ASSESSMENT REPORT 47

NATURAL FUEL LTD
&
VOPAK TERMINAL DARWIN PTY LTD

BIODIESEL PLANT
(EAST ARM DEVELOPMENT AREA)

ENVIRONMENTAL ASSESSMENT REPORT

AND

RECOMMENDATIONS

by the

OFFICE OF ENVIRONMENT AND HERITAGE

NORTHERN TERRITORY GOVERNMENT

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Northern Territory Government
Office of Environment and Heritage

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GLOSSARY & ABBREVIATIONS

ARI	Average Return Interval
COD	Chemical Oxygen Demand
DHCS	Northern Territory Department of Health and Community Services
DIFT	Darwin Industry Fuel Terminal
DIPE	Northern Territory Department of Infrastructure, Planning and Environment
DPC	Darwin Port Corporation
LDC	Land Development Corporation
PER	Public Environmental Report
EMP	Environmental Management Plan
km	Kilometres
m	Metres
NOI	Notice of Intent
NT	Northern Territory
OEH	Office of Environment and Heritage

The consultant	EcOz Environmental Services
The proponent	Natural Fuel Ltd and Vopak Terminal Darwin Pty Ltd

EXECUTIVE SUMMARY

This report assesses the environmental impacts of the proposal by Natural Fuel Ltd and Vopak Terminal Darwin Pty Ltd (the proponent), to establish a biodiesel plant within the East Arm Industrial Precinct, 5 km south east of Darwin. The proposal is to construct a processing plant to manufacture biodiesel, a fuel derived from natural vegetable oil that can be used as a replacement for mineral fuel. The development will consist of the processing plant, storage tanks, pipelines and associated infrastructure. The main storage tanks will be constructed on the Darwin Industry Fuel Terminal site and will be managed by Vopak. The product will be distributed interstate and overseas via road, rail and sea.

The Assessment Report reviews the revised Public Environmental Report and information, comments and advice provided by Northern Territory Government agencies.

Environmental assessment is the process of defining those elements of the environment which may be affected by a development proposal and of determining the significance, risk and consequences of the potential impacts of the proposal. Recommendations arising from the assessment address methods to mitigate these impacts.

Major Issues

The principal environmental issues associated with the proposed project are:

- Geotechnical stability;
- Process water management;
- Stormwater management;
- Waste management and disposal;
- Spill prevention; and
- Emergency management.

Conclusions

The Office of Environment and Heritage considers that the environmental issues associated with the proposed project have been adequately identified. Appropriate environmental management of some of these issues has been resolved through the assessment process, while the remainder will be addressed through monitoring and management actions detailed in a comprehensive Environmental Management Plan.

The final Environmental Management Plans for the construction and operational phases of the biodiesel plant will be subject to review and approval by relevant Northern Territory Government agencies. They will be working documents for the life of the project and will require continual review in the light of operational experience and changed circumstances.

Based on its review of the revised Public Environmental Report and submissions from relevant Northern Territory Government agencies, the Office of Environment and Heritage considers that the biodiesel plant can be managed in a manner that avoids unacceptable environmental impacts, provided that the environmental commitments, safeguards and recommendations detailed in this Assessment Report and in the final Environmental Management Plans are implemented, with regular reporting and compliance auditing.

LIST OF RECOMMENDATIONS

Recommendation 1

The proponent shall ensure that the proposal is implemented in accordance with the environmental commitments and safeguards:

- **Identified in the revised Public Environmental Report for the Development of a Biodiesel Plant at the East Arm Development Area; and**
- **Recommended in this Assessment Report (No. 47).**

All safeguards and mitigation measures outlined in the revised PER are considered to be commitments by the proponent and are included in Appendix II of this report.

Recommendation 2

In accordance with clause 14A of the Administrative Procedures of the *Environmental Assessment Act 1982* the proponent shall advise the Minister of any changes to the proposal for determination of whether or not further environmental impact assessment is required.

Recommendation 3

Future proposals for additional biodiesel plants on the site are to be provided to the Office of Environment and Heritage for consideration under the *Environmental Assessment Act,* in accordance with Recommendation 2 of this Assessment Report.

Recommendation 4

If an alternative fuel source is to be used for fuelling the boiler system instead of natural gas, then the revised proposal is to be provided to the Office of Environment and Heritage for consideration under the *Environmental Assessment Act,* in accordance with Recommendation 2 of this Assessment Report.

Recommendation 5

All excavation works (including founding and pavement design) must adhere to the recommendations provided by the geotechnical report (Douglas Partners 2004).

Recommendation 6

Any structures founding in the north west corner of the site will require additional investigation to determine the extent of poor quality filling material and the depth of marine sediments to provide information for the design of remedial works and footings systems.

Recommendation 7

Any excavation of marine sediments will require the development of an Acid Sulphate Soils Management Plan to ensure adequate disposal or treatment of potentially acid sulphate mud.

Recommendation 8

Provision should be made for adequate site drainage, both above ground and subsoil, to control the ingress of groundwater into the subgrade and pavement materials.

Recommendation 9

Prior to any discharge of water, the proponent shall obtain a whole-of-site Waste Discharge Licence under the *Water Act* and comply with any conditions of such a licence.

Recommendation 10

If a seawater heat exchange system is to be used for the cooling process instead of a cooling tower, then the proponent must:

- **Provide evidence of adequate consideration and management of the environmental impacts of releasing heated water into the marine environment, to be approved by the Office of Environment and Heritage;**

- **Obtain a Water Extraction Licence under the *Water Act 1992* and comply with any conditions of that licence; and**

- **Liaise with the Office of Environment and Heritage to ensure that any off-site discharges associated with the heat exchange system are incorporated in the whole-of-site Waste Discharge Licence, in accordance with Recommendation 9 of this Assessment Report.**

Recommendation 11

The proponent should liaise with the Environmental Health Branch of the Department of Health and Community Services to determine an appropriate sewerage treatment system, which must comply with the *Code of Practice for Small On-Site Sewage and Sullage Treatment Systems and the Disposal and Reuse of Sewage Effluent.*

Recommendation 12

Disposal of any liquid waste to Power and Water treatment facilities will be required to meet discharge quality acceptance guidelines in accordance with Power and Water's Trade Waste Code.

Recommendation 13

Prior to construction, the proponent shall specify a discharge point for wastewater from the Waste Water Treatment Plant. In selecting the discharge point the proponent must show consideration of the potential environmental impacts and strategies for minimising these impacts, to the satisfaction of the Office of Environment and Heritage.

Recommendation 14

The proponent shall liaise with the Office of Environment and Heritage to ensure that any off-site discharges associated with the Waste Water Treatment Plant are incorporated in the whole-of-site Waste Discharge Licence, in accordance with Recommendation 9 of this Assessment Report.

Recommendation 15

Re-use of wastewater for irrigation must comply with the *Guidelines for Sewerage Systems – Use of Reclaimed Water* (ANZECC/ARMCANZ 2000) and *Site Specific Type Approval* by the Department of Health and Community Services.

Recommendation 16

The proponent shall liaise with the Office of Environment and Heritage to ensure that procedures for the testing and release of water from all bunded areas are developed and incorporated in the whole-of-site Waste Discharge Licence, in accordance with Recommendation 9 of this Assessment Report.

The procedures should include details of testing techniques, identify which contaminants are being tested for, specify levels at which water is deemed contaminated and unfit for release into the environment, and address contingency procedures in circumstances such as on-going heavy rain or pump failure.

Recommendation 17

The proponent will investigate appropriate greenhouse gas emission offset schemes in consultation with the Office of Environment and Heritage prior to commencement of operation.

Recommendation 18

Waste Management Plans shall be submitted as part of both the construction and operational Environmental Management Plans. The plans should include a complete list of all waste streams with projected quantities and planned routes for disposal. The plans will identify in detail safe storage of wastes while on-site including spill control contingency plans; opportunities for recycling, reuse and remediation of site wastes; and any contractual agreements with the waste contractors to provide records and reports on the treatment and final destination of all wastes collected from the site.

Recommendation 19

Vopak will develop operating procedures for loading/unloading ships and for cleaning/venting/discharging from ships. The procedures must be approved by the Harbour Master and submitted as part of the operational Environmental Management Plan.

Recommendation 20

Operating procedures should be developed for the transfer of materials at the truck loading/unloading facility on the Darwin Industry Fuel Terminal site.

Recommendation 21

Operating procedures should be developed for the transfer of materials via pipelines between the Darwin Industry Fuel Terminal site and the Natural Fuel site. These should include details on the change over of responsibilities between Vopak and Natural Fuel Ltd at the boundary of the two sites.

Recommendation 22

An asset management system should be developed by both Vopak and Natural Fuel for the infrastructure on their respective sites. This should include an inspection and testing programme, as well as required maintenance procedures.

Recommendation 23

A cyclone management plan should be developed and submitted as part of the operational Environmental Management Plan. It should identify responsibilities and include actions to be taken to secure the site at different levels of cyclone alert, evacuation procedures, and response procedures to emergencies such as flooding.

Recommendation 24

Both the construction and operational Environmental Management Plans should include measures that limit the time water is allowed to pool on site (including depressions, tanks, bunds and drains) to less than 5 consecutive days. Irrigation areas should be appropriately sited and managed to prevent effluent water pooling either on-site, or downstream of the irrigated area.

Recommendation 25

Drains should be designed and maintained in a manner that prevents mosquito breeding, including regular maintenance, weed control, desilting and erosion prevention.

Recommendation 26

Workers should be informed of the potential pest problem and encouraged to use personal protection measures, in accordance with the guidelines for "*Personal protection from mosquitoes and biting midges in the NT*" produced by the Medical Entomology Branch of the Department of Health and Community Services.

Recommendation 27

The proponent should take appropriate measures, such as landscaping and fencing, to ensure that the biodiesel plant and associated infrastructure are adequately screened, to minimise any detriment to visual amenity.

Recommendation 28

The proponent will ensure that decommissioning is done according to the best environmental standards available at the time.

Recommendation 29

Environmental Management Plans covering construction and operation of the Biodiesel Plant are to be submitted to the Office of Environment and Heritage for approval prior to commencement of construction and operation respectively.

In preparing each Environmental Management Plan, the proponent will include any additional measures for environmental protection and monitoring contained in this Assessment Report and recommendations made by the NT Government with respect to the proposal. The Environmental Management Plans shall form the basis for approvals and licences issued under relevant NT legislation.

FIGURE 1 – Aerial photo of East Arm Industrial Precint
(from PER prepared by EcOz Environmental Services, December 2004)

FIGURE 2 – Proposed site layout
(from PER prepared by EcOz Environmental Services, December 2004)

1 INTRODUCTION AND BACKGROUND

This report assesses the environmental impacts of the proposal by Natural Fuel Ltd and Vopak Terminal Darwin Pty Ltd (the proponent), to establish a biodiesel plant within the East Arm Industrial Precinct, 5 km south east of Darwin. Figure 1 is an aerial photo of the East Arm Industrial Precinct indicating the location of the proposed site. The proposal is to construct a processing plant to manufacture biodiesel, a fuel derived from natural vegetable oil (palm/coconut oil) that can be used as a replacement for mineral fuel. The development will consist of the processing plant, storage tanks, pipelines and associated infrastructure. The main storage tanks will be constructed on the Darwin Industry Fuel Terminal (DIFT) site and will be managed by Vopak. The processing plant and associated infrastructure will be located adjacent to the DIFT site, on land leased from Vopak by Natural Fuel. Figure 2 illustrates a proposed site layout. The product will be distributed interstate and overseas via road, rail and sea.

This Environmental Assessment Report is based on a review of the revised Public Environmental Report (PER) and advice from Northern Territory (NT) Government agencies. No comments were received from the public. A list of respondents to the revised PER and issues raised in their submissions are provided in Appendix I.

1.1 Environmental Assessment Process

One of the major objectives of environmental impact assessment is to fully define those elements of the environment that may be affected by a proposed development and to determine the significance, risks and consequences of the potential impacts of the proposal. The potential impacts are considered at both local and regional levels.

This report evaluates the adequacy of undertakings and environmental safeguards proposed by the proponent to avoid or mitigate the potential impacts identified in the assessment process. The safeguards may be implemented at various levels within the planning framework of a project and include (among other approaches):

- Design and layout of buildings and other infrastructure on site;
- Management of construction activities; and
- Management of processes used in operations at the facility (e.g. inputs and outputs).

A list of undertakings made by the proponent in the revised PER is provided in Appendix II. Additional safeguards are recommended in this Assessment Report where appropriate.

The contents of this Assessment Report form the basis of advice to the NT Minister for the Environment and Heritage on the environmental issues associated with the project.

1.2 Environmental Impact Assessment History

The proponent lodged a Notice of Intent (NOI) with the Office of Environment and Heritage (OEH) in March 2004, proposing the construction of a biodiesel plant at East Arm Port. It was considered that the environmental issues associated with the proposal were sufficiently significant to warrant assessment under the NT *Environmental Assessment Act 1982* at the level of a PER.

On 14 April 2004 the Minister for the Environment and Heritage directed that a PER be prepared for the proposal. Draft guidelines covering issues to be addressed in the PER were subject to public review from 4 June 2004 – 18 June 2004. Final guidelines were prepared, taking into account the comments received from the public and government agencies. The Minister issued the final guidelines and a direction to the proponent to prepare the PER on 19 July 2004.

The PER was submitted on 23 August 2004 and placed on public review for four weeks from 23 August 2004 to 20 September 2004. The Minister requested additional information be provided on the 19 September 2004. A revised PER was submitted by the proponent on 4 January 2004.

2 THE PROPOSAL

The proposed development will involve the manufacture of biodiesel by mixing vegetable oil with alcohol (methanol) in the presence of an alkaline catalyst (sodium methylate) to produce methyl esters (biodiesel) and glycerine. The reaction takes place in the mixers. The product is then passed to the settlers to allow the two immiscible reaction product phases of methyl ester to separate from the denser glycerine. The ester-rich phase is upgraded to the final biodiesel product by washing with water. It is then vacuum-dried. The heavier glycerine-rich phase is distilled and refined to pharmaceutical grade glycerine. The majority of methanol is recovered for reuse during purification of the biodiesel and distillation of the glycerine.

Vegetable oil feedstock will be sourced from South East Asia and methanol will be sourced mainly from Malaysia. The biodiesel product will be distributed interstate and overseas via road, rail and sea. Pharmagrade glycerine will also be produced and will be sold predominantly to existing markets in Australia for use in the food industry.

The development will involve construction of the processing plant and supporting infrastructure on the Natural Fuel site, including:

- Site preparation – cut and fill operations up to 2.5 m deep to achieve required grades for site access and drainage;
- Biodiesel processing plant – consists of five integrated units which perform the processes of transesterification, methylester drying, glycerin water treatment, glycerin water evaporation and glycerin distillation;
- Day tanks and chemical tanks – used for storing hydrochloric acid, liquid caustic, anti-oxidant, excess process water, fatty acid residue and distillation residue;
- Pipelines from boundary fence with DIFT to processing plant – for transfer of feedstock oil, methanol, biodiesel and glycerine;
- Boiler building – to house package boiler system (including demineralisation unit), plant air compressor unit and package nitrogen unit;
- Underground pipeline for supply of natural gas – for fuelling the boiler in the plant;
- Cooling water system – may include cooling tower or a seawater heat exchanger;
- Waste water treatment plant – for treatment of organic and organic-free waste water streams;

- Fire suppression system;
- Control building;
- Maintenance building; and
- Administration building.

Further infrastructure to support the processing plant will be located on the adjacent DIFT site and managed by Vopak. This will include:

- Main storage tanks – used for storing feedstock oil, methanol, sodium methylate, biodiesel product and pharmagrade glycerine;
- Day tanks – for temporary storage of methanol and palm oil;
- Pipeline construction between DIFT and East Arm wharf – for transfer of feedstock oil, methanol and biodiesel between ships and storage tanks;
- Pipeline from storage tanks to boundary fence of Natural Fuel site – for transfer of feedstock oil, methanol, biodiesel and glycerine;
- Fire water tank – will service both DIFT and Natural Fuel sites; and
- Tanker loading and unloading facility – for delivering chemicals and transporting products by road.

3 ENVIRONMENTAL IMPACT ASSESSMENT

3.1 Introduction

The main purpose of this Environmental Assessment Report is to determine if the proposed project can proceed without unacceptable environmental impacts. It does this by identifying all relevant potential environmental impacts and evaluating the feasibility and likely effectiveness of environmental safeguards put forth by the proponent. Where the proposed safeguards were considered incomplete, inadequate or insufficiently clear, or for safeguards that are particularly crucial, this Assessment Report makes recommendations to complete or emphasize the safeguards and commitments made by the proponent.

The environmental acceptability of the project is based on consideration of the following, from the PER:

- Adequacy of information outlining the proposal (particularly which structures or activities are likely to impact on the environment);
- Adequacy of information on the existing environment (particularly environmental sensitivities);
- Adequacy of information on the range and extent of potential impacts; and
- Adequacy of the proposed safeguards to avoid or mitigate potential impacts.

The outcome of the environmental impact assessment for this proposal is that the NT Government believes that the project can be implemented without unacceptable

environmental impacts. This outcome is dependent on the proponent implementing the environmental safeguards identified in its PER in addition to recommended measures for environmental management presented in this Environmental Assessment Report.

Because minor and non-substantial changes may be made to the design and specifications presented in the PER, some degree of flexibility is desirable and will be necessary for adapting the environmental safeguards defined in the PER and this Assessment Report. Where it can be shown that such changes are not likely to have a significant impact on the environment, an adequate level of environmental protection may still be achieved by the following recommendations, modifications to these recommendations or by conditions attached to relevant statutory approvals for these modifications.

This section contains recommendations (in **bold**), each of which are preceded by text that identifies concerns, suggestions and undertakings associated with the project. For this reason, recommendations should **not** be considered in isolation.

Subject to decisions that permit the project to proceed, the primary recommendation of this assessment is:

Recommendation 1

The proponent shall ensure that the proposal is implemented in accordance with the environmental commitments and safeguards:

- **Identified in the revised Public Environmental Report for the Development of a Biodiesel Plant at the East Arm Development Area; and**
- **Recommended in this Assessment Report (No. 47).**

All safeguards and mitigation measures outlined in the revised PER are considered to be commitments by the proponent and are included in Appendix II of this report.

Recommendation 2

In accordance with clause 14A of the Administrative Procedures of the *Environmental Assessment Act 1982* the proponent shall advise the Minister of any changes to the proposal for determination of whether or not further environmental impact assessment is required.

3.2 Summary of major environmental issues

The principal environmental issues raised by the proponent and through this assessment include:

- Geotechnical stability;
- Process water management;
- Stormwater management;
- Waste management and disposal;
- Spill prevention; and
- Emergency management.

The remainder of Section 3 deals with issues raised in the government submissions to the revised PER and the proponent's commitments to environmental management provided

within the revised PER. No public submissions were received. In addition, recommendations to complement or strengthen environmental management strategies and safeguards will be presented.

3.3 Issues not included in the scope of this environmental impact assessment

3.3.1 Second Processing Plant

The current proposal is for one processing plant. If there is an increased demand for the product, the proponent intends to develop a second processing plant at the site. This report does not assess the development of a second plant, which will undergo a separate assessment process under the *Environmental Assessment Act 1982* prior to development.

Recommendation 3

Future proposals for additional biodiesel plants on the site are to be provided to the Office of Environment and Heritage for consideration under the *Environmental Assessment Act,* in accordance with Recommendation 2 of this Assessment Report.

3.4 Supply of natural gas

The proponent intends to use natural gas to fuel the boiler in the plant. Negotiations are underway between the proponent and NT Gas for the supply of natural gas, which will be piped through an underground pipeline. The revised PER states that vegetable oil is being considered as an alternative fuel source for the boiler.

Given that the descriptions of infrastructure and greenhouse emissions calculations in the revised PER refer to the use of natural gas, any plans for an alternative fuel source would need to be submitted to OEH for consideration.

Recommendation 4

If an alternative fuel source is to be used for fuelling the boiler system instead of natural gas, then the revised proposal is to be provided to the Office of Environment and Heritage for consideration under the *Environmental Assessment Act,* in accordance with Recommendation 2 of this Assessment Report.

3.5 Erosion and sediment control

The proposed development site is predominantly cleared of vegetation. The revised PER states that preparation of the site will require cut and fill earthworks to bring the site to a common elevation with the adjacent DIFT site. Excavation and construction activities have the potential to cause erosion and sedimentation of the surrounding marine and estuarine environment if not managed appropriately.

The revised PER commits to the development of an Erosion and Sediment Control Plan to be submitted as part of the construction Environmental Management Plan (EMP). It is therefore considered that erosion and sedimentation issues have been adequately addressed by the revised PER.

3.6 Geotechnical stability

The site of the proposed development was originally a quarry site, with the current surface created by placing terrestrial soil and rock over marine sediments. It is essential for the structural integrity of the biodiesel plant and associated infrastructure that the site has sufficiently settled and is stable enough to support the development.

The original PER did not address geotechnical stability, though following the Minister's request for additional information, the revised PER includes a report of a geotechnical investigation conducted at the site (Douglas Partners 2004). The report identifies the limits of the rock platform and the depth, type and quality of the filling in the area and provides recommendations for excavation, founding and construction of pavements. It was found that most of the site has underlying phyllite rock with some soil filling or cemented coffee rock, though one section in the north west has uncontrolled filling and rocky filling over marine sediments. It is noted that marine sediments have the potential to contain acid sulphate soils. In the current proposal no structures are to be built on the north west section of the site.

While the revised PER summarises the findings of the geotechnical report in its site description (Section 4.1.1), it fails to address any of the recommendations of the report in its environmental management commitments.

Recommendation 5

All excavation works (including founding and pavement design) must adhere to the recommendations provided by the geotechnical report (Douglas Partners 2004).

Recommendation 6

Any structures founding in the north west corner of the site will require additional investigation to determine the extent of poor quality filling material and the depth of marine sediments to provide information for the design of remedial works and footings systems.

Recommendation 7

Any excavation of marine sediments will require the development of an Acid Sulphate Soils Management Plan to ensure adequate disposal or treatment of potentially acid sulphate mud.

Recommendation 8

Provision should be made for adequate site drainage, both above ground and subsoil, to control the ingress of groundwater into the subgrade and pavement materials.

3.7 Water

3.7.1 Whole-of-site water management

There are a number of issues identified in the revised PER regarding water management on the development site, details of which are provided below (Sections 3.7.2 – 3.7.5). Several of these issues will require licensing under the NT *Water Act 1992*. It has therefore been determined that the most effective way of addressing these issues is under a whole-of-site Waste Discharge Licence. Discharge licences are administered by OEH, on behalf of the

Controller of Water Resources. Monitoring of discharge water will be required as a condition of the Licence.

Recommendation 9

Prior to any discharge of water, the proponent shall obtain a whole-of-site Waste Discharge Licence under the *Water Act* and comply with any conditions of such a licence.

3.7.2 Water supply

Approximately 14.7 m^3 of domestic freshwater will be required per hour in the plant. This water will be used for steam generation, cooling water and process water, as well as servicing domestic requirements and general purposes around the plant. The original PER also required freshwater for periodic uses, though this requirement has been eliminated in the revised PER by recycling sealing water from the processing plant for this purpose (refer to Table 6 in the revised PER).

In order to further minimise freshwater consumption, the proponent has suggested using seawater for the cooling process as an alternative to the currently proposed on-site cooling tower. This alternative would require seawater to be pumped through a heat exchanger and then returned to the sea marginally warmer. No consideration of the environmental impacts of this alternative is provided in the revised PER. If this alternative were to be adopted, the proponent will require a Water Extraction Licence under the *Water Act* to extract seawater. Discharge of the heated water would have to be included in the whole-of-site Waste Discharge Licence.

Recommendation 10

If a seawater heat exchange system is to be used for the cooling process instead of a cooling tower, then the proponent will:

- **Provide evidence of adequate consideration and management of the environmental impacts of releasing heated water into the marine environment, to be approved by the Office of Environment and Heritage;**

- **Obtain a Water Extraction Licence under the *Water Act 1992* and comply with any conditions of that licence; and**

- **Liaise with the Office of Environment and Heritage to ensure that any off-site discharges associated with the heat exchange system are incorporated in the whole-of-site Waste Discharge Licence, in accordance with Recommendation 9 of this Assessment Report.**

3.7.3 Sewerage

There is no reticulated sewerage system available for the site, so the proponent intends to install an on-site septic tank system. The PER proposes that effluent from the system will be collected by a licensed waste contractor and disposed of to an appropriate treatment facility. Power and Water have advised that any disposal of liquid waste to Power and Water treatment facilities will be required to meet discharge quality acceptance guidelines in accordance with Power and Water's Trade Waste Code.

The Environmental Health Branch of the Department of Health and Community Services (DHCS) has advised that the proponent should liaise with Environmental Health prior to finalising the type of sewerage treatment system and appropriate effluent disposal.

Recommendation 11

The proponent should liaise with the Environmental Health Branch of the Department of Health and Community Services to determine an appropriate sewerage treatment system, which must comply with the *Code of Practice for Small On-Site Sewage and Sullage Treatment Systems and the Disposal and Reuse of Sewage Effluent.*

Recommendation 12

Disposal of any liquid waste to Power and Water treatment facilities will be required to meet discharge quality acceptance guidelines in accordance with Power and Water's Trade Waste Code.

3.7.4 Process water management

The process of manufacturing biodiesel and distilling the glycerine will result in a combined water output of approximately 14.45 m^3 per hour. Of this, approximately 2.3 m^3 will contain organic matter (comprised of residual glycerine, vegetable oil, methanol and fatty matter) with an estimated Chemical Oxygen Demand (COD) content of 48.7 kg/hr. The high COD levels preclude the possibility of wastewater being disposed of to sewerage.

The original PER did not provide a viable solution for the disposal of wastewater. Following the Minister's request for more information and discussions between the proponent and OEH, this has been resolved in the revised PER with the proposal to install an on-site anaerobic/aerobic Waste Water Treatment Plant. The treatment plant involves three phases: primary anaerobic treatment; secondary aerobic treatment; and a tertiary filtration treatment. The non-organic wastewater streams generated by the boiler unit and cooling tower (approximately 1.93 m^3 per hour) will be combined with the organic wastewater at the sand filtration (tertiary) treatment phase.

The discharge of treated wastewater to the sea will need to be incorporated into the whole-of site Waste Discharge Licence.

A final discharge point has not been nominated in the revised PER, though it recognises the need to consider a location that will minimise the impact on the environment. The proponent indicates that a final discharge point will be determined in consultation with OEH and Land Development Corporation (LDC). Issues to consider include mixing characteristics, visibility, effects on marine and land traffic, potential for disturbance of acid sulphate soils and depth of discharge.

It is suggested in the revised PER that during the dry season some of the treated wastewater may be used for irrigation of gardens. The revised PER does not address any health standards or requirements for the reuse of treated wastewater for irrigation.

Recommendation 13

Prior to construction, the proponent shall specify a discharge point for wastewater from the Waste Water Treatment Plant. In selecting the discharge point the proponent must show consideration of the potential environmental impacts and strategies for minimising these impacts, to the satisfaction of the Office of Environment and Heritage.

Recommendation 14

The proponent shall liaise with the Office of Environment and Heritage to ensure that any off-site discharges associated with the Waste Water Treatment Plant are incorporated in the whole-of-site Waste Discharge Licence, in accordance with Recommendation 9 of this Assessment Report.

Recommendation 15

Re-use of wastewater for irrigation must comply with the *Guidelines for Sewerage Systems – Use of Reclaimed Water* (ANZECC/ARMCANZ 2000) and *Site Specific Type Approval* by the Department of Health and Community Services.

3.7.5 Stormwater management

The Darwin region is exposed to intense rainfall throughout the wet season, which typically produces large quantities of run-off. Given the proximity of the site to Darwin Harbour, stormwater run-off, together with any contaminants will be carried rapidly into the Harbour. Hazardous substances, such as methanol and hydrochloric acid, also have the potential to contaminate groundwater and soil around the site. It is therefore critical that stormwater be managed appropriately and that any potential contaminants are prevented from leaving the site.

Natural Fuel site

Underground and above ground stormwater design at the site will be based on a 10 year Average Return Interval (ARI) and a 100 year ARI respectively. At the Natural Fuel site, stormwater run-off from clean areas, including the administration building, car park area and other non-bunded areas and pathways, will be directed to an open unlined drain located on the DIFT site. The revised PER states that if feasible, clean run-off from the south and east of the site will be directed to the public road drainage system, to reduce the distance the water needs to travel across the site.

Areas which are potential sources of contamination, including the tank farm and processing plant, will be bunded to contain any spills. Stormwater from bunded areas will be directed to a waste water buffer tank, where it will be tested for contaminants. If no significant contamination is observed it will be released to the stormwater open unlined drains. If contaminants are present, the contaminated water will be removed by a licensed waste contractor. The revised PER does not describe testing techniques for the different types of contaminants or concentrations at which the water in the buffer tank would be considered contaminated. The consultant has suggested that testing requirements will be set by the Waste Discharge Licence (letter to OEH 30/11/04).

DIFT site

The tanks servicing the biodiesel plant that will be located on the DIFT site will all be bunded. Stormwater from the combustible liquids bund (around the biodiesel, vegetable oil and glycerine tanks) will be drained to a sump and then pumped through an oily water separator prior to discharge into the stormwater drain. The oily water separator can be by-passed in cases of heavy rain or pump failure due to power black-outs. The by-pass will only apply to water that has been deemed free of contaminants following a sampling procedure. It is unclear what will happen to contaminated water in the case of heavy rain or pump failure.

The bund around the methanol and sodium methylate tanks will be tested for contamination by following a documented procedure. It will then be directly drained to the clean stormwater drain if no contaminants are detected, or removed by a licensed waste contractor for treatment off-site if contaminated.

Recommendation 16

The proponent shall liaise with the Office of Environment and Heritage to ensure that procedures for the testing and release of water from all bunded areas are developed and incorporated in the whole-of-site Waste Discharge Licence, in accordance with Recommendation 9 of this Assessment Report.

The procedures should include details of testing techniques, identify which contaminants are being tested for, specify levels at which water is deemed contaminated and unfit for release into the environment, and address contingency procedures in circumstances such as on-going heavy rain or pump failure.

3.8 Air quality and noise

There is potential for the construction phase of the development to cause fugitive dust emissions and increased noise levels.

Air emissions during operation of the biodiesel plant will arise from the biodiesel production process, the glycerine distillation process and the bulk storage activities on the DIFT site. Fugitive emissions may include methanol, natural gas and steam. Both Natural Fuel and Vopak will submit emissions data to the National Pollutant Inventory. Operational noise and odour generation are both expected to be minimal, and the proponent commits to investigating and responding to any complaints.

Issues regarding air quality and noise during both the construction and operational phases of the development have been adequately addressed by the revised PER.

3.9 Greenhouse management

The revised PER estimates that total annual greenhouse gas emissions from the proposed plant will be 15 430 t CO_2-e. This would represent a 0.1% increase in NT greenhouse emissions (based on NT inventory data for 2000), and a 0.003% increase in greenhouse emissions on a national scale (based on national inventory data for 2002).

The proponent highlights the benefits of using renewable fuel over fossil fuels from a greenhouse emissions perspective. Life cycle analysis referenced in the revised PER suggests that biodiesel produces lower CO_2 emissions than petroleum diesel. While the proponent has been unable to provide data on life cycle analysis of greenhouse emissions from biodiesel produced specifically from palm oil, it is accepted that there are no published guidelines in Australia and a scarcity of international literature on analysis specific to palm oil derived biodiesel.

Following the request from the Minister for more information, the revised PER has included a section addressing Greenhouse gas emission offsets (Section 5.4.4). The revised PER states that the proponent will investigate participating in nationally approved offset schemes. Comments from the Greenhouse Unit of OEH recommend that it would be preferable for the proponent to consider offset programs recognised by the NT Government, which has been agreed to in a letter from the consultant (letter to OEH 30/11/04).

Recommendation 17

The proponent will investigate appropriate greenhouse gas emission offset schemes in consultation with the Office of Environment and Heritage prior to commencement of operation.

3.10 Waste management

The revised PER identifies wastes that will be generated on site during both the construction and operational phases of the development. The principal solid wastes produced by the processing plant that will need to be managed include fatty matter, distillation residue and used activated carbon. Though not addressed in the waste management section of the revised PER, the Waste Water Treatment Plant will also produce a solid waste stream (sludge) containing glycerine, nitrogen, phosphate and sodium chloride salt.

Wastes will be stored in dedicated vessels on-site for subsequent collection and disposal by licensed waste contractors. The consultant has provided written assurance that the proponent has received confirmation from a waste contractor that they are able to accept the types of wastes that will be produced (letter to OEH 30/11/04). The revised PER does not address safe storage of potentially hazardous wastes while on-site prior to removal (e.g. waste oil generated during construction should be kept in bunded storage prior to collection and removal offsite).

In response to the Minister's request for more information, the revised PER commits to segregation of suitable wastes for reuse and recycling, but does not provide details of which products will be reused/recycled or how this will be achieved.

Recommendation 18

Waste Management Plans shall be submitted as part of both the construction and operational Environmental Management Plans. The plans should include a complete list of all waste streams with projected quantities and planned routes for disposal. The plans will identify in detail safe storage of wastes while on-site including spill control contingency plans; opportunities for recycling, reuse and remediation of site wastes; and any contractual agreements with the waste contractors to provide records and reports on the treatment and final destination of all wastes collected from the site.

3.11 Transport

The plant will most likely be constructed interstate, with modules being transported to Darwin via ship. Alternatively construction will take place in Darwin, in which case parts will arrive via rail, road and sea.

Once the plant is operational, vegetable oil feedstock and methanol will be shipped to the East Arm Port from South East Asia. Delivery will occur once a month for the first 6 months of operation and fortnightly thereafter. Some of the biodiesel product (approximately 20%) will be used locally, while the rest will be shipped to overseas and interstate clients. Possibly the railway will also be used for interstate transport.

All port and marine activities are under the control of the Darwin Port Corporation (DPC), represented by the Harbour Master. The revised PER states that where practicable, ships delivering feedstock will be refilled with biodiesel. Comments from DPC note that where backloading of vessels will occur, there is likely to be some form of vessel tank cleaning and

venting undertaken. If so, appropriate procedures need to be developed and agreement reached with the Harbour Master regarding facilities for cleaning, washing and discharges from vessels undertaking prolonged stays in the Port.

Feedstock, methanol and biodiesel will be transported between the Port and the storage tanks on the DIFT site via a pipeline. The uploading and offloading of feedstock, methanol and biodiesel to/from ships will be the responsibility of Vopak, who currently plan to do this using hoses. Comments from the DPC indicate that hoses are not an optimal safety or environmental solution. DPC advises that fixed loading arms are being installed by Vopak for the DIFT project, and suggests that these also be adopted for handling biodiesel and associated products.

Recommendation 19

Vopak will develop operating procedures for loading/unloading ships and for cleaning/venting/discharging from ships. The procedures must be approved by the Harbour Master and submitted as part of the operational Environmental Management Plan.

Pipelines will also be used for transporting feedstock, methanol, biodiesel and glycerine between the storage tanks on the DIFT site and the processing plant on the Natural Fuel site. Vopak and Natural Fuel are each responsible for the integrity of the pipelines on their respective sites.

The revised PER is ambiguous on how chemicals required for processing (hydrochloric acid, sodium methylate and liquid caustic) will be transported. Section 2.8.2 *Operational Phase* states that they will be delivered by road, rail or sea on a weekly to monthly basis, while Section 5.6 *Operation* states that they will be transported via road or rail from interstate on a monthly basis. There is no mention in the revised PER of how glycerine will be distributed. Safe transportation of all materials will be ensured by the proponent's commitment to comply with the *NT Dangerous Goods Act 1996* and the *Australian Dangerous Goods Code 1998*.

All heavy vehicles will enter and exit via the DIFT access point, and make deliveries/receive goods at the tanker loading facility on the DIFT site. Site personnel and visitors will access the Natural Fuel site via a proposed new access road, along the southern boundary of the site, adjacent to the Northern Cement Works. The site boundary and proposed new access road are still being negotiated with LDC, though the Road Network Division of the Department of Infrastructure, Planning and Environment (DIPE) have advised that there is in principle agreement to the proposed access.

3.12 Hazards and risks

3.12.1 Spill prevention

The main risks associated with the proposed development involve spills or leaks of hazardous materials which can threaten the safety of personnel and potentially impact on groundwater, soil and the surrounding marine environment. Spill prevention is therefore a management priority. This can be achieved through implementation of standard operating procedures, particularly relating to transfer of materials to and from ships and vehicles and between the two sites; safe storage and handling procedures; and ensuring the integrity of storage tanks, pipelines and bunds through regular inspection.

These issues are largely addressed in the revised PER through commitments to comply with Australian standards, legislation and codes of practice for the storage, handling and transport of hazardous goods.

The proponent commits to developing standard operating procedures for loading and unloading materials at the Port, though fails to clearly address spill prevention strategies for loading and unloading of trucks and the transfer of materials between the two sites. The truck loading facility will be located on the DIFT site and is therefore the responsibility of Vopak. The companies will each have responsibility for the pipelines on their respective sites, with change of responsibility occurring at the boundary of the two sites. The revised PER refers to "*an integrated protocol system of process controls and interlock logic*" for ensuring the safe transfer of materials between the two sites, but it is not clear what is meant by this.

The revised PER includes a commitment by Vopak to develop an asset management system for all pipelines between the Wharf and DIFT. This should be extended to include all pipelines on the site, as well as other infrastructure, such as storage tanks and bunds that need to be monitored and maintained to prevent leaks and spills. A similar system should be developed by the proponent for infrastructure on the Natural Fuel site.

Recommendation 20

Operating procedures should be developed for the transfer of materials at the truck loading/unloading facility on the Darwin Industry Fuel Terminal site.

Recommendation 21

Operating procedures should be developed for the transfer of materials via pipelines between the Darwin Industry Fuel Terminal site and the Natural Fuel site. These should include details on the change over of responsibilities between Vopak and Natural Fuel Ltd at the boundary of the two sites.

Recommendation 22

An asset management system should be developed by both Vopak and Natural Fuel for the infrastructure on their respective sites. This should include an inspection and testing programme, as well as required maintenance procedures.

3.12.2 Emergency management

If a spill or leak occurs, it is essential that effective contingency plans are in place. These include containment of spills, sufficient supplies of spill clean up equipment on-site, and appropriate disposal of hazardous material.

The revised PER recognises that marine oil spills are dealt with under the Darwin Harbour Oil Spill Contingency Plan, and commit to incorporating vegetable oil feedstock and biodiesel into this Plan. In response to the revised PER, the DPC have advised that contingency plans for methanol spills must include verification that appropriate type and volume of foam stocks are held to combat product spill incidents. This requirement should be fulfilled under the proponent's commitment to developing emergency protocols for methanol spills and fire in consultation with the DPC.

Commitments have been provided in the revised PER that adequately address contingency planning should a spill incident occur.

While the revised PER does refer to evacuation procedures during a cyclone, no consideration is given to management of the plant during and after a cyclone.

Recommendation 23

A cyclone management plan should be developed and submitted as part of the operational Environmental Management Plan. It should identify responsibilities and include actions to be taken to secure the site at different levels of cyclone alert, evacuation procedures, and response procedures to emergencies such as flooding.

3.12.3 Biting insects

The revised PER fails to adequately address the issue of biting insects. The development site is nearby to mangroves and coastal areas that will be sources of pest biting midges, and sources of pest and potential disease carrying mosquitoes.

All collection points for water created during construction and operation will become potential breeding sites and further exacerbate the problem.

Recommendation 24

Both the construction and operational Environmental Management Plans should include measures that limit the time water is allowed to pool on site (including depressions, tanks, bunds and drains) to less than 5 consecutive days. Irrigation areas should be appropriately sited and managed to prevent effluent water pooling either on-site, or downstream of the irrigated area.

Recommendation 25

Drains should be designed and maintained in a manner that prevents mosquito breeding, including regular maintenance, weed control, desilting and erosion prevention.

Recommendation 26

Workers should be informed of the potential pest problem and encouraged to use personal protection measures, in accordance with the guidelines for "*Personal protection from mosquitoes and biting midges in the NT*" produced by the Medical Entomology Branch of the Department of Health and Community Services.

3.13 Visual amenity

The revised PER does not address the impact of the development on visual amenity. While the site is located in an industrial zone, the size of the plant and the boiler stack means it will be visible from Darwin city. The plant will also be clearly visible to train passengers arriving at the adjacent railway terminal. It is conceivable that steam from the stack will raise public concern about potential air pollution issues. The proponent should consider a means for receiving and responding to queries from the public, for example a community hotline.

Recommendation 27

The proponent should take appropriate measures, such as landscaping and fencing, to ensure that the biodiesel plant and associated infrastructure are adequately screened, to minimise any detriment to visual amenity.

3.14 Decommissioning

The proposed sub-lease agreement between Vopak and Natural Fuel is for a contract period of 20 years, with the possibility to extend for a further 30 years. There is no mention in the revised PER of decommissioning.

Recommendation 28

The proponent will ensure that decommissioning is done according to the best environmental standards available at the time.

4 MONITORING AND ENVIRONMENTAL MANAGEMENT

The proponent has provided a draft EMP for the construction phase of the proposed development within the revised PER, and commits to the development of an operational EMP. The proponent also indicates that they will comply with several existing standards, including ISO 14001 Environmental Management System, to develop an integrated management system encompassing quality, environment and safety.

The draft construction EMP includes the following components associated with construction:

- Erosion and sedimentation;
- Spills and discharges;
- Air quality and noise;
- Construction waste management;
- Weeds;
- Rehabilitation;
- Health and safety; and
- Emergency management.

The draft construction EMP will need to be revised to incorporate the additional measures for environmental protection and monitoring that are contained in this Assessment Report.

The operational EMP will include the above issues applicable to the operation of the biodiesel plant and include the following additional components:

- Documented procedures for the testing and release of water from all bunded areas;
- Operational waste management;
- Operating procedures for loading/unloading ships and for cleaning/venting/discharging from ships;
- Documented procedures for the transfer of materials between ships/vehicles/pipelines;
- Asset management systems for inspection, testing and maintenance of infrastructure on each site; and
- Monitoring and reporting.

The PER provides commitments to the monitoring of a number of operational issues, including dust, erosion, weeds, waste segregation/disposal, groundwater and discharge water

quality. Details of these monitoring programmes should be addressed in the operational EMP and include reporting requirements, trigger levels of contaminants at which to notify the Pollution Response Hotline, etc.

The EMPs will be referred to relevant NT Government agencies for review prior to finalisation, after which they will become public documents. The EMPs will be the major vehicle for implementing management and monitoring commitments made by the proponent in the revised PER and the recommendations detailed in this Assessment Report. As such, they will be working documents for the life of the proposal and will require continual review in light of operational experience and changed circumstances.

Recommendation 29

Environmental Management Plans covering construction and operation of the Biodiesel Plant are to be submitted to the Office of Environment and Heritage for approval prior to commencement of construction and operation respectively.

In preparing each Environmental Management Plan, the proponent will include any additional measures for environmental protection and monitoring contained in this Assessment Report and recommendations made by the NT Government with respect to the proposal. The Environmental Management Plans shall form the basis for approvals and licences issued under relevant NT legislation.

5 CONCLUSIONS

The Office of Environment and Heritage (OEH) considers that the environmental issues associated with the proposed project have been adequately identified. Appropriate environmental management of some of these issues has been resolved through the assessment process, while the remainder will be addressed through monitoring and management actions detailed in a comprehensive Environmental Management Plan (EMP).

The final EMPs for the construction and operational phases of the biodiesel plant will be subject to review and approval by relevant NT Government agencies. They will be working documents for the life of the project and will require continual review in the light of operational experience and changed circumstances.

Based on its review of the revised PER and submissions from relevant NT Government agencies, OEH considers that the biodiesel plant can be managed in a manner that avoids unacceptable environmental impacts, provided that the environmental commitments, safeguards and recommendations detailed in this Assessment Report and in the final EMPs are implemented, with regular reporting and compliance auditing.

6 REFERENCES

Douglas Partners (2004) Draft report on geotechnical investigation: Proposed biodiesel plant and storage facility – Lot 5175, road easement and Lot 5718 Berrimah Road, East Arm, Northern Territory.

EcOz Environmental Services (2004) Public Environmental Report for the Development of a Biodiesel Plant at the East Arm Precinct. Prepared for: Natural Fuel Limited (August 2004).

EcOz, 30 November 2004, Letter – Re: Facsimile received 26/11/2004 – Draft revised PER for the proposed Biodiesel plant.

EcOz Environmental Services (2004) Revised Public Environmental Report for the Development of a Biodiesel Plant at the East Arm Development Area. Prepared for: Natural Fuel Ltd and Vopak Terminal Darwin Pty Ltd (December 2004).

APPENDIX I

List of respondents to the revised PER and issues raised

Respondents	Issues
Road Network Division, Department of Infrastructure, Planning and Environment	Transport – road access
Land Development Corporation, Department of Infrastructure, Planning and Environment	Land tenure Wastewater management Stormwater management Spill management Greenhouse management Emergency management Visual amenity Local industry participation
Greenhouse Unit, Department of Infrastructure, Planning and Environment	Greenhouse management
Power and Water Corporation	Wastewater management
Department of Health and Community Services	Effluent treatment and disposal Biting insects
Darwin Port Authority	Spill management Emergency management Discharges from vessels
Department of Business, Industry and Resource Development	Local industry participation

APPENDIX II

Table of Commitments made by the proponent in the revised PER

Aspect	Commitment
Landform	Natural Fuel Ltd and Vopak Terminal Darwin Pty Ltd commit to the development of a construction erosion and sedimentation management plan as part of the construction EMP. Sediment control fencing will be established where required.
Water – *Natural Fuel Ltd site*	Install an anaerobic/aerobic waste water treatment plant to treat organic and organic-free waste waters. Obtain discharge permit under the NT *Water Act 1992* prior to operation commencing. Design and construction of underground and above ground stormwater systems will be based on a 10 year ARI (Australian Rainfall Intensity) and a 100 year ARI respectively. Drain water from all bunded areas will be directed to the waste water buffer tank for inspection and testing by an experienced plant operator. Direct all clean stormwater run-off from the administration building, car park area, non-bunded areas and pathways to the stormwater open unlined drain located on the Vopak site. Regular routine inspections will be conducted of the site to ensure that no pipelines or other infrastructure are leaking. Where deemed necessary, waste water will be removed by a licensed wast contractor. Tanks, bunds and pipelines will be constructed according to industry best practice and current Australian Standards and regulations. Spill response procedures and emergency protocols will be established for all chemicals on-site. These will be developed according to the MSDS and in consultation with the NTFRS. Personnel will be trained in the use of spill clean-up materials and in the spill response procedures. All spilt material will be removed by a licensed waste contractor (this will include materials used in the clean-up process). Organic and organic-free water will be treated via an on-site anaerobic/aerobic wastewater treatment plant. Discharge of water from this plant will comply with the specifications detailed in a Discharge Permit to be obtained under the NT *Water Act 1992*.

Aspect	Commitment
Water – *Vopak Terminal Darwin Pty Ltd site*	A segregated stormwater drainage system is being developed on the Vopak site to minimise the potential for contaminating stormwater and groundwater on the site. All tanks will be bunded and rainwater and spillages contained as per AS1940. Operators will follow established procedures when determining how to direct and treat water that accumulates in bunded areas. Contaminated water from bunded areas will be treated via an oily-water separator or removed by a licensed waste contractor.
Air Quality and Noise – Construction	Dust levels will be visually monitored by the site supervisor and dust suppression strategies implemented as required. Earthworks and construction activities will be restricted primarily to day-light hours. Noise levels will comply with *AS2436-1981 – Guide to noise control on construction, maintenance and demolition sites.* Any public or personnel complaints regarding air quality or noise will be fully investigated and controls implemented where required.
Air Quality and Noise – Operation	Air emissions will be minimal at all times. Air emissions leaving the plant will have been passed through a scrubbing system as a minimal level of treatment. Procedures and protocols will be in place to prevent unplanned fugitive emissions. As part of the Operating Management Plan to be instigated prior to commissioning, an Emergency Management Plan will be prepared. The Package Boiler System will be fitted with a relief safety valve. This will undergo an annual test. Noise generation will be negligible during operation. Minimal odour will be produced from the processing plant and these are not anticipated to be offensive in any way. Any public or personnel complaints regarding air quality or noise will be fully investigated and controls implemented where required. Both Natural Fuel and Vopak will be required to submit emission data to the National Pollutant Inventory (NPI) on an annual basis for those substances that trigger the requirement to report.

Aspect	Commitment
Greenhouse Management	Natural Fuel Ltd will subscribe to the Greenhouse Challenge. There will be no sulfur emissions from the plant or resulting biodiesel product.
Environmental Management	It is the intent of Natural Fuel to develop an integrated management system that would encompass quality, environment and safety. All contractors and employees (personnel) working during the construction and operation phases of the plant will be required to attend an induction session that will highlight the responsibilities of all personnel whilst on the site and all health and safety and environmental obligations. Objectives will be established and EMPs developed to ensure that any potential or actual environmental risks associated with the activities, products and services of the biodiesel plant are minimised. Regular, routine inspections will be conducted on an internal basis.
Health, Safety & Emergency Management	The processing plant and associated infrastructure will be designed and constructed according to the most relevant Australian and International Standards. As part of the induction process, personnel will be informed of the climatic conditions to be expected in the Top End and how best to combat these in the work environment. Emergency procedures will exist for personnel to abide by during emergency situations such as cyclones and fire. Drills will be conducted on these scenarios on a regular basis no less than annually.
Waste Management – Construction	All clean rock or rubble remaining from excavation activities will be retained on site or removed for use elsewhere to locations approved by the Land Development Corporation or DIPE. Any waste that cannot be separated for recycling or re-use will be transported to an approved landfill facility for disposal. Waste oil will be collected in marked empty drums and will be removed from site by a licensed waste contractor to be disposed of at an approved facility. Portable toilets will be used on-site until the permanent facilities are made available.
Waste Management – Operation	Waste materials from the process will be temporarily stored in dedicated vessels for subsequent collection and disposal by a licensed waste contractor. The majority of reuse or recycling will occur offsite and will be conducted by

Aspect	Commitment
	the licensed waste contractor. Domestic waste will be removed regularly by a licensed waste contractor and taken to an approved landfill facility. In selecting a waste disposal method, consideration will be given to the chemical nature of the waste, safe transport requirements and disposal receptors. To facilitate reuse and recycling, suitable wastes will be segregated from the general waste streams and areas on site will be made available for temporary storage. Most reuse and recycling will occur off-site following collection of wastes by a licensed waste contractor. Domestic waters and sewage will be treated via an on-site septic system.
Transport	All heavy vehicle access to the site will be via the approved ingress and egress point on the DIFT site. Management, operators and visitor access to the site will be via the proposed new access road adjacent to the Northern Cement Works. Transport of all hazardous substances during construction and operation will comply with the NT *Dangerous Goods Act 1996* and the Australian Dangerous Goods Code 1998. Vegetable oil feedstock and biodiesel must be incorporated into the Darwin Harbour Oil Spill Contingency Plan. Emergency protocols for methanol spills and fire will be developed in consultation with the DPC, Vopak and Natural Fuel Ltd. All offloading and uploading of feedstock, methanol and products will comply with the procedures established by Vopak and approved by the Harbour Master. In the event of an emergency at the Wharf or within Darwin Harbour, all personnel will take instruction from the Harbour Master. The biodiesel product will comply with the Australian Fuel (Biodiesel) Determination under the *Fuel Quality Standards Act 2000.* Transport of feedstock, methanol and the resulting biodiesel product from the Port to the Vopak site will occur via a ships pipeline up to 350 mm in diameter. Vopak will establish operating procedures that will integrate with the tanker discharge and terminal operations. Vopak will develop an asset management system for all pipelines between the Wharf and DIFT. A pipeline emergency contingency plan will be developed to address pipeline failure and management of spills of vegetable oil, methanol and biodiesel.