

LIQUID WASTE TREATMENT FACILITY

ENVIRONMENTAL ASSESSMENT AND RECOMMENDATIONS

By the Environment and Heritage Division
Department of Lands, Planning and Environment

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EXECUTIVE SUMMARY

This report assesses the environmental impacts of the proposal to build and operate a Liquid Waste Treatment Facility on Mendis Rd, Hudson Creek. The facility is designed to receive and treat hazardous wastes.

This Assessment Report reviews the Public Environment Report (PER). It also relies on information, comments and advice provided by Northern Territory Government agencies and previous studies undertaken in the region.

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.

Major Issues

The principal environmental issues identified by the proponent and this assessment are:

- Air Quality.
- Noise.
- Surface Runoff and Erosion.
- Risk Management
- Spills and leakages.
- Introduced weeds, pests and diseases.
- Waste Disposal.
- Biting Insects.
- Traffic.

The potential benefits associated with the proposal include:

- Providing a much-needed facility for the treatment of Hazardous wastes in Darwin.
- Location of the terminal in an area specifically zoned for Industry.

Conclusion

It is considered that the environmental issues associated with the project have been adequately identified. Some of the issues have been resolved through this assessment process, while the remainder will be addressed through the Construction and Operational Environmental Management Plans, and various licences that will be required for the operation of the facility.

Initially, the PER and recommendations detailed in this Assessment Report will form the basis for the N.T Resource Recovery's management and monitoring commitments. The Environmental Management Plan will be a working document for the operation of the facility and will require continual review and updating in the light of operational experience and changed circumstances.

In addition, there is a high probability that Liquid Waste Treatment Facilities will be listed under Schedule 2 of the *Waste Management and Pollution Control Act* and as such it will become a licensable activity. If so it will be required to comply with any licence conditions as well as regulations set down by the act.

Provided that the environmental commitments and safeguards detailed in the PER are implemented, the recommendations in this Assessment Report are adopted and regular reviews and reporting are undertaken, long term environmental impacts should be minimised.

SUMMARY OF RECOMMENDATIONS

Recommendation 1

N.T Resource Recovery (NTRR) shall ensure that the proposal is implemented in accordance with the environmental commitments and safeguards identified in the Liquid Waste Treatment Facility (LWTF) Public Environment Report (PER) (summarised in Tables 1.2, 1.3 and Appendix A of the PER) and as recommended in this assessment report. All safeguards and mitigation measures outlined in the PER are considered to be commitments by NTRR.

Recommendation 2

An Environmental Management Plan that covers the construction phase of the LWTF shall be submitted to the Department of Lands Planning and Environment (DLPE) for approval, prior to construction commencing.

Recommendation 3

An Environmental Management Plan (EMP) for the operational phase of the LWTF shall be submitted to the DLPE and the Work Health Authority (WHA) for approval prior to commencement of operations.

Recommendation 4

Design approval must be sought from the Northern Territory Fire and Rescue Services prior to commencement of construction.

Recommendation 5

A detailed monitoring plan shall be included in the construction and operational environmental management plans. This plan shall include details of location and frequency of monitoring, parameters monitored, and levels at which further investigation or implementation of mitigation measures should occur.

Recommendation 6

Air monitoring for Noxious Odours, H₂S and CH₄, along with standard air quality parameters CO, NO_x, SO₂, PM10 shall be included in the operational phase of the monitoring program.

Recommendation 7

NTRR shall include a detailed landscape plan in the site design and the EMP required for the construction phase.

Recommendation 8

A wash down procedure for all vehicles entering the site, and an inspection and wash down procedure for all heavy machinery imported to the site shall be implemented.

Recommendation 9

A waste management plan for the construction phase of the project shall be included as part of the overall EMP.

Recommendation 10

It is recommended that a comprehensive Risk Assessment be carried out at the final design stage, prior to commencement of operations and continually throughout the operation to ensure risk is kept to a minimum.

Recommendation 11

It is recommended that volume to contain a 1 in 100 year return 72 hour rainfall event be included in the final design of the evaporation ponds over and above the maximum operating level of the ponds. Management strategies for the decommissioning of the ponds at the onset of the wet season should be included in the operational EMP.

Recommendation 12

As part of the comprehensive Risk Management study of the LWTF site, all potential scenarios for hazardous waste discharge from the LWTF, and the transport to and from the site should be investigated. It is incumbent on NTRR to identify and document all the sensitive areas within Darwin Harbour such as aquaculture farms, water inlets, flora and fauna habitats and to have in place publicly accountable action plans to adequately address each scenario.

Recommendation 13

It is recommended that NTRR demonstrate to the satisfaction of the DLPE that all appropriate licences and approvals for disposal of liquid effluent have been obtained and are current prior to commencement of operations at the LWTF. NTRR should also provided detail as to the alternative disposal options for liquid effluent that does not meet Power and Water Authority acceptance criteria.

Recommendation 14

It is recommended that NTRR demonstrate to the satisfaction of the DLPE that all appropriate licences and approvals for disposal of solid wastes have been obtained and are current prior to commencement of operations at the LWTF. NTRR should also provided detail as to the alternative disposal options for solid wastes that do not meet Shoal Bay waste disposal facility acceptance criteria.

Recommendation 15

It is recommended that NTRR examine the operations of the facility to see if it triggers National Pollutant Inventory (NPI) thresholds. If this is the case, NTRR should report the NPI emissions as part of the national program.

Recommendation 16

Administration and workshop facilities should be adequately screened to ensure the buildings are biting midge proof.

1 INTRODUCTION AND BACKGROUND

This report assesses the environmental impacts of a proposal by N.T. Resource Recovery (NTRR) to build and operate a Liquid Waste Treatment Facility on Mendis Rd, Hudson Creek to receive, store and treat liquid wastes. This facility is to be known as the Liquid Waste Treatment Facility (LWTF) and it is located within the area covered by the East Arm Control Plan 1998.

This Assessment Report relies on information, comments and advice provided by Northern Territory Government agencies, Non Government Agencies and the public, and previous studies undertaken in the region.

1.1 Environmental Assessment Process

Environmental impact assessment is based on adequately defining those elements of the environment which may be affected by a proposed development, and on quantifying the significance, risks and consequences of the potential impacts of the proposal at a local and regional level.

The PER provides a description of the existing environment in the area and the proposed operations, and evaluates the environmental impacts and proposed mitigating measures to minimise the expected impacts.

This report will assess the adequacy of the PER in achieving the above objectives, and will evaluate the undertakings and environmental safeguards proposed by the proponent to mitigate the potential impacts. Further safeguards may be recommended as appropriate.

The safeguards may be implemented at various levels within the planning framework of a project. These include, but are not limited to:

1. Site selection;
2. Design and layout of facilities;
3. Management of construction activities;
4. Processes used in operations and facilities (i.e. inputs and outputs); and
5. Management of operations, processes and facilities.

The contents of this report form the basis of advice to the Northern Territory Minister for Lands, Planning and Environment on the environmental issues associated with the project.

1.2 Environmental Assessment History

June D'Rozario & Associates Pty Ltd on behalf of N.T Resource Recovery lodged a development application with the Department of Lands, Planning and Environment (DLPE) on 15 November 1999, proposing the development of a Liquid Waste Treatment Facility on Section 5109, Mendis Road. The development application was examined by the Environment and Heritage Division (EHD) of DLPE and it was considered that the environmental issues associated with the proposal warranted assessment under the *Environmental Assessment Act 1982* at the level of PER.

The Minister for Lands, Planning and Environment accepted the EHD's recommendation and on 30 December 1999 directed that a PER be prepared for the proposal.

Draft guidelines for the preparation of a PER were advertised for public comment and circulated to NT Government advisory bodies for comment on 22 January 2000. Final guidelines were prepared taking into account the comments received from government agencies and Darwin City Council. No public comment was received. The Minister issued the final guidelines and a direction to the proponent to prepare the PER on 20 February 2000.

The PER was submitted on 11 October 2000 and placed on public review for 4 weeks from 25 October 2000 to 22 November 2000. It was also circulated to government advisory bodies for review and comment. Comments have been received by the EHD and are incorporated in this report. One public comment was received on the PER.

2 THE PROPOSAL

NT Resource Recovery, a division of Transpacific Industries Pty Ltd, proposes to build and operate a liquid waste treatment facility at Mendis Road, Hudson Creek with a nominal capacity of 20 ML per year.

The facility will provide waste management support to the port and maritime industries located within the East Arm Control area and the Trade Development Zone and receive, store, treat and dispatch non-sewerable liquid wastes from industries within the Darwin region. Such a facility will provide an outlet for industrial wastes and used lubricating oils that have the potential to be serious environmental contaminants.

The by-products of the treatment processes can be reused as in the case of lubricating oils, can be used as a nutrient additive in the case of the biodegradable wastes or co-disposed with general refuse at an approved landfill as a non-hazardous solid waste.

The objectives of the facility are:

- Recovery of useable or recyclable products, i.e., oil, solvents, biodegradable greases and fats.
- Maximum removal of water from wastes.
- Chemical neutralisation, stabilisation and solidification of industrial wastes to a level acceptable for disposal in which the risk to the environment is minimal.
- Biological treatment of the water phases to a level suitable for discharge to the environment or the receiving environment, i.e., PAWA lagoons.
- Waste collection and transport services.

NTRR is proposing to offer waste management services to support the port and port-related activities and the industries of the Northern Territory including the following:

- Collection, transport and treatment of shipping wastes including bunker oils, bilge wastes, sewage and biodegradable wastes;

- Waste management services to industries in the Northern Territory and offshore oil and gas drilling rigs;
- Complete waste management services to the local and international Defence Forces;
- Industrial cleaning operations including high pressure water blasting, drain cleaning, tank cleaning and washout of ships' holds, shipping containers and ISO-tankers;
- Washing and cleaning of shipping containers for importers and exporters to comply with quarantine requirements;
- Collection and treatment of non-sewerable industrial wastes from maritime support industries;
- Emergency response advice and services.

Port and maritime industries will use 50% of the LWTF's treatment capacity and 75% of its servicing capabilities.

In the future, NTRR also intends to provide more diversified maritime services, including heavy vacuum road tankers, oil salvage tankers and high pressure water blasting units.

The LWTF will incorporate the following units:

- Biological aqueous waste receipt, storage and treatment plant;
- Oily water and waste oil receipt, storage and treatment plant;
- A chemical fixation, stabilisation and solidification (CFS) plant for non-sewerable industrial wastes;
- A container storage and washdown area;
- A wastewater oxidation unit;
- Shipping container and ISO-tainer washdown unit;
- Evaporation ponds;
- Workshop

3 ENVIRONMENTAL ASSESSMENT

3.1 Introduction

The information provided in the PER has been assessed and then used, along with submissions from advisory bodies and public comment on the PER, to determine the adequacy of the information provided by the proponent and the accuracy and acceptability of predicted impacts and safeguards. Comments and recommendations, based on submissions and comments from Government advisory bodies, are then made.

It is acknowledged that during implementation, flexibility is necessary and desirable to allow for minor and non-substantial changes to the proposal outlined in the PER and examined as part of this assessment. It is considered that subsequent statutory approvals for this project could make provisions for such changes, where it can be shown that the changes are not likely to have a significant effect on the environment.

It is important for interpretation purposes that the recommendations (in bold) are not considered in isolation, as the text identifies concerns, suggestions and undertakings associated with the project.

Safeguards and mitigation measures undertaken by the proponent in the PER are summarised in tables 1.2 and 1.3, and Appendix A of the PER.

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

Recommendation 1

N.T. Resource Recovery shall ensure that the proposal is implemented in accordance with the environmental commitments and safeguards identified in the Liquid Waste Treatment Facility Public Environment Report (summarised in Tables 1.2, 1.3 and Appendix A of the PER) and as recommended in this assessment report. All safeguards and mitigation measures outlined in the PER are considered to be commitments by N.T. Resource Recovery.

3.2 Issues

3.2.1 Major Environmental Issues

The principal environmental issues identified by the proponent and this assessment are:

Construction Phase

1. Air Quality.
2. Noise.
3. Surface Runoff and Erosion.
4. Introduced weeds, pests and diseases.
5. Disposal of Construction Wastes.
6. Biting Insects.
7. Traffic.

Operational Phase

1. Risk Management
2. Surface Runoff and Water Quality.
3. Spills and leakages.
4. Waste Disposal.
5. Air Quality and Odour Control
6. Noise.
7. Biting Insects
8. Traffic.

3.2.2 General Issues

The proponent has addressed the issues detailed in the PER Guidelines on 30 December 1999. However, the PER lacks detail in some areas leading to uncertainty as to the impacts of the proposal, their mitigation and management. Where this uncertainty occurs, recommendations have been made to reflect this.

3.2.2.1 Environmental Management Plan

An integral part of the environmental management of the LWTF site will be the preparation and implementation of a comprehensive Environmental Management Plan (EMP), and how it interacts and operates with any site management plans.

Plans will need to be developed for both aspects of the project, the construction and the operation. Each of these plans will require approval by DLPE prior to the commencement of construction and operation.

The plans will detail a management system that is equivalent to the ISO14000 standard. Key elements of this system have been identified in Appendix B of the PER.

The EMP will also need to identify the construction and operational management structure and a specific contact officer and contact details, as these were not identified within the PER.

Recommendation 2

An Environmental Management Plan that covers the construction phase of the LWTF shall be submitted to the DLPE for approval, prior to construction commencing.

Recommendation 3

An Environmental Management Plan for the operational phase of the LWTF shall be submitted to the DLPE and the Work Health Authority (WHA) for approval prior to commencement of operations.

This management plan should incorporate, but not be limited to, aspects such as Risk, Fire and Emergency Services Response, Spill Response, Monitoring and Environmental Management. The plan should be routinely reviewed by NTRR, and any major amendments should be submitted to the DLPE and the WHA for approval.

Both management plans should incorporate the matters raised in this assessment report relevant to construction and operations.

3.2.2.2 Site Design

Given the potential hazards associated with handling liquid wastes, the media and public focus on such facilities, and the potential for the site to be exposed to adverse weather such as cyclones, storm surge, torrential rain and severe lightening, a high standard of site design and construction is imperative.

The PER indicates that the LWTF will be designed and constructed to the relevant Australian and International Standards, incorporating the most recent available data and recommended practices. Given the unique location of Darwin and its history of severe weather, NTRR should implement Best Practice in the design and construction of the site.

Australian Standard 1170.2 provides for construction to withstand a Category 4 cyclonic wind such as cyclone Tracy. Darwin was recently under threat of a Category 5 cyclone with winds of up to 340 km/h (94 m/s) with the passing of cyclone Thelma in December 1998. Similar intense systems have been recorded elsewhere in Australia and around the world in the past few years. For such a hazardous installation, the prevailing standard may not be adequate.

Adequate access for Emergency Services in and around the LWTF should be incorporated in the design. It is recommended that the Northern Territory Fire and Rescue Services (NTFRS) should be consulted on any plans to ensure appropriate access is achieved, and suitable water pressure is available on site to assist in fire fighting.

Recommendation 4

Design approval must be sought from the Northern Territory Fire and Rescue Services prior to commencement of construction.

3.2.2.3 Monitoring

Environmental Monitoring is vital in determining the environmental impact of a project. The information gained over time will be invaluable in assessing the long-term impact of the proposal on the surrounding environment as well as providing trends and immediate triggers for remedial work should environmental pollution occur.

The PER provides a brief outline of a monitoring program that covers the following aspects:

Construction Phase

- Dust.
- Noise.
- Surface Water Discharge.
- Mosquito and Biting Insects.
- Complaint Response.

Operational Phase

- Stormwater Discharge.
- Noise.
- Spills and Leaks.
- Mosquito and Biting Insects.

- Complaint Response.

Each of these aspects has only been address superficially. They do not detail the location of monitoring and how these are to be undertaken, and in most cases are reactive rather than pre-emptive.

Recommendation 5

A detailed monitoring plan shall be included in the construction and operational environmental management plans. This plan shall include details of location and frequency of monitoring, parameters monitored, and levels at which further investigation or implementation of mitigation measures should occur.

Given the sizeable quantities of mixed liquid wastes to be treated on site, and the biological processes that will be used to break down these liquids, one of the areas where monitoring will be required is Air Quality and Odour detection. It is recommended that some form of air monitoring be included in the Operational Phase of the monitoring program.

Recommendation 6

Air monitoring for Noxious Odours, H₂S and CH₄, along with standard air quality parameters CO, NO_x, SO₂, PM10 shall be included in the operational phase of the monitoring program.

The monitoring program will be developed in conjunction with the DLPE and should be an integral part of the Environmental Management Plan. Details including sites, parameters, frequency and detection limits should be included. Periodic reviews of the data and the program should also be undertaken with the DLPE.

There is a high probability the site will be listed under Schedule 2 of the *Waste Management and Pollution Control Act* and as such it will become a licensable activity. If this is the case, periodic reporting of monitoring results to the DLPE will be recommended as a condition.

3.2.2.4 Alternative sites

One omission from the PER was the discussion of alternatives to the project. The guidelines for the preparation of the PER stated that details of alternative sites considered for the LWTF should be included. The PER only briefly discusses the selection criteria for the site but does not discuss any sites except the Mendis Road site.

The major impacts identified and discussed in the PER and in this report are not site specific but related to a project of this nature. The only site specific concern is its location adjacent to Berrimah Road, the main entrance to East Arm Port, and the potential visual impact this may cause. Although the proponent proposes to landscape the area adjacent to Berrimah Road, the PER gives no details of this landscaping. Depending on the extent of landscaping this should help in alleviating any visual

impacts associated with the project. The proponent needs to provide more details on the proposed landscaping.

Recommendation 7

NTRR shall include a detailed landscape plan in the site design and the Environmental Management Plan required for the construction phase.

3.2.3 Construction Issues

The site is on land subdivided by Paradise Developments Pty Ltd for industrial development. This preparation includes earthworks, off-site stormwater drainage, and connection of services. .

NTRR intend to commence on site works immediately after Paradise Developments Pty Ltd have finished the preparatory works. Once approvals have been given it is envisaged that construction works will commence early in 2001 for completion by mid 2001.

3.2.3.1 Air Quality.

In constructing any industrial facility such as the LWTF, dust will be generated due to the movement of vehicles on cleared land. To avoid issues associated with wet season runoff, such as erosion and turbid runoff into Darwin Harbour, it is suggested that the major earthworks be carried out in the dry season. This will, however, increase the potential for dust and impacts on Air Quality.

The PER commits to implementing appropriate dust control measures should dust levels prove to be an issue. NTRR should be more proactive on the issue and implement a dust management plan that ensures dust does not become an issue. Periodic watering of construction roads and earth materials is seen as a more effective method than attempting to predict conditions when dust is likely, or acting after high levels of dust are observed.

3.2.3.2 Noise.

The East Arm Port facility and associated industrial areas are sufficiently far away from residential areas that construction noise will not be an issue.

On site exposure to noise, however, will be significant for workers and contractors during construction. NTRR should liaise with the WHA to ensure that appropriate Occupational Health and Safety practices are implemented on site in regards to noise.

3.2.3.3 Surface Runoff and Erosion.

Construction operations have the potential to impact on both surface and groundwater resources. Surface water resources can be contaminated through surface runoff. Contaminants could potentially include spilt petroleum products from construction vehicle refuelling and suspended material from soil erosion. Groundwater resources can potentially be impacted by the infiltration of contaminants into the soil.

Contaminants may include petroleum products and soluble compounds leached from site materials.

The off-site discharge of surface drainage could act as a vector for the movement of contaminants from the facility into the broader environment, including the mangrove areas and the waters of Hudson Creek. Siltation of mangrove areas, increased turbidity and sedimentation in the waters of Hudson Creek could result.

NTRR has committed to requiring the Principal Contractor to adopt good construction practices that minimise the environmental impact of waste effluent generated on site. These will include surface drainage systems that divert runoff away from disturbed areas, and silt traps to minimise off-site sediment discharges.

As in section 3.2.3.1, it is suggested that where possible, major earthworks should be conducted in the dry season. If the construction timetable extends into the wet season, attempts should be made to rehabilitate the disturbed areas prior to the onset of the wet season. An erosion and sediment control plan should be included in the construction EMP.

3.2.3.4 Introduced weeds, pests and diseases.

The LWTF site will service international shipping as well as a large regional area. With this, the potential for weeds, pests and diseases to be introduced into the Darwin area through traffic movements and shipping waste is significant.

Introduced weeds are of particular concern during the construction phase where heavy earthmoving equipment may be sourced from around the Territory and interstate.

It is essential that prior to operation on site, any introduced machinery is washed down and inspected to ensure no weeds or pests are present.

Recommendation 8

A wash down procedure for all vehicles entering the site, and an inspection and wash down procedure for all heavy machinery imported to the site shall be implemented.

The handling of national and international shipping wastes introduces a potential vector for diseases and introduced marine pests.

The Department of Primary Industry and Fisheries and the Northern Territory Parks and Wildlife Commission should be consulted on the best approach to prevent the importation of weeds, pests and diseases.

3.2.3.5 Disposal of Construction Wastes.

For a large construction site such as the LWTF, waste management during the construction phase is an important component due to the large volume of solid waste that will be generated. Significant amounts of waste oils and solvents will also be generated and will require recycling or disposal.

NTRR has committed to collecting all liquid wastes during construction and storing them for recycling or treatment once the LWTF is complete. If storage is not possible, then the wastes will be sent to an approved waste disposal facility.

The PER lacks detail on descriptions and volumes of predicted construction wastes. It is recommended that a detailed waste management plan for the construction of the LWTF facility be incorporated into the construction EMP.

Recommendation 9

A waste management plan for the construction phase of the project shall be included as part of the overall Environmental Management Plan.

Territory Health Services (THS) should be consulted in relation to the provision of ablution facilities during construction, and the removal and handling of associated sewage and sullage.

3.2.3.6 Biting Insects.

Due to the LWTF sites proximity to known breeding habitats for biting midges and mosquitoes, biting insects will be a problem during construction and will remain a problem throughout the operational phase for those personnel working in and around the facility.

All collection points for water created during construction will become potential breeding sites and further exacerbate the problem. NTRR have indicated that they will undertake measures to control or eliminate these potential breeding sites, and undertake regular inspections to ensure potential habitat areas are kept in check.

NTRR should liaise with the Medical Entomology Branch of THS throughout the construction and operation of the site on issues of Biting Insects.

Workers at the facility should be informed of the potential pest problem and encouraged to use personal protection measures when biting insect numbers are high. Reference should be made to the THS publication “Personal Protection for Mosquitoes & Biting Midges in the NT” when formulating policy on Biting Insects.

3.2.3.7 Traffic.

During construction of the site, traffic entering and exiting the site from Mendis Road will temporarily increase. Movement of large vehicles and loads is expected throughout the construction phase.

As the LWTF site is part of the East Arm Precinct, and the site has major arterial access. Traffic movements should not be adversely effected. There are no residential areas that will be affected by the proposal.

3.2.4 Operational Issues

The LWTF site will be owned and operated by NTRR. Operation will involve the handling and disposal of liquid wastes that vary in their hazardous nature. Water and air emissions quality will therefore be areas of potential environmental impact. The waste outputs from the facility will also have the potential to impact on the environment.

Wastes from the facility, both solid and liquid, will be produced and will require disposal. Three options have been proposed for the disposal of these wastes, the disposal of solid wastes to landfill, the disposal of liquid wastes to the Power and Water Authority treatment ponds, and the reprocessing of wastes that do not meet disposal criteria. Both the PAWA and the Darwin City Council, which operates the Shoal Bay landfill site, will play an integral part in the successful operation of the project.

Operation is expected to commence on completion of construction in the middle of 2001.

3.2.4.1 Risk Management

There is a high public awareness and scrutiny of such treatment facilities throughout Australia. NTRR will need to ensure that the risks associated with this facility are all manageable, and will need to be pro-active in ensuring that the public and media are confident that the site is and will remain safe for the life of the Facility.

The Risk Assessment Matrix put forward by NTRR for this site is comprehensive and seems to have addressed, at a preliminary level, every potential hazard that could cause an environmental impact. Further comprehensive risk assessments will need to be undertaken at the final design stage, prior to commencement of operations, and continually throughout the operation to ensure risk is kept to a minimum.

NTRR should seek review and input from the NTFRS, WHA and the DLPE in relation to any risk assessments undertaken.

Recommendation 10

It is recommended that a comprehensive Risk Assessment be carried out at the final design stage, prior to commencement of operations and continually throughout the operation to ensure risk is kept to a minimum.

3.2.4.2 Surface Runoff and Water Quality.

The Darwin region is exposed to intense rainfall throughout the wet season. These events frequently produce large flash floods and excess quantities of runoff that are not readily experienced in other parts of Australia. The proposed site is also located close to Darwin Harbour and sensitive mangrove communities. Given this and the nature of the products being treated on site, water management will be a critical aspect in the environmental management of the LWTF.

The LWTF will consist of large areas of hardstand and roof surfaces. This will produce a large increase in stormwater runoff quantities and velocities above those expected in a typical catchment of this size. This runoff will potentially contain many contaminants including petroleum hydrocarbons, oils, solvents, acids, alkalines and biological wastes.

The site also includes treatment ponds used for tertiary treatment, evaporation and settling of solids. NTRR have committed to emptying these ponds prior to the onset of the wet season. As a management technique this is considered risky as the timing of the onset of the wet season is difficult to determine, and early wet season rains can be intense and unexpected. It is recommended that these ponds be re-engineered to include a freeboard equal to a 1 in 100 year return 72 hr rainfall event, over and above the maximum pond level. Management of the ponds should incorporate this freeboard, and once the onset of the wet season is imminent, strategies should be implemented to remove this effluent for further treatment or approved disposal to the PAWA ponds.

Recommendation 11

It is recommended that volume to contain a 1 in 100 year return 72 hour rainfall event be included in the final design of the evaporation ponds over and above the maximum operating level of the ponds. Management strategies for the decommissioning of the ponds at the onset of the wet season should be included in the operational EMP.

Velocities of stormwater runoff will be high at times and have the potential to scour at discharge points. To avoid significant scouring, energy dissipation in the form of blocks or rip rap should be considered at stormwater discharge locations.

3.2.4.3 Spills and leakages.

Darwin Harbour has many commercial and recreational beneficial uses. Many of these uses are within the vicinity of East Arm industrial area. These beneficial uses have become a focal point for public focus in recent times. The main public focus on the facility will be its potential to impact on Darwin Harbour from spills and leaks into the harbour.

The LWTF will house hazardous liquid wastes that have a variety of properties as described in the previous section. Some of these hazardous wastes will include products that have a high aquatic toxicity and a spill can have a serious impact on marine life, particularly in the intertidal zone.

There are 3 main areas of risk where spills and leaks could impact on Darwin Harbour. The transport of liquid wastes to site, the failure of containment of spills on site combined with stormwater discharge, and the transport of wastes to disposal.

Recommendation 12

As part of the comprehensive Risk Management study of the LWTF site, all potential scenarios for hazardous waste discharge from the LWTF, and the transport to and from the site should be investigated. It is incumbent on NTRR to identify and document all the sensitive areas within Darwin Harbour such as aquaculture farms, water inlets, flora and fauna habitats and to have in place publicly accountable action plans to adequately address each scenario.

In assessing the various scenarios for hazardous waste spills, NTRR should consult with DLPE who are currently working on the Darwin Harbour hydrodynamic model. This model will be invaluable in determining the spread of any spill and providing varying scenarios for differing tidal ranges and discharge points.

Hazardous liquid waste spill contingency planning should be carried out in consultation with the Darwin Port Corporation and the NT Marine Pollution Committee.

3.2.4.4 Waste Disposal.

Waste disposal will be required for both liquid and solid outputs from the LWTF. It is intended that liquid outputs will be evaporated during the dry season and disposed of into PAWA lagoons during the wet season. Solids outputs from the process will be tested and then sent to landfill disposal at the Darwin City Council's Shoal Bay Landfill. In both cases, approval will be required from the operators. These approvals will be based on meeting the disposal criteria for each respective facility.

NTRR currently hold a Bulk Wastewater Agreement with PAWA that lists bulk wastewater products that are able to be received at nominated PAWA facilities such as freshwater septage, milk wastes and salt water septage (subject to notice). The acceptance of any other materials is subject to PAWA's determination of acceptability and approval. This agreement expires on the 30 June 2001.

During the wet season when the LWTF evaporation ponds are inoperative, it is assumed through reading the PER that NTRR will utilise PAWA's waste stabilisation ponds for disposal of primary treated effluent. PAWA have indicated that they can not guarantee acceptance of such liquid waste.

As there is some doubt as to the availability of disposal options for liquid effluent from the LWTF, it is recommended that NTRR ensure that all appropriate licences and approvals for disposal of liquid effluent have been obtained, and are current, prior to commencement of operations. NTRR must also identify alternative disposal options for effluent that does not meet PAWA acceptance criteria prior to commencement of operations.

Recommendation 13

It is recommended that NTRR demonstrate to the satisfaction of the DLPE that all appropriate licences and approvals for disposal of liquid effluent have been obtained and are current prior to commencement of operations at the LWTF.

NTRR should also provided detail as to the alternative disposal options for liquid effluent that does not meet PAWA acceptance criteria.

The Darwin City Council (DCC) operates the solid waste disposal facility at Shoal Bay. Any solid wastes NTRR intend to dispose at this facility will be required to meet certain acceptance criteria which will include TCLP tests, volumes and contaminant results. If solid wastes fail to meet these requirements the waste will not be accepted at the site and NTRR will have to find alternative disposal sites interstate, or re-treat the waste until it meets the criteria.

Again it is recommended that NTRR ensure that all the appropriate approvals are in place for the acceptance of solid wastes from the process at the Shoal Bay waste disposal facility. Details of alternative disposal options for solid wastes that do not meet Shoal Bay waste disposal facility acceptance criteria should also be provided.

Recommendation 14

It is recommended that NTRR demonstrate to the satisfaction of the DLPE that all appropriate licences and approvals for disposal of solid wastes have been obtained and are current prior to commencement of operations at the LWTF. NTRR should also provided detail as to the alternative disposal options for solid wastes that do not meet Shoal Bay waste disposal facility acceptance criteria.

NTRR should also consult with the DLPE in regards to appropriate waste disposal and general on-site Waste Management. A waste management plan for general site operations should be included in the operational EMP.

Septic system effluent disposal will be in accordance with THS requirements. NTRR should be aware that the current requirements are detailed in the Territory Health Services' *Code of Practice for Small On-site Sewage and Sullage Treatment Systems and the Disposal or Reuse of Sewage Effluent*.

3.2.4.5 Air Quality and Odour Control.

The main air quality issue during the operation of the LWTF will be odours from biodegradable aqueous wastes, oil wastes and CFS wastes. The major source of these odours will be the open treatment ponds. The proponent should monitor these emissions as part of the operational EMP to ensure odours do not become a problem for surrounding industries and residents further afield (refer to Recommendation 6).

Volatile Organic Carbon (VOC) emissions will occur from the storage and handling of waste oils, fuels and oily waters. VOC's have the potential to be significant contributors to the greenhouse effect and also contain carcinogenic substances such as benzene. Evaporative losses of VOC's from the LWTF site are expected to be low and not cause an environmental impact.

Facilities in the Northern Territory that exceed certain activity thresholds are required to report emissions to air, land and water on an annual basis. These emission reports will be provided to the Commonwealth for inclusion in a public database. This database is known as the National Pollutant Inventory (NPI).

Recommendation 15

It is recommended that NTRR examine the operations of the facility to see if it triggers National Pollutant Inventory (NPI) thresholds. If this is the case, NTRR should report the NPI emissions as part of the national program.

3.2.4.6 Noise.

The East Arm Port facility and associated industrial areas are sufficiently far away from residential areas that noise will not be an issue.

Occupational Health and Safety noise levels will be consistent with good industry practice and WHA regulations.

3.2.4.7 Biting Insects

As mentioned above, the LWTF site's proximity to known breeding habitats for biting midges and mosquitoes will be a problem throughout the operational phase for those personnel working in and around the facility.

All collection points for water created around the site will become potential breeding sites and further exacerbate the problem. NTRR have indicated that they will undertake measures to control or eliminate these potential breeding sites, and undertake regular inspections to ensure potential habitat areas are kept in check.

NTRR should liaise with the Medical Entomology Branch of THS throughout the construction and operation of the site on issues of Biting Insects.

Workers at the facility should be informed of the potential pest problem and encouraged to use personal protection measures when biting insect numbers are high. Reference should be made to the THS publication "Personal Protection for Mosquitoes & Biting Midges in the NT" when formulating policy on Biting Insects.

Normal fly screening does not screen midges affectively and in this area this could create a biting midge problem within buildings and workshops.

Recommendation 16

Administration and workshop facilities should be adequately screened to ensure the buildings are biting midge proof.

3.2.4.8 Traffic.

During the operation of the LWTF a maximum of 10 tankers and 15 trucks will visit the site per day. Although this is a sizeable amount of large haulage traffic, arterial access to the site is good and does not currently involve travel through residential areas. NTRR have committed that all traffic movements will be via the designated arterial roads and road train routes.

4 CONCLUSION

It is considered that the environmental issues associated with the project have been adequately identified. Some of the issues have been resolved through this assessment process, while the remainder will be addressed through the Construction and Operational Environmental Management Plans.

Initially, the PER and recommendations detailed in this Assessment Report will form the basis for the NTRR's management and monitoring commitments. The Environmental Management Plan will be a working document for the operation of the facility and will require continual review and updating in the light of operational experience and changed circumstances.

In addition, there is a high probability that Liquid Waste Treatment Facilities will be listed under Schedule 2 of the *Waste Management and Pollution Control Act* and as such it will become a licensable activity. If so it will be required to comply with any licence conditions as well as regulations set down by the act.

Provided that the environmental commitments and safeguards detailed in the PER are implemented, the recommendations in this Assessment Report are adopted and regular reviews and reporting are undertaken, long term environmental impacts should be minimised.