Manildra Park Pty Ltd

Response to Submissions
Marine Fuel Storage/Distribution and Biodiesel Production Facility Kooragang Island

April 2008

Umwelt
Environmental Consultants

Response to Submissions

Marine Fuel Storage/Distribution and Biodiesel Production Facility

Kooragang Island

Prepared by

Umwelt (Australia) Pty Limited

on behalf of

Manildra Park Pty Ltd

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TABLE OF CONTENTS

FIGURES

APPENDICES

1.0 Introduction

This document has been prepared in response to a request from the Director-General in accordance with section 75H(6) of the *Environmental Planning and Assessment Act 1979* (NSW) (EP&A Act) that Manildra Park Pty Ltd (Manildra Park) prepare a response to the issues raised during the public exhibition period for the Marine Fuel Storage/Distribution and Biodiesel Production Facility (Project). This report has been prepared by Umwelt (Australia) Pty Limited (Umwelt) on behalf of Manildra Park and addresses the issues raised by the Department of Environment and Climate Change (DECC), Newcastle Port Corporation (NPC), Newcastle City Council (NCC), New South Wales Fire Brigades (NSWFB) and Orica Australia Pty Ltd (Orica).

The Department of Planning advise that no public submissions were made during the public exhibition period for the Project.

Issues raised by each organisation are addressed in each of the following sections, where additional information and or clarification is required. For each primary issue, the theme of the matters raised is noted in bold, followed by a response in normal type.

2.0 Newcastle Port Corporation

Newcastle Port Corporation supports the proposed development and provides requirements in relation to future operations. Manildra Park has no objection to Newcastle Port Corporation requirements which principally relate to their future involvement in risk assessment workshops and the development of operational procedures, as outlined in their 13 February 2008 submission.

3.0 Department of Environment and Climate Change (DECC)

The DECC submission notes that they have no objection to the Project proceeding as described in the Environmental Assessment and provided recommended conditions of approval. In relation to the issues raised in their letter the following response is provided where further clarification/information is warranted.

3.1 Air Quality

Requirement to complete a post commissioning monitoring requirement to confirm emissions from the boiler comply with the Protection of the Environment Operations (Clean Air) Regulation 2002.

DECC suggest that annual monitoring be undertaken to confirm the emissions from the operation of the boiler complies with the *Protection of the Environment Operations (Clean Air) Regulation 2002*.

Table 3.1 below is reproduced from the Environmental Assessment (Table 5.15) summaries the highest predicted ground level concentrations for carbon monoxide, oxides of nitrogen and sulphur dioxide associated with the operation of the boiler.

Table 3.1 - Highest Predicted Ground-level Pollutant Concentrations for CO, NO_x and SO_2

Pollutant and Averaging Time	Assessment Criteria	Boiler Stack /Emissions	Existing Levels	Total (Project Contribution + Existing)
Maximum 1-hour average CO (mg/m^3)	30	0.006	4.5	4.506
Maximum 8-hour average CO (mg/m^3)	10	0.004	4.5	4.504
Maximum 1-hour average NO_x ($\mu g/m^3$)	246	23	116	139
Annual average NO_x ($\mu g/m^3$)	62	0.5	16	16.5
Maximum 1-hour average SO_2 ($\mu g/m^3$)	570	8.5	192	200.5
Maximum 24-hour average SO_2 ($\mu g/m^3$)	228	2.3	40	42.3
Annual average SO_2 ($\mu g/m^3$)	60	0.2	6	6.2

Table 3.1 shows that there are no predicted exceedances of the relevant air quality assessment criteria. Furthermore the highest predicted ground level concentrations are at least an order of magnitude less than the relevant assessment criteria. Given that these levels are significantly below the respective assessment criterion, we suggest that a once off assessment be undertaken as part of the commissioning process.

3.2 Bund Liner

DECC have questioned the performance (the long term integrity) of bentonite clay and High Density Polyethylene (HDPE) liners within the bunded areas and stability when exposed to fuels and other solvents.

Manildra Park have considered the use of a concrete bund liner and estimate that a 250 to 300 millimetre thick concrete slab would be required to minimise potential cracking. It is also noted that given the size of the facility the concrete bund would be constructed in sections i.e. not one continuous slab. This would result in expansion joints and thereby potentially compromise the integrity of the bund area. A HDPE liner does not require expansion joints and thus forms a continuous barrier. Manildra Park therefore proposes to use a HDPE liner within the bunded areas.

HDPE liners are now commonly used in oil & gas industries as well as water dams and ponds. The performance of the HDPE liner is no different to any of the other components associated with the Project, i.e. its performance is governed by the quality control and assurance associated with its manufacture and installation. As such, the HDPE liner will be installed by a supplier approved installer who is familiar with the installation requirement i.e. sub grade preparation, welding of seams, anchoring arrangements and seals around penetrations.

To minimise physical damage (i.e. punctures to the HDPE liner), 200 to 300 millimetres of soil is placed over the top.

The DECC has suggest that a number of performance measures be included to address the issues regarding long term performance (see **Table 3.2**).

Table 3.2 - DECC Suggested Performance Measures

DECC Suggested Performance Measure	Manildra Park Response
Double lining of all tanks and pipelines.	The facility has been designed in accordance with the *American Petroleum Industry Standard 650 Welded Steel Tanks for Oil Storage* and *Australia Standard 1940:2004 The Storage and Handling of Flammable and Combustible Liquids*. Double lining of tanks is only undertaken for the storage of LNG to assist in maintaining the low temperatures associated with LNG storage.
Certification of leak detection system	Agreed
Maintenance and Management system for all bunds, fuel delivery, and storage system.	Agreed
Groundwater monitoring program.	Agreed – scope of groundwater monitoring parameters to be confirmed (see **Section 2.6**).
Oil response and prevention plan.	Agreed
Inspection and monitoring program for bunds, pipelines, tanks to detect leaks/spills.	Agreed
Site Security plan.	Agreed
Staff Training.	Agreed

It is important to note:

- the HDPE liner provides a secondary measure of protection in the event of a leak with the tank providing primary containment;

- a variety of physical, visual and operational measures are in place to detect leaks i.e. Manildra Park are not relying solely on the storage tank and HDPE liner to manage and detect leaks. For example:

  - **Physical** a radial network of pipes are located under the base of the tanks to collect any leaks from the base of the tanks (refer to Figure 5.7 of the Environmental Assessment);

  - **Visual** leaks from the walls of the tanks will be easily identified during routine inspections as the tanks are painted white; and

  - **Operational** the theoretical volume of product held in storage is cross checked against the actual volume. Thus allowing for discrepancies to be easily identified.

The Statement of Commitments has been revised (see **Appendix 1**) to include the development of a Containment Bund, Tank and Pipeline Integrity Assessment Program and Tank Farm Bunding Detailed Design and Construction Report as requested by DECC.

3.3 Discharge of Treated Stormwater

DECC is unlikely to licence any discharge of surface water.

Manildra Park is not seeking a licence for uncontrolled stormwater overflows, but rather the stormwater which is collected within the “dirty water” catchment areas. This water will be passed through an oil/water separator and subject to meeting the water quality criteria outlined in **Table 3.3**, reproduced from Table 5.12 of the Environmental Assessment, will be actively discharged from the site either through pumping and/or opening a valve. It is this activity for which Manildra Park will seek a licence.

Table 3.3 - Water Quality Discharge Criteria

Water Quality Parameter	Unit of Measure	Criteria 100 % Concentration Limit
pH	pH	6.5 – 8.5
Total Suspended Solids	mg/L	50
Oil and Grease	visible	none
Chemical Oxygen Demand	mg/L	40
Volume	KL	none
BOD	mg/L	

DECC has suggested an extensive suite of parameters for surface water and groundwater samples.

The facility primarily handles hydrocarbons i.e. oils. Any potential groundwater contamination is therefore associated with the handling of these products. On this basis, we suggest that the groundwater monitoring program be reduced to the following parameters: Electrical conductivity, pH, Total suspended solids, Total petroleum hydrocarbons and total oil and grease. The Statement of Commitments has been revised (see **Appendix 1**) to include the development of a groundwater monitoring program for these parameters in consultation with DECC.

3.4 Waste Water Management

Offsite disposal of wash water generated during the biodiesel production process.

Wash water generated during the production of biodiesel will be transported off site to an approved disposal facility.

DECC's Preference that treated effluent from the enviro type system be removed off site for disposal.

Effluent from the enviro system will be trucked off site for disposal at an approved facility.

3.5 Aboriginal and Cultural Heritage

DECC requested test pitting investigations for any area to be excavated prior to the commencement of construction.

Figure 3.1 shows that the facility is constructed on reclaimed land, i.e. the area has been extensively filled to create the current shape and landform height. The island itself has also been heavily disturbed and modified by historical land uses including grazing.

Section 5.11 notes that Kooragang Island was reclaimed using dredge river sediments. This together with the lack of cultural heritage evidence associated with previous surveys for other recent development within the vicinity of the site indicates that there is negligible potential for discovering evidence of aboriginal occupation within the project area.

Source: Parish Map, 1892

0 1.0 2.0 3km
1:60 000

Legend

- Greenleaf Terminal
- Receival and Distribution Pipeline
- Barge Refuelling Pipeline

FIGURE 3.1

1892 Parish Map Showing Individual Islands Prior to the Creation of Kooragang Island

As such we do not believe that subsurface impact investigations are warranted prior to commencement of excavation works:

3.6 Construction Hours of Operations

DECC has suggested construction hours of operation be limited to 7 am to 6 pm Monday to Friday; 7 am to 1 pm Saturdays; no time on Sundays or public holidays, unless inaudible at residential premises.

Manildra Park has suggested the construction hours of operation be as follows to allow for the delivery of oversized loads, maintenance activities and emergency circumstances.

7 am to 6 pm Monday to Friday; 7 am to 1 pm Saturdays; no time on Sundays or public holidays, unless inaudible at residential premises.

Works proposed to be undertaken outside of these hours includes:

- the delivery of materials as requested by the Police or other authorities for safety reasons;
- emergency work to avoid the loss of life, property and/or prevent environmental harm; and
- any other work as agreed through negotiation between Manildra Park and potentially affected noise receivers or as otherwise agreed by the DECC.

3.7 Material used in the Construction of the Bund

Only virgin excavated natural material (VENM) can be used for the bund construction unless otherwise approved in writing by DECC.

It is noted that soil located around the base of the existing tanks has existing elevated lead levels. Manildra Park proposes to encapsulate this material in the existing earth bund during its reshaping. The existing bund material may also be reshaped on parts of the site.

If additional material is required for the construction of the bund, Manildra Park agrees that only VENM will be imported and used unless otherwise approved in writing by DECC. The Statement of Commitments has been updated to reflect this commitment (see **Appendix 1**).

4.0 Orica

Assessment of radiant heat from a tank/bund fire in the main tank farm on Orica's facilities.

SEPP 33 requires a Level 3 quantitative risk analysis (QRA) to be undertaken whenever the scale and nature of a development creates significant potential for a major accident, or when the partial (Level 2) assessment fails to sufficiently demonstrate that relevant criteria will be met. The Preliminary Hazard Analysis considered that the storage of the flammable and combustible liquids at the Manildra Park site would meet the relevant risk criteria and did not warrant a QRA of a major fire involving the flammable or combustible liquids stored on the site. However, given the concerns raised by Orica (letter dated 15 February 2008), and the request by the NSW Fire Department (letter dated 22 February 2008) for thermal radiation contours, the computational model Breeze® Haz-Pro has been used to estimate the thermal radiation distances from a major fire involving the flammable (methanol) and combustible (oil/diesel) liquids at the Manildra Park site.

The quantitative analysis includes a consequence analysis of a fire scenario where the thermal radiation heat level exceeds 23 kW/m^2 i.e. the level at which structural failure of unprotected steel may occur, thereby propagating an incident at the Orica facility. A conditional cause consequence analysis has been undertaken to assess the probability of this event.

4.1 Criteria

Section 4.3 of the Hazardous Industry Planning Advisory Paper Number 4 (HIPAP 4) notes that a radiant heat level of 23 kW/m^2 as a result of a fire may effect a neighbouring potentially hazardous installation resulting in the propagation of the incident and should not be exceeded in neighbouring industrial areas at a risk of more than 50 chances in a million per year.

Table 3 of Section 4.3 of HIPAP 4 notes a radiant heat level of 12.6 kW/m^2 may cause unprotected wood to ignite and light gauge steel to fail.

Section 4.2 of HIPAP 4 notes a radiant heat level of 4.7 kW/m^2 will cause pain in 15 to 20 seconds and should not be exceeded in residential areas at a frequency of more than 50 chances in a million per year.

4.2 Methodology

4.2.1 Hazard Scenarios

The consequence scenarios considered included:

1. fire in the methanol tank;
2. fire in the methanol bund;
3. fire in one of the 7,000m^3 oil/diesel storage tanks;
4. fire in one of the 25,000m^3 combustible liquid storage tanks; and
5. fire in the oil/diesel bund.

These scenarios have been chosen based on the:

- storage arrangements for the methanol and oil/diesel products, i.e. these materials are stored in separate bunds; and
- potential loss of containment scenarios.

4.2.2 Consequence Model

The thermal radiation levels were determined for each of the hazard scenarios using the computational model Breeze® Haz-Pro using the Confined Pool Fire Model.

A confined pool fire occurs when liquid is ignited in a confined area such as a bund or tank. The pool fire model assumes the vapour required to sustain the flame is provided by the vaporisation of the liquid. Breeze calculates the maximum mass burning rate from *Society of Fire Protection Engineers Handbook of Fire Protection Engineering*, Mudan and Croce (1988) as:

$$\dot{m} = 1x10^{-3}\left(\frac{\Delta H_c}{\Delta H_v + \int_T^{T_b} Cpdt}\right)[1 - \exp(-\beta\, D)] \quad (\text{kg/m2 s})$$

Breeze determines the flame length (L_f) as a function of the pool fire diameter (D) using the relationships originally presented in *The Size of Flames from National Fires*, Thomas (1963) where:

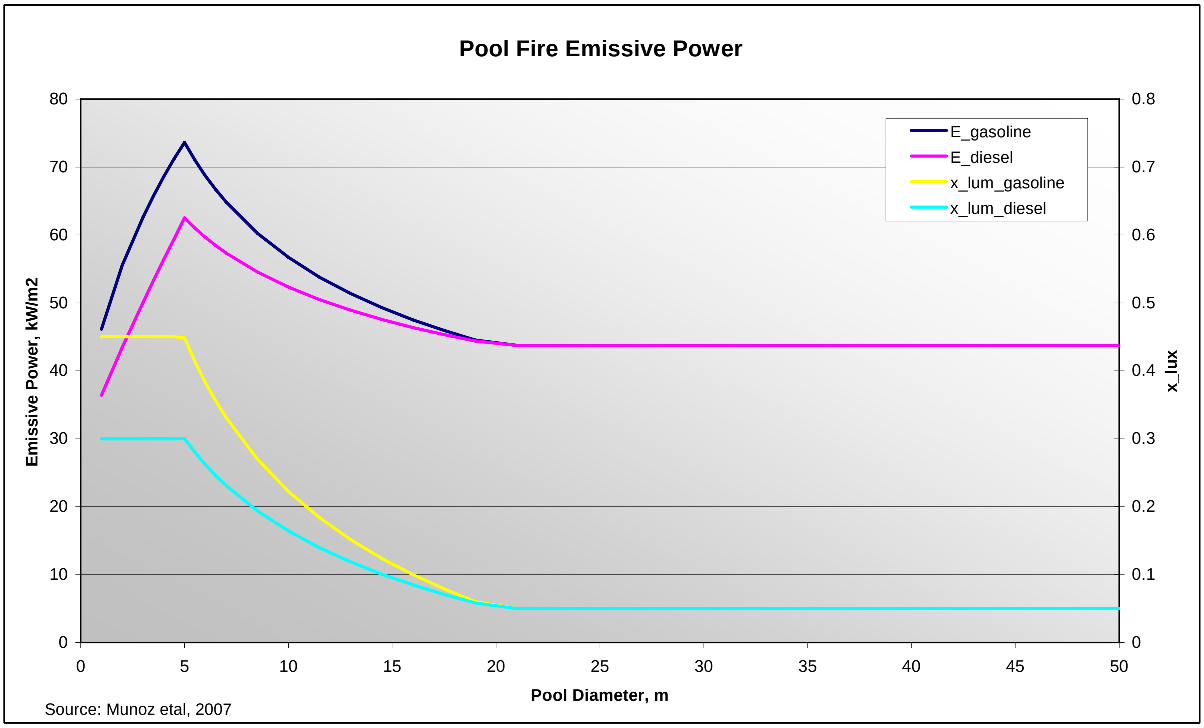
$$\frac{L_f}{D} = 42\left(\frac{\dot{M}}{\rho_a \sqrt{g\, D}}\right)^{0.61}$$

The radiant heat level (or thermal flux) (q") is a function of the emissive power of the flame (E), the view factor (F) and the transmissivity (τ), and is calculated as:

$$q'' = \varepsilon . E_b . F . \tau$$

In *Predicting The Emissive Power Of Hydrocarbon Pool Fires*, Muzoz M. etal (2007) provide average emissive powers for pool fires based on the pool fire diameter. The average emissive powers for gasoline and diesel pool fires based on information provided by Muzoz M. et al (2007) are shown in **Figure 4.1**. For the purposes of this assessment gasoline has been considered to be equivalent to methanol, as these materials have similar calorific values and boiling points. As shown in **Figure 4.1** the emissive power of the fire is governed by the diameter of the pool. Initially the emissive power increases as the pool fire diameter increases until it peaks, beyond this point the fire requires more oxygen than can be provided and thus the emissive power of the fire decreases.

Figure 4.1 – Pool Fire Emissive Power



4.2.3 Likelihood Model

The likelihood of the fire in the oil/diesel bunded area is determined using a conditional cause consequence analysis with data sourced from *Hazard And Barrier Analysis Guidance Document*, Department of Energy Office of Operating Experience Analysis and Feedback (1996) and *Loss Prevention in the Process Industries – Hazard Identification, Assessment and Control*, Lees F.P (1996).

4.3 Consequence Analysis

4.3.1 Methanol Tank (T-7) Fire

Scenario 1: Confined pool fire in the methanol tank, Tank T-7.

Parameters:	Tank diameter:	10 metres
	Tank height	6 metres
	Contents:	Methanol

The results from Breeze® Haz-Pro are presented in **Appendix 2.**

Table 4.1 shows the distances from the centre of the pool fire to nearby structures and the corresponding estimated maximum radiant heat levels.

Table 4.1 - Radiant Heat Levels Methanol Tank Fire

Location	Distance to Nearby Structures	Maximum Flux
Manildra Park Structures		
Biodiesel plant	≈ 21 metres	5.3 kW/m^2
Tank T-1	≈ 27 metres	3.2 kW/m^2
Other		
Northern boundary of the Manildra Park Facility	≈ 46 metres	< 1.0 kW/m^2

Figure 4.2 shows the 23.0 kW/m^2, 12.6 kW/m^2 and 4.7 kW/m^2 radiant heat contours for a methanol tank fire (T-7). The 23.0 kW/m^2 radiant heat contour does not extent to any structure either on or off site. It is therefore unlikely that a methanol tank fire would result in the propagation of an incident either on or off site.

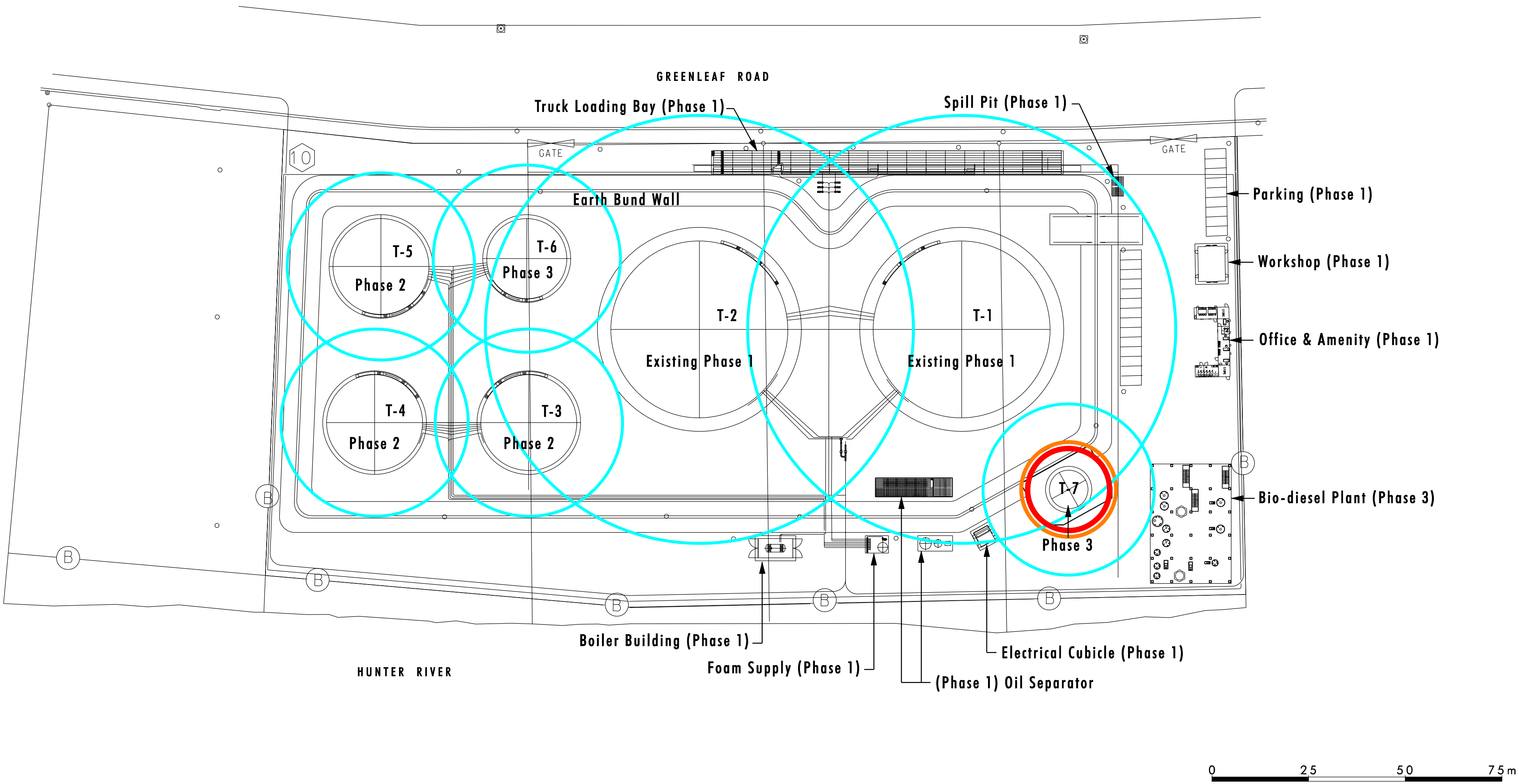
4.3.2 Methanol Bund Fire

Scenario 2: Confined pool fire in the methanol bund. The model assumes the fire is unrestricted by the tank and therefore over estimates the size of the fire.

Parameters:	Bund size:	20 x 14.5 metres
	Bund height	2 metres
	Contents:	Methanol

The results from Breeze® Haz-Pro are presented in **Appendix 3**.

Table 4.2 shows the distances from the centre of the pool fire in the bund to nearby structures and the corresponding estimated maximum radiant heat level.



Legend

- 4.7kW/m² Thermal Flux Contour
- 12.6kW/m² Thermal Flux Contour
- 23.0kW/m² Thermal Flux Contour

FIGURE 4.2

Radiant Heat Contours for Storage Tank Fires

Source: Manildra Park

File Name (A4): R06_V1/2305_052.dgn

Table 4.2 - Radiant Heat Levels Methanol Bund Fire – Worst Case

Location	Distance to Nearby Structures	Maximum Flux
Manildra Park Structures		
Biodiesel plant	≈ 21 metres	20.0 kW/m^2
Tank T-1	≈ 27 metres	12.6 kW/m^2
Other		
Northern boundary of the Manildra Park Facility	≈ 46 metres	2.9 kW/m^2

Table 4.2 presents the worst case scenario associated with a fire in the methanol bund, as it does not take into account that the methanol tank has a fire protection system, umbrella roof over the floating roof and utilises a nitrogen blanket to prevent the build-up of flammable gas. In the event of a bund fire, these protection systems / design aspects should prevent the tank from becoming involved in the pool fire. If the methanol tank remains structurally sound the size of the pool fire in the bund would be equivalent to a pool fire with a hydraulic radius of approximately 16.5m diameter. In addition to this, the methanol tank would shield approximately 33% of the fire. On this basis the estimated maximum radiant heat level are shown in **Table 4.3**.

Table 4.3 - Radiant Heat Levels Methanol Bund Fire (equivalent hydraulic radius)

Location	Distance to Nearby Structures	Maximum Flux
Manildra Park Structures		
Biodiesel plant	≈ 21 metres	9.6 kW/m^2
Tank T-1	≈ 27 metres	6.0 kW/m^2
Other		
Northern boundary of the Manildra Park Facility	≈ 46 metres	1.7 kW/m^2

Figure 4.3 shows the 23.0 kW/m^2, 12.6 kW/m^2 and 4.7 kW/m^2 radiant heat contours for a methanol bund fire – worst case. The 23.0 kW/m^2 radiant heat contour extents only to the biodiesel facility. Given the protection systems / design aspects incorporated into the methanol tank, it is unlikely that a bund fire would involve the tank and thus the 23.0 kW/m^2 radiant heat contour would not extend to the biodiesel facility. It is therefore unlikely that a fire within the methanol bund would result in the propagation of an incident either on or off site.

4.3.3 Oil/Diesel Tank (T-5) Fire

Scenario 3: Confined pool fire in the oil tank, Tank T-5.

Parameters:	Tank diameter:	15 metres
	Tank height	13.5 metres
	Contents:	Combustible liquid (diesel or marine fuel oil)

The results from Breeze® Haz-Pro are presented in **Appendix 4**.

Table 4.4 shows the distances from the centre of the pool fire to nearby structures and the corresponding estimated maximum radiant heat level.

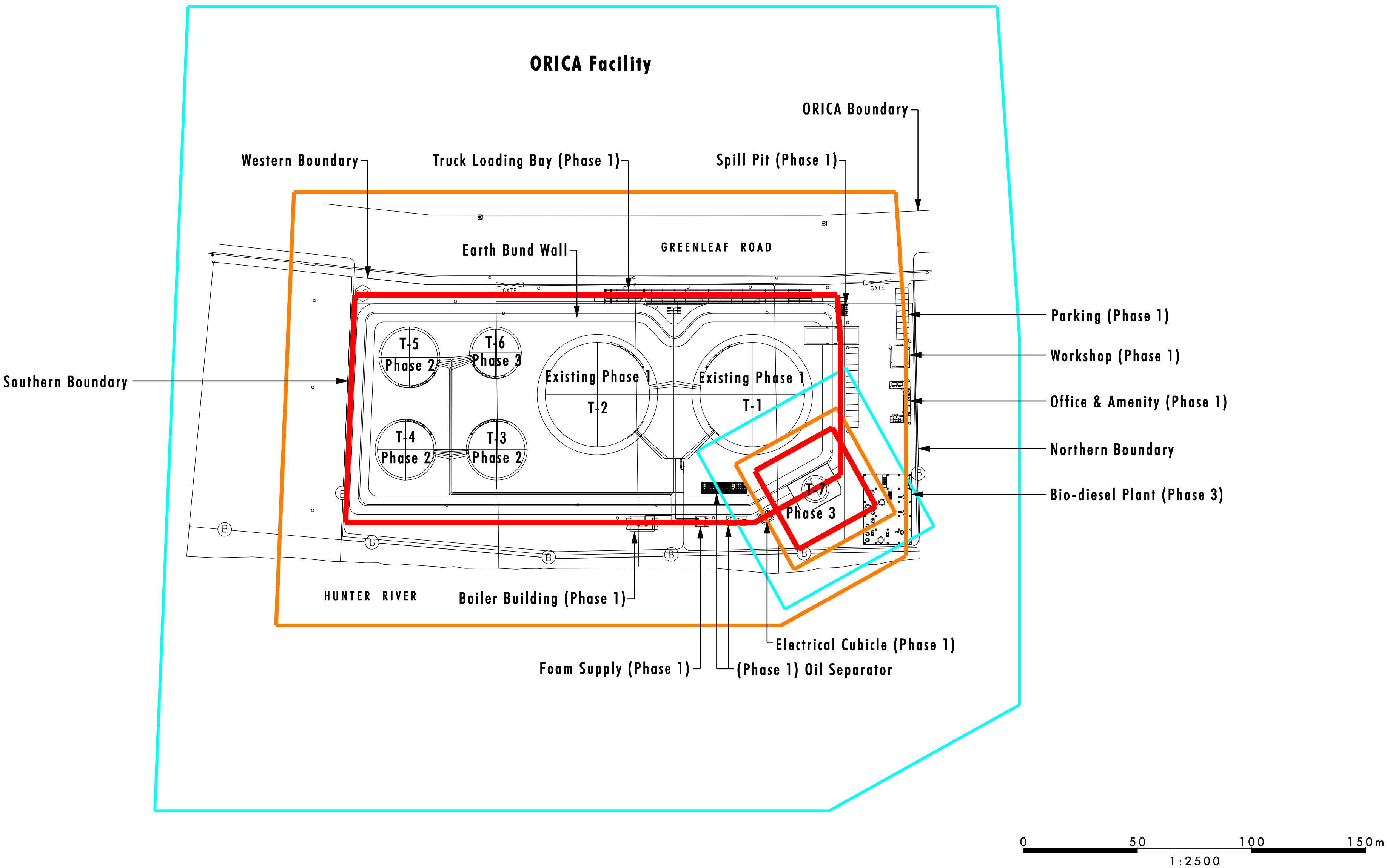


FIGURE 4.3

Radiant Heat Contours for Bund Fires

Source: Manildra Park
File Name (A4): R06_V1/2305_053.dgn

Table 4.4 - Radiant Heat Levels Diesel Tank Fire

Location	Distance to Nearby Structures	Maximum Flux
Manildra Park Structures		
Tank T-6	≈ 27 metres	4.2 kW/m^2
Other		
Southern boundary of the Manildra Park Facility	≈ 27 metres	5.0 kW/m^2
Western boundary of the Manildra Park Facility	≈ 36 metres	3.2 kW/m^2

Figure 4.2 shows only the 4.7 kW/m^2 radiant heat contour for an oil/diesel tank fire, as the fire does not generate radiant heat levels in excess of approximately 7.32 kW/m^2. Given the absence of a 23.0 kW/m^2 radiant heat contour for this scenario, it is unlikely that a oil/diesel tank fire would result in the propagation of an incident either on or off site.

4.3.4 Oil/Diesel Tank (T-1) Fire

Scenario 4: Confined pool fire in the oil tank, Tank T-1.

Parameters:	Tank diameter:	45 metres
	Tank height	16 metres
	Contents:	Combustible liquid (diesel or marine fuel oil)

The results from Breeze® Haz-Pro are presented in **Appendix 5**.

Table 4.5 shows the distances from the centre of the pool fire to nearby structures and the corresponding estimated maximum radiant heat level.

Table 4.5 - Radiant Heat Levels Diesel Tank Fire

Location	Distance to Nearby Structures	Maximum Flux
Manildra Park Structures		
Tank T-7	≈ 45 metres	5.2 kW/m^2
Tank T-1	≈ 45 metres	5.2 kW/m^2
Tanker loading	≈ 45 metres	5.2 kW/m^2
Biodiesel plant	≈ 62 metres	4.2 kW/m^2
Other		
Western boundary of the Manildra Park Facility	≈ 48 metres	5.0 kW/m^2
Northern boundary of the Manildra Park Facility	≈ 72 metres	3.6 kW/m^2

Figure 4.2 shows only the 4.7 kW/m^2 radiant heat contour for an oil/diesel tank fire, as the fire does not generate radiant heat levels in excess of approximately 5.19 kW/m^2. Given the absence of a 23.0 kW/m^2 radiant heat contour for this scenario, it is unlikely that a oil/diesel tank fire would result in the propagation of an incident either on or off site.

4.3.5 Oil/Diesel Bund Fire

Scenario 5: A confined pool fire in oil/diesel bund caused by the catastrophic failure of Tank T-1 or T-2 or multiple tanks, followed by ignition of the combustible liquid in the bund.

Parameters:
- Bund size: 200 x 75 metres
- Bund height 2 metres
- Contents: Combustible liquid (diesel or marine fuel oil)

The results from Breeze® Haz-Pro are presented in **Appendix 6**.

Table 4.6 shows the distances from the centre of the pool fire in the bund to nearby structures and the corresponding estimated maximum radiant heat level.

Table 4.6 - Radiant Heat Levels Diesel Bund Fire

Location	Distance to Nearby Structures	Maximum Flux
Manildra Park Structures		
Tanker loading	≈ 44 metres	> 23.0 kW/m^2
Tank T-7	≈ 95 metres	> 23.0 kW/m^2
Western boundary of the Manildra Park Facility	≈ 55 metres	21.0 kW/m^2
Biodiesel plant	≈ 170 metres	7.3 kW/m^2
Other		
At Orica's Eastern boundary	≈ 83 metres	12.8 kW/m^2
Northern boundary of the Manildra Park Facility	≈ 190 metres	5.0 kW/m^2

Figure 4.3 shows the 23.0 kW/m^2, 12.6 kW/m^2 and 4.7 kW/m^2 radiant heat contours for a oil/diesel bund fire. The 23.0 kW/m^2 radiant heat contour contains the remaining tanks in the bund, the truck loading facility, the methanol tank T-7, the boiler, the foam supply unit, the oil separator unit and electrical cubical. The 23.0 kW/m^2 contour however, does not extend to any structure off site. A fire in the oil/diesel bund may therefore lead to the propagation of an incident at each of the above locations.

4.4 Results

4.4.1 Impact on Nearby Structures

The consequence analysis shows that the maximum radiant heat levels as outlined in scenarios one to four do not exceed 23 kW/m^2 (the level at which structural failure of unprotected steel may occur) at any of the off-site nearby structures (tanks and buildings etc) associated with the adjoining Orica facility or the tanks and biodiesel plant within the proposed facility.

The maximum radiant heat levels as outlined in scenario five however, exceeds 23 kW/m^2 at the on-site methanol tank (T-7), the truck loading facility, the boiler, the foam supply unit, the oil separator unit, the electrical cubical and the remaining tanks in the oil/diesel bund.

Therefore a oil/diesel bund fire may result in structural damage of structures within the proposed Manildra Park facility.

The Environmental Assessment and the Preliminary Hazard Analysis detailed control measures to be implemented by Manildra Park to reduce the level of risk associated with a oil/diesel bund fire. These measures include, but are not limited to, hard barriers such as the use of shell cooling systems and fire deluge systems, leak detection systems, and the separation of flammable liquids from the combustible liquids plus soft barrier such as routine inspection and operational procedures.

4.4.2 Off Site Impacts

The consequence analysis shows that the 23 kW/m^2 radiant heat contour does not extend outside the Manildra Park property boundary for any of the scenarios modelled. It is therefore unlikely that a fire event at the Manildra Park facility will result in the propagation of the incident off site. However, for completeness a ‘worst case’ scenario which could result in the propagation of the incident at the Orica site has been considered and is detailed in **Section 4.4.3**.

4.4.3 Impact on Orica

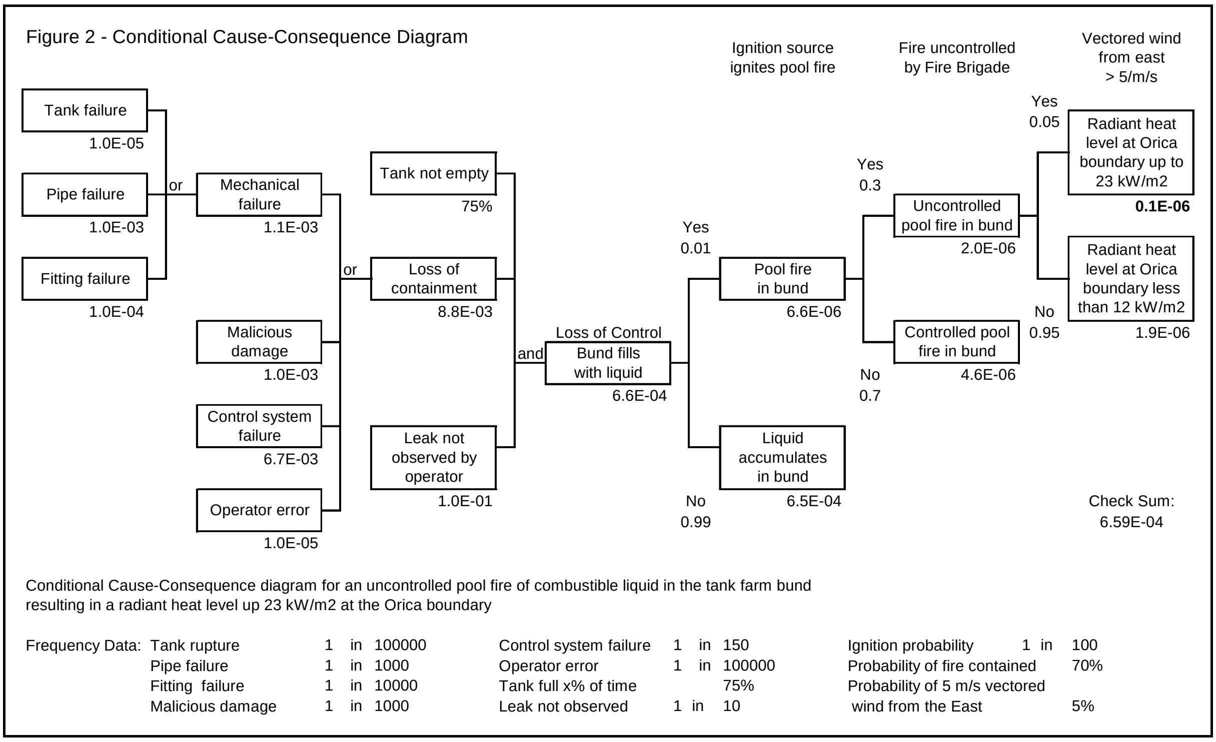
The results of the consequence models are based on meteorological conditions that support the propagation of the radiant heat level from the fire towards the target receiver at winds speeds of 1.5m/s. Under these conditions the 23 kW/m^2 radiant heat level contour (i.e. a situation that could result in the propagation of an incident off site) associated with tank and bund fires do not extend beyond the Manildra Park property boundary.

A radiant heat level of 23 kW/m^2 at the Orica boundary could be achieved by a fully established fire in combustible liquids bund if it was supported by a wind with a 5 m/s vectored component from the north-east, east or south-east i.e. ‘worst case’ situation - adverse meteorological conditions.

A conditional cause-consequence diagram (see **Figure 4.4**) has been used to estimate the potential likelihood of this ‘worst case’ scenario and assessed the likelihood of this event as being 0.1 chance in a million per year. This likelihood does not exceed and is actually significantly less than the HIPAP 4 criteria of 50 chances in a million per year.

The Environmental Assessment and the Preliminary Hazard Analysis detailed a raft of technical and non technical control measures to be implemented by Manildra Park to reduce the level of risk associated with the operation of the facility.

Figure 4.4 – Conditional Cause-Consequence Diagram



4.4.4 Impact on NSW Fire Brigades Operations

During a fire incident the services of the NSW Fire Brigades may be required. The maximum radiant heat loads for each of the fire scenarios has been calculated. **Figures 4.2** and **4.3** show the 23 kW/m^2, 12 kW/m^2 and 4.7 kW/m^2 thermal radiation contours around the tanks and bunds.

Details regarding the fire detection and suppression systems will be included as part of the Fire Safety Study which will be provided to the NSW Fire Brigades as part of the project approval process.

4.5 Conclusion

The EA notes 'Propagation off site to other industrial facilities in adjacent occupied developments is considered to be negligible as the critical thermal radiation levels for structural damage will be restricted to within site boundaries, and the distance between the bunded area and adjacent facilities is significant compared to the extent of thermal radiation impacts'. This assessment confirms that there are no off site impacts which exceed the HIPAP 4 criteria of 23 kW/m^2.

5.0 Newcastle City Council

In relation to Newcastle City Council's submission the following additional information and or clarification is provided.

5.1 Development Control Plan – Buildings, Structures and Site Layout

The Environmental Assessment does not demonstrate compliance with Section 7.4.7 of the Newcastle Development Control Plan.

This is addressed in **Section 3.4** of the Environmental Assessment – "Section 75R of the EP&A Act notes that the Newcastle Development Control Plan (DCP) does not apply to this project as it is a Major Projects defined under Part 3A of the Act. Nevertheless, the objectives of the DCP have been incorporated into the proposed development where possible."

5.2 Development Control Plan – Landscaping, Habitat Conservation and Open Space

The Environmental Assessment does not demonstrate compliance with Section 7.4.8 of the Newcastle Development Control Plan.

A conceptual landscape design was provided in the Environmental Assessment – Figure 5.12.

5.3 Development Control Plan – Access and Parking

The Environmental Assessment does not demonstrate compliance with Section 7.4.9 of the Newcastle Development Control Plan.

The Environmental Assessment (Appendix 6 page) notes "The local traffic network exhibits all the hallmarks of a successfully designed industrial area…"

Greenleaf Road is approximately 25 metres wide and thus no issues are expected to occur from the largest vehicle entering the site. Access driveways will be able to be designed in accordance with *AS 2890.2:2002.*

Manildra Park will design the car park to comply with *AS/NZS 2890.1:2004 - Parking Facilities – Off-street car parking* i.e. specifically the incorporation of parking spaces for disabled persons. A minimum of 18 parking spaces is required under the Newcastle Development Control Plan. Figure 2.1 of the Environmental Assessment shows 23 car parking spaces. Thus there is ample room within the facility to accommodate car parking for able bodied and disabled persons.

5.4 Construction Noise

Minor exceedence of construction noise goal.

Council has suggested that restricting the hours of construction will minimise the potential noise exceedence. This is not the case. The noise model has adopted a conservative approach and assumed that all items associated with the construction of the facility are operating simultaneously. In practice this is an unlikely scenario and thus the likelihood of potential noise exceedence is unlikely.

5.5 Air Quality

Assessment of the dust and greenhouse gas emissions associated with shipping.

Newcastle Port receives approximately 1500 ships per year. Section 5.3.3 of the Environmental Assessment notes that the Project will contribute an additional 27 vessel visits per year. These vessels will be in port for approximately 24 hours before departing. While in port auxiliary generators are typically used to provide power to the vessel and not the main motor. Particulate emissions resulting from the combustion of diesel within these auxiliary motors is considered to make an insignificant contribution to the overall air quality levels and therefore have not been considered as part of the detailed air quality assessment.

The delivery of material from its point of origin to the facility has not been included in the greenhouse gas assessment, as the emissions associated with this aspect are considered to be equivalent to transport of fuel to existing facilities from overseas locations to either Port Kembla or Sydney.

5.6 Contamination

Additional groundwater sampling to determine source of elevated ammonia groundwater levels.

Section 5.9.1 of the Environmental Assessment notes the Orica site located immediately to the west of the terminal has the following notices issued:

- Note of Existence of Voluntary Remediation proposal (current);
- Declaration of Remediation site (current); and
- Note of Existence of Voluntary Remediation Proposal (former).

The declaration of the remediation site notes that arsenic and ammonia contaminated groundwater from the adjacent Orica site has migrated off the site and may continue to migrate.

The primary source of contamination from the Orica Site is considered to be in the vicinity of the former sludge pit located in the Ammonia Plant. While elevated ammonia levels have been recorded on site, it is noted that the former sludge pit is located west of a groundwater hydraulic divide runs centrally along the southeast peninsular of Kooragang Island (URS 2006).

The elevated ammonia levels are an existing condition. The construction and operation of the Project is not expected to alter the local groundwater conditions. The Orica Environmental Management Plan outlines the procedure for dealing with potentially arsenic contaminated material however, no specific measures are documented for dealing with ammonia contaminated soils and/or groundwater. Manildra Park will however notify Orica of its proposed excavation works program.

5.7 Acid Sulphate Soils

Testing to determine the presence of acid sulphate soils on site.

Figure 3.1 shows that the facility is constructed on reclaimed land, i.e. the area has been extensively filled to create the current shape and landform height. **Section 5.11** notes that Kooragang Island was reclaimed using dredge river sediments.

Based on borehole logs undertaken by Douglas Partners outlined in the baseline contamination assessment for the Environmental Assessment (see Appendix 9 of the Environmental Assessment) the depth of fill is estimated to be between 1.1 and 2.6 metres. Assuming an average depth of 2 metres only the excavation associated with the oil separator pit (20 metres long, 5 metres wide and 5 metres deep) will extend into the natural soil profile. The volume of potential acid sulphate soil generated by this excavation would be approximately 300 m^3. This volume of material can be easily handled on site.

A Potential Acid Sulphate Soil management plan will be developed prior to construction. The Statement of Commitments has been updated to reflect this commitment (see **Appendix 1**).

5.8 Climate Change

Assessment of the greenhouse gas emissions associated with shipping.

The delivery of material from its point of origin to the facility has not been included in the greenhouse gas assessment, as the emissions associated with this aspect are considered to be equivalent to transport of fuel to existing facilities from overseas locations to either Port Kembla or Sydney.

6.0 NSW Fire Brigades

The NSW Fire Brigades (NSWFB) notes that the Environmental Assessment and the Preliminary Hazard Analysis adequately address all of the anticipated hazards for the Project. NSWFB has requested additional information regarding:

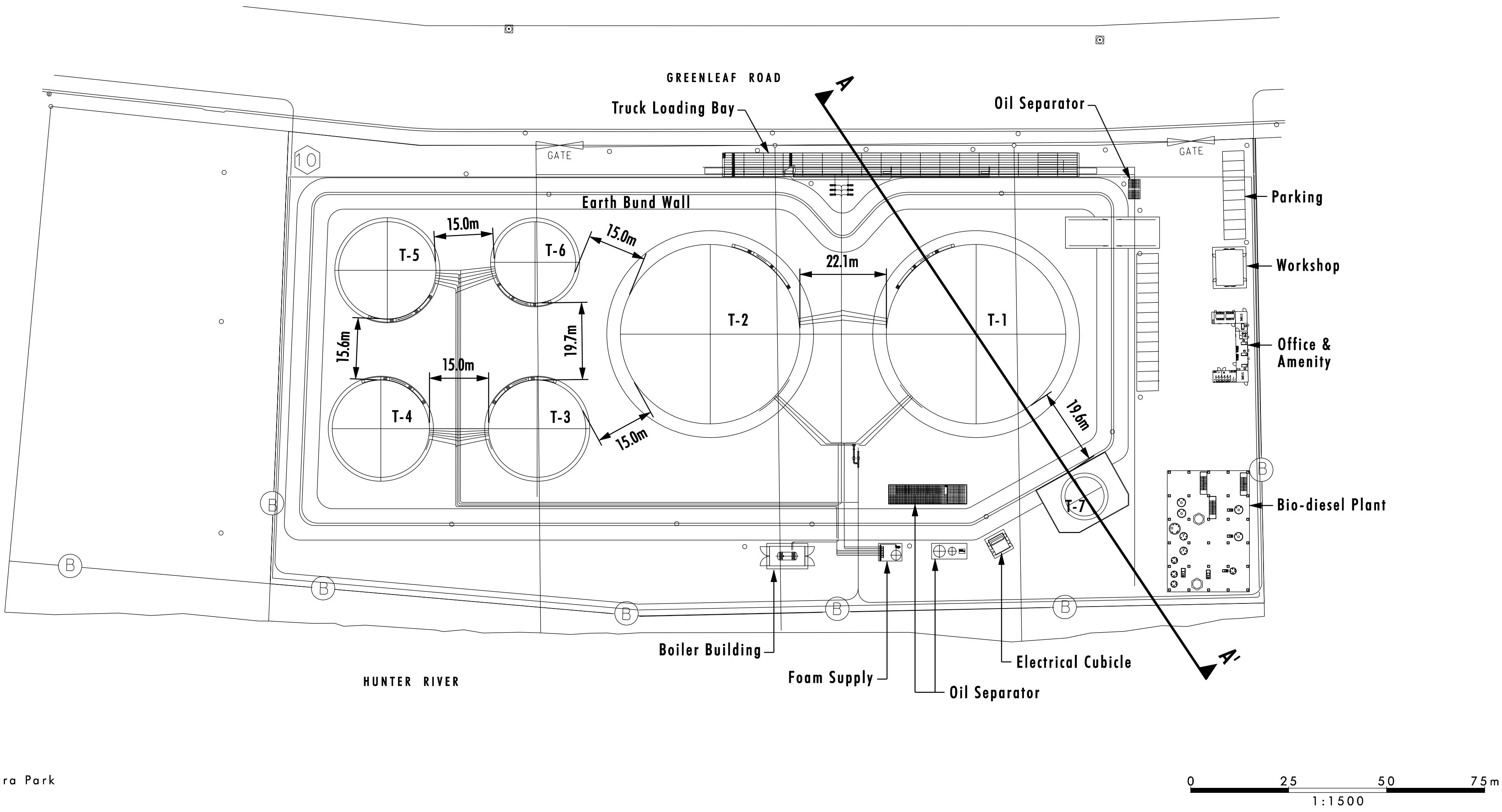
- the affect of radiant heat from a bund fire from a NSWFB intervention view point; and
- fire detection and suppression.

See **Section 4.0**.

7.0 Department of Planning – Hazards Branch

The Department of Planning Hazards Branch requested a cross sectional drawing of the facility.

See **Figures 7.1** and **7.2**.



Source: Manildra Park

FIGURE 7.1

General Arrangement Greenleaf Road Terminal

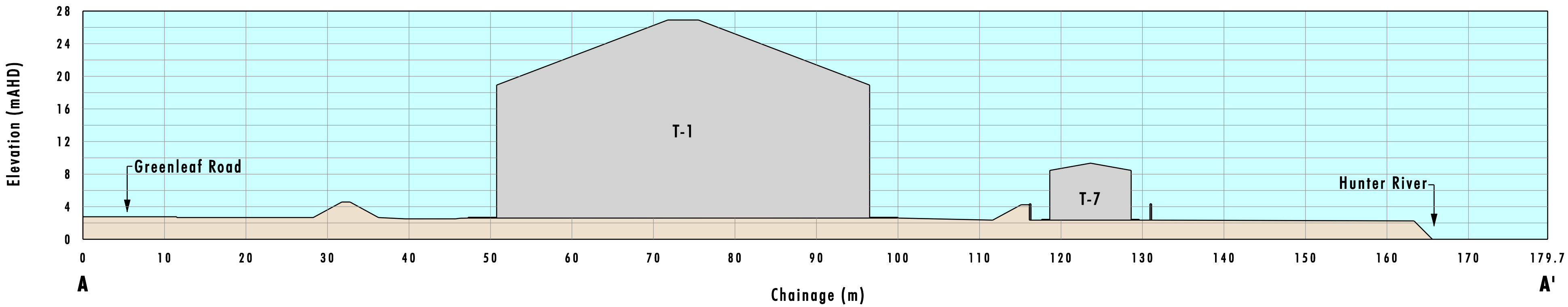


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FIGURE 7.2

Transect A-A' Through Greenleaf Road Terminal

APPENDIX 1

Revised Statement of Commitments

7.0 Revised Draft Statement of Commitments

The draft Statement of Commitments included in the EA has been revised to consider the issues raised in the response to submissions. The Statement of Commitments detail the measures proposed by Manildra Park for environmental mitigation, management and monitoring.

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If approval is granted under the Environmental Planning and Assessment Act 1979 for the Project, Manildra Park will commit to the following controls.

7.1 Operational Controls

7.1.1 All activities will be undertaken generally in accordance with this EA.

7.1.2 The Project will operate up to 24 hour per day 7 days per week.

7.2 Noise

7.2.1 Construction activities which are audible at any residential or other sensitive receiver will be limited to between 7.00 am and 6.00 pm Monday to Friday and 8.00 am and 1.00 pm Saturdays.

Works proposed to be undertaken outside of these hours includes:

- any works that do not cause construction noise emissions to be audible at any nearby sensitive noise receiver;
- the delivery of materials as requested by the Police or other authorities for safety reasons;
- emergency work to avoid the loss of life, property and/or prevent environmental harm; and
- any other work as agreed through negotiation between Manildra Park and potentially affected noise receivers or as otherwise agreed by the DECC.

Noise Mitigation Measures

7.2.2 During the detailed design and procurement process Manildra Park will ensure noise emissions from the facility meet the DECC goals.

7.2.3 Noise emissions from all pumps associated with Phase 3 operations will be enclosed or mitigated.

7.3 Traffic

Pipeline Construction

7.3.1 Manildra Park will provide appropriate traffic management controls during the construction of the transfer pipeline during Phase 1 of the Project. Traffic management controls will include a one lane ‘stop-go’ control along Heron Road and/or the temporary closure of both Heron and Greenleaf Roads.

7.3.2 Manildra Park will consult with the RLMC (or its successor), traffic management operators, Newcastle City Council and the RTA to determine the most effective traffic management measures to be implemented during the construction of the pipeline during Phase 1 of construction.

Operational Traffic Controls

Operational traffic management measures to be implemented include:

7.3.3 Provision of a minimum of 18 parking spaces on-site, where possible.

7.3.4 Overnight heavy vehicle parking will be accommodated for on-site.

7.3.5 The design of the access driveway, and internal access roads, will conform to Australian Standard *AS 2890.2:2002 - Off Street Commercial Vehicle Facilities*.

7.3.6 Provision of appropriate access driveways and circulation roadways, as well as loading areas, which will ensure that all manoeuvring occurs on site.

7.3.7 The design of on-site service areas including the refuelling, service or maintenance bays, will be in accordance with *AS 2890.2*, where appropriate. Through bays may be utilised where the vehicles do not need to manoeuvre on either approach or departure to the service area.

7.3.8 As a principle, heavy vehicles will use the route via Greenleaf Road and the Teal Street on and off ramps for access to and from the west to minimise any potential traffic flow issues.

7.4 Hydrocarbon Management

Manildra Park will manage the risk of hydrocarbon spills through the implementation of a range of physical controls and mitigation measures in the handling of hydrocarbons in the storage, transfer pipeline, refuelling barge and the road tanker loading/unloading bay. The specific physical controls and mitigation measures to be implemented include:

Storage

7.4.1 The following physical controls and mitigation measures have been incorporated into the design and operation of the terminal:

- the storage tanks and connecting pipeline infrastructure has been designed in accordance with *AS 1940:2004 - The storage and handling of flammable and combustible liquids*;
- a leak detection system has been incorporated within the base of each tank;
- the tanks are contained within a bunded area which has been designed in accordance with *AS 1940*. The bunded area has a storage capacity of approximately 110 per cent of the storage capacity of the largest tank. This capacity has also taken into account firewater and rainfall events;

- the bunded area will be lined with high density polyethylene (plastic), ensuring that any spills can not disperse into the soil and/or groundwater;

- prior to commencement of construction of the tank farm bund, or parts of it, Manildra Park will submit a **Tank Farm Bunding Detailed Design and Construction Report**. ("the Report"). The Report will include, but need not be limited to the following:

  - the bund technical specifications including details such as final footprint, size, containment volumes and permeability details;

  - design of the bund lining system to achieve an impermeable barrier with appropriate early warning leak detection and leak prevention systems that are reviewed by a site auditor accredited under the *Contaminated Land Management Act 1997,* prior to the commencement of construction of these facilities;

  - bund construction methodology, including construction quality assurance procedures and timeframes;

  - measures to ensure that any liquids contained within the bund are securely contained and that there is no migration of contaminants from the bund that could cause pollution of ground waters or other risk of harm to human health or the environment; and

  - details of assessment and monitoring programs to ensure that the performance objectives of the bund are achieved and that the bund continues to provide an effective barrier for the prevention of pollution of land and waters;

- as-constructed drawings will be prepared from field surveys which depict the basal elevation of the bund, the upper surface of the liner(s), any geotextiles, engineered liners and sealed layers of the bund;

- prior to the bulk storage of fuel commencing on site, Manildra Park will provide a report which confirms that the bunds infrastructure has been installed in accordance with the **Tank Farm Bunding Detailed Design and Construction Report**. The report will include the 'as constructed drawings', the construction quality control results and written advice from the person(s) overseeing the works to advise whether or not they were installed in accordance with the approved design and construction specifications;

- an automated monitoring system will be installed in all tanks (radar gauge and Programmable Logic Control system-fuel level detector), which will automatically stop fuel pumping if the storage level in the tank exceeds its designed limits during a fuel transfer, i.e. high level alarms;

- standby emergency spill kits are available. Additional resources are available from the Newcastle Port Corporation and from Australian Marine Oil Spill Centre (AMOSC) members located in the area, such as Shell etc;

- isolation valves are physically locked when not in use; and

- valves located within secure/fenced area.

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Transfer Pipeline

7.4.2 The following physical controls and mitigation measures have been incorporated into the design and operation of the transfer pipeline:

- the design, construction, operation and maintenance of the pipeline will be undertaken in accordance with *AS 2885 Pipelines – Gas and liquid petroleum*;
- the pipeline will be cathodically protected for enhanced anti-corrosion properties;
- any underground or inaccessible sections will be sheathed in polymer coating or wrapped in anti-corrosion impregnated tape;
- flexible hoses will be blown out and cleared of fuel with compressed air at end of every use, prior to disconnecting the flexible hose;
- fuel will be removed from the transfer pipeline at the conclusion of each transfer operation i.e. the pipeline will be pigged. The transfer pipeline is empty when connecting flexible hose/or not in use;
- drip trays of a size to Australian Standards will be located underneath the point of connection between the steel pipeline and flexible hose on wharf and barge. Drip trays to be removed by hand and cleaned at terminal;
- the pig points will be bunded. The capacity of the bund will exceed the capacity of the pig hatch;
- the terminal tank(s) will be dip gauged before filling the pipeline and after pigging pipeline to ensure zero fuel remains in pipeline, i.e. confirm the total volume of fuel dispatched/received;
- the volume of fuel dispatched/received will be cross checked at both ends;
- regular (every half hour) cross checks of volume dispatched from terminal to that received at the berth and visa versa;
- regular (continuous at start of pumping then every half hour) cross checks of the pressure within the pipeline at the terminal to that at the berth will be undertaken. Pressure is logged on the Product Transfer Form;
- automatic shut off of the terminal pumps will occur if the maximum operating pressure of the pipeline is exceeded;
- visual inspection of the pipeline will be undertaken prior to and during loading. Half hourly checks will be undertaken during loading;
- emergency stop buttons will be located at staffing points i.e. at terminal, berth, and refuelling barge. Staff walking the pipeline will be in contact with staff at these locations via a radio;
- multiple isolation valves are located along the pipeline, i.e. damaged sections of the pipeline to be isolated to minimise spills;
- isolation valves are physically locked when not in use;

- non-return valves used on pipeline;
- flexible hoses used for fuel tanker vessel discharge will be pressure tested prior to every discharge operation;
- pressure testing of the transfer pipeline will be undertaken at the following intervals:
  - on installation, the pipeline will be pressure tested to 1.5 times its maximum allowable operating pressure;
  - yearly hydrostatic leak and strength testing of pipeline in accordance with the existing operating procedure at Port Kembla; and
  - monthly air pressure test of pipeline in accordance with the existing operating procedure at Port Kembla;
- flexible hoses for barge and ship refuelling are pressure and continuity tested every six months in accordance with the existing operating procedure at Port Kembla;
- valves located within secure/fenced area;
- collision aspects have been considered in the design of pipeline. Physical protection methods e.g. bollards, armco guard rail etc and high visibility colours and signage on pipeline including emergency contact phone numbers will be included where required;
- fuel transfer operations will be undertaken in accordance with Manildra Park’s existing operating procedure at Port Kembla;
- minor spills will be cleaned up using spill kit materials;
- large volume of spilt oil to be removed by a licensed waste oil contractor (e.g. Nation Wide Oil), as required;
- appropriately trained and competent operators in accordance with the existing operating procedure at Port Kembla; and
- multiple staff are located a critical locations during barge refuelling operations allowing for greater awareness and quick response to any issues.

The Refuelling Barge

7.4.3 The following physical controls and mitigation measures have been incorporated into the design and operation of the refuelling barge:

- the barge will be double hulled/double skinned;
  - if the hull of the barge is damaged the contents will be emptied to a ship or the terminal; and
  - additional water based spill control equipment and resources can be called on from the Newcastle Port Corporation and Australian Marine Oil Spill Centre (AMOSC) members e.g. Shell etc;

- Manildra Park will have an emergency response vehicle and punt based on land and the barge will also carry oil spill response equipment (e.g. floating booms) Manildra Park's Oil Spill Response system and capability exceeds IMO & AMSA 'Marine Oil Spill & Pollution Guidelines';

- all loading operations are computer controlled using Programmable Logic Control system at terminal;

- flow meters provide readings of volumes transferred with automatic presets to stop pumps at set volumes;

- radar gauge is used to provide constant readout of barge tank capacity with alarms activated when tanks are nearing capacity;

- manual dippings and ullages (the volume remaining in the tank) at terminal tanks and barge tanks, are undertaken to confirm flow meter and radar gauge readings;

- fuel is to be loaded evenly between the barges tanks to minimise the listing of the refuelling barge;

- the barge includes a dedicated overflow/slops tank;

- radio contact between barge, terminal and staff walking the pipeline is available at all times;

- maintenance of barge is undertaken as part of overall maintenance program;

- the operation and calibration of measuring equipment is undertaken as per existing operating procedure at Port Kembla;

- minor spills to be cleaned up using spill kit materials;

- large volumes of spilt oil to be removed by licensed waste oil contractor (e.g. Nationwide Oil), as required;

- multiple staff at critical locations during barge refuelling operations allowing for greater awareness and quick response to any issues;

- emergency stop buttons located at staffing points;

- additional equipment and resources can be called for from the Newcastle Port Corporation and Australian Marine Oil Spill Centre (AMOSC) members e.g. Shell etc;

- all Manildra Park staff are trained and accredited by the Australian Marine Oil Spill Centre (AMOSC);

- procedures adhere to International Safety Guideline for Oil Tankers and Terminals (ISGOTT) Manual; and

- competent and trained operators e.g. Barge Master.

Road Tanker Loading Unloading Bay

7.4.4 The following physical controls and mitigation measures have been incorporated into the design and operation of the road tanker loading/unloading bay:

- truck loading occurs within a bunded concrete area;
- all spills/stormwater within the loading bay are directed to a 20 KL Spill Pit meeting AS 1940 requirements, which includes an impervious lining layer, such as bentonite (clay) or high density polyethylene (plastic) and provides capacity for spillage from one 8 KL road tanker compartment;
- trucks connect to a PLC system during loading, which controls the loading process via:
  - correlating volume to be loaded with truck ID Tag; and
  - the Scully system i.e. sensor which detects fuel level in tank and activates automatic shut off if triggered;
- flow meters provide readings of volumes transferred with automatic presets to stop pumps at set volumes;
- radar gauge is used to provide constant readout of tank capacity with alarms activated when nearing tank capacity;
- emergency stop buttons are located at filling bays;
- trucks fitted with brake interlocks, which prevents the truck from driving off while connected to the loading bay hoses;
- hoses are fitted with dry break couplings which prevents spills/leaks during connection/disconnection operations; and
- mobile spill kits will be available at the loading site (e.g. wheelie bins with quick response resources).

General

7.4.5 Manildra Park will prepare and implement a **Containment Bund, Tank and Pipeline Integrity Assessment Program**. The Program will detail measure(s) to assess the integrity of the tank farm containment bund, other containment structures, tanks and transfer pipelines during the life of the facility. The Program will include but need not be limited to measures to monitor the effectiveness/integrity of the bunds, tanks other containment structures and pipelines.

Asset Security and Training

7.4.6 A site security plan will be developed prior to the commissioning. This plan will detail how access to fuel storages, master flow and drain values, pumps loading/unloading connections and pipelines will be secured and controlled.

7.4.7 Staff will receive inductions and regular operational training reflective of their roles and responsibilities.

7.5 Hydrology and Water Quality

Construction

7.5.1 A Soil Water Management Plan will be developed in accordance with the requirements of the *Managing Urban Stormwater: Soils and Construction* (NSW Landcom 2004) (the Blue Book) to outline the sediment and erosion control measures implemented during the construction phase.

Operation

7.5.2 Water controls will be designed and constructed to divert clean water around the Project site.

7.5.3 Water collected from dirty areas on site will be stored within spill pits and/or bunded areas (fitted with a high density polyethylene (plastic) impervious liner) and treated. Prior to discharge off site water will be sampled and analysed to ensure it meets the relevant criteria outlined in **Table 7.1**.

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Table 7.1 - Water Quality Discharge Criteria

Water Quality Parameter	Unit of Measure	Criteria 100 % Concentration Limit
pH	pH	6.5 – 8.5
Total Suspended Solids	mg/L	50
Oil and Grease	visible	none
Chemical Oxygen Demand	mg/L	40
Volume	KL	none
BOD	mg/L	No limit specified

7.5.4 Wash water generated during the production of biodiesel will be transported off site to an approved facility for disposal;

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7.5.5 A comprehensive groundwater monitoring program will be developed in consultation with DECC and establish trigger levels which represent limits to indicate the detection of groundwater pollution. The groundwater monitoring parameters includes:

- electrical conductivity;
- pH;
- total suspended solids;
- total petroleum hydrocarbons; and
- total oil and grease.

Deleted: The biodiesel facility will generate approximately 11 ML of wastewater per year. Given the significant and rapid technological advancements occurring with biodiesel technology and that the facility is not expected to be constructed for approximately 3 – 5 years, it is anticipated that either waterless technology and/or significant improvements in plant performance will be achieved. This may alter the wastewater characteristics. Therefore, prior to the commencement of construction of the biodiesel plant, the Soil and Water Management Plan will be revised and updated in consultation with DECC and to satisfaction of DoP. If necessary seek a variation to its EPL from the DECC if on-site treatment followed by discharge to the Hunter River is proposed. Alternatively the wastewater could be transported off site for disposal.

7.5.5 An oil response and prevention plan will be developed.

7.5.6 Effluent from the enviro system will be trucked off site for disposal at an approved facility.

7.5.7 Groundwater samples will be collected and analysed for a period of at least 24 months from the commencement of construction. From this monitoring data Manildra

Park will establish for each parameter the range of concentrations/units indicative of uncontaminated groundwater at the premises.

7.5.8 Within 27 months from the commencement of construction date Manildra Park will submit in writing to the DECC the data obtained under the groundwater monitoring program. The data will be submitted in both graphical and tabular form.

7.5.9 Within 27 months from the commencement of construction date Manildra Park will submit in writing to the DECC and seek written approval for the following:

- a list of parameters and sampling frequencies to be used as the basis of groundwater testing for an on-going groundwater monitoring program; and
- a list of concentrations/units for the parameters to be used as limits to indicate the detection of groundwater pollution when compared to the groundwater test results obtained from the on-going groundwater monitoring program.

7.6 Air Quality

Air Quality Management and Mitigation

Manildra Park have committed to the following air quality management and mitigation measures for the Project:

Construction

7.6.1 Maintenance of appropriate dust management controls during the construction phase of the Project including minimisation of disturbed areas, watering of exposed surfaces during construction and the stabilisation of exposed areas post construction;

Operation

7.6.2 Fitting diesel, marine fuel, biodiesel and associated feedstock (vegetable oils) storage tanks with floating roofs and pressure release valves to assist in minimising vapour emissions from the tanks;

7.6.3 The biodiesel methanol process tank will be blanketed using nitrogen.

Air Quality Monitoring

7.6.4 During the operation of the biodiesel plant, Manildra Park will monitor the methanol recovery system to ensure that it is operating at least 80 per cent efficiency at all times. A shutdown procedure will be implemented if the methanol recovery system is operating at less than 80 per cent efficiency at any time.

7.7 Visual

7.7.1 The site will be landscaped to improve the visual amenity of the site. Native tree and grass species will be selected for landscaping. The species used would be endemic to the area and would complement the objectives of the Kooragang Wetland Rehabilitation Project.

7.7.2 All lighting associated with the proposed development will be designed, installed and operated in accordance with *AS 4282:1997 - Control of the Obtrusive Effects of Outdoor Lighting*.

7.7.3 A weed management plan will also be incorporated into the landscape management plan.

7.8 Hazard and Operability

The preliminary hazard analysis (refer to **Appendix 8**) identified a range of technical control measures and non-technical safeguards and procedures that will be put in place to reduce the level of risk associated with the operation of the facility.

7.8.1 The technical control measures to be implemented include:

- design of tanks, plant, bunding and piping in accordance relevant standards and codes;
- design of surface drainage systems to prevent contamination of surrounding waterways;
- equipment selected for respective hazardous area classification to control ignition sources;
- provision of emergency isolation valves, shut down system and backflow prevention devices;
- reversion of valves, process equipment and control systems to fail safe positions;
- auto shutdown of plant on high temperatures or pressures;
- install tank level device(s) as appropriate and provision of high level alarms;
- physical barriers including bunding and bollards;
- ensuring biodiesel and methanol is stored at suitable conditions to prevent fires and explosions, including venting and nitrogen blanketing;
- control of ignition sources;
- storage of dangerous goods in dangerous goods compliant stores;
- inlet and outlet flow monitoring during ship transfers;
- implementation of leak detection system;
- provision of pump deadhead instrumented protection and recycle lines;
- provision of flame arrestors on vent systems;
- installation of oil/water separators to remove contamination prior to discharge; and
- provision of fire detection system and fire suppression fire water ring main and if required by Australian standards cooling water system and foam deluge fire fighting system.

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7.8.2 The non technical safeguards and procedures to be implemented include:

- conducting HAZOPs of process designs, site layout and design changes;
- equipment and plant inspection and maintenance procedures;
- operating procedures, including manual tank transfers, and training;
- cessation of operations in adverse weather conditions;
- operator monitoring of control conditions such as inlet and outlet flow monitoring during ship transfers, leak detection systems;
- Hot Work/Safe Work Procedure;
- implementation of site speed limit and driver training;
- provision of security measures include ‘person proof’ fencing, CCTV, intruder beams, security patrols, operator/driver vigilance, security access pass for after hours access;
- isolation of the tank farm from the truck loading area when the facility is not manned via fencing i.e. access to tank farm prohibited. Trucks and drivers can only access the truck loading area via a swipe card arrangement;
- development of spill response procedures and management plan;
- provision of PPE and safety shower/eye wash;
- appropriate training and supervision of operations;
- provision of on-water pollution response equipment and plan;
- ensure no flammable class 3 liquids are stored in the same bund area as the combustible C1 substances;
- preparation of a Fire Safety Study;
- procedures are in place for the storage and handling of dangerous goods;
- management procedure for contaminated soil in accordance with Orica Management Plan; and
- preparation of an Emergency Response Plan in accordance with HIPAP 1 that coordinates onsite activities and defers authority to the Local Emergency Operations Controller once external support is sort is response to the emergency. The Local Emergency Operations Controller is the position as defined in the *Newcastle Disaster Plan Newcastle City Council 2005*.

7.8.3 Manildra Park will also implement the following safeguards as recommended by the PHA for the management of the hazards associated potential methanol fires:

- conducting a HAZOP of the process design to minimise the potential for the loss of containment of methanol on site;

- the design, inspection and maintenance of the facility to ensure that infrastructure is fully secure and operational;
- access to foam fire fighting systems to control and mitigate any fires encountered; and
- control of ignition sources.

7.9 Soil and Groundwater Contamination

Pipeline Construction

7.9.1 Prior to disturbance of soils within the identified Orica contamination zone, for pipeline construction Manildra Park will follow the processes outlined in the Orica EMP.

7.9.2 A physical barrier such as a clay plug will be constructed at the northern and southern extents of the contamination zone

Construction and Operation

7.9.3 In the event of any potential or actual ASS/contaminated material being encountered, the following management measures will be implemented:

Materials Handling:

- separate stockpiles for different materials;
- stockpiles to be located within a bunded area;
- liming of the stockpile ground prior to the stockpiling of ASS material; and
- the stockpile will be treated with lime as required.

Testing:

- testing of ASS and treatment with lime as required; and
- classification of material prior to disposal.

7.9.4 Where possible, ASS material will be treated and re-used for the backfilling of pipeline trenches, or other construction activities on site. Contaminated material may also be encapsulated within the on site earthen bunds or used as backfill material in the trench. In the event that the material cannot be successfully treated and or reused it will be removed from site. If additional material is required for the construction of the bund, only Virgin Excavated Natural Material (VENM) will be imported and used unless otherwise approved in writing by DECC.

7.9.5 A remediation action plan will be prepared for the handling of lead contaminated material that occurs in surface layer around the base of the existing tanks.

7.10 Greenhouse Management

7.10.1 Assess the viability of implementing energy management systems;

7.10.2 Seek continuous improvement in energy efficiency in the onsite processes; and

7.10.3 Assess and implement energy and greenhouse management initiatives during the design and operation of the Project.

7.11 Waste Management

7.11.1 The management of waste materials generated by the construction and operation of the Project will be managed through the design; procurement of construction materials and purchasing; identification and segregation of reusable and recyclable materials; processing materials for recycling; and considering environmental impacts for waste removal processes.

7.12 Environmental Management, Monitoring, Auditing and Reporting

Environment Management System

7.12.1 Manildra Park will develop and implement an Environment Management System to outline the environmental management practices to be implemented during the construction and operation of the Project.

Environmental Protection Licence

7.12.2 Manildra Park will obtain an Environmental Protection Licence for the Project.

Independent Environmental Audit

7.12.3 Three years after the commencement of the Project, and every four years thereafter, Manildra Park will commission and pay the full cost of an Independent Environmental Audit of the Project.

Incident Reporting

7.12.4 Within seven days of detecting an exceedance of the limits/performance criteria in this approval or an incident causing (or threatening to cause) material harm to the environment, Manildra Park will report the exceedance/incident to the Department, and any relevant agency. The report will:

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- describe the date, time, and nature of the exceedance/incident;
- identify the cause (or likely cause) of the exceedance/incident;
- describe what action has been taken to date; and
- describe the proposed measures to address the exceedance/incident.

Community Enquiry Phone Number

7.12.5 Prior to the commencement of construction, Manildra Park will implement, publicise and list with a telephone company a contact phone number, which would enable the general public to reach a person who can arrange appropriate response action to the enquiry. Manildra Park will maintain a register to record details of all enquiries received and actions undertaken in response. Manildra Park will supply the DECC with a copy of the enquiries register on an annual basis.

APPENDIX 2

Methanol Tank (T-7) Fire

Appendix 2 - Methanol Tank (T-7) Fire

CONFINED POOL FIRE MODEL

CIRCULAR DIKE OR TANK FIRE

FUEL

Name	: ETHYL ALCOHOL
Pool temperature	: 25.0 °C

CONSTANT PROPERTIES

Molecular weight	: 46.07
Boiling point	: 78.3 °C
Critical temperature	: 516.25 K
Critical pressure	: 63.83 bar
Heat of combustion	: 2.69E+07 J/kg
Flame temperature	: 1300 K

CALCULATED PROPERTIES

Liquid compressibility factor	: 0.002
Liquid density	: 763.2 kg/cu m

DIMENSIONS

Pool diameter	: 10.0 m
Pool liquid height	: 6.0 m
Height of flame base	: 6.0 m
Height for Radiation Calculations	: 2.0 m

LOCAL AMBIENT CONDITIONS

Air temperature	: 25.0 °C
Ambient pressure	: 1.01 bar
Wind speed	: 1.5 m/s
Relative humidity	: 50.0%

RESULTS

Mass burning rate	: 0.026 kg/m² s
Flame length	: 10.2 m
Flame tilt from vertical	: 31.17°
Flame drag ratio	: 1.00
Maximum emissive power	: 75.0 kW/m²
Effective emissive power	: 71.27 kW/m²

Thermal flux (kW/m²)	Distance From center of Pool (m)
23.0	10.61
12.6	12.26
4.7	22.13

Distance from center of pool (m)	Thermal flux to horizontal target (kW/m²)	Thermal flux to vertical target (kW/m²)	Maximum flux to target (kW/m²)
7.50	11.14	3.14	25.83
10.00	10.88	6.13	26.90
12.50	8.56	6.97	11.04
15.00	6.22	6.58	9.06
20.00	3.07	4.82	5.71
25.00	1.56	3.30	3.65
30.00	0.85	2.29	2.44
40.00	0.32	1.22	1.26
60.00	0.08	0.48	0.49
100.00	0.01	0.15	0.15

APPENDIX 3

Methanol Bund Fire

Appendix 3 - Methanol Bund Fire

```
CONFINED POOL FIRE MODEL

 RECTANGULAR DIKE FIRE

 FUEL
   Name                                     : ETHYL ALCOHOL
   Pool temperature                         : 25.0 °C

 CONSTANT PROPERTIES
   Molecular weight                         : 46.07
   Boiling point                            : 78.3 °C
   Critical temperature                     : 516.25 K
   Critical pressure                        : 63.83 bar
   Heat of combustion                       : 2.69E+07 J/kg
   Flame temperature                        : 1300 K

 CALCULATED PROPERTIES
   Liquid compressibility factor            : 0.002
   Liquid density                           : 763.2 kg/cu m

 DIMENSIONS
   Pool width                               : 14.5 m
   Pool length                              : 20.0 m
   Pool Liquid Height                       : 2.0 m
   Height of flame base                     : 2.0 m
   Height for Radiation Calculations        : 2.0 m

 LOCAL AMBIENT CONDITIONS
   Air temperature                          : 25.0 °C
   Ambient pressure                         : 1.01 bar
   Wind speed                               : 1.5 m/s
   Relative humidity                        : 50.0%

 RESULTS
   Mass burning rate                        : 0.028 kg/m² s
   Flame length                             : 13.62 m
   Flame tilt from vertical (front view)    : 23.35°
   Flame tilt from vertical (side view)     : 14.38°
   Flame drag ratio (front view)            : 1.00
   Flame drag ratio (side view)             : 1.00
   Maximum emissive power                   : 75.0 kW/m²
   Effective emissive power (front view)    : 74.03 kW/m²
   Effective emissive power (side view)     : 74.81 kW/m²

   Front view (view along dike/trench width)
   -------------------------------------------------------------------
     Thermal flux                 Distance from center of pool
        (kW/m²)                                (m)
   -------------------------------------------------------------------
          23.0                                 19.69
          12.6                                 26.38
           4.7                                 39.69
   -------------------------------------------------------------------

   Side view (view along dike/trench length)
   -------------------------------------------------------------------
     Thermal flux                 Distance from center of pool
        (kW/m²)                                (m)
   -------------------------------------------------------------------
          23.0                                 19.43
          12.6                                 25.43
           4.7                                 37.36
   -------------------------------------------------------------------
```

Maximum emissive power : 23,775 Btu/ft² hr

Front view (view along dike/trench width)

Distance from center of pool (m)	Thermal flux to horizontal target (kW/m^2)	Thermal flux to vertical target (kW/m^2)	Maximum flux to target (kW/m^2)
10.88	33.38	30.42	44.99
14.50	22.86	27.49	35.75
18.13	14.27	22.28	26.46
21.75	8.59	17.00	19.04
29.00	3.26	9.57	10.11
36.25	1.43	5.70	5.88
43.50	0.72	3.67	3.74
58.00	0.25	1.83	1.85
87.00	0.06	0.67	0.67
145.00	0.01	0.20	0.20

Side view (view along dike/trench length)

Distance from center of pool (m)	Thermal flux to horizontal target (kW/m^2)	Thermal flux to vertical target (kW/m^2)	Maximum flux to target (kW/m^2)
15.00	22.51	27.43	35.48
20.00	11.00	18.70	21.69
25.00	5.30	12.01	13.13
30.00	2.72	7.86	8.32
40.00	0.90	3.83	3.93
50.00	0.38	2.17	2.20
60.00	0.19	1.38	1.39
80.00	0.07	0.66	0.67
120.00	0.02	0.25	0.25
200.00	0.00	0.08	0.08

APPENDIX 4

Oil/Diesel Tank (T-5) Fire

Appendix 4 - Oil/Diesel Tank (T-5) Fire

```
CONFINED POOL FIRE MODEL

CIRCULAR DIKE OR TANK FIRE

 FUEL
   Name                                     : DESIEL FUEL OIL
   Pool temperature                         : 25.0 °C

 CONSTANT PROPERTIES
   Molecular weight                         : 200.0
   Boiling point                            : 173.85 °C
   Critical temperature                     : 550.1 K
   Critical pressure                        : 39.62 bar
   Heat of combustion                       : 4.26E+07 J/kg
   Flame temperature                        : 1300 K

 CALCULATED PROPERTIES
   Liquid compressibility factor            : 0.004
   Liquid density                           : 2062.9 kg/cu m

 DIMENSIONS
   Pool diameter                            : 15.0 m
   Pool liquid height                       : 13.5 m
   Height of flame base                     : 13.5 m
   Height for Radiation Calculations        : 2.0 m

 LOCAL AMBIENT CONDITIONS
   Air temperature                          : 25.0 °C
   Ambient pressure                         : 1.01 bar
   Wind speed                               : 1.5 m/s
   Relative humidity                        : 50.0%

 RESULTS
   Mass burning rate                        : 0.07 kg/m² s
   Flame length                             : 24.58 m
   Flame tilt from vertical                 : 33.71°
   Flame drag ratio                         : 1.00
   Maximum emissive power                   : 47.0 kW/m²
   Effective emissive power                 : 46.48 kW/m²
```

Thermal flux (kW/m²)	Distance From center of Pool (m)
23.0	Unable to calculate distance to this flux
12.6	Unable to calculate distance to this flux
7.7	21.10
4.7	24.22

Distance from center of pool (m)	Thermal flux to horizontal target (kW/m²)	Thermal flux to vertical target (kW/m²)	Maximum flux to target (kW/m²)
11.25	4.08	0.54	4.48
15.00	4.75	1.40	6.24
18.75	4.66	2.10	7.32
22.50	4.19	2.52	4.88
30.00	2.96	2.62	3.95
37.50	1.94	2.27	2.98
45.00	1.25	1.84	2.22
60.00	0.54	1.14	1.27
90.00	0.14	0.48	0.50
150.00	0.02	0.15	0.15

APPENDIX 5

Oil/Diesel Tank (T-1) Fire

Appendix 5- Oil/Diesel Tank (T-1) Fire

CONFINED POOL FIRE MODEL

CIRCULAR DIKE OR TANK FIRE

FUEL

Name	: DESIEL FUEL OIL
Pool temperature	: 25.0 °C

CONSTANT PROPERTIES

Molecular weight	: 200.0
Boiling point	: 173.85 °C
Critical temperature	: 550.1 K
Critical pressure	: 39.62 bar
Heat of combustion	: 4.26E+07 J/kg
Flame temperature	: 1300 K

CALCULATED PROPERTIES

Liquid compressibility factor	: 0.004
Liquid density	: 850 kg/cu m

DIMENSIONS

Pool diameter	: 45.0 m
Pool liquid height	: 16.0 m
Height of flame base	: 16.0 m
Height for Radiation Calculations	: 2.0 m

LOCAL AMBIENT CONDITIONS

Air temperature	: 25.0 °C
Ambient pressure	: 1.01 bar
Wind speed	: 1.5 m/s
Relative humidity	: 50.0%

RESULTS

Mass burning rate	: 0.071 kg/m² s
Flame length	: 53.11 m
Flame tilt from vertical	: 0.0°
Flame drag ratio	: 1.00
Maximum emissive power	: 50.0 kW/m²
Effective emissive power	: 50.0 kW/m²

Model unstable at less than 50 kW/m^2

Thermal flux (kW/m²)	Distance From center of Pool (m)
23.0	Unable to calculate distance to this flux
12.6	Unable to calculate distance to this flux
5.2	43.70
4.7	55.35

Distance from center of pool (m)	Thermal flux to horizontal target (kW/m²)	Thermal flux to vertical target (kW/m²)	Maximum flux to target (kW/m²)
33.75	3.74	2.02	4.25
45.00	3.84	3.50	5.19
56.25	2.96	3.57	4.64
67.50	2.17	3.19	3.86
90.00	1.16	2.30	2.58
112.50	0.65	1.64	1.76
135.00	0.39	1.20	1.26
180.00	0.17	0.69	0.71
270.00	0.05	0.31	0.31
450.00	0.01	0.11	0.11

APPENDIX 6

Oil/Diesel Bund Fire

Appendix 6 - Oil/Diesel Bund Fire

```
CONFINED POOL FIRE MODEL

 RECTANGULAR DIKE FIRE

 FUEL
   Name                                     : DESIEL FUEL OIL
   Pool temperature                         : 25.0 °C

 CONSTANT PROPERTIES
   Molecular weight                         : 200.0
   Boiling point                            : 173.85 °C
   Critical temperature                     : 550.1 K
   Critical pressure                        : 39.62 bar
   Heat of combustion                       : 4.26E+07 J/kg
   Flame temperature                        : 1300 K

 CALCULATED PROPERTIES
   Liquid compressibility factor            : 0.004
   Liquid density                           : 850 kg/cu m

DIMENSIONS
   Pool width                               : 75.0 m
   Pool length                              : 200.0 m
   Pool Liquid Height                       : 0.5 m
   Height of flame base                     : 0.5 m
   Height for Radiation Calculations        : 2.0 m

 LOCAL AMBIENT CONDITIONS
   Air temperature                          : 25.0 °C
   Ambient pressure                         : 1.01 bar
   Wind speed                               : 1.5 m/s
   Relative humidity                        : 50.0%

 RESULTS
   Mass burning rate                        : 0.071 kg/m² s
   Flame length                             : 75.74 m
   Flame tilt from vertical (front view)    : 0.0°
   Flame tilt from vertical (side view)     : 0.0°
   Flame drag ratio (front view)            : 1.00
   Flame drag ratio (side view)             : 1.00
   Maximum emissive power                   : 45.0 kW/m²
   Effective emissive power (front view)    : 45.0 kW/m²
   Effective emissive power (side view)     : 45.0 kW/m²

   Front view (view along dike/trench width)
   ------------------------------------------------------------------
     Thermal flux                 Distance from center of pool
        (kW/m²)                              (m)
   ------------------------------------------------------------------
          23.0                              49.97
          12.6                              94.97
           4.7                             176.23
   ------------------------------------------------------------------

   Side view (view along dike/trench length)
   ------------------------------------------------------------------
     Thermal flux                 Distance from center of pool
        (kW/m²)                              (m)
   ------------------------------------------------------------------
          23.0                             108.90
          12.6                             137.49
           4.7                             187.27
   ------------------------------------------------------------------

   Maximum emissive power                   : 14,265 Btu/ft² hr
   Front view (view along dike/trench width)
   -----------------------------------------------------------------------------
     Distance from     Thermal flux to     Thermal flux to      Maximum flux
     center of pool    horizontal target   vertical target       to target
          (m)              (kW/m²)             (kW/m²)             (kW/m²)
   -----------------------------------------------------------------------------
```

56.25	12.65	17.47	21.05
75.00	8.55	14.46	16.43
93.75	5.68	11.81	12.80
112.50	3.80	9.52	10.01
150.00	1.81	6.18	6.30
187.50	0.95	4.15	4.18
225.00	0.54	2.91	2.91
300.00	0.22	1.61	1.60
450.00	0.06	0.68	0.67
750.00	0.01	0.23	0.22

Side view (view along dike/trench length)

Distance from center of pool (m)	Thermal flux to horizontal target (kW/m^2)	Thermal flux to vertical target (kW/m^2)	Maximum flux to target (kW/m^2)
150.00	4.37	9.00	9.62
200.00	1.18	3.74	3.80
250.00	0.43	1.89	1.89
300.00	0.19	1.10	1.10
400.00	0.06	0.50	0.50
500.00	0.03	0.28	0.28
600.00	0.01	0.18	0.18
800.00	0.00	0.09	0.09
1,200	0.00	0.04	0.04
2,000	0.00	0.01	0.01

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