

1.1 The Title of the Proposal

The Shell Company of Australia Limited (Shell), BP Australia Limited (BP) and Mobil Oil Australia Limited (Mobil) propose to build and operate a terminal at East Arm Port in Darwin Harbour to receive, store and load out petroleum products. The facility is referred to as the Darwin Joint Terminal (DJT).

1.2 Name and Address of Proponent

The three companies are in the process of negotiating an agreement with the Northern Territory Government concerning access to 20 ha of land within the East Arm Port precinct. Following agreement with the Government, the three companies will jointly form an appropriate business entity to construct, own and operate the facility. Shell has been appointed project manager, and as such the Proponent for this project is:

Shell Company of Australia Limited
Shell House
1 Spring Street
Melbourne
VICTORIA 3001

Attention: MLB LOMX

1.3 Project Background and Justification

The Northern Territory Government announced in August 1992 that additional port facilities would be built at East Arm in Darwin Harbour. Expansion of the port has been a long-term goal of the Northern Territory Government since self-government was achieved in 1978. The East Arm Port is being constructed in stages and will ultimately have the potential to handle projected volumes of general cargoes, livestock and bulk materials for at least the next fifty years.

Bulk petroleum shipments are currently received at the Fort Hill Berth, with product stored at and distributed from the Shell, BP and Mobil terminals at Frances Bay. The proposed DJT at East Arm will replace the three existing terminals and will be capable of handling the bulk fuel requirements for Darwin and a large proportion of Territory markets. It will be designed to grow with the Territory and will be a purpose-built facility appropriately designed and constructed to suit the needs of the users.

The site is strategically located near the new East Arm Port, which will have bulk oil tanker berthing facilities and dedicated receipt pipelines from the wharf to the terminal. It is also located adjacent to the proposed Alice Springs to Darwin railway line. Allowance has been made for the future construction of a dedicated siding and rail tank car loading gantry.

The construction of the new terminal at East Arm and the removal of the old terminals will allow land at Frances Bay to be redeveloped for the uses proposed in the Central Darwin Land Use Objectives 1996. With the relocation of the oil company Fort Hill Wharf and tank farm activities, it is expected that oil company road train movements will be significantly reduced within the city area. This will have traffic safety and residential benefits.

1.4 Description of Project

The DJT site is being prepared for the proponent by the Northern Territory Government, and this preparation includes the necessary subdivision, earthworks and off-site stormwater drainage, and connection of services. The Northern Territory Government will also provide the oil berth, the wharf/terminal supply pipelines and other ancillary works. The proponent will provide the DJT and will operate the integrated oil berth, wharf/terminal pipeline and terminal system. Therefore for the purposes of this PER the starting point for the project is the construction of terminal facilities.

The 20 ha site will provide adequate space for the immediate and future storage and distribution needs of the three oil companies.

A total of 11 tanks will be constructed initially. The terminal layout plan allows for construction of at least 2 additional tanks in the future to meet potential market demands. The basis of the design for tankage is the year 2006 offtakes, and has regard for stock cover and product supply logistics. The total storage capacity is 135 Ml of bulk fuel. The total actual and estimated throughput for the years 1996 and 2006 are 606 and 797 Ml, respectively.

The largest tanks to be constructed will have height/diameter dimensions of 22/36 m, respectively. Tank separation will conform to the relevant Australian Standards (AS 1940). Separation distances are 1.5 times the diameter of the tanks, having regard to risk management and the ability to reduce the need for ancillary fire equipment.

The gantry/distribution area will ultimately allow for the transport of fuel by road trains and rail. Road access will be provided to Berrimah Road to Department of Transport and Works Construction Agency requirements. The gantry/distribution area will also incorporate offices, a control room, a workshop, firewater tank and pump house, storage areas and other ancillary facilities.

All fuel circulation pipelines within the site will generally be constructed above ground.

The site will be secured with security fencing and complemented by security guard patrols. Vehicle and personal access will be by security key card. Site lighting will be provided and emergency security lighting will be provided in the event of a power failure.

1.5 Potential Environmental Impacts

The potential environmental impacts and proposed management associated with each stage of the development are summarised in **Table 1.1**.

The primary objectives of the proposed environmental management and monitoring programme are to control environmental impacts to levels within acceptable standards, and to minimise possible impact on the community and the workforce of foreseeable risks during the planning, design, construction and subsequent operation phases of the terminal.

The proposed construction phase of the development will extend for approximately 24 months and will result in a number of short term effects such as the generation of noise and dust caused by earthworks and building activities and may result in increased erosion through surface runoff.

The operation phase of the project has the potential to produce longer term effects on the environment than the construction phase. The main issues include risk and hazards associated with the handling and storage of flammable hydrocarbons, atmospheric emissions, contamination of the environment through spills or leaks of hydrocarbon products and management of potentially contaminated stormwater.

It should be noted that the DJT will rationalise the three existing oil company terminals at Frances Bay to the single East Arm location, and that there will be a corresponding rationalisation of risk. There will be benefits such as emergency response and a general reduction in the Darwin community's exposure to risk from fuel storage facilities and operations.

1.6 Summary of Management Commitments

The proposal seeks to establish a joint user petroleum terminal that will use proven, appropriate technology to minimise environmental impacts from the terminal. The major potential environmental impacts and risks associated with the project are well categorised and understood, and appropriate management practices will be adopted for the benefit of the community at large.

The proponent has proposed several management commitments to ensure the development of an environmentally sound project. A summary of the management commitments is presented in **Table 1.2**.

Table 1.1: Summary of Potential Impacts Associated with the DJT

Construction Phase

Issue	Potential Impact	Environmental Management and Safeguards	Monitoring
Air Quality	Dust emissions from earthworks and vehicle movements reducing air quality.	If dust emission is a problem then dust suppression using water trucks and sprinklers will be implemented.	Visually monitored by construction contractor. Ambient monitoring will be undertaken in response to complaints.
Noise	Construction activities may generate significant noise.	Construction will be carried out in accordance with Section 6 of Australian Standard 2436-1981. Site is within a designated industrial area with the nearest residence more than 5km away.	Ambient noise monitoring will be implemented in response to noise complaints.
Surface Runoff and Erosion	Siltation of mangrove areas and increased turbidity and sedimentation of the waters of East Arm from surface runoff and erosion.	Implementation of good construction practices aimed at minimising erosion impacts such as providing surface drainage system to divert runoff away from disturbed areas and provision of silt traps to minimise off-site sediment discharge.	Regular inspection of silt traps.
Acid Sulphate Soils	Leachate from acid sulphate soils impacting on the surrounding environment and causing corrosion and weakening of concrete foundations and sub-surface structures.	Investigate the acid forming potential of landfill used at the site. If potential acid forming soils are identified then an acid sulphate soil management plan will be implemented.	The acid potential of soil from DJT site will be monitored prior to construction.
Introduced Weeds, and Pests and Diseases	The importation of weed species or seed material by vehicles.	A washdown procedure for off-road vehicles to be instigated if required.	
Construction Wastes	Waste management of construction wastes will be required.	Solid wastes disposed of to approved landfill sites. Wastes oils and solvents collected and recycled or disposed to an approved liquid waste disposal site. Sewage and sullage retained in sealed tanks and disposed to an approved waste disposal site.	

Issue	Potential Impact	Environmental Management and Safeguards	Monitoring
Biting Insects	<p>Increase in mosquitos and other biting insect numbers due to pondage of water and potential for creation of breeding sites.</p> <p>Potential public health problem through the transmission of diseases.</p> <p>Public nuisance.</p>	<p>Careful attention to design and maintenance of earthworks and drainage systems during construction to avoid creation of significant habitat areas for mosquito larvae.</p> <p>Use of larvicides may be required to prevent mosquito breeding in slit traps.</p>	Regular site inspection for breeding areas.
Traffic	Increased traffic and associated safety issues.	Only through traffic is to adjacent cement complex or East Arm Port. Construction traffic movements will be via designated arterial roads such as Berrimah Road, Tiger Brennan Drive and Stuart Highway and will not travel through residential areas.	

Table 1.1: Summary of Potential Impacts Associated with the DJT (continued)

Operational Phase

Issue	Potential Impact	Environmental Management and Safeguards	Monitoring
Risk	Proposed facilities have the potential to pose significant hazards to workforce and general public.	Preliminary risk and hazard assessment has been undertaken. Risk management controls incorporated into detailed design and terminal operations to minimise risk to ALARP.	
Surface Runoff	The off-site discharge of drainage water could act as a vector for the movement of contaminants from the terminal into the broader environment such as the mangal area to the west of the site.	Segregated drainage system with effluent treatment facilities will be provided. The system will be designed to handle all drainage from the oily water and clean water systems.	Water quality of stormwater discharged from site.
Spills and leakages	Hydrocarbons and other toxic chemicals leaching into sub-surface from spills, leaking product lines, fill points, gantry, storage tanks, Wharf/Terminal pipelines or stored chemicals impacting soil, groundwater or surface water. Oil spill within Darwin Harbour resulting from tanker discharge operations.	All storage will be bunded and product handling and delivery facilities will be connected by the segregated drainage system to the oily waste treatment system. Design standards and operational practise to prevent product leakage. Design to include spill containment, bund impermeability and drainage system. Strict adherence to operating and maintenance procedures. Emergency contingency plans.	Groundwater up and down the hydraulic gradient of the terminal site will be monitored by a series of bores.
Waste disposal	Waste management of operational wastes will be required.	Any sludge/waste oil generated from the drainage treatment system will be recycled or disposed to an approved off-site waste disposal site.	

Issue	Potential Impact	Environmental Management and Safeguards	Monitoring
Air Quality	<p>Volatile organic carbon (VOC) emissions will occur to the atmosphere from the storage and handling of fuels.</p> <p>It is estimated that at maximum throughput, less than 600 tonnes of VOC will be released per annum.</p>	<p>VOC emissions to the atmosphere will occur at a safe location. Minimal other VOC sources within the airshed, and minimal impact on the air quality.</p> <p>Tanks containing highly volatile motor gasolines will have internal floating covers. Jet and Avgas tanks to be fitted with PV valves.</p> <p>Allowance for construction of a VOC recovery unit at a later time.</p>	
Noise	Operational activities may generate noise.	<p>Site is within a designated industrial area with the nearest residence more than 5 km away.</p> <p>Road vehicle movements likely to be the only notable source of noise.</p>	Ambient noise monitoring will be implemented in response to noise complaints.
Biting Insects	<p>Potential public health problem through the transmission of diseases.</p> <p>Public nuisance.</p>	<p>Careful attention to design and maintenance of drainage systems to avoid the creation of significant habitat areas for mosquito larvae.</p> <p>Education of operators to the dangers of biting insects.</p> <p>Provision of personal repellent and protective clothing as required.</p> <p>Use of larvicides as required.</p>	Inspection of drainage system during maintenance and operation.
Traffic	Increased traffic and associated safety issues.	The location of the site within a designated industrial area and its direct access to the regional road network will ensure that the proposed development is unlikely to have any adverse impact as a result of the traffic generated by the proposal.	

Table 1.2: Summary of Commitments

Pre-Construction

Issue	Objective	Commitment	Timing	Whose Advice	Measurement Compliance Criteria
Fire (ref 2.4.7)	To assess the risk of fire due to terminal operations, having regard to layout and the design basis.	A fire risk study will be conducted. The scope will include automation of foam deluge on the road gantry, top or bottom foam injection into tanks and provision of fusible shutdown systems.	During the design phase	DLPE, NT Fire and Rescue	Submission of fire risk study report.
Acid sulphate soils (ref 4.1.4)	To prevent acid generation in on-site soils and a consequential adverse effect on the environment and terminal facilities.	Samples of soil from the DJT site will be analysed for acid sulphate potential. If potential acid forming soils are identified, then an acid sulphate soil management plan will be implemented.	Prior to construction	DLPE	Issue of acid sulphate assessment report.
Hazard identification (ref 4.2.1.1)	To reduce risks associated with the construction and operation of the DJT to an acceptable level.	Significant hazards associated with the construction and operation of the terminal will be identified and management controls incorporated in facility design and for construction and operation.	Prior to construction	DLPE, WHA	Hazard identification and implementation of management controls.
Water Discharge (ref 4.2.2)	To ensure discharge water does not adversely affect the receiving environment.	The drainage system and treatment facility to be designed to ensure discharge water meets DLPE requirements.	Prior to construction	DLPE	Design and construction documentation.
Leakages from Wharf/Terminal Pipelines (ref 4.2.3.2)	To ensure no adverse impacts due to leakages from Wharf/Terminal Pipeline.	The proponent will consult with the DLPE and DTW on the route and design and construction of the Wharf/Terminal pipelines.	Prior to construction	DLPE, DTW	Consultation with the DLPE and DTW.
Air emissions (ref 4.2.5)	To reduce VOC emissions from the DJT to an acceptable level.	VOC emission reduction technology will be incorporated into the gantry and storage tank design.	Prior to construction	DLPE	Design and construction documentation.
Environmental management plan for construction (ref 5.2)	To ensure environmental management in accordance with key objectives.	An EMP will be prepared once environmental approval for the DJT has been granted. The EMP will comprise two sections - Construction and Operation.	Prior to construction	DLPE	Issue of Construction EMP.

Table 1.2: Summary of Commitments (Continued)

Construction

Issue	Objective	Commitment	Timing	Whose Advice	Measurement Compliance Criteria
Dust (ref 4.1.1)	To protect the surrounding land users such that dust emissions will not adversely impact upon their welfare and amenity or cause health problems.	Appropriate dust control measures, such as the spraying of exposed surfaces with water will be implemented should dust levels prove to be an issue.	During construction	DLPE	Site inspections.
Surface runoff and erosion (ref 4.1.3)	To ensure that the environmental impact of waste effluents is minimised.	The proponent will adopt good construction practices that will ensure the environmental impact of waste effluents generated on-site during construction will be minimised.	During construction	DLPE	Site inspections.
Construction waste (ref 4.1.6)	To adopt measures to reduce and recycle solid wastes where practicable. Dispose of remaining wastes so as to reduce any environmental impacts.	All waste materials generated during construction will be disposed of in a manner satisfactory to the DLPE.	During construction	DLPE	Receipt of waste at DLPE approved sites.

Table 1.2: Summary of Commitments (Continued)

Operation					
Issue	Objective	Commitment	Timing	Whose Advice	Measurement Compliance Criteria
Emergency response (ref 4.2.1.1)	Ensure minimal risk of damage to the environment or personnel through the implementation of appropriate action in the case of an emergency.	An Emergency Response Plan will be prepared that addresses issues relating to the accidental release of hydrocarbon vapours, accidental spillage of hydrocarbon products, fires and explosions. Terminal employees will be trained in this Emergency Response Plan.	Prior to commissioning	DLPE, NT Fire and Rescue	Submission of Emergency Response Plan and delivery of training.
Hazardous materials (ref 4.2.1.1)	Ensure risks associated with hazardous materials are managed.	Hazardous materials management procedures will be developed, introduced and maintained.	Prior to commissioning	DLPE, WHA	Issue of hazardous materials management procedures.
Health and safety (ref 4.2.1.1)	Ensure the health and safety of on-site personnel is proactively managed.	An Occupational Health and Safety programme will be developed with all terminal employees trained in the procedures.	Prior to commissioning	DLPE, WHA	Issue of Occupational Health and Safety programme and delivery of training.
Oil spills in Darwin Harbour (ref 4.2.3.1)	To ensure marine oil spill response capability.	Consult with DPA to amend the Darwin Harbour Oil Spill Contingency Plan.	Prior to commissioning	DLPE, DPA	Consultation with DPA.
Leakages from Wharf/Terminal Pipelines (ref 4.2.3.2)	To ensure no adverse impacts due to leakages from Wharf/Terminal Pipeline.	The proponent will establish an asset management system and an emergency contingency plan for the Wharf/Terminal pipelines.	Prior to commissioning	DLPE, DTW	Establishment of an asset management system and issue of pipeline emergency contingency plan.
Groundwater (ref 4.2.3.3)	To ensure no adverse impact on groundwater by terminal operations.	Groundwater quality in the vicinity of the terminal will be monitored and corrective action taken if unacceptable impacts are identified.	During operation	DLPE	Issue of groundwater monitoring results.

Table 1.2 : Summary of Commitments (Continued)

Operation (Continued)

Issue	Objective	Commitment	Timing	Whose Advice	Measurement Compliance Criteria
Noise (ref 4.2.6)	To protect the amenity of neighbours from noise impacts resulting from operational activities associated with the terminal.	Plant and community sound level limits will be consistent with good industry practice and government regulations.	During operation	DLPE	Noise monitoring as required.
Environmental Management System (ref 5.1)	To control environmental impacts to levels within acceptable standards and minimise possible impact on community and the workforce of foreseeable risks.	An Environmental Management System will be developed and implemented.	During commissioning and operation	DLPE	Issue of EMS.
Environmental management plan for operation (ref 5.2)	To ensure environmental management in accordance with key objectives.	An EMP will be prepared once environmental approval for the DJT has been granted. The EMP will comprise two sections - Construction and Operation.	Prior to operation	DLPE	Issue of Operations EMP.

1.7 Structure and Scope of PER

This Public Environmental Report (PER) has been prepared to satisfy the requirements of the Northern Territory *Environmental Assessment Act*. The report provides concise and comprehensive information concerning the design, construction and operation, and the potential environmental impacts of the DJT. This information will enable environmental issues associated with the DJT to be considered in a balanced manner and will ensure that unnecessary and unacceptable harm to the environment is avoided.

Information regarding the existing physical biological, cultural and socio-economic environment has been extensively covered in the approved East Arm Port Development Environmental Impact Statement 1994, and therefore are not covered in this report. This PER specifically focuses on the environmental impact of the proposed development on its immediate surrounds.

Consistent with the respective project scopes of the proponent and the Northern Territory Government, the scope of this PER is for the construction of the DJT and for the operation of the integrated oil berth, wharf/terminal pipeline and terminal system. The preparation of the DJT site, the provision of services, the oil berth and the wharf/terminal pipelines are not the responsibility of the proponent and are subject to separate environmental approvals.

This document has been prepared in accordance with the guidelines issued by the Minister for Lands, Planning and Environment (DLPE) in September 1999.

The PER includes the following main sections:

SECTION 1: Executive Summary

This section outlines the background and justification of the project.

SECTION 2: Project Description

This section describes the locality of the proposed development and the specific elements of the project, including the design, construction and operation of the facilities.

SECTION 3: Existing Environment

This section describes the existing environment occurring at and in the immediate vicinity of the site.

SECTION 4: Environmental Impacts and Management

This section predicts the potential environmental impacts arising from construction and operation of the terminal and outlines the management strategies to enhance the positive impacts and mitigate the negative impacts.

SECTION 5: Environmental Management of Proposed Facility

This section outlines the proposed environmental management system for the facility, describes the environmental management plans that will be developed for the construction and operational phases of the project and describes the monitoring programmes that will be implemented to evaluate the adequacy of these provisions.

SECTION 6: Summary of Environmental Commitments

This section provides a tabular summary of the Proponent's commitments to the management and monitoring strategies outlined in **Sections 4 and 5**.

SECTION 7: Glossary

SECTION 8: References

This section lists the references researched in preparing the PER.

1.8 Studies Undertaken as Part of PER

Extensive site surveys were undertaken in association with the preparation of the Draft Environmental Impact Assessment for East Arm Port. This PER draws heavily on that information and the experience gained by the three oil companies in the design and operation of similar terminals in Australia and overseas. As such, no new site-specific surveys have been undertaken as part of this PER.