proposed Emergency Services Levy may have implications for emergency services. The proponent is therefore requested to discuss with FESA the question of provision of emergency services within the Burrup.*

   GTL will discuss with FESA the provision of emergency services on the Burrup.

***Items under Vol. 3 Appendix M para 1.1.6***

4. *It is requested that FESA be invited to become involved in the Development of a Joint Integrated Emergency Management Plan with Woodside.*

GTL will commit to discussing with FESA and Woodside the benefits of Joint Integrated Emergency Management Plan.

5. *All fire fighting systems should be designed according to AS 1940 and in consultation with FESA in the planning stages.*

   Acknowledged.

***Items under para 8.2.3***

6. *Emergency fire fighting services at Dampier consist of a private volunteer Fire Brigade. While they are registered under the Fire Brigades Act, it must be accepted that any response may be very limited.*

   Accepted, the GTL plant design will be self sufficient and not have to rely upon external fire fighting support. At all times the plant will have a full competent emergency response team present.

7. *How many personnel will be on-site to respond to emergencies during normal operations (day, night, weekends)? Will they be sufficient for emergency situations?*

   See 2 and 6 above. Additionally there will always be adequate numbers of competent personnel available on site to perform the most labour intensive operational tasks, safely.

8. *If there is a fire in the neighbouring conservation estate, has the proponent considered the risks presented to the facility associated with airborne embers (Bearing in mind the document "Planning for Bush fire Protection" is written more for a local community, not major industrial complexes)?*

   As stated in Section 8.2.3 of the PER, the fire protection system within the GTL plant will be sufficient to prevent any threat from fires in the surrounding conservation estate. In this context, any includes the threat from airborne embers. Details of the fire protection system will be finalised during the detail design phase. Risks from fires in the conservation estate and in the Withnell East Industrial Area (WEIA) will be addressed in the QRA undertaken during detail design.

9. *Would the proponent consider arrangements to assist the relevant authority in responding to a fire in the conservation estate? Would such arrangements include some provision of firewater from its reserves?*

   GTL will consider providing mutual aid to relevant authorities to the extent that its own emergency and operational cover is not compromised. GTL design will incorporate a small fire water storage tank (3108 cubic metres). In the event of a fire demanding more than this quantity, the supply would be taken from the cooling tower basin which is supplied from the process seawater supply (1450 tonnes per hour). The scenarios under which this supply needs to be accessed can be discussed with relevant authorities as stated under 4 above.

10. *Will the proponent ensure compatibility of emergency response equipment and emergency response procedures with those of FESA?*

As stated above, the GTL plant will be self sufficient in fire fighting equipment and competent emergency teams. The plant fixed fire fighting systems e.g. deluge, will be supplied from on site fire pump, the pressure rating of this will have to be determined by the system parameters and is unlikely to be compatible with FESA mobile fire tenders. To this extent compatibility cannot be guaranteed. However 9 above answers this question.

Emergency procedures will be written in consultation with all emergency services as appropriate.

***COMMENTS FROM MINERAL AND PETROLEUM RESOURCES (dated 7 October 2002)***

1) *The PER states that the level of risk to persons outside of the plant boundary is within tolerable limits considered acceptable to the Environmental Protection Authority. As per my letter of 1 August 2002, the Preliminary Risk Assessment (PRA) indicates that the ten-in-a-million ($1x10^{-5}$) contour extends beyond the plant boundary on the north and south sides. Therefore, it is strongly recommended that the areas outside the plant boundary affected by this contour be not used in a manner contrary to the expected risk level.*

Acknowledged.

2) *As the PRA was conducted based on preliminary information, a Quantitative Risk Assessment (QRA) based on the final plant design is required prior to commissioning of the plant, to verify the assumptions made in the PRA, as per the commitment made in the PER. The QRA should also address the issues specified in the aforementioned letter from this Department, which is included in Appendix M of the PER.*

Acknowledged. QRA will be conducted during detail design.

3) *This Department acknowledges that GTL Resources has committed to the development of a Safety Management Plan for the operation of the plant. Please note that as the proposed plant will be classified as a Major Hazard Facility in accordance with the National Standard – Control of Major Hazard Facilities [NOHSC:1014(1996)], a Safety Case/Report meeting the requirements of the National Standard and acceptable to the Chief Inspector of Explosives and Dangerous Goods, is required prior to commissioning of the plant. The Safety Case/Report should demonstrate that all hazards associated with the operation of the plant, export pipeline and loading arm, have been identified and that the risk reduction measures implemented are adequate to ensure safe operation of the facility, including the adequacy of the Safety Management Plan.*

Acknowledged. Safety Case/Report will be prepared during detail design and submitted for approval prior to commissioning.

4) *It appears that the export pipeline will only be provided with isolation valves at the ends of the export pipeline. The appropriateness of not providing additional isolation valves along the length of the pipeline to limit the quantity of methanol that can be released in the event of a leak from the pipeline, needs to be demonstrated in the Safety Case/Report.*

Acknowledged. These issues will be addressed during detail design and in the Safety Case/Report.

***PUBLIC SUBMISSION No.1 (dated 5 Oct 02)***

*1)* Respondent A *note that the Burrup Peninsula has been found to contain a large number of vegetation associations (each with a small area of occurrence), a rich flora for its size, and a high number of geographically restricted or uncommon species.* Respondent A *believes it is inappropriate to site an industrial area on the Burrup Peninsula for this reason. The peninsula should been preserved for conservation purposes and the methanol plant should be sited at the nearby Maitland area. We believe that GTL should not clear vegetation types ChCwIm and GpImTe of which only 1.8 and 9.1 ha, respectively, are retained in the Conservation, Heritage and Recreation Area (Table 7.5 of the GTL PER). We would also like to see the preservation of the other threatened communities in the Withnell East Industrial Area identified by GTL in Table 7.5 and this should be addressed as soon as possible before development takes place on these sites.*

The proponent recognises the conservation value of vegetation communities and flora species on the Burrup Peninsula and for this reason has undertaken a comprehensive review to place the vegetation and flora on the GTL lease into a regional perspective and enable an assessment of impacts to be made with the best information currently available. This review has included determining area estimates of the 16 vegetation types that occur within GTL site based on Trudgen's Burrup Survey mapping and an assessment of the conservation status of those types by application of a "threatened community" assessment process (see Section 7.3.1.4 of PER), which considers the distribution of each specific vegetation type elsewhere on the Burrup Peninsula. While this review identified that the area of two types (ChCwIm and GpImTe) of particular conservation importance would be reduced by the construction of the GTL plant, the review also identified significant limitations with the application of the Trudgen mapping for such assessments due to the mapping not having been checked on the ground. Ground truthing of the GTL site undertaken for the review (Appendix D) found some discrepancy between what was mapped for the Trudgen Burrup Survey and what actually occurs on the site. In the case of ChCwIm, ground truthing indicates that there is actually less of this association on the GTL lease than is shown in Trudgen's mapping and this type may in fact be less threatened than is apparent.

In consideration of the above, it is currently difficult to reliably determine the significance of impacts from the GTL plant on vegetation communities as the available Burrup mapping would appear to be questionable for the WEIA, including the GTL lease. These limitations are further compounded by the lack of wet season vegetation data due to the drought conditions that have prevailed in the areas over the last 12-18 months. The proponent commits to map the vegetation within and surrounding the WEIA in the wet season to enable better confirmation of the actual rarity of the vegetation associations currently described as threatened. Where possible, any vegetation types not well represented in the CHRA that occur within the lease area (but outside the plant footprint), will be protected from future disturbance.

*2)* Respondent A *supports the desulphurisation of the natural gas to be used in the Methanol Plant to ensure that the emission of sulphur dioxide from the plant will be as low as possible given the circumstances. We are pleased to see that the worst-case 1-hour carbon monoxide concentrations predicted by modelling are far below the relevant assessment criteria for carbon monoxide. We also support the use of vapour blankets and a vapour recovery system to capture fugitive emissions of VOCs from the ship loading activities and bulk storage tanks.*

The Proponent acknowledges and accepts this submission, supporting GTL's efforts to minimise atmospheric emissions from the methanol project.

*3)* Respondent A *is disappointed that the GTL plant will emit 450 000 tonnes of carbon dioxide per annum and believe that GTL and other emitters of such large amounts of green house gases should contribute a tax or levy to a fund to be used to reduce emissions of green house gases through out Australia. This fund should at least support research into technology aimed at reducing emissions and also education programmes aimed at increasing the awareness of developers and the public about greenhouse gas issues and technology.*

The proponent is not aware of suggestions from the WA Government to support a tax or levy to reduce greenhouse gas emissions. GTL will be investing in best available technologies to maximise energy and greenhouse efficiencies for the proposed methanol project.

It should be noted that, in comparison to other existing and proposed point sources of greenhouse gases on the Burrup Peninsula, the GTL project will make a relatively minor contribution to total potential emissions (eg. one-fifth of that anticipated from the much larger Methanex methanol synthesis complex). For industrial processes that require downstream processing of natural gas, $CO_2$ is an unavoidable consequence of the release of energy from carbon-based fuels. Therefore GTL will adopt appropriate measures, as described in the PER, to minimise its GHG contribution in accordance with *EPA Guidance Statement No. 12* and State and Commonwealth Government policy.

The GTL methanol plant will produce methanol for the world market using latest state-of-the-art technology. If GTL is not built then that part of the methanol market will be met by extending the life of older less efficient plants with greater global $CO_2$ emissions per tonne of methanol.

## ***PUBLIC SUBMISSION No.2 (dated 7 Oct 02)***

### *1) Context of this Environmental Impact Assessment*

*In a letter dated 28 September 2001 the Chairman of the EPA wrote* Respondent B *explaining the outcomes of the latest review of the Environmental Impact Assessment (EIA) process. The review took into account Government policy, especially in relation to:*

- *reform of the EIA process to ensure cumulative and regional impacts are given due consideration; and*
- *to incorporate the principles of ESD into the EIA process.*

*Respondent B was generally supportive of the improvements to the EIA process detailed in the letter, and was particularly encouraged to note that:*

> *the specification of what needs to be included in an environmental review document has been developed to specifically include:*
>
> 1. *placing the proposal in a regional setting in relation to existing biophysical impacts and potential for cumulative impacts; and*
> 2. *discussion of how the principles of sustainability have been incorporated.*

*In view of these improvements to EIA and the Government's commitments it is extremely disappointing to find that the PER for GTL Resources Ltd's Burrup Peninsula Methanol Manufacturing Plant has failed to address either of the above issues.*

The proposal has been placed in a regional context and cumulative impacts have been addressed.

The need to address sustainability principles per se was not included in the PER Guidelines for the project. However, the proponent will incorporate the fundamental principles of sustainability into the operation of the project.

### *2) Cumulative Impact Assessment*

*As noted in the Chairman's letter, proposals must address the matter of Cumulative Impact Assessment (CIA). CIA can be defined as:*

*"the impact on the environment which results from the incremental impact of the action when added to other past, present and reasonably foreseeable future actions…Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time." NEPA (1969).*

*The seven steps to CIA can be summarised as follows:*

1. *Set goals*
2. *Establish spatial and temporal boundaries*
3. *Establish the environmental baseline*
4. *Define impact factors*
5. *Identify threshold values*
6. *Analyse the impacts of proposals and their alternatives*
7. *Establish monitoring. Clark (1994).*

*It is vital that this process be followed for CIA of impacts on marine and terrestrial ecology and on $CO_2$, $NO_x$ and $SO_x$ emissions.*

Cumulative impacts have been assessed where appropriate.

### *3) Greenhouse gas emissions*

*The GTL approach to resolving the problem of the plant emitting 450,000 Mtpa of carbon dioxide (GTL, Environmental Brief for Key Stakeholders, February 2002) is unacceptable.*

The Environmental Brief (Feb 2002) cited by the respondent, was not intended to provide complete details of GTL's proposed measures to minimise greenhouse gas emissions. The reader is encouraged to refer to the PER (and in particular, Appendix H) for GTL's approach to minimise emissions as far as practicable during the design of the plant (such as adoption of highly efficient combined reforming, waste heat recovery and intergrated utilities systems), and commitments for continuous review of further opportunities to minimise greenhouse emissions during the life of the project. The proponent therefore believes that this approach is fully acceptable and meets the management objectives defined by the Environmental Protection Authority.

*There is considerable ambiguity over the amount of greenhouse gas emissions associated with this proposal.*

The proponent disagrees with this statement. The amount of GHGs associated with the proposal are stated in the PER (see Section 7.4.2 – Greenhouse Gases), which will be further refined during the process of detailed design.

*In view of the discrepancy between per unit of production greenhouse gas emission levels associated with GTL Ltd's methanol proposal and the Methanex proposal, the EPA should insist that a determination be made on which company is really using the latest, technically feasible, technology.*

The proponent confirms that Lurgi, as the selected technology provider for the proposed methanol plant, utilises the latest highly efficient proprietary Combined Reforming Technology representing world's best practice. GTL has demonstrated this fact in its assessment. It is concluded that both GTL and Methanex plants expect a natural gas utilisation efficiency of 33-34 GJ per tonne of methanol product and therefore both will employ latest efficient reforming technology in their design.

It should be noted that the proposed Methanex plant is 5 times larger (in product capacity) than GTL plant. It is therefore to be expected that the larger plant would have slightly lower energy losses from its larger hot equipment and may have better utilisation of auxiliary equipment, all other things being equal. Therefore the energy efficiency would be expected to be slightly better for the larger plant.

Any further determination is an issue to be addressed by the EPA in its assessment of these proposals and consequent advice to the Minister for Environment and Heritage.

*If the proposal is implemented, it would result in a significant increase in Australia's greenhouse gas emission levels. Such a project would seriously jeopardise Australia's ability to meet our international commitments relating to the reduction of greenhouse gases.*

The proponent disagrees with this assertion. The approximate emissions of 450,000 tpa $CO_{2\ (eq)}$ from the proposal equate to 0.08% of Australia's domestic inventory (according to the UNFCCC Inventory accounting provisions, Australia's 2000 net greenhouse gas emissions totalled 535 million tonnes (Mt) of carbon dioxide equivalent). Therefore, while committed to minimise GHG emissions as part of the project design, the proponent does not believe that such a minor increase will jeopardise Australia's international commitments.

77% of the carbon in the feed gas to the methanol plant is embodied in the methanol product, most of which is exported. If the gas were instead to be used as a fuel for some other energy intensive industry, then all the carbon from the gas would be emitted as $CO_2$ and would contribute to Australia's inventory. Strictly speaking, comparisons on a national basis are inappropriate because all $CO_2$ emissions discharge into the same single atmosphere.

### *3.1) The Greenhouse Challenge*

*Voluntary schemes with non-binding targets, such as the Greenhouse Challenge, are an inadequate response to an environmental issue as critical as global climate change.*

Initiatives such as the Greenhouse Challenge have been shown to be extremely effective mechanisms for companies to monitor, report and set targets for minimising greenhouse gas emissions, and is supported by the proponent. Please note the range of commitments made by the proponent to address this issue (see Commitments O&M 2 to 7 inclusive, Table 8.3).

### *3.3) Water Desalination $CO_2$ Emissions*

*The PER has failed to account for the $CO_2$ emissions associated with the energy required in the water desalination process. It is understood that there will be 55ML/day of sea water that will be processed for use in the plant.*

The proponent disagrees with this statement. The technology provider Lurgi confirms that power (energy) for the desalination plant is generated on site, and the pro-rata portion of $CO_2$ for this energy has already been accounted for in the greenhouse balance presented in the PER.

### *3.5) Sequestration programs*

*Plantations forming carbon sinks, would have the potential to sequestrate $CO_2$ produced through the GTL plant's activity. Why has GTL failed to address this option of managing the environmental consequences of their enterprise?*

*The proponent must develop a comprehensive, legally binding programme to ensure the sequestration of an equivalent quantity of carbon dioxide. A documented program showing carbon rights contracts must be negotiated with landholders prepared to enter into carbon sink arrangements. Details of the carbon sequestration program must be managed under the ERMP and must be placed as Ministerial Conditions.*

*Such an approach would be consistent with the Gallop Government's Environment Policy – Greenhouse commitment to "continue the expansion of Western Australia's plantation estate for its wood and carbon sequestration values", why does the Government not require proponents of greenhouse gas emitting industries, like GTL, to have legally binding carbon sequestration programs (such programs could have massive environmental benefits for the urgently required revegetation of the salinity affected wheatbelt)?*

Potential 'beyond no regrets' measures which will be considered by GTL are described in Appendix H. GTL's consideration of measures to reduce the greenhouse footprint of the plant will focus primarily on on-site process improvements. "Beyond no-regrets" process improvement measures will be considered where these are sensible in order to achieve effective and meaningful real reductions in global greenhouse gas emissions. GTL is prepared to further consider off-site activities, although noting that such compensatory measures are outside of their core business area.

### *4) Location*

*Given that relative to other developments on the Burrup Peninsula this proposal is located further north the any other Burrup proposal, at the very heart of the Conservation and Heritage area, the additional risks to environment and heritage values must be more comprehensively assessed. Development of this area represents an unacceptable increase in industrial sprawl over the Burrup Peninsula. The development would disrupt the flow of species between the northern and southern portions of the Peninsula.*

The proponent cannot accept that the proposed site could be considered as the "heart of the Conservation and Heritage area", given its location adjacent the NWSVP. The proponent would be

interested to learn how the flow of species between the northern and southern portions of the Peninsula could be disrupted, in order that this could be taken into account during plant design. Respondent B should note that only the plant site, and not the entire lease area, will be fenced – thereby enabling the flow of species to continue.

### *5) Fire Risk*

*The results of recent fires have been observed in this area. They are understood to be the result of excesses flaring at the Woodside facility. Recent inspections of the Burrup Peninsula by* Respondent B *have found that the Woodside flare stack has caused fires in the area assigned for the development of the GTL proposal. It is totally unacceptable that the document PRA for a Methanol Manufacturing Plant has not fully addressed this issue. The Woodside flaring would have caused an explosion had the GTL plant been constructed. The implications of developing a methanol plant immediately adjacent to the Woodside flare stack, which is known to emit 'fire lobs', should be fully considered.*

The proponent agrees that there has been at least one fire in the area within the past 12 months. However, the proponent considers that their connection with the NWSVP is unproven.

Respondent B is inconsistent in that they first say the fires "are understood to be the result of excesses flaring", but then goes on to say that "recent inspections….. have found that the Woodside flare stack…" and that "the Woodside flare…. is known to emit 'fire lobs'". If Respondent B has firm evidence that the fires were caused by the NWSVP flare stack, then the proponent would hope that, as a responsible citizen, they would submit such evidence to the appropriate authorities. If such evidence has been submitted, then the proponent wishes to access the information so that it may be taken into account during detail design. Further, the proponent would hope that action has been taken by the appropriate authorities to ensure that this situation is remedied prior to commencement of construction of the proposed plant.

The proponent notes that, from a risk assessment perspective, the ability to calculate the frequency of burning ejecta from the Woodside flare impacting the GTL site would require data which are not available. The frequency of burning ejecta, the size distribution and the force distribution with which it leaves the flare would need to be known. Any attempt to model this would have to include numerous assumptions and hence the level of accuracy would be too low for a meaningful assessment to be made.

On a pragmatic note, the proponent feels that Respondent B should recognise that the NWSVP's own plant would be at far greater risk of impact from any such ejecta than the GTL plant, unless Respondent B is implying that the NWSVP can limit any releases to only those times when wind conditions are favourable to have any ejecta move off-site. Given the relative position of the NWSVP flare stacks to the LNG and LPG shiploading facilities and other liquids storage (propane, butane, etc.), and the easterly winds which predominate during the winter months, the proponent is confident that the NWSVP will have made every endeavour to ensure that such emissions have not taken place in the past and will not take place in the future.

### *6) Approval from Aboriginal claimant groups*

*There is a suggestion that Aboriginal people have been given the opportunity to express their environmental concerns. GTL should demonstrate that the Aboriginal people involved were adequately equipped with the necessary understanding of the environmental issues at stake. If GTL cannot demonstrate that the Aboriginal people were adequately equipped with necessary environmental information then it should be concluded that consultations were not conducted in a fair and reasonable manner.*

The company has met with each of the three native title groups with claims over the Burrup area. At these meetings company representatives provided a briefing about the project and the environmental issues associated with it. Copies of the document titled "Australian Methanol Project", which provided a summary of the project and the companies involved, were provided to all groups. The groups and

their representatives were subsequently provided with copies of the documents "Burrup Peninsula Methanol Plant – Project Outline for Stakeholder Consultation, October 2001" and "Burrup Peninsula Methanol Plant, Environmental Scoping Document, November 2001".

Invitations were sent to each group and their representatives to attend a public presentation in Karratha about the environmental aspects of the project and the assessment process. A senior member of the Wong-Goo-Tt-Oo group subsequently attended the meeting.

### *7) Archaeological surveys*

*The standard of archaeological survey work and ethnographic consultation prior to construction does not appear to be adequate.*

Following the signing of an agreement between the State and the Ngarluma Yindjibarndi people covering the acquisition by the State of the Burrup Industrial Land (including the proposed GTL site) there have been detailed heritage surveys of the GTL site undertaken. These surveys, which were undertaken at the end of September and beginning of October 2002, located a number of previously unrecorded isolated rock engravings on the western portion of the proposed GTL lease.

The surveys also located two areas that had been used to manufacture stone tools as well as an area of arranged stones (often referred to as a Burrup terrace). A number of these previously unrecorded sites are located within the footprint of the plant site. The company will be making an application under section 18 of the Aboriginal Heritage Act for approval to disturb those sites that cannot be avoided. The remaining sites, which do not need to be disturbed, will be fenced off to avoid any damage during the construction period.

The archaeological survey was carried out by two archaeologists and a team of up to six traditional custodians. It involved the team members walking north-south transects at approximately 10 m spacings across the entire lease area. Any areas where sites or archaeological material were located were marked and subjected to a subsequent more detailed survey, evaluation and recording.

### *8) World Heritage*

*The proponent has failed to acknowledge that the proposal is likely to impact on an area proposed for World Heritage listing. Robert G. Bednarik, President of the International Rock Art Federation, describes the Burrup as the world's richest petroglyph gallery. It is unacceptable that the proponent has failed to provide documented advice on the proposal from the International Rock Art Federation.*

It is not correct to say that the Burrup has been "proposed for World Heritage listing". There is no such proposal. Some people, including Bednarik, have suggested that it should be proposed for listing. There is one very significant petroglyph site, which has been listed on the Register of the National Estate, located approximately 1.3km south of the proposed GTL plant site. The proposed project will have no impact on this site and the plant will not be visible from the site.

### *9) Alternative sites*

*In the GTL document 'Burrup Peninsula Methanol Plant Environmental Scoping Document' the proponent has discussed "alternatives considered", but has completely ignored the need to discuss the viability of the Maitland Industrial Estate.*

*The 3000 ha Maitland Industrial Estate is perfectly suited to projects such as this. Maitland is pastoral station country, which has already been rezoned for industrial use. It is acknowledged that careful planning in the development of a pipeline between the plant and a deep water ship loading facility would be essential.*

*By arguing to have the proposal on the Burrup Peninsula, GTL has demonstrated an inability to understand the impacts it will have on this unique area.*

The non-viability of the Maitland Estate for this project is addressed in Chapter 4 of the PER, which supersedes the Environmental Scoping Document and is the document upon which the submission should have been made.

### *10) MTBE*

*It is outrageous that through this PER process GTL could be allowed to produce methyl tertiary butyl ether (MTBE), a substance which is considered to be too dangerous for Western Australian use. It is equally outrageous that the dangers of this substance have not been discussed in the PER.*

*It is likely that as much as 38% of GTL's Burrup production will be for MTBE. The United States EPA advises that in the US methanol is principally used for the production of methyl t-butyl ether [Ref http://www.epa.gov/opptintr/chemfact/f_methan.txt].*

*MTBE is a highly dangerous contaminant of ground water supplies. Western Australia's existing fuel quality regulations rightly guard against the presence of it in WA's fuel.*

*It is unacceptable that production of MTBE has not been considered as an Environmental Factor.*

The proponent wishes to confirm that it is proposed to produce only chemical grade methanol at the plant.

### *11) Flora and Vegetation*

*This proposal should not be allowed to proceed before an adequate flora survey has been conducted. GTL's own botanical consultant has clearly stated that the survey area was only sampled once, and that this was at an inappropriate time for the detection of many ephemeral and cryptic flora species.*

*The proposal should not be allowed to proceed without the supporting statistical information presenting scenarios indicating the percentage of each vegetation type remaining should all the proposed Burrup developments proceed. This would enable a cumulative assessment to be made of the impacts of this proposal on the vegetation values of the area.*

*This would enable a clear determination to be made on how the proposal meets the EPA's Position Statement No. 2 Environmental Protection of Native Vegetation in Western Australia.*

*Landholders wishing to clear agricultural zoned land are required to meet the terms of the criteria developed by Safstrom and Craig (1996). A proponent of the stature of GTL should, as a minimum, be required to meet the same standards as those imposed on farmers.*

*The representation levels of the vegetation complexes should be presented in the context of the local (15 km) area. This will involve the determination of detailed representation statistics. The figure will need to be accompanied by a discussion of the representation of the genetic diversity of the species that may occur within the complexes.*

*In its referral documentation GTL claims that a 'wet season' flora survey will be conducted. No such survey has been conducted. The referral documentation states:*

*A detailed count of the occurrence of the above Priority flora species will be conducted as part of the*

*subsequent 'wet season' survey. GTL and URS have met with the Pilbara Regional Manager of CALM …, and will continue correspondence with the agency as the more detailed 'wet season' flora study results are available.*

Due to the lack of rainfall on the Burrup Peninsula during the preparation of the PER, the proponent has been unable to undertake a wet season survey. As stated in the PER, the proponent re-affirms its commitment to undertake a detailed wet season survey of the GTL lease area as soon as appropriate conditions prevail.

Given the absence of rainfall and the inability to undertake a wet season survey, the proponent considers that it has reviewed all the available relevant information to best determine the conservation significance of the vegetation within the lease area and plant footprint. This has included determining area estimates of the 16 vegetation types that occur within GTL site based on Trudgen's Burrup Survey mapping and an assessment of the conservation status of those types by application of a "threatened community" assessment process, which considers the representation of each specific vegetation type elsewhere on the Burrup Peninsula. As an indicator of "representation levels", estimates also are provided of the areas of each vegetation type that will be retained in the Conservation, Heritage and Recreation Area. The data provided in the PER enables an assessment of the impacts to vegetation from the GTL proposal to be made in a regional context (and within the limitations described in Section 7.3.1.3). The approach employed for this assessment is consistent with that undertaken for the other current proposed developments.

### *12) Use Of Environmental-Offsets*

*In preparing this submission* Respondent B *has given due consideration to the claimed environmental benefits that would arise should the proposal proceed. It is in this regard that* Respondent B *considers that it is essential that the Environmental Protection Authority (EPA) develop an EPA Position Statement outlining the appropriate extent of environmental benefits that should be achieved for proposals. In giving this advice* Respondent B *is aware that there is a grave danger that the standard of 'environmental offset' will be a reflection of the negotiating skills of the EPA, or its service unit.*

*It is considered that the EPA and its service unit do not necessarily have the training or expertise to negotiate optimum 'environmental offsets'. As such there is a significant risk that the Environmental Impact Assessment process could lead to inappropriate 'deal cutting'. Such deals may have little relationship to the environmental values associated with a given proposal.*

The proponent believes they are not required to respond to this comment.

### *13) Applying the Precautionary Approach*

*Given the many uncertainties involved with this proposal the Precautionary Approach should be applied. Wherever there is a risk of a development degrading or diminishing environmental values, and there is a lack of knowledge, insufficient knowledge, or uncertainty about the potential impacts and management of the impacts, such as on coastal environments, the Precautionary Principle (Approach) should be used as a tool to underpin decision-making. According to Deville and Harding (1997), in deciding whether or not to apply the Precautionary Principle in a given situation, the critical considerations are:*

*A. Identifying the threats to the environment from the proposal (including cumulative impacts) There are three classes to consider - threats that are known, threats that cannot be determined or quantified because of lack of knowledge, and threats that we are not aware may exist because we may not yet be aware that what we do not know may be important in the long term (epistemological threats).*

*B. Identifying the seriousness of threats. This should consider all aspects of the threats to determine their significance, including spatial scale, magnitude of impacts, value of the threatened environment, temporal scale of possible impacts, interconnectedness of the impacts of the activity, cumulative impacts in the regional (ecosystem type) area and manageability, including knowledge specific to and essential for the environmental management of the coastal area.*

*C. Establishing whether the threats are reversible or irreversible and over what time frames, allowing for major climatic changes and perturbations that have the potential to impede rehabilitation of the coastal area.*

*D. Examining the likelihood of the threats occurring (estimates of risk) and certainty about the threats to the environment; and finally*

*E. Where there is reasonable scientific certainty and a high degree of confidence about the threats, establishing the most appropriate preventative measures that should be applied.*

*A proposal involving a high degree of threat to an area of high environmental significance with low level of knowledge of how to manage the potential impacts would be unlikely to be found environmentally acceptable. Significant threats to the environment, even when supported by a high degree of scientific certainty, would also be likely to militate against a proposal being found to be environmentally acceptable. (Adapted from: EPA Position Statement No 4, Deville, A. & Harding, R., (1997) Applying the Precautionary Principle: The Federations Press, 79 pp.)*

The proponent believes they are not required to respond to this comment.

### *14) Unsubstantiated claims and unfulfilled commitments*

*It is extremely disappointing to read the PER and find a range of unsubstantiated claims and unfulfilled commitments. Examples include:*

- *the commitment to doing a wet season vegetation and flora survey;*
- *Claims that $NO_x$ and $SO_x$ levels will not exceed assigned levels.*

The inability to undertake a wet season vegetation and flora survey is addressed in (11) above.

The proponent is unclear as to why Respondent B believes the assessment of $NO_x$ and $SO_x$ levels has given rise to "unsubstantiated claims".

### *15) Conclusion*

*It is* Respondent B's *view that a CIA must be undertaken prior to any further consideration of proposals on the Burrup Peninsula. Such an assessment should be undertaken by independent professionals, but funded by proponents and those who already have site specific environmental approvals.*

*The following is a summary of the CIA and EIA issues that must be properly addressed before the proposal can proceed:*

*i. A comprehensive study of the vegetation communities that would be impacted on by the proposal. The GTL proposal would impact on an area of 95 hectares, covering a range of highly sensitive ecological communities. It is to be noted that previous proposals in this area have not adequately assessed the potential impacts on biodiversity and vegetation values relative to regional representation levels.*

Given the lack of rain and resultant lack of wet season data, the proponent (in the PER) has undertaken a comprehensive assessment of the vegetation communities that would be impacted by the proposal [see response to Respondent B's comment (11)]. This assessment has included placing the impacts to vegetation at the GTL site into regional context. The proponent commits to undertake additional vegetation mapping within and surrounding the lease in the wet season to enable better confirmation of the vegetation types and flora species present. The GTL proposal would impact an area of approximately 15 ha, not 95 ha as claimed by Respondent B.

*ii. Comprehensive mapping of the area's vegetation communities must be undertaken. There should be no destruction of any vegetation type that has less than 30% of its original extent remaining. This would ensure the proposal is consistent with the Environmental Protection Authority's Position Statement No 2. Environmental Protection of Native Vegetation in Western Australia, which notes that the "threshold level" below which species loss appears to accelerate exponentially at an ecosystem level is regarded as being at a level of 30% of the pre-clearing extent of the vegetation type.*

See response to i. above.

iii. *This area has outstanding aboriginal heritage values including rock art and spiritual associations. The assessment process must ensure that there is no degradation of these values and that any assessment is consistent with the wishes of traditional owners.*

It is reasonable to describe the Burrup Peninsula as an area that has outstanding Aboriginal heritage values, including rock art and spiritual associations. It is, however, not the case that the proposed GTL site itself has any outstanding Aboriginal heritage values.

The company will be seeking approval under section 18 of the Aboriginal Heritage Act to disturb some archaeological sites. As part of this process the company has already consulted two groups of traditional owners and will continue to seek consultation with the remaining group.

iv. *Discussion must be made of alternative locations, proving why these have not provided a better environmental alternative.* Respondent B *understands that the Maitland site would provide a viable alternative location. It is to be noted that the Maitland area has been zoned industrial and that it has substantially lower environmental, heritage and spiritual values.*

See response to (9) above.

v. *Air quality impacts associated with the proposal must be assessed through EIA and CIA processes.*

Air quality impacts associated with the proposal have been considered in detail in the PER (and in particular Appendix G), which has incorporated cumulative atmospheric modelling for key pollutants using both Ausplume and TAPM as agreed with the EPA Service Unit. Potential effects, comparison of concentrations with relevant standards and proposed mitigation measures are documented and endorsed as commitments by the Proponent.

vi. *Noise impacts must be assessed through EIA and CIA processes.*

Consideration of potential noise impacts, both from the methanol plant in isolation and in cumulative terms, was completely addressed in the PER in accordance with EPA Guidance.

vii. *The safety implications of developing a methanol plant immediately adjacent to the Woodside flare stack.*

See response to (5) above. The risks associated with <u>any</u> neighbouring facilities will be taken into account during the QRA, which will be undertaken during the detail design phase.

viii. *The EIA of the proposal must assess the potential environmental impacts associated with the use of seawater in the production process. It is understood that the proponent intends to use 55ML/day of seawater.*

The potential environmental impacts associated with the seawater supply are addressed in Section 7.3.3.1 of the PER.

ix. *Energy consumption and associated emission of greenhouse gasses, including those from the desalination plant should be included in the proposal's greenhouse gas calculations.*

As previously discussed, the technology provider Lurgi confirms that power (energy) for the desalination plant is generated on site, and the pro-rata portion of $CO_2$ for this energy has already been accounted for in the greenhouse calculations presented in the PER.

x. *Full analysis of the risk of producing MTBE for Western Australia and for the nations who purchase this product.*

See response to (10) above.

*It is a matter of grave concern that proponents, such as GTL, seem to be able to ignore issues if they so wish. The above issues indicate that the PER presented by GTL is inadequate. The PER document fails to demonstrate that the proposal can be managed to ensure that it does not have a significant impact on the environment. Some of the issues that have led* Respondent B *to this conclusion have been documented in this submission. Until such time as these issues have been fully addressed the EPA must recommend to the Minister for Environment and Heritage that the proposal should not proceed.*

The proponent refutes Respondent B's assessment of the adequacy of the PER, which they feel demonstrates that the project can be readily managed to minimise environmental impacts; that all management requirements are well understood and reliable; and that the EPA's objectives for environmental protection can be met.

## ***COMMENTS FROM PILBARA DEVELOPMENT COMMISSION (dated 8 Oct 02)***

### *2.3.3 & 7.5.5 Workforce and Accommodation*

*The Review states that GTL is aware of the risk 'for this and other potential projects to place additional pressure on the local housing situation'. GTL has recently accepted an invitation to join the Nickol Bay Accommodation Task Force.*

***Commission comment***

*Whilst the Commission acknowledges GTL's acceptance to join the Nickol Bay Accommodation Taskforce it is of critical importance to the Commission that the relevant information is forwarded to the Taskforce as soon as possible. The information includes:*

- *The accommodation requirements for the project's construction and permanent workforces*
- *The proposed accommodation strategies of GTL Resources*

*Despite accommodation being acknowledged as an issue the Commission is concerned that GTL has failed to assess the wider impact of the development on the social and physical infrastructure of the towns of Dampier and Karratha. In particular, what will be the impacts of the project be upon:*

- *Childcare*
- *Educational facilities*
- *Police/law and order services*
- *Health facilities (public and private)*
- *Recreation services*
- *Local government services (eg. rubbish collection)*

***Recommendation 1***

*That the project's accommodation requirements be determined in conjunction with the Nickol Bay Accommodation Taskforce as soon as possible.*

Accommodation requirements will be determined as soon as possible.

***Recommendation 2***

*That the impact of the project on the operational cost of delivery of social, educational and recreational services to the towns of Karratha and Dampier be assessed.*

These impacts will be assessed during detail design.

#### *7.4.4.1 Noise*

*The Review concludes 'that noise emissions from the proposed plant are predicted to not exceed the assigned levels for residential, commercial receivers'. The review also states that 'the GTL plant will not influence cumulative noise levels at Dampier and Hearson Cove'.*

***Commission comment***

*The value to the community of areas such as Hearson Cove and Withnell Bay includes the low noise levels sought after for passive recreation. Anecdotally there is a strong link between places of 'natural quiet' and passive recreation.*

*The Review correctly recognises that an acceptable standard is yet to be established by the WA Government for recreational areas but it is reasonable to assume that the standard would be below the 60dBA for noise sensitive premises at locations further than 15m from a building directly associated with a noise sensitive use and might approach a range of 35-45dBA. The Review indicates a potential noise level at Withnell Bay of up to 52dBA.*

*It is of concern to the Commission that the Review has not attempted to document the impact of increased noise levels at Withnell Bay.*

*Further it is not reasonable for the Review to assume that other proposed industrial developments in the King Bay – Hearson Cove Industrial Area will dominate cumulative noise levels at Hearson Cove. Recent press releases indicate the Syntroleum Sweetwater GTL project has been suspended. This suspension has the potential to affect the noise level modelling for the area.*

*The Commission would expect the Review to analyse the impact of noise levels from the GTL plant in isolation and as part of the cumulative noise level at Hearson Cove. GTL has no control over the sound levels of other proponents in the area and might find that due to a large variety of external factors that it will contribute to the cumulative noise levels. Further more, it is generally accepted that a sound level of up to 10dBA lower than background is discernable in some conditions – the review predicts GTL's predicted noise contribution at Hearson Cove to be only 2-7dBA lower than background.*

*The Commission acknowledges the Review's statement that due to 'change in land use, the noise environment cannot be maintained at existing levels'. The Commission maintains that recreational and environmental amenity for residents and visitors will be lost and that suitable offsets should be considered.*

***Recommendation 3***

*That GTL analyse and report on the impacts of increased sound levels on the recreational amenity of Withnell Bay.*

The proponent maintains the objective of minimising noise emissions as far as realistically practical so as to protect amenity values in the area. Current noise measurements from the existing NWSVP plant are in the order of 45-50 dB(A), with predicted cumulative noise with GTL's contribution in the order of 46-52 dB(A), as detailed in the PER. The modelling results to date indicate that the proposed methanol plant will not significantly contribute to the existing noise environment at Withnell Bay under typical meteorological conditions. Lurgi have incorporated a range of mitigation measures, such as installation of sound hoods on all compressors and large turbine drives, and the cooling tower will be of a low noise design.

It is reasonable to expect that, through incorporation of more individual equipment noise sources into the model once these are available after detailed design, the total radiated noise may well be below 121.6 dB(A) as used in the present assessment. The proponent has undertaken a slightly conservative assessment in the PER to appropriately address this issue.

Contrary to the submission, the proponent did indeed analyse the impact of noise levels from the GTL plant in isolation and as part of the cumulative noise level at Hearson Cove and Withnell Bay. The cumulative modelling was completed so as to represent 'worst case' levels which may be expected if all proposed Burrup projects were to be commissioned, as per EPA Guidance. GTL is not in a position to pre-empt the outcome of current and/or future assessments to anticipate which proposals may not eventuate.

The proponent reiterates its commitments to:

1. ensure the final plant design meets the statutory criterion of 65 dB(A) at the plant boundary;
2. further investigate additional noise mitigation measures during the detailed design phase; and,
3. utilise the expertise of an acoustic engineer during the detailed design phase to ensure noise level criteria are met and, where practicable, reduced further.

### *7.5 Social Surroundings*

*The Review briefly identifies the benefits to the Pilbara region (Section 3.1-Justification for the Proposal):*

- *Contribution to the local economy of the Pilbara area, both directly and indirectly, as a result of the long term employment that will occur during the construction and operational phase of the development, and*
- *Provision of additional employment and training opportunities during the construction phase of the development*

***Commission comment***

*The Commission believes that Section 7.5 – Social Surroundings does not detail what strategies will be used by the proponent to provide contractual and employment opportunities for the residents of the Shire of Roebourne. The Commission strongly argues that for local businesses and contractors to benefit from the project, GTL needs to conduct a concerted awareness campaign among local businesses to advise the supply requirements. To that end, it is recommended that GTL work with the Karratha and Districts Chamber of Commerce and Industry to achieve this objective.*

***Recommendation 4***

*That GTL conducts a number of seminars in conjunction with the Karratha and Districts Chamber of Commerce and Industry for Shire of Roebourne businesses and contractors on the likely supply requirements and employment opportunities resulting from the GTL Methanol Plant.*

***Recommendation 5***

*GTL should make a "buy local" commitment to businesses in the Shire of Roebourne and surrounding areas that are able to competitively supply the GTL Methanol Plant with relevant goods and services.*

These issues are beyond the scope of the environmental approvals process. However, GTL welcomes the suggestions and will consider such approaches at the appropriate time.

*Consideration also needs to be given to the employment opportunities the project can offer to local Aboriginal people. The Commission believes that a strategy needs to be developed to determine what Aboriginal employment opportunities exist.*

***Recommendation 6***

*That GTL consult with local Aboriginal organisations and representative bodies including ATSIC, the Office of Aboriginal Economic Development and the Department of Training and the Pilbara College of TAFE to identify employment opportunities for Aboriginal people resulting from the GTL Methanol Project. The consultations should also develop workable strategies to achieve this objective.*

This issue is beyond the scope of the environmental approvals process. However, GTL welcomes the suggestions and will consider such approaches at the appropriate time.

### *7.5.2 Road Transport and Traffic*

*The Review provides limited information with regard to traffic management planning for large loads and portions of the plant being delivered to the Mermaid Marine facility.*

***Commission comment***

*The Review fails to address the potentially significant impact of the traffic generated during the thirty month construction period. An estimated 500 strong construction workforce has the potential to impact road traffic between the site and Karratha. These impacts will be exacerbated if other projects enter a construction phase at the same time.*

*The ability to manage the construction workforce traffic will be affected by the accommodation strategy adopted by GTL. A dispersed construction workforce will require collection points (possibly with associated parking) for collection of workers if a bus service is to be adopted. The potential might exist to combine or coordinate services with other resource projects on the Burrup Peninsula.*

***Recommendation 7***

*That the GTL Methanol Project develops a strategy to manage the impact of construction workforce traffic in conjunction with the Shire of Roebourne and the Nickol Bay Accommodation Taskforce.*

The Traffic Management Plan referenced in Section 7.5.2 of the PER will incorporate management of all potential traffic impacts. Consultations with all appropriate authorities will be undertaken during preparation of the plan.

### *7.5.3 Culture and Heritage*

*The Review advises that employees will undergo cultural awareness training including addressing the requirements of the Aboriginal Heritage Act 1972.*

***Commission comment***

*While supportive of GTL's initiatives in educating its workforces about their Aboriginal heritage obligations, the Commission believes these obligations will be more effectively understood if employees and contractors develop a broader knowledge of Pilbara indigenous culture and heritage.*

*To that end, the Commission recommends that GTL's construction and permanent employees and contractors undertake some form of Cross Cultural training.*

***Recommendation 8***

*That the GTL Methanol Project construction and operations workforce undertake a Cross Cultural induction program, delivered by an approved service provider in the Pilbara.*

This issue is beyond the scope of the environmental approvals process. However, GTL welcomes the suggestion and will consider such a programme at the appropriate time.

### *7.5.4 Visual Amenity*

*The Review sets out the visual impact of the GTL Methanol Project including the impact from locations at Withnell Bay. The Review includes a number of computer-generated images to assess the visual impact of the project and determines that the impact is 'not considered to be largely significant'.*

***Commission comment***

*The argument set out in the Review is diminished by the failure to include comparative photographs from locations 6, 7 and 8 (i.e. Withnell Bay), as set out in Appendix J. The Review argues that*

*compared to the existing visual impact of the NWSVP the GTL Methanol project is not significant, but without the necessary visual comparison the argument might be difficult for some to assess.*

*Notwithstanding the above, the Commission would argue that Withnell Bay is a popular area for public recreation and any further alteration to the natural landscape is significant.*

*In conjunction with the noise issues described above, there will be an overall impact on the Withnell Bay area and a subsequent loss of amenity for visitors and residents. In conjunction with the necessary stakeholders, GTL should consider assisting access to alternative recreation sites in addition to Withnell Bay, such as Conzinc Bay.*

***Recommendation 9***

*That the GTL Methanol Project work in conjunction with government and community stakeholders to assess the requirement for access to alternative recreational areas on the Burrup Peninsula.*

It should be noted that the view of the plant site from Withnell Bay shown in Figure 13 of the main PER report is the same image as appears in Appendix J (View from Location 6). The views from Locations 7 and 8 were not included in the main PER as the visual impact at each of these was less than that at Location 6. In Section 7.5.4 of the PER, the reader is directed to Appendix J to view further images of the plant.

In the spirit of good corporate citizenship, GTL will consider lending support to government and community stakeholders working to assess the requirement for access to alternative recreational areas on the Burrup Peninsula. However, it is considered inappropriate that GTL should be expected to make a commitment to work in conjunction with these bodies. The subject of alternative recreational areas is considered to be beyond the scope of the PER.

### *7.5.6 Recreational Access*

*The Review indicates access to Withnell Bay will be improved with the construction of a sealed road to the project site.*

***Commission comment***

*The Commission acknowledges that improved access to Withnell Bay will be welcomed by the community (ref: Appendix L3) however the Review provides little detail on how 'potential impacts of a greater level of access to this area will be considered'. An increased level of access to Withnell Bay has the potential to create traffic and parking management issues, a requirement for improved public facilities and the danger of environmental damage through uncontrolled access to areas further to the north.*

*The significant development on the Burrup Peninsula is having a major impact upon the quality of the recreational areas and as a consequence the Commission is of the opinion that the various resource projects, including the GTL Methanol Project, should be required to contribute to the upgrading of public recreational infrastructure in the area.*

***Recommendation 10***

*That the GTL Methanol Project works in conjunction with the Shire of Roebourne and other stakeholders to determine the impact of improved access to Withnell Bay.*

***Recommendation 11***

*That the GTL Methanol Project contribute to the cost of upgrading public recreational infrastructure at various locations on the Burrup Peninsula.*

In the spirit of good corporate citizenship, GTL will consider supporting proposals to upgrade the public recreational infrastructure in the area. However, it is considered inappropriate for GTL to be "required to contribute" to this. It should also be noted that CALM "does not agree that there will be "improved" public access to Withnell Bay as a result of the upgrade of the road to the plant site. The

road to the plant site is already easily accessible by 2 wheel drive vehicles" (see CALM submission below).

### *8.2.2 Safety and Emergency Management*

*The Review details that 'operations will be conducted in accordance with an effective safety management system'. The review also indicates that the emergency management team will be self-sufficient but will also be able to integrate with Dampier emergency services.*

***Commission comment***

*The Review lacks any detail with regard to consultation with Dampier emergency services. The review does not set out how the GTL emergency management team might be able to integrate with Dampier emergency services. It is not clear whether joint exercises will be undertaken for training purposes and who, in an emergency, will be responsible for coordination and under what circumstances. GTL has not detailed whether access will be granted to the Project for the wider emergency services stakeholders to gain an understanding of the risks and emergency management requirements.*

*According to the Review, the GTL emergency management team will be fully trained and able to handle a wide range of emergency situations. Will individual team members be able to participate and contribute to the various community emergency, ambulance and search and rescue groups in Karratha and Dampier?*

***Recommendation 12***

*That GTL work closely with Dampier emergency services stakeholders to establish a detailed strategy to coordinate responses if and when required.*

As stated in Section 8.2.3 of the PER, the emergency team at the plant will be able to integrate with Dampier emergency services. This integration would include the usage of emergency response procedures which are compatible with those of FESA.

***Recommendation 13***

*That GTL provide support for the various community emergency response teams in Karratha and Dampier.*

The involvement of GTL personnel in the (voluntary) local community emergency response teams will be a decision for each individuals to make. In the spirit of good corporate citizenship, GTL will consider supporting the Karratha and Dampier teams. However, this should not be seen as a requirement for GTL.

***PUBLIC SUBMISSION No.3 (received 11 Oct 02)***

1. *The 10-5 risk contour extends beyond the Withnell East IndustrialArea which appears to be in contradiction with the EPA Guidelines.*

The area to the south of the plant is conservation land with elements that are significant to Aboriginal heritage. However, there are no areas designated as "significant" heritage locations within the 10E-6 contour. The infrequent use of the land means this level of risk is acceptable. This was discussed with and accepted by the DEP and MPR.This absence of significant aboriginal heritage sites within the 5 x 10-5 contour was clarified with the proponent's heritage consultant.

2. *The potential for an explosion in the air separation unit appears to have been overlooked in the Risk Assessment.*

The potential for explosion was not overlooked in the PRA. Oxygen is not being stored onsite, but is being produced on demand by the Air Separation Unit. An oxygen release would increase the thermal effects of any existing flammable scenario. However, a release in its own right would not be likely to result in an explosive or toxic atmosphere as an ignition source would be required to cause an explosion.

## ***COMMENTS FROM CALM (received 11 October 2002)***

**Infrastructure Corridors**

*The document indicates in section 2.1 Project Components & Location - that environmental approvals for all the pipelines within the infrastructure corridors will be sought separately from this document. These pipelines will involve feed gas, methanol product, sea water and brine return pipelines. This Department believes that by not including these items, there is a potential fatal flaw with the document.*

*This infrastructure corridor will be required to cater for all the pipelines and other industry infrastructure requirements for Woodside and the delivery of gas to industrial sites on and off the Burrup Peninsula, as well as services to the Withnell East and Conzinc South industrial sites.*

*If all the industrial sites proposed are developed on and off the Burrup there will be great demand for services in this very limited corridor. There are no other infrastructure corridors that can be used.*

*This Department is concerned that without detailed planning the infrastructure corridor will need to be expanded into the adjacent Conservation, Recreation & Heritage areas. This detailed planning must involve on-ground surveys and design to establish the capacity of the corridor. Visits by staff from this Department to the site with staff from the Office of Major Projects have identified a number of points along this corridor where the installation of pipelines will be very restricted.*

*This Department considers that the priority use of this infrastructure corridor should be for gas pipelines. Potentially a range of gas pipelines will be required in the long term to supply the different gas qualities and pressures needed for domestic and industrial sites to the south of the Woodside plant. To use this corridor for other infrastructure such as seawater, brine and methanol products now, it may limit the ability to install future gas pipelines in this corridor. There is the potential for long term industrial development off the Burrup peninsula to be compromised.*

***Recommendation***

*The EPA should indicate the following:*

- *The priority use for this corridor must be the supply of gas to the south of the Woodside plant.*
- *No expansion of the corridor into the adjacent proposed Conservation Recreation and Heritage zones is acceptable.*
- *Approval of the GTL project not be given until detailed surveys and design of the corridor is completed. This will need to show that delivery of gas to the south of the Woodside plant will not be compromised in the long term by the installation of the pipeline infrastructure for the GTL plant.*

*To maximise use of this limited corridor, all pipelines installed in this corridor must be the largest practical size pipeline for the product being transported.*

The proponent believes these represent issues which must be addressed by MPR, in conjunction with CALM.

***Water Supply for Construction***

*The document indicates at 2.2.1 Utilities Required During Construction Phase - that up to 20 cm.m/hr of water will be required. If this was taken to the maximum level proposed it would result in a draw of 175,200 cm.m/yr.*

*Currently the only water supply for the Karratha Dampier area is coming from the Millstream aquifer. The Harding Dam will not be used for a number of years until a filtration plant is completed.*

*The current drawdown on the Millstream aquifer exceeds the Water Corporations license conditions. This Department is concerned at this current level of drawdown and would like to see the licence conditions complied with.*

*The demand for water is rising in the Karratha area due to the existing construction activity and this is likely to increase rather than decrease. This Department believes it is not in the best interests of the Millstream aquifer to approve any further development that will increase the demand for water until the Harding Dam supplies are available. Alternatively water using developments should be delayed until other resources are available, such as dual plumbing of Harding Dam water for industrial use on the Burrup or reverse osmosis desalinization is available.*

***Recommendation***

*The EPA not approve this project to commence until the Harding Dam is available and has been working reliably for 12 months or alternatively until other resources are available such as dual plumbing of Harding Dam water for industrial use at the Burrup or reverse osmosis desalinization is available.*

The proponent believes these represent issues which must be addressed by the Water Corporation, in conjunction with CALM.

### 7.3.1 Vegetation and Flora

*The Department is concerned that, based n the information provided, there appears to be a number of vegetation units that may be significantly threatened by this project.*

*The tables from 7.1-7.4 inclusive, have been done at the 200 group level. This Department would like additional information before finalising its position in regard to this issue.*

*The following information is requested:*

- *Table 7.1, 7.2, 7.3 and 7.4 should be completed again based on the 50 group level.*
- *An analysis of the information in the above tables.*

The queries raised by CALM suggest some misunderstanding of the results presented in the Trudgen reports. The floristic analysis (detailed in Volume 2 – Trudgen & Griffin 2001) presents an analysis using the floristic composition and cover of species at recording sites for a very large data set (some 605 quadrats, transects and releves). The data set was sourced from several projects in the Pilbara. This data was then analysed using PATN (computer package) which sorted the sites into groups of sites based on overall composition and abundance of the flora species present. In order to make some sense of the sorting, Trudgen chose to group the sites at a 50 group level and a 200 group level. The 50 and 200 group levels of floristic analysis can be thought of as each representing a unit definable at particular level and as such some conservation values can be made for sites within those levels.

The vegetation mapping of the Burrup Peninsula was not based on this floristic analysis. Trudgen et al. manually mapped vegetation on the Burrup Peninsula according to the vegetation present at any one sample site. The mapping was done at the level (as defined by himself) of Association – in other words, units in which structure and dominance are relatively constant, but floristic comparison varies. The system used is that of Specht as modified by Aplin (1979). About 240 associations were identified by Trudgen using vegetation descriptions made both during and after the quadrat recording phase at quadrat and releve sites and elsewhere. Aerial photographs were also used.

Trudgen notes that the floristic analysis (ie the 50 and 200 group levels) could not be used for mapping, both because the sampling numbers were far too small, but also because there is no database of such associations for the larger Botanical District.

Trudgen himself states the fact that equating the units defined by PATN (floristic analysis) closely to vegetation formations and associations is very difficult, if not impossible. At the best, the 50 group level of the analysis could be roughly equated to the formation level. The 200 group level is more refined than the association level. Tables 7.1, 7.2, 7.3 and 7.4 in Section 7.3.1 of the PER are based on

the actual mapping (i.e. vegetation associations) not on the floristic analysis (50 and 200 group levels). Therefore it is not possible to provide any further information as requested by CALM.

### *2.2.1 Utilities Required During Construction Phase*

*This section refers to a "temporary pipeline from an existing tank" to supply water during construction. There is no indication where this temporary line will be placed. Further information is required on its location to determine if the location of the pipeline is appropriate.*

The route of the temporary pipeline has not been defined at this stage, but will be within the "north-south" infrastructure corridor for which environmental approvals are being sought by MPR.

### *7.3.2 Terrestrial Fauna - Management P7-13*

*This section indicates a number of actions will be undertaken in "consultation" with this Department. The work 'consultation' should be replaced with the word 'agreement'. This is requested as past consultation has resulted in developers talking to the department and then not accepting or complying with our requirements. This has lead to less than desirable outcomes for the environment*.

Noted. The proponent accepts the wording suggested above by CALM and will modify its commitments regarding fauna management accordingly.

***Social Outcomes***

*The document indicates at 5.3.4 Recreational Values - that "public access to Withnell Bay is difficult at present". At 9.0 Conclusions - it indicates that one of the social and environmental benefits is that improved public access to Withnell Bay will come as a result of the upgrade of the road to the plant site.*

*This Department does not agree that there will be "improved" public access to Withnell Bay as a result of the upgrade of the road to the plant site. The road to the plant site is already easily accessible by 2 wheel drive vehicles.*

*Access to Withnell Bay past the plant site is difficult and will not change as a result of this project. At Withnell Bay the boat ramp is poorly defined and in need of upgrading also the parking area is poorly defined and is continuing to expand. Work is required to upgrade this facility and prevent further environmental damage.*

*This Department has a proposal for the upgrade of this area in the document "Burrup Peninsula, Conservation, Heritage & Recreation Areas, Recreation & Tourism Master Plan", Feb 1999. This plan was developed with Aboriginal groups as well as local public input.*

*There are no other environmental benefits listed at section 9.0.*

***Recommendation***

*As a condition of approval the proponent should be required to upgrade the following sites to the satisfaction of this Department and the native title claimants for the area:*

*Access to Withnell Bay*

*Withnell Bay boat ramp*

*Withnell Bay parking areas*

GTL will endeavour to ensure that the recreational values of Withnell Bay are not adversely affected as a result of the project and, in the spirit of good corporate citizenship, will consider supporting proposals to upgrade the facilities at Withnell Bay. However, it is understood that the land in question

is vacant Crown Land and as such is beyond the scope of the PER for the GTL project. It is therefore felt that to impose the condition of approval suggested by CALM would be inappropriate.

## ***COMMENTS FROM DEPARTMENT FOR PLANNING & INFRASTRUCTURE (received 15 Oct 02)***

1) *The project will be adding some 50 tonnes of nitrogen/ammonia into King Sound. This will approximately double the amount of N entering the Sound, and approximately triple the amount of anthropogenic N. However, the potential for ecological changes has not been considered. It is proposed that the impacts of this will be considered in the detail design phase of the plant. The implication is that this can be lessened by the design of the plant, however this important issue should be dealt with in a more concise fashion at this point in the process. Furthermore, while there are set objectives for the protection of marine flora and fauna, there appears to be no description of the affected area upon which to base any judgement of impact.*

Since submission of the PER, the proponent has indicated that the quantity of nitrogen contributed to King Bay via the brine return will be reduced to considerably less than 50 tpa. The alternative methods under investigation for reducing nitrogen load are discussed in a letter which is separate from this Response to Submissions but included elsewhere in the EPA Bulletin. The likely nitrogen load to King Bay from the proposed plant will be determined during detail design, once the water treatment system is confirmed. The characteristics of the discharge water will be confirmed through monitoring, within three months of commissioning and stabilisation of the plant, to ensure they are substantially consistent with predictions. Should the characteristics not be substantially consistent with predictions, then an ecological risk assessment of the potential effects of the nitrogen load upon the receiving environment will be undertaken. If the potential for adverse effects is deemed significant (by a panel of independent experts acceptable to DEP and GTL), then management actions will be implemented to mitigate the risk.

2) *Unlike the Methanex proposal at Hearson's Cove, this proposal has less of an impact on coastal planning and management. The major issue revolves around the fact that the location chosen is currently reasonably difficult to access, and the construction will necessitate a road upgrade. This will enable many more people to reach an area of the Burrup which has so far remained somewhat isolated. Some consideration needs to be given to the prospect of greater visitor numbers being able to travel further up the peninsula, and what the long term impacts upon vegetation and fauna might be. The section of the document relating to roads (p7-46) makes no acknowledgement of this. Section 7.5.6 on page 7-50 makes a very bland and useless comment about how greater access will be considered, but provides no information about how this would be considered, by who, to what level of detail, nor does it make any suggestions at all about potential ways of managing those impacts.*

MPR has indicated that the upgrade to Withnell Bay Road, from the junction with Burrup Road to the entry to the GTL lease, is included as a part of the WA Government's infrastructure package for the Burrup industrial estates. Main Roads WA will assume responsibility for the upgraded section of Withnell Bay Road, while the Shire of Roebourne will assume responsibility for the road between Withnell Bay Road and the GTL lease. Off-site impacts arising from the road upgrade are therefore beyond the scope of the PER. It should also be noted that CALM "does not agree that there will be 'improved' public access to Withnell Bay as a result of the upgrade of the road to the plant site. The road to the plant site is already easily accessible by 2 wheel drive vehicles" (see CALM submission above).

3) *The impacts of both the permanent workforce and the construction workforce upon housing and recreational infrastructure are not well handled. The recreational aspects of the Burrup are of considerable importance to the community. Given the high cost of living, the ability to recreate in an unspoilt coastal environment is very important. This plant will be seen from the boat launching area and as such, this could be seen as a major impact.*

The visual impact of the proposed GTL plant from the boat launching area (see Appendix J; Plates 6, 7 and 8) will be minor by comparison with the existing industrial landscape that occurs in the southern section of Withnell Bay due to the presence of the NWSVP facility. The proposed plant will not impact on the unspoilt coastal environment that exists in the northern and eastern sections of Withnell Bay (see PER Plate 1).

4) *Proponent asserts that light is not an issue because of the proximity of Woodside. However, they do not consider the cumulative impact of both facilities upon recreational users in Withnell Bay.*

The proponent believes that, in cumulative terms, the proposed methanol plant will not significantly contribute to existing light levels from the much larger NWSVP facility, due to its small size, positioning of the plant away from Withnell Bay towards the southern end of the Withnell East Industrial Area, and proposed measures to minimise light overspill in accordance with best practice consistent with site safety and security requirements (see Commitment No. O&M 22). The plant will be a minimum of 750 m from Withnell Bay, at this distance light intensity is anticipated to be low and not unduly influence recreational users at the Bay. Note also that the plant site is situated within a valley, therefore light will be ameliorated to some extent by shrouding afforded by terrain features (e.g. rocky outcrops) that occur between the proposed plant site and Withnell Bay (see Appendix J Visual Impact Assessment, Locations 6 & 8).

5) *The PER conclusions generally appear to be accurate in respect to predicted visual impacts. The plant would be adjacent to the very large Woodside Onshore Treatment Plant and as such would be part of the industrial component of the Burrup Peninsula's landscape. It would not be highly visible from major recreation sites. The plant will be clearly visible in the foreground of publicly accessible views from Burrup Road, but its size would be small compared to the adjacent gas plant.* ***It is considered that the EPA's objectives in respect to aesthetic impacts can be met by the proposal.***

The proponent concurs with the above comments.

*The PER's assessment of visual impacts has a number of inadequacies, as outlined below.*

- *There is no overall description of the site within the context of regional landscape character.*

Section 5.1.3 of the PER (Topography and Geomorphology) provides this description and Plates 1-5 provide a visual representation of the local and regional landscape.

- *There is no description of current and potential future public opportunities to see the site.*

The potential for the GTL project to include provision for tourist related activities (i.e. Industrial Tourism) was raised by the Western Australian Tourism Commission during the community consultation process. The visitor centre at the NWSVP facility is an example of the benefits to both the public and the company that come from providing opportunities for the public to visit such industrial sites and gain understanding of the operations. GTL will consider this issue further during development of the project.

- *The map showing viewpoints does not indicate direction of view or label viewpoints eg which site is the boat ramp?*

The reference map provided in Appendix J (Visual Impact Assessment) shows the position of each viewpoint. The direction of each viewpoint was approximately towards the middle of the proposed GTL plant site. Viewpoint 6 is from the informal car park area adjacent to the boat ramp.

- *No rationale is provided for the choice of viewpoints.*

Viewpoints were selected from areas that the public regularly use for recreation (viewpoints 6,7,8) or for travel to those recreation areas (viewpoints 3,4,5). Views from the Mt Wongama Road (viewpoints 1,2) were used to place the proposed GTL plant into a context of the both the local topography and the existing industrial landscape (due to presence of the NWSVP facility).

- *No information is provided as to why Mt Wongama Road is closed to the public and whether this situation is likely to be reversed.*

The Mt Wongama Road was constructed, and is controlled by, the NWSVP for access to the Mt Wongama communication facility. The land is currently crown land leased to NWSVP. The issue of future public access to the Mt Wongama Road will be addressed by the relevant government authorities responsible for planning the development of the Withnell East Industrial Area.

- *The view from Mt Wongama road is actually from a location a distance away from the road, and no indication is given as to why the view from the top of Mt Wongama has not been included in the analysis.*

The view from Location 1 (see Appendix J) was taken next to the Mt Wongama Road and was chosen instead of the view from the top of Mt Wongama as it offered better views of the Withnell East Industrial area within which the GTL plant would be placed.

- *Views 3 & 4 appear to use photographs that do not actually cover the entire site.*

The majority of the remaining plant site (not shown in views 3 & 4) is obscured by rocky hills.

- *View 5 appears to have located the sun at an incorrect angle for the simulation ie instead of overhead, the sun appears to be located in the southwest, a situation that would not occur at the site. This particular simulation should have included ancillary infrastructure such as perimeter fencing, overhead powerlines and the pipeline.*

View 5 would not look markedly different if it was adjusted as per the above comment.

- *The exact location from which views 6, 7 & 8 have been taken is not indicated. Were they taken from the beach itself, from the boat ramp, from a parking area etc?*

These views were taken from the landward margin of the beach at these locations to present the maximum view that would be experienced by the public at these locations. In the case of views 6 and 7 there were taken from the landward edge of the informal carpark areas. Most public use in the areas concentrates on the lower sections of the beach at these locations (i.e. for boat launching or shore-based fishing) from where the views of the GTL plant would be more obscured than is currently shown in views 6 and 7.

- *Views 6, 7 & 8 should have included a wider panorama including the existing gas plant, so the overall context can be visualised.*

The overall context is best represented in view 1.

- *When access improves to Conzinc Bay in the future, what are the potential views from a new road?*

Similar to those views provided in Appendix J of the PER.

- *How will the proposed plant look at night?*

See response to comment 4) above and Section 7.4.4.2 of the PER.

- *There is no written analysis of the views from each chosen viewpoint, or strategies for management of the views, where appropriate.*

Section 7.5.4 of the PER describes the management strategies that will be undertaken to improve the visual amenity of the proposed plant.

- *There is no overall description of the general public viewing experience in which this site is included, to complement the analysis of individual views.*

Due to the rocky and hilly landscape that dominates the Burrup Peninsula, the views shown in Appendix J best describe the public viewing experience as these will be the main views that the public will have of the plant. The plant will be obscured from most other viewpoints along public transport routes or the Withnell Bay recreational area (i.e. other areas where the public are likely to be).

- *There is no comprehensive strategy for minimising visual impacts eg reference to landscaping, treatment of pipelines (eg rehabilitate road reserve where road is to be realigned, reduce impacts of buried pipeline by addressing any weed problems).*

Section 7.5.4 of the PER describe the management strategies that will be undertaken to improve the visual amenity of the proposed plant.

- *There should have been a discussion of impacts on the landscape beyond the site. For example, what impacts will result from rerouting the creekline that runs through the site. Will this impact on the character of the creekline downstream of the site? Another potential impact is weeds and general disturbance surrounding the site.*

Water flow will be managed to ensure that the integrity, functions and environmental values of the creeklines downstream of the plant will be retained as close to pre-development conditions as practicable. Weed control and general disturbance will be further addressed in management plans that will be prepared and implemented for both construction and operation phases of the project.

***AIR QUALITY MODELLING (DEP)***

- *Is the proponent aware that AUSPLUME has tended to underestimate concentrations at Dampier because of its inability to model coastal fumigation? Could the proponent provide a better analysis of the model output and discussion of model limitations with reference to the Pilbara modelling study*.

As noted above, the proponent is aware of the limitations of AUSPLUME, and the conclusions of the Pilbara Modelling Study that the model may underestimate concentrations at Dampier. However, when the assessment was started the DEP Air Quality Branch was contacted to discuss appropriate assessment methodologies and no major issues were raised with respect to the proposed use of the AUSPLUME model at that time. During the course of the assessment, discussions with the DEP suggested that there are limitations associated with AUSPLUME in potentially underpredicting ground level concentrations at Dampier, which were addressed based on advice from the DEP at the time. While the GTL air quality assessment was essentially completed prior to receiving this advice, the proponent concurs with comments from the Air Quality Branch that there are other models which may be better suited to Burrup meteorological conditions in preference to AUSPLUME. To this end, GTL is prepared to remodel anticipated ground level concentrations of key pollutants once detailed design is finalised, at which time the advice of the Air Quality Branch will be sought. The proponent endorses a collaborative cumulative study involving all Burrup proponents to remove the current variability in methodologies and assumptions, noting that resulting glc's from the GTL Project are anticipated to be very low in relation to other proponents.