



# Eni Australia

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## BLACKTIP OPERATIONS

## ONSHORE GAS PLANT ENVIRONMENTAL MANAGEMENT PLAN

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**000036\_DV\_EX.HSE.0684.000**

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<p><b>BLACKTIP OPERATIONS</b></p> <p><b>Onshore Gas Plant Environmental Management Plan</b></p>					
<b>Abstract:</b>					
<p>This document is the Environmental Management Plan (EMP) for operations at the Blacktip onshore gas plant (OGP). It describes the ways in which activities at the OGP interact with the environment, and the safeguards required to prevent pollution and other negative effects. The document is reviewed by the Northern Territory Department of Natural Resources, Environment, the Arts and Sport in accordance with the <i>Waste Management and Pollution Control Act</i> (NT).</p>					
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## ACRONYMS

AAPA	Aboriginal Areas Protection Authority
ALARP	As Low As Reasonably Practicable
AMOSC	Australian Marine Oil Spill Centre
AMSA	Australian Maritime Safety Authority
ANZECC	Australian and New Zealand Environment and Conservation Council
APPEA	Australian Petroleum Production and Exploration Association
BOMS	Blacktip Operations Management System
BPD	Barrels of oil Per Day
BWPD	Barrels of Water Per Day
CCTV	Closed Circuit Television
CCR	Central Control Room
Cth	Commonwealth
DMP	Department of Mines and Petroleum (WA)
DEWHA	Department of Environment, Water, Heritage and the Arts
DRDPIFR	Department of Regional Development, Primary Industry, Fisheries and Resources (Northern Territory)
EIS	Environmental Impact Statement
EMP	Environmental Management Plan
EMS	Environmental Management Strategy
Eni	Eni Australia
EPA	Environmental Protection Agency
EPBC	Environmental Protection and Biodiversity Conservation Act 1999
ERP	Emergency Response Plan
ESD	Emergency Shutdown
FID	Final Investment Decision
GFU	Induced Gas Flotation Unit
GSA	Gas Sales Agreement
HP	High Pressure
HSE	Health Safety Environment
IMS	Integrated Management System
KO	Knock out
KPaG	Kilo Pascal Gauge
KPI	Key Performance Indicators
LP	Low Pressure
LTS	Low Temperature Separator
MDQ	Maximum Daily Quantity



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MEG	Monoethylene glycol
MMscfd	Million standard cubic feet per day
MP	Medium pressure
MSDS	Materials Safety Data Sheet
NOPSA	National Offshore Petroleum Safety Authority
NLC	Northern Land Council
NRETAS	Northern Territory Government, Department of Natural Resources, Environment, The Arts and Sport
NT	Northern Territory
ODS	Ozone depleting substance
OIW	Oil In Water
OGP	Onshore Gas Plant
OPGGSA	<i>Offshore Petroleum and Greenhouse Gas Storage Act 2006 (Cwth)</i>
OPGGSER	Offshore Petroleum and Greenhouse Gas Storage (Environment) Regulations 2009
PCV	Pressure Control Valve
PW	Produced Water
RVP	Reid Vapor Pressure
SCE	Safety Critical Element
SDA	Shell Development (Australia) Pty Ltd
SPM	Single Point Mooring
TEG	Triethylene Glycol
TPD	Tonnes Per Day
UPS	Uninterrupted Power Supply
WA	Western Australia
WEL	Woodside Energy Ltd
WHP	Wellhead Platform
WMPC Act	<i>Waste Management and Pollution Control Act (NT)</i>
WWTP	Waste Water Treatment Plant

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## **1. INTRODUCTION**

### **1.1 BACKGROUND**

Eni Australia B.V. (Eni) operates the Blacktip Gas Field, approximately 300km South West of Darwin in the Joseph Bonaparte Gulf (Figure 1.1). The field consists of a small unmanned offshore wellhead platform (WHP), a subsea pipeline bringing whole well stream fluid, (i.e. gas, condensate and produced water) to Yelcherr Beach and an onshore gas plant (OGP) near Wadeye (Figure 1.2). The processed gas is exported via an onshore export pipeline, by Australian Pipeline Trust, to the customer, Power and Water Corporation. The condensate is exported via a subsea pipeline to a single-point mooring (SPM) for shipping via tanker vessel.

This Environmental Management Plan (EMP) is reviewed by the Northern Territory (NT) Department of Natural Resources, Environment, The Arts and Sport (NRETAS), in accordance with the requirements of Environment Protection Licence EPL57 issued under the *Waste Management and Pollution Control Act* (NT) (Ref [1]).

Eni's Health Safety and Environment (HSE) Policy (Appendix A) provides the overarching framework guiding the environmental performance standards and objectives for the Blacktip OGP presented in this EMP.

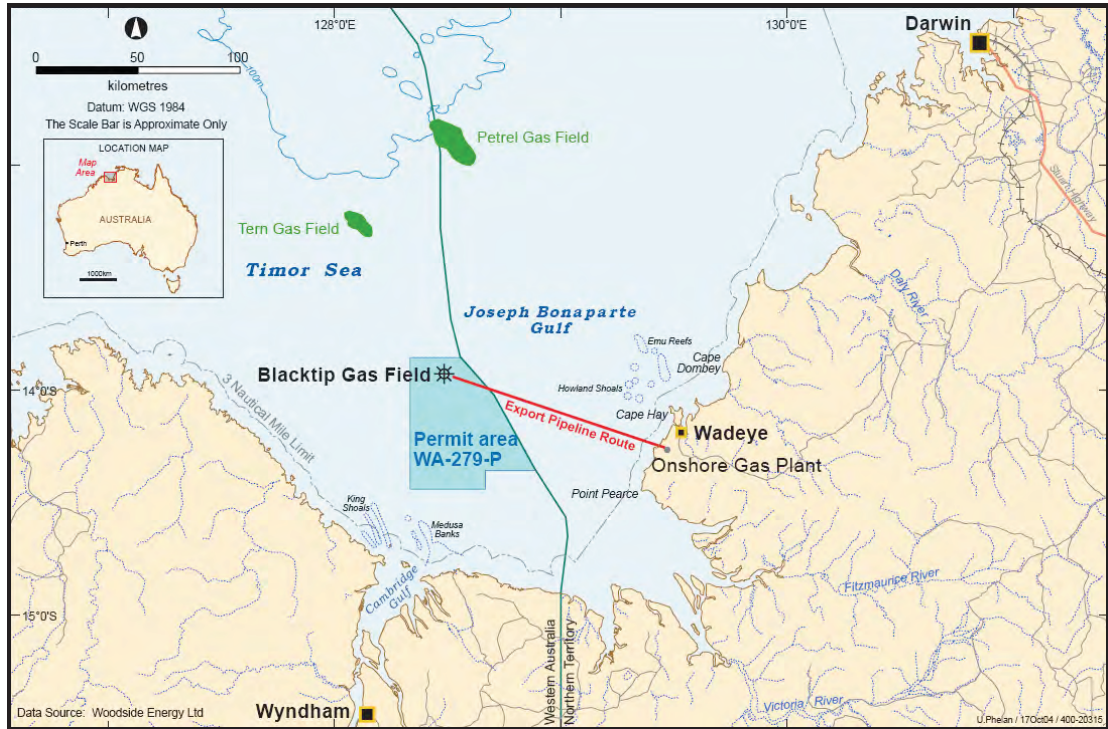
### **1.2 SCOPE AND OBJECTIVES OF THIS EMP**

The scope of this EMP is all onshore operational activities relating to production of gas from the Blacktip field. This includes the OGP and the onshore portions of the Blacktip gas and condensate export pipelines, from the shore crossing to the OGP. Note that offshore aspects are presented in the Offshore Operations Environment Plan (Ref. [1]).

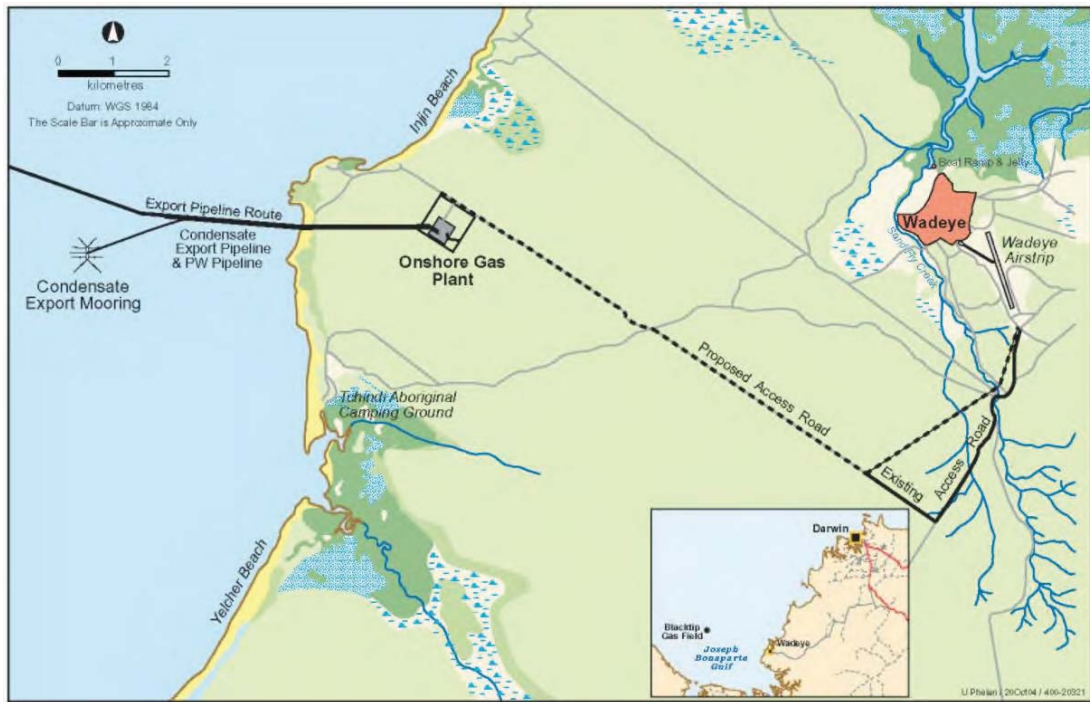
The overall aim of the EMP is to describe how activities at the OGP interact with the environment, and to prescribe safeguards to reduce environmental risks to as low as reasonably practicable (ALARP).

The objectives of this EMP are to:

- provide a description of the activity (Section 2);
- provide a description of the known environment in the vicinity of the facility (Section 3);
- indicate the potential environmental effects and risks associated with the facility (Section 4);
- summarise Eni's environmental strategies for relevant environmental aspects (Section 5); and
- outline the strategy that will be implemented to minimise actual and potential environmental effects and risks, which may arise from facility activities (Section 6).



**Figure 1.1: Blacktip Field Location**



**Figure 1.2: Onshore Gas Plant**

### 1.3 ASSOCIATED MANAGEMENT PLANS

This document should be read in conjunction with the following Management Plans, which were prepared to satisfy commitments in the Blacktip Environmental Impact Statement (EIS) and various recommendations and conditions stipulated in the approval for the project:

- Offshore Environment Plan (Ref. [2]);
- Produced Water Management Plan (Ref. [3]);
- Greenhouse Gas Management Plan (Ref. [4]);
- Flaring Management Plan (Ref. [5]);
- Joseph Bonaparte Gulf Oil Spill Contingency Plan (Ref. [6]);
- Communications Plan (Ref. [7]); and

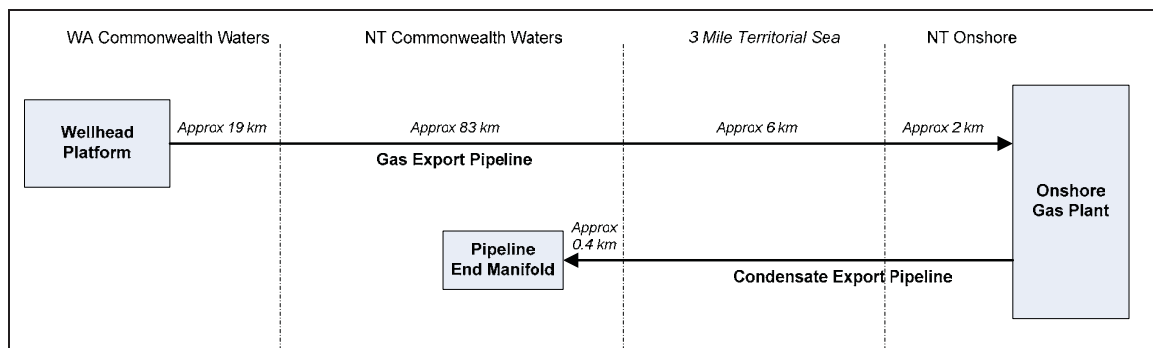
### 1.4 RELEVANT ENVIRONMENTAL LEGISLATION

As stated in Eni's HSE policy (Appendix A), Eni is committed to conducting operations in accordance with legislative requirements. Eni will ensure that the operation of the Blacktip OGP complies with all relevant Acts and regulations.

#### 1.4.1 Blacktip Project jurisdictions

The Blacktip Project transects four jurisdiction boundaries, Commonwealth (Cth) waters administered by Western Australia (WA) and NT, coastal NT waters and NT lands (Figure 1.3). The majority of the approvals and ongoing monitoring associated with the Project lie within NT jurisdiction.

An EIS (Refs. [9], [10] and [11]) was prepared to fulfil the requirements of the *Environment Protection and Biodiversity Conservation Act 1999* (Cth) (EPBC Act) and the NT *Environmental Assessment Act 1984*. Assessment Report No. 50 from the EPA Program was finalised in October 2005 [14]. Approval to develop the Blacktip Project was received from the Australian Government on 29 November 2005.



**Figure 1.3: Project Jurisdictions**

## 1.4.2 Onshore gas plant

Gas production activities at the OGP are subject to a number of environmental laws and industry guidelines, as shown in Table 1.1. Eni's Environmental Advisors (HSE Department) review environmental legislation annually or when significant legislation changes occur (in accordance with Eni Procedure *Maintaining Knowledge of HSE Legal and Other Obligations* ENI-HSE-PR-006). Such changes are communicated to Eni through its participation in industry associations (e.g. APPEA) and through email newsletters from Eni's consultant lawyers (e.g. Minter Ellison).

The annual legislation review will be included in the annual audit of compliance with the Environment Protection Licence (Ref [1]) for the OGP (auditing is described in Section 6.7.2).

**Table 1.1: Environmental legislation relevant to the Blacktip OGP**

<b>Commonwealth Legislation</b>
<ul style="list-style-type: none"> <li>• <i>Environment Protection and Biodiversity Conservation Act 1999</i> (EPBC Act). This Act provides for the protection of matters of national environmental significance, such as threatened species and World Heritage Areas.</li> </ul>
<ul style="list-style-type: none"> <li>• National Environment Protection (National Pollutant Inventory) Measure (Cth). This legal instrument is implemented by corresponding state/territory legislation. It requires certain industrial facilities to estimate and report annually their air pollutant emissions, for the purposes of government environmental planning, transparency in the community, and to promote waste minimisation, cleaner production, and energy and resource savings.</li> </ul>
<ul style="list-style-type: none"> <li>• <i>National Greenhouse and Energy Reporting Act 2007</i>. Provides for the reporting and dissemination of information related to greenhouse gas emissions, energy production and energy consumption.</li> </ul>
<b>Northern Territory Legislation</b>
<ul style="list-style-type: none"> <li>• <i>Waste Management and Pollution Control Act</i>. Provides for the protection of the environment through encouragement of effective waste management and pollution prevention measures, including licensing for certain levels of pollution discharges to air and water. The Act does not apply to wastes that are confined to the site on which they are generated, but requires licensing and registration for wastes that are discharged offsite.</li> </ul>
<ul style="list-style-type: none"> <li>• <i>Environment Protection (National Pollutant Inventory) Objective</i>. This is an objective under the <i>Waste Management and Pollution Control Act</i> that provides for compulsory reporting of air emissions by certain facilities, in accordance with the Commonwealth National Environment Protection (National Pollutant Inventory) Measure.</li> </ul>
<ul style="list-style-type: none"> <li>• <i>Water Act</i>. Provides for the protection of water resources, including groundwater, from pollution and exploitation.</li> </ul>
<ul style="list-style-type: none"> <li>• <i>Energy Pipelines Act</i>. This stipulates requirements for the construction, operation, maintenance and decommissioning of onshore pipelines in the Northern Territory, as well as environmental management requirements. The Act applies to the onshore section of the export pipeline route. Under the Act, discrete licences, permits and plans are required for the construction and operation of a pipeline.</li> </ul>
<ul style="list-style-type: none"> <li>• <i>Public Health Act (NT)</i> and the Public Health (General Sanitation, Mosquito Prevention, Rat Exclusion and Prevention) Regulations (NT). This Act and Regulations provides for the protection of public health from negative impacts of pollution from a range of sources, including sewage treatment systems.</li> </ul>

<ul style="list-style-type: none"> <li>• <i>Territory Parks and Wildlife Conservation Act</i>. Applies statutory obligations in relation to the protection of vegetation, flora and fauna to the project. The Act allows the listing of threatened species with special conservation status and requires a permit to be granted prior to interference with these species.</li> </ul>
<ul style="list-style-type: none"> <li>• <i>Weeds Management Act 2001</i>. Obliges land owners or land managers to control certain weed species (declared weeds) in order to prevent their spread.</li> </ul>
<ul style="list-style-type: none"> <li>• <i>Bushfires Act (NT)</i>. Prohibits lighting of fires in bushland, and makes provisions for implementing firebreaks where necessary to minimise fire risk.</li> </ul>
<ul style="list-style-type: none"> <li>• <i>Heritage Conservation Act</i>. The Act provides a system for the identification, assessment, recording, conservation and protection of places and objects of prehistoric, protohistoric, historic, social, aesthetic or scientific value. The Heritage Conservation Branch maintains an Archaeological Sites Register and Heritage Register, which protects sites of Heritage value prescribed under the Heritage Conservation Act.</li> </ul>
<ul style="list-style-type: none"> <li>• <i>Northern Territory Aboriginal Sacred Sites Act</i>. This Act provides protection to Aboriginal Sacred Sites and Objects. The Act requires development proponents to comply with a process for consulting with site custodians and an Authority Certificate will need to be obtained from the Aboriginal Areas Protection Authority (AAPA) prior to development.</li> </ul>
<ul style="list-style-type: none"> <li>• <i>Dangerous Goods Act</i>. This Act provides for the safe storage, handling and transport of certain dangerous goods (e.g. flammable, combustible liquids) in order to promote public safety, and protect property and the environment.</li> </ul>
<ul style="list-style-type: none"> <li>• <i>Dangerous Goods (Road and Rail Transport) Act</i>. This Act regulates the transport of dangerous goods (e.g. flammable, combustible liquids) by road and rail in the NT in order to promote public safety, and protect property and the environment.</li> </ul>
<p><b>Industry Codes of Environmental Practice</b></p>
<ul style="list-style-type: none"> <li>• <i>Australian Petroleum Production and Exploration Association (APPEA) Code of Environmental Practice 2008</i>: This provides guidance on a set of recommended minimum standards for petroleum industry activities offshore. These standards are aimed at minimising adverse impact on the environment, and ensuring public health and safety by using the best practical technologies available.</li> </ul>
<ul style="list-style-type: none"> <li>• <i>The Australian Pipeline Industry Association Code of Environmental Practice: Onshore Pipelines, 2009</i>. This code provides minimum environmental management standards for the Australian onshore pipeline industry, encouraging the adoption and integration of appropriate environmental management systems and procedures.</li> </ul>
<ul style="list-style-type: none"> <li>• <i>Northern Territory Code of Practice for Small On-site Sewage and Sullage Treatment Systems and the Disposal or Reuse of Sewage Effluent</i>. This code is called up in Regulations 28-28B of the Public Health (General Sanitation, Mosquito Prevention, Rat Exclusion and Prevention) Regulations (NT). It provides for the appropriate design of septic tank systems to prevent negative impacts to the environment and public health.</li> </ul>

## 1.5 EXTERNAL CONSULTATION

Extensive government and community consultation on environmental matters was undertaken during development of the EIS (Refs [9], [10] and [11]).

During operations, consultation with the NT Government on environmental matters occurs via the annual report to NRETAS (see Section 6.7.5), and on an ad hoc basis between NRETAS officers and the Eni HSE Team Environmental Advisors as required.



Any complaints from the community can be raised with Eni via a free-call telephone Communications Line (as described in the Blacktip Project Operations Communications Plan, Ref [7]).

## **1.6 OWNERSHIP AND MANAGEMENT**

Eni is one of the world's major international integrated energy companies operating large upstream projects, downstream gas and power generation infrastructure, refining and marketing activities, as well as oil field services and engineering.

In addition to the Blacktip Project, Eni's interests in Australia include a 65% in the Woollybutt oilfield in offshore Carnarvon Basin, WA, and a 12% interest in the Bayu-Undan and Darwin LNG Projects, NT. Eni has an active exploration program in Australia with interests in 13 permits, of which it currently operates 7.



## 2. FACILITY DESCRIPTION

### 2.1 GENERAL OVERVIEW

Infrastructure at the OGP includes:

- a gas processing plant consisting of separation, gas dehydration, compression, condensate storage and produced water treatment facilities
- the onshore portion of an 18" carbon steel, multi-phase pipeline bringing produced fluids from the offshore gas field to the OGP, starting from the shore crossing
- the onshore portion of a condensate export pipeline from the condensate storage facilities at the OGP to the shore crossing
- a portion of the onshore gas export pipeline that runs from the gas processing plant to a custody transfer meter at the boundary of the OGP site.

After processing, un-odorised natural gas at agreed specifications is delivered to the customer via an onshore export pipeline to a custody transfer meter at the boundary of the OGP, at a maximum delivery rate of 191 TJ/day.

Stabilised condensate is stored on site at the OGP before being exported to the SPM for offload via tankers.

The production life of the field is planned to be 25 years based on initial gas sales contract. The design life of the Blacktip OGP is 30 years.

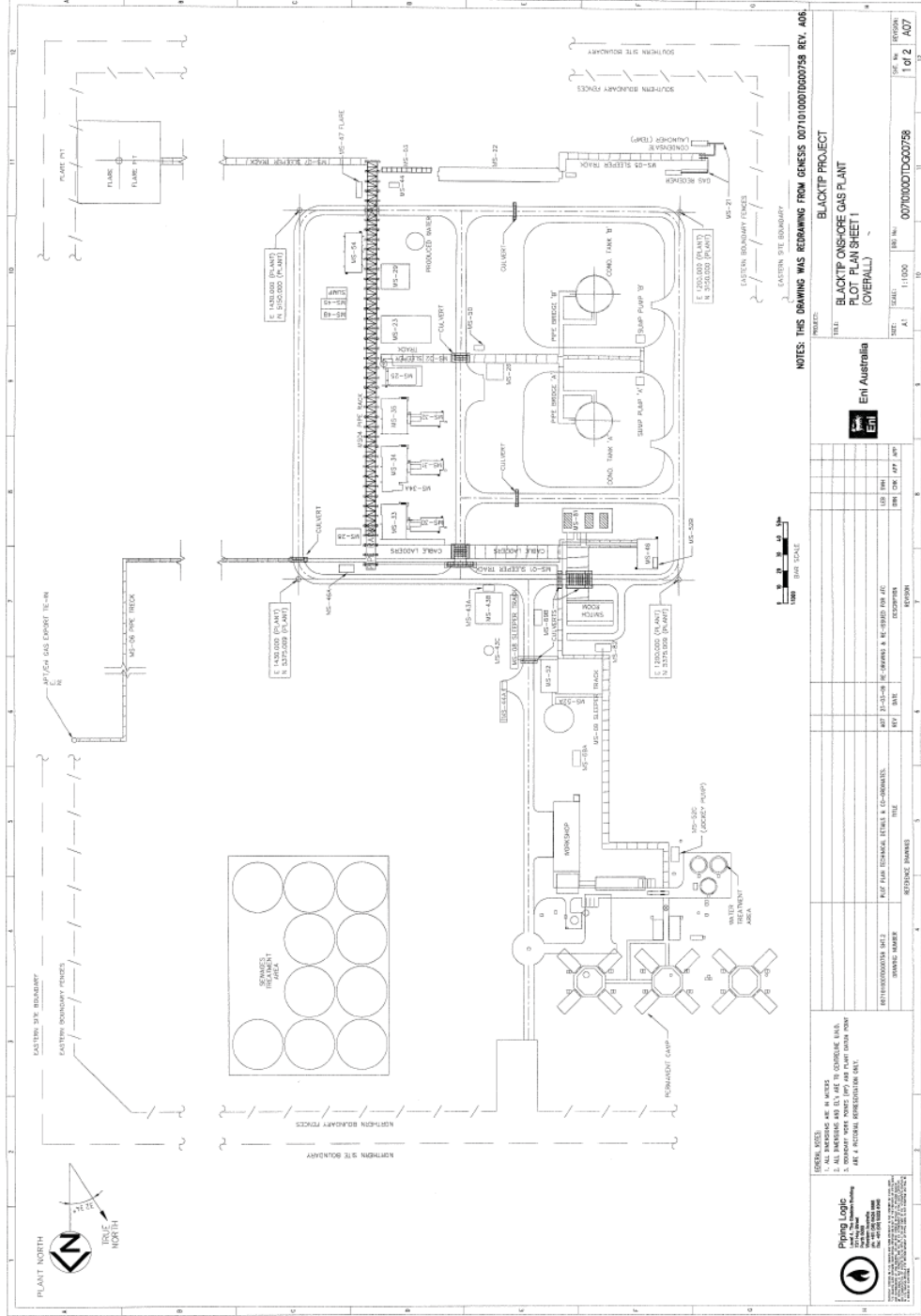
### 2.2 DESIGN AND CONFIGURATION

#### 2.2.1 Overview

The entire OGP site occupies an area of 750m x 750m, with the main process facility located to the south of the site (occupying an area of approximately 250m x 380m) and the accommodation, warehouse, offices and control room to the north (Figure 2.1). The coordinates of the OGP are shown in Table 2.1.

**Table 2.1: OGP Coordinates**

Corner	GDA 1994		GDA 1994 MGA Zone 52	
	East	North	mE	mN
W	129°25'52.09"	14°14'33.60"	546 510	8 425 393
N	129°26'05.87"	14°14'13.22"	546 924	8 426 018
E	129°26'26.77"	14°14'26.66"	547 549	8 425 604
S	129°26'12.99"	14°14'47.04"	547 135	8 424 979



**Figure 2.1: Blacktip OGP layout**

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The OGP site is surrounded by a security fence with signage. Closed circuit television (CCTV) monitored from the control room provides visual monitoring of the OGP facilities and the security fencing.

To assist in normal operations and maintenance duties, access to the OGP site is provided for utility vehicles. The layout includes consideration for future equipment that will allow additional gas processing capacity.

The OGP process facility is divided into four main areas, namely:

- Inlet Separation Facilities;
- Gas Processing and Treatment Facility;
- Condensate Processing Facility; and
- Produced Feed Water Treatment Facility.

The OGP is also self sufficient in all utilities required to allow continuous manned operation for the hydrocarbon processing. The functionality for the process areas in the OGP is summarised in Table 2.2 and illustrated in Figure 2.2.

**Table 2.2: OGP Process Area Functionality**

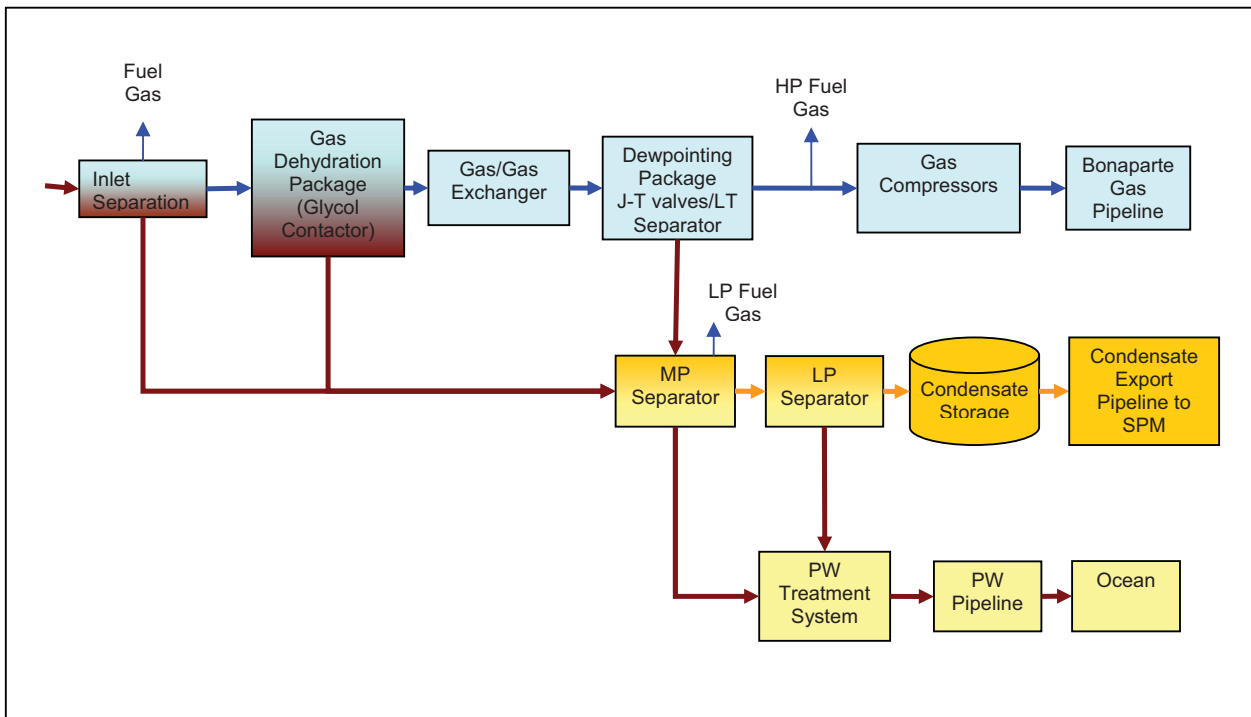
Process Area				
Inlet Facilities		Gas Processing	Condensate Processing	PFW Treatment
<b>Functionality</b>	Pig Receiver	Inlet Separation	Dewatering	PFW Degasser /de-oiler
	Slugcatcher and bulk gas liquid separation	Gas Dehydration and Conditioning	Stabilisation	Dispersed oil removal - Air Induced Floatation Units
		Sales Gas Compression and Export	Storage and Export Pumping	PFW Discharge Point
		Gas Sales and Fiscal Metering		

The OGP includes a slugcatcher facility for the receipt of the multiphase production fluids from the offshore gas field. The process is essentially divided into two streams: a gas processing stream and produced liquids processing stream.

The gas processing route uses a Triethylene Glycol (TEG) absorption process system to extract water from the gas stream. Further treatment of the gas stream via the Joule-Thompson pressure-temperature reduction process and liquids separation process downstream of the TEG-glycol system is applied to the gas stream to meet the export gas dewpoint specifications. Thereafter, the gas is compressed before it is exported via a custody transfer meter.

Liquids stream removed from the slugcatcher are further separated in two stages: medium pressure (MP) followed by a low pressure (LP) separation system. The stream entering the LP separator is heated to flash off lighter components in the liquid stream in order to meet the condensate vapour pressure (RVP) specification prior to being rundown to condensate storage tank, and subsequently load-out to tanker at the SPM.

Produced water separated from the liquids stream is further processed in the PFW system to remove free oil prior to disposal at sea.



**Figure 2.2: OGP Process Block Diagram**

The OGP is designed to export at up to 128 MMscfd of sales gas under steady state conditions on a continuous basis. This capacity exceeds the contractual maximum daily quantity of 103 MMscfd, to provide daily operating flexibility to meet changing gas nominations.

### 2.2.2 Process Design Case – Normal Operations

The following basis has been used for process system design, based on known process parameters:

- Operating / Maximum Design Pressure: 6000/9800 kPag (inlet)
- Operating / Maximum Design Temperature: 20/33°C (inlet)
- Maximum Raw Gas flow rate: 128 MMscfd
- Peak Water Production: 6,000 BWPD
- Condensate Production: 700 BPD

Table 2.3 presents the well fluid composition.

**Table 2.3: Well Fluids Composition**

Component	Mol%
H <sub>2</sub> O	25.43
CO <sub>2</sub>	0.82
N <sub>2</sub>	5.50
Methane	65.02
Ethane	1.89
Propane	0.61
i-Butane	0.09
n-Butane	0.17
i-Pentane	0.05
n-Pentane	0.04
Hexanes	0.05
Heptanes	0.07
Octanes	0.09
Nonanes	0.04
Decanes	0.03
Undecanes	0.02
C <sub>12</sub> <sup>+</sup>	0.07

### 2.2.3 Process Design Case – Turndown

For design purposes a low flow case to simulate turndown has been assumed. The turndown rate is a minimum of 30 MMscfd sales gas export with no free formation water.

### 2.2.4 OGP Manning

The OGP is fully manned for day shifts only. At night two personnel are present in the control room. Other personnel will respond to emergencies during night shifts. Manning is based on requirements to monitor and control to meet daily nominations while maintaining high availability/uptime at a remote location site.

It is expected that an additional two domestics will be on site to support the operational personnel. The functions covered by these domestics will include cooking, cleaning, medic and security.



### 2.2.5 Organisation and Structure

The Blacktip asset team is responsible for the safe and efficient operation of the assets within the Blacktip Gas Production System, including management, production and maintenance operations and modification of wells and facilities. This includes the WHP, the OGP and associated pipelines, the SPM and the various logistical support services and facilities.

The overall philosophy is to utilise minimum manning during regular operations. External specialists from contractor companies will be used during maintenance campaigns and facility integrity inspections.

The field organisation and personnel distribution is shown in Table 2.4.

**Table 2.4: Personnel distribution during day and night shifts**

<b>Worker Group</b>	<b>Dayshift (12 hrs)</b>	<b>Nightshift (12 hrs)</b>
Operators (Panel Op & Op Superintendent)	2	1
Ops Technicians/Maintenance	4	1
Caterers/Cleaners	2	0
Off-shift (sleeping)	2	8
<b>Total (Persons)</b>	<b>10</b>	<b>10</b>

During night time, the facilities are manned by shift Control Room Operator and an Operations Technician. The Mechanical and Instrument/Electrical Technicians are on call during night time, with mobilisation time of less than 15 minutes in the event of an emergency.

All of the field personnel work on rotational basis with schedule 14 days on and 14 days off. The teams are transported in by fixed wing aircraft to Wadeye airport. The incoming crew is transported to the OGP where a comprehensive hand over takes place prior to the outgoing crew flying out.

The teams are responsible for the day to day safe and efficient operation of the complete processing system from wells to product delivery. It is anticipated that the technicians will carry out frontline maintenance activities appropriate to their competency profiles. They will also be responsible for preparation of equipment for campaign maintenance and issuing of permits.

### 2.2.6 Maintenance and Services

The overall philosophy is one of minimum manning, with reliance on the maximum use of a dedicated General Maintenance Service contractor (Wood Group) and other specialist contractors. Due to the remote location of the OGP, minimum manning is required to respond to minor unplanned breakdown maintenance and routine frequent preventative maintenance tasks to prevent unacceptable outages. All other maintenance (planned campaign and unplanned major outages) will be performed by mobilising technicians to the OGP.



Maintenance is planned to align with contractual obligations in the Gas Sales Agreement (GSA), which specifies:

- Shutdowns up to 8 days per year permitted for planned activities;
- Statutory maintenance or inspections (up to 8 days consecutive);
- Other maintenance (max of 4 days consecutive);
- Planned outages targeted for low demand months (June to August);
- Unplanned shutdowns up to 10 days per year; and
- No more than 5 days consecutive (in any 30 day period).

### **2.2.7 Campaign Maintenance**

Campaign maintenance shall be conducted throughout the life of the Project. This includes (but is not limited to) such activities as vessel inspections, PSV change-outs, Safety Critical Element (SCE) inspections and change-outs, electrical system ex-rating inspections, turbine element change-outs, crane and lifting appliance certification, underwater inspections and painting. The Operations Manager shall be responsible for planning and scheduling these campaign activities with the maintenance services contractor or specialist sub-contractors.

### **2.2.8 Verification and Technical Integrity**

A contract has been established with a Verification Authority by the Asset Technical Integrity Custodian (who reports to the Operations Manager). During the life of the fields this authority will provide verification that the facilities are operated according to the design performance standards. This service may be called upon to witness various inspection and function testing requirements in accordance with the predefined inspection and verification program. The contractors for both onshore and offshore are required to define this inspection and verification program. The operations verification requirements are to be established in line with the Project requirements.

### **2.2.9 Transportation**

All personnel travelling to the OGP normally do so by fixed wing aircraft to Wadeye airport, which operates 24 hours per day. Transfer from the airport is by vehicle.

Diesel powered four-wheel drive utility vehicles are provided at the OGP as part of the moveable equipment provision. These vehicles shall be used for plant maintenance purposes, onshore pipeline inspections and for towing of the fire trailers. A mobile, all terrain vehicle capable of lifting small loads such as nitrogen quads and utilising forklift tines for unloading warehouse supplies is also provided.

## 2.3 UTILITIES SYSTEMS

The OGP has a number of utility and support systems. The main utility systems required for the OGP include:

- Power generation;
- Compressed air system;
- Flare;
- Fresh water;
- Chemical injection;
- Fuel gas;
- Drains and effluent treatment; and
- Firewater.

Power is supplied by gas turbine driven generators, with UPS units and a diesel emergency back-up unit.

Air compressor units are required for the air distribution system. The air distribution system is segregated into instrument air and utility air networks such that utility air demand does not starve the instrument air network.

A Hydrocarbon Flare System is provided on site, rated for minimum flow at train start up and suitable for emergency depressurisation of the onshore facilities. Flare system design has been optimised to minimise external visibility.

Water is drawn from the local aquifer and for use as process water. This water is also treated for potable water use. There are fresh water wash-down stations throughout the plant area.

High pressure fuel gas is taken from the process gas stream downstream of the JT Valves, and low pressure fuel gas is supplied from MP separator.

Diesel fuel is supplied from road tankers as a fuel for the emergency generator, fire pump and plant vehicles. Diesel storage, handling and transportation facilities are provided. No centralised diesel distribution system is provided for the OGP. All diesel day tanks will be manually filled.

A closed drain sump is incorporated into the oil sump of the produced water flash drum. A segregated open drains system services the whole plant for storm water. Effluent treatment facilities common to the whole plant are installed within the OGP.

## 2.4 ANCILLARY BUILDINGS

### 2.4.1 Accommodation

The accommodation buildings are a self-contained set of facilities that cater for all the day to day living needs of the OGP personnel and any visitors. The number of accommodation units provided in the accommodation block is based on the requirement to provide a dedicated wing for continuous operations crew plus an additional wing for visitors / ad-hoc maintenance personnel. The accommodation buildings are grouped north of the control room.

## 2.4.2 Laboratory, workshop and stores

### Laboratory Facilities

Regular sampling and analysis are required within the OGP to ensure the quality of product, by-product and waste stream emissions to the environment are maintained within specification. The environmental requirements also include monitoring the quality and quantity of gases flared and/or vented. Specialised testing may be carried out offsite at a NATA registered laboratory. Regular process and utilities sample analysis includes:

- OIW quantification;
- H<sub>2</sub>S / Hg analysis;
- Diesel quality; and
- Condensate quality.

### Workshop/Stores

A workshop and stores building is provided to allow maintenance and critical spares to be stored onsite. A storage area is located adjacent to the workshop to store all portable chemicals (lubes oils, diesel etc.) in a dedicated bunded area. Gas cylinders are stored in an appropriately designed area.

## 2.5 HAZARDOUS SUBSTANCES AND INVENTORIES

### 2.5.1 Hydrocarbon Inventories

The bulk of the hazardous substances contained within the OGP are hydrocarbons. Table 2.5 shows a list of the major hydrocarbon inventories located on the OGP.

### 2.5.2 Non-hydrocarbon Inventories

In addition to the hydrocarbon inventories a number of other hazardous substances are generated, used or stored on the OGP. These include the following:

- Tri Ethylene Glycol (TEG)      As per TEG Contractor design
- Diesel      Day tank quantities
- Methanol      As per operational requirements
- Lube Oils      As per operational requirements
- Seal Oils      As per operational requirements

### 2.5.3 Toxic Substances

There are a number of additional chemicals that are used in conventional plant applications that may be considered toxic. These include degreasers, paint thinners and laboratory reagents.

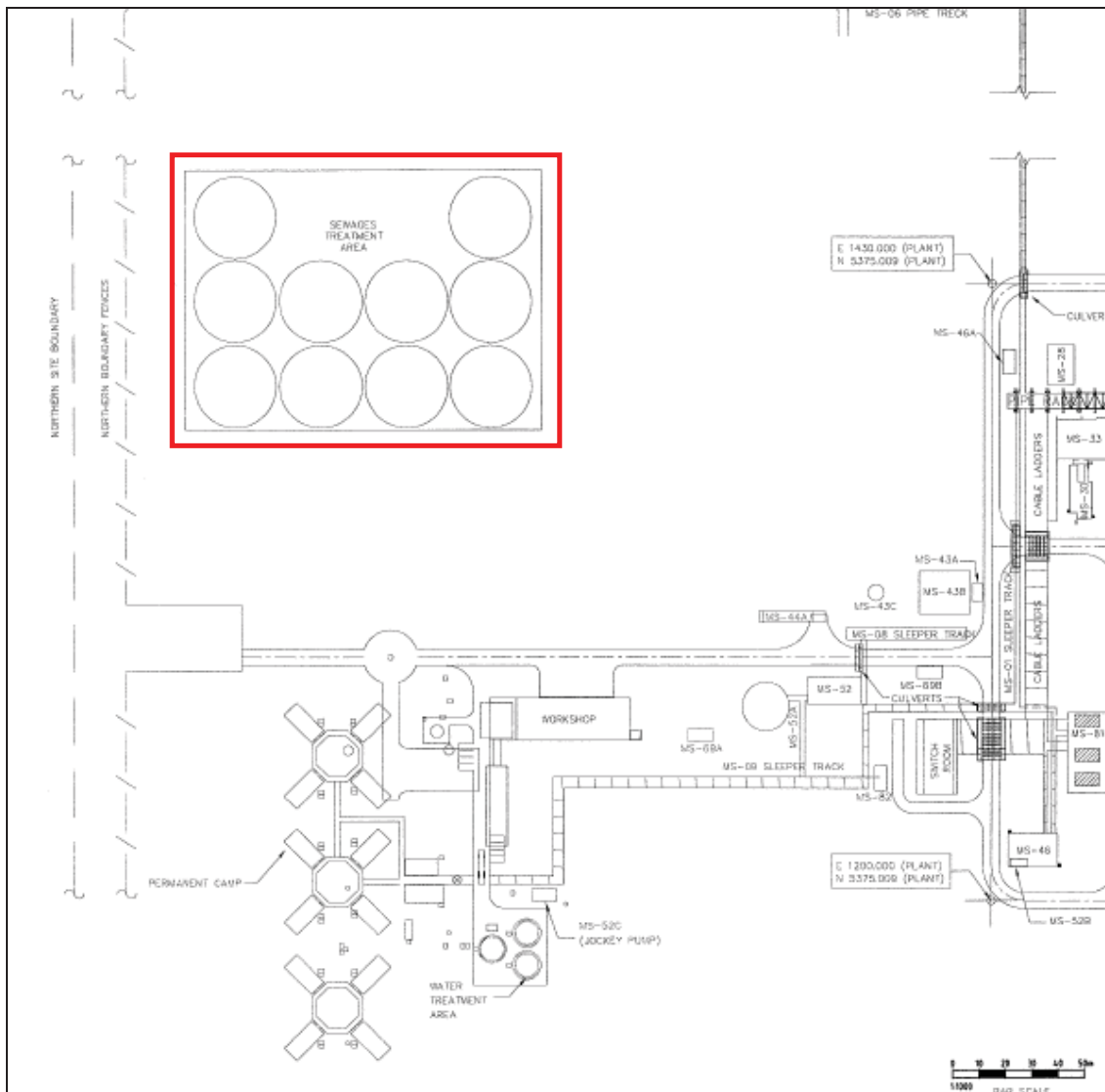
**Table 2.5: Major Hydrocarbon Inventories**

Event	Description	Volume (m <sup>3</sup> )	Free Gas (kg)	Residual Liquid (kg)	Liquid that vapourises (kg)	Total mass (kg)
A1	Pipeline	17494.7	837715	64826	283680	1186222
A2	Inlet Pipework	6.3	301	23	102	426
A3	Pig Receiver	2.2	106			106
A4	Slug Catcher (G)	102.2	1557		41160	42717
A5	Slug Catcher (L)	92.9		9574	41160	50734
A6	MP Separator (G)	34.5	75		32	107
A7	MP Separator (L)	33.9		1130	33	1162
A8	Condensate Heater & LP Separator (G)	5.6	9		19	28
A9	LP Separator (L)	6.4		2369	25	2393
A10	Condensate Rundown Pumps & Rundown Cooler	7.3	9	1303	26	1338
A11	Condensate Storage Tanks A & B	4079.8		1545303	16598	1561901
A12	Condensate Export Pumps	13.2		9979	54	10033
A13	Condensate Export Piping to Boundary	3.5		2677	14	2691
A14	TEG Contactor	18.4	845	125	709	1679
A15	Gas Gas Exchanger and Low Temperature Separator	17.3	621	50	312	983
A16	Export Compression Train A	216.8	24140	130	7	24278
A17	Export Compression Train B	216.8	24140	130	7	24278
A18	Export Compression Train C	216.8	24140	130	7	24278
A19	Export Header and Gas Metering Package	7.1	864			864
A20	Export Gas Pipeline	7068.6	859822			859822
A21	HP Fuel Gas	9.9	292			292
A22	LP Fuel Gas	1.5	6			6

## 2.6 WASTEWATER

Wastewater entering the Wastewater Treatment Plant (WWTP) originates from showers, wash basins, toilet facilities, laundries and kitchens. Each of these facilities produces a characteristic effluent that is mixed to form the raw sewage feeding the WWTP through the sewerage system.

The WWTP is an ABACO Jacana Sequencing Batch Reactor (SBR) (Ref. [16]). Effluent will be discharged through an irrigation system to the designated area shown in Figure 2.3. The irrigation system has a flow rate capacity of 3.5 m<sup>3</sup>/hr and consists of 10 sprinklers, each with a 40 m radius.



**Figure 2.3: Designated effluent discharge area**

Wastewater from the toilet facilities and kitchen contain large amounts of solids and organic matter, which are likely to make up a large proportion of the Biochemical Oxygen Demand (BOD) and Suspended Solids (SS) of the WWTP. Faecal matter will also contain bacteria (*E.coli*).

Nitrogen in wastewater comes from the reduction of ammonia, nitrate or protein from food sources and faecal matters. Phosphorous is mainly due to detergent used within laundry or dish washers.

The waste water system is designed for 150 persons, however, due to average plant manning numbers the average usage and output of this facility will be around 10% of capacity. Discharge will therefore vary from about 6 m<sup>3</sup>/day to the design capacity of the system (67.5 m<sup>3</sup>/day).

The SBR includes primary (settlement) and secondary treatment (activated sludge).

Controls will be put in place to prevent certain products entering the drains system. These include:

- pesticides, herbicides or insecticides;
- petrol/oil;
- organic solvents (turpentine/kerosene);
- large quantities of chlorine;
- large quantities of acids or caustic material;
- heavy metals (copper, lead, silver, mercury, cadmium, barium or arsenic);
- chemicals of toxic nature to the protozoa or bacteria within the sewage treatment system; and
- plastics, fabrics, contraceptives and sanitary items.

Appendix B contains the approval to operate the WWTP. The plant has been classified by the NT Department of Health and Families as a Low Exposure Risk Levels (non food crops). As such, the recommended effluent monitoring parameter and compliance value are E.coli at <10,000cfu/100ml, sampled annually.

Should the water quality from the system be seen to deteriorate, the system will be serviced immediately to rectify the problem. Regular inspection and maintenance will be undertaken to ensure that the system operates optimally. The main sensitive environmental receptors are the ground water and surrounding vegetation.

## 2.7 STORM WATER

The open drains on the OGP are designed to collect stormwater, washdown water, fire test water and any accidental spills from equipment. During the wet season, a large volume of water will enter the drains. Only the first flush will be treated as this is the only component likely to be contaminated. Thereafter, the water will be clean and allowed to drain to land.

The main contaminant of concern in the equipment bund will be residual hydrocarbons related to equipment leaks or maintenance. The flow will be highly variable and likely to be minimal in the dry season and up to the design capacity of 130 m<sup>3</sup>/hr during the wet season.

The plant drains are split into two separate systems (Ref. [17]):

- hazardous; and
- non hazardous.

Both drains comprise of Accidental Oil Contamination (AOC) and Continuous Oil Contamination (COC) systems, which capture storm runoff and route it to a dedicated sump pump for further treatment (Figure 2.4). The AOC runoff is captured via a series of grated sumps cast in the concrete slabs throughout the process and utility areas. This water may or may not contain hydrocarbon contamination. The COC runoff is captured by drip trays and skid bases, and is more likely to contain hydrocarbon contaminants.

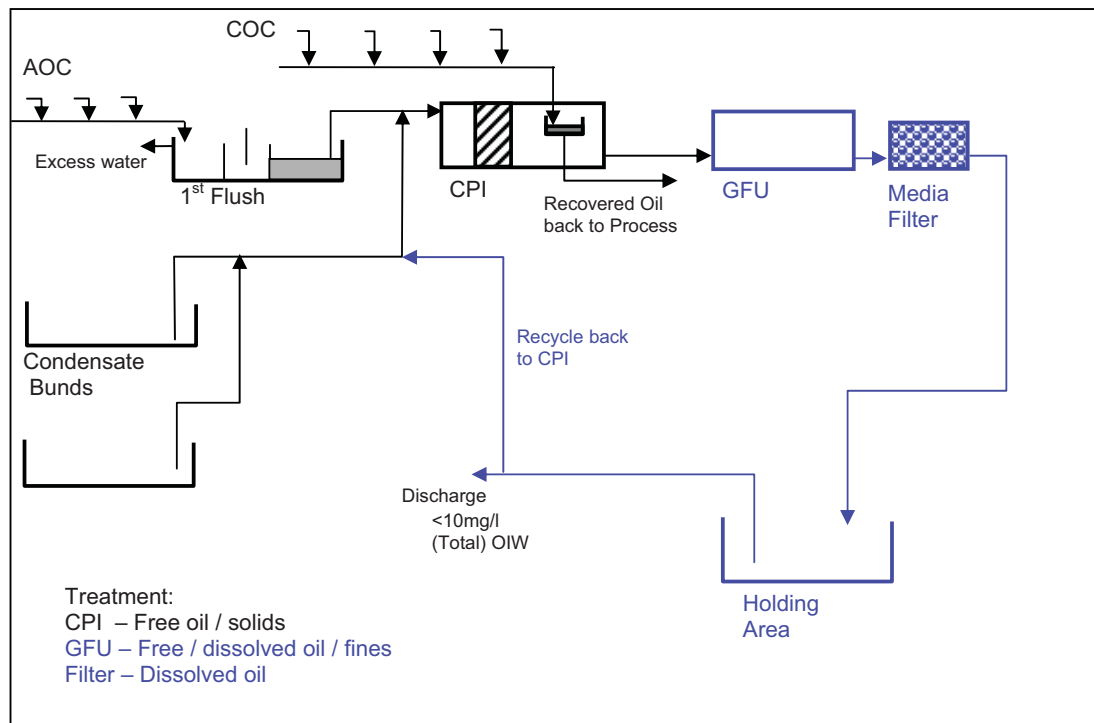
All captured hazardous waste is sent to the process CPI unit sump (MS-48) and the non hazardous waste is sent to the utilities runoff sump (MS-43-A) (Figure 2.5). Water

from each sump pump is pumped to a dedicated CPI vessel which provides bulk separation of contaminants and solids prior to forwarding on to the combined hazardous and non hazardous treatment system.

Water can also be pumped to the hazardous open drains CPI from the two condensate storage tank bunds should this water become polluted. Treatment is only required should a visible oil sheen be observed on the surface of the water in the condensate storage tank bunds. If this is not the case water is allowed to flow to natural drainage.

The oily water treatment system is capable of receiving water from either or both of the CPI vessels. Flow enters two 50% GFUs (MS-43-B) which remove the majority of any remaining free oil from the stream. From here the effluent is pumped through one of two 100% oily water polishing filters which contain adsorption media to remove hydrocarbon content in the discharge stream.

Once treatment is complete the water enters the treated water break tank (MS-43-C). This ensures that sampling can be performed and compliance with regulations confirmed prior to discharge to natural drainage (Figure 2.5).

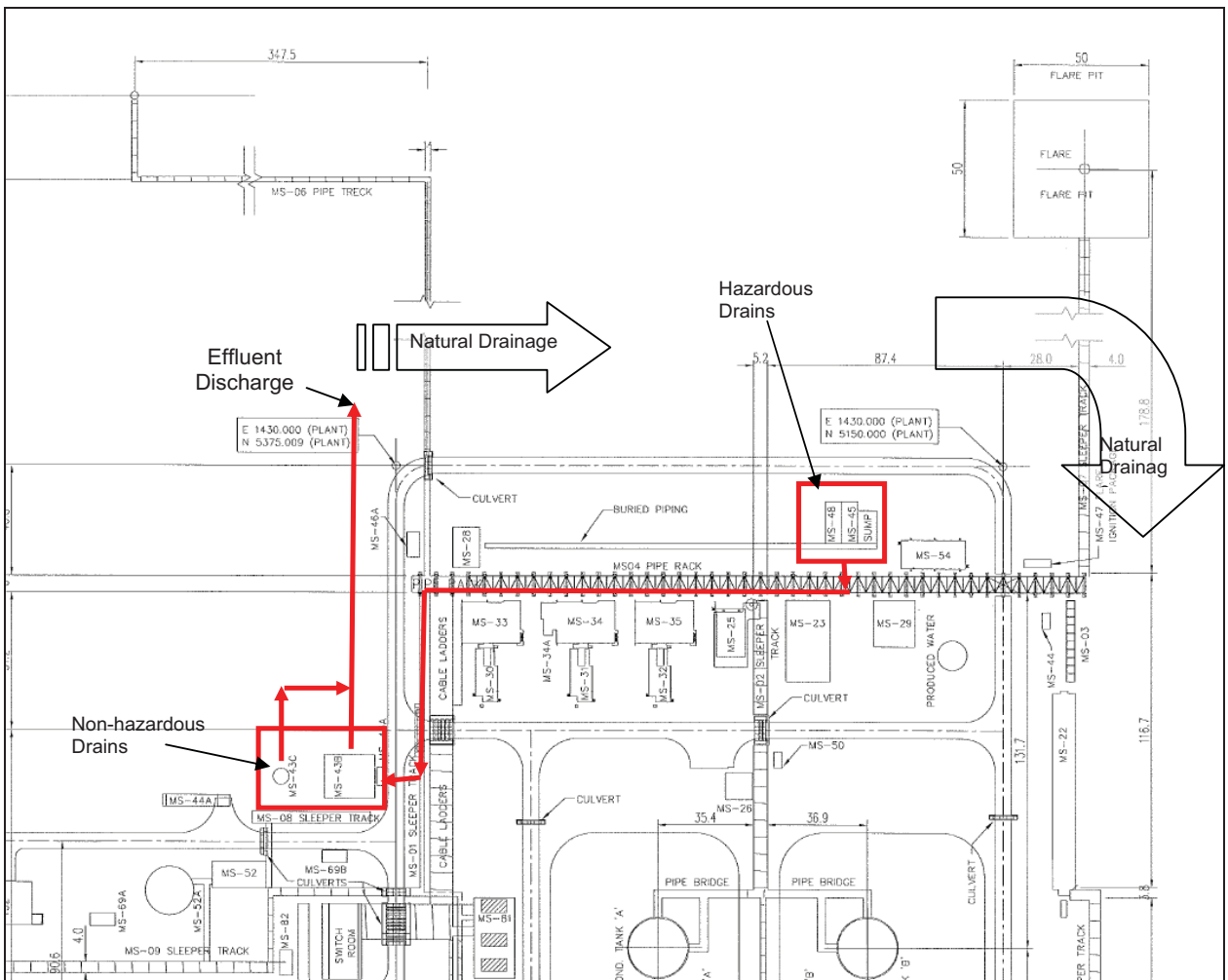


**Figure 2.4: Storm water treatment system**

It is proposed to test the treated storm water prior to discharge, for the water quality parameters given in . Concentration limits for each parameter are also provided.

**Table 2.6: Proposed water quality parameters for routine monitoring of treated storm water discharge**

Parameter	Concentration Limit
pH	5 – 9
Total Petroleum Hydrocarbons	≤30mg/L
Total Dissolved Solids	≤250mg/L



**Figure 2.5: Location of hazardous and non-hazardous drain water treatment packages on the Onshore Gas Plant**



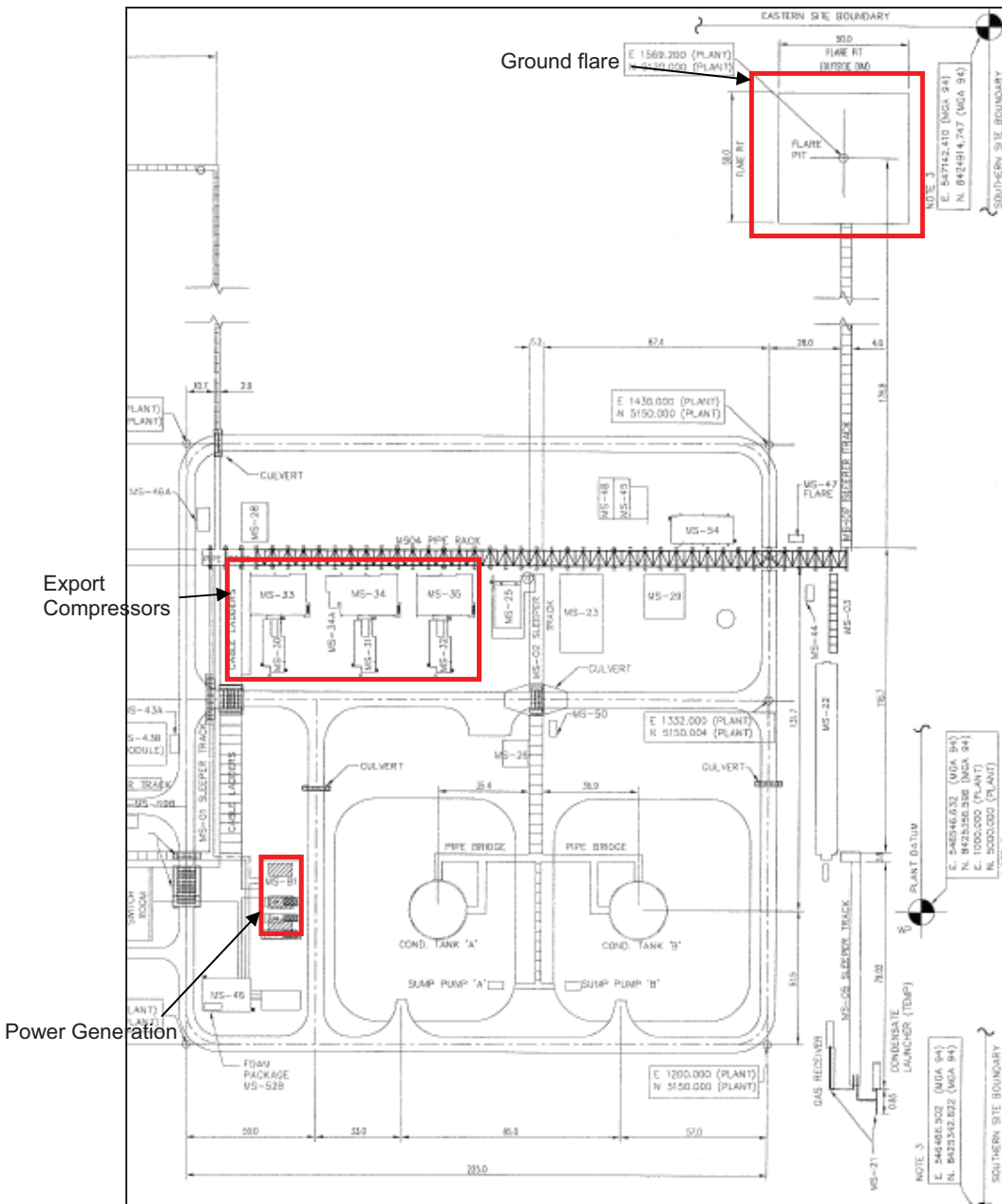
## **2.8 ATMOSPHERIC EMISSIONS**

### **2.8.1 Source and location of emissions**

Major atmospheric emissions from the site come from the:

- flare
- export gas compressors (MS-30, MS-31 and MS-32); and
- power generation packages (MS-81).

The OGP will operate high pressure (HP) and low pressure (LP) ground flare systems (Ref. [18]). These are provided by John Zink and located in a 'pit' at the south east corner of the plant (Figure 2.6). The locations of the solar gas turbine compressors and the gas engine generator packages are also shown in Figure 2.6. These packages operate on a 3 x 50% basis.



**Figure 2.6: Flare location**

## 2.8.2 Flare

### HP Flare

The HP flare header is designed for inventories above 1000 kPag. The system is sized to blowdown the Hydrocarbon inventory in the OGP to achieve the required 690 kPag or 50% of operating pressure (whichever is lower) within 15 mins. The following sources relieve into this header:

- Pig receiver
- Slug Catcher
- Glycol Contactor
- Gas/Gas Exchanger
- Low Temperature Separator
- MP Separator
- HP Fuel Gas pre-heater
- HP Fuel gas KO Drum
- HP Fuel Gas Superheater
- HP Fuel Gas Distribution header.
- Export Gas Compressors
- Seal Gas Filter Coalescers
- Seal Gas Superheaters
- Export Gas Compressor Suction Header
- Export Compressors 1<sup>st</sup> Stage
- Export Compressors 2<sup>nd</sup> Stage
- Export Gas Metering skid

The HP flare will also be used to regulate pressure surges, via automatic PCV controllers, from the pipeline to ensure continued stable operation during ramping and start-up operations. Pressure controllers have been installed to allow operations to route gas to flare downstream of the Glycol Contactor and the LTS vessel should out of quality gas be detected.

### LP Flare

The purpose of the LP flare is to:

- safely dispose of regeneration offgas; and
- control pressure regulation during normal operation.

The flares will be purged using LP fuel gas, backed up by nitrogen.

This system is designed to allow for continuous flaring, which may be from the following sources:

- Condensate Header
- LP Separator
- Produced Water Degasser
- Condensate Rundown pumps
- LP Fuel gas Superheater
- LP Fuel Gas Distribution
- Glycol Reboiler
- Glycol Flash Drum
- Methanol Injection
- Export Gas Metering Skid
- Propane Backup Supply Relief
- Export Compressor Inner Seal Leakage
- Analyser loops

For each system, gaseous and liquid hydrocarbon discharges will be collected in the headers and directed to the HP and LP Flare KO Drums for liquid removal prior to gas disposal by combustion (flare).

### **2.8.3 Pollution control equipment**

Pollution control equipment and strategies are as follows.

- The gas is combusted, which is preferred to venting as it converts hydrocarbon compounds to carbon dioxide and water, which have a lower global warming potential.
- KO drums are provided to remove liquids that form in the HP and LP headers.
- The process is divided into the following isolation sections:
  - Inlet Facilities
  - Gas Process & Liquids Handling
  - Gas Compression
- Should the plant trip, only the section with the problem will be blown down (if required), thereby reducing the quantity of gas flared.

### **2.8.4 Composition and quantity of contaminants**

Table 2.7 provides estimates of composition and quantity of contaminants released from flaring and the compressor and power generation packages.

### **2.8.5 Monitoring Programs**

Table 2.8 summarises the proposed monitoring program. The quantity of gas being flared will be measured continuously using an ultrasonic flow meter. Fuel usage for the compressors and gas engines, will also be monitored continuously. These measurements in conjunction with the feed gas analysis will provide estimates of NO<sub>x</sub>, SO<sub>x</sub> and CO<sub>2</sub>-e emissions. Stack analysis will also be undertaken on the compressor and gas engine exhausts to measure NO<sub>x</sub> and SO<sub>x</sub> emissions.

**Table 2.7: Blacktip gas emissions and sources**

Emission Source	CO <sub>2</sub> <sup>5</sup>	CH <sub>4</sub> <sup>1</sup>	N <sub>2</sub> O <sup>6</sup>	CO <sub>2</sub> -e	NO <sub>x</sub> <sup>2</sup>	SO <sub>x</sub> <sup>2</sup>	NMHC <sup>2</sup>
	Tonnes/annum						
Flare	1,900	11	<1	2,144	15	<1	70
Compressor 1	43,000	4	1.5	43,683	133	<1	1
Compressor 2	43,000	4	1.5	43,683	133	<1	1
Compressor 3 <sup>7</sup>	0	0	0	0	0	0	0
Power Generator 1	2,000	<1	<1	2,036	11	<1	0.05
Power Generator 2	2,000	<1	<1	2,036	11	<1	0.05
Power Generator 3 <sup>8</sup>	0	0	0	0	0	0	0
Emergency Diesel Generator	220	<1	0	243	0	0	0
Condensate Tanks venting	0	39	0	809	0	0	0
Fugitive	0	58	0	1,213	0	0	0
<b>Totals</b>	92,514	116	3	95,846	303	0	72

<sup>5</sup> From HAC report (Ref. [19])

<sup>6</sup> From EIS (Ref. [9])

<sup>7</sup> Note that there are three compressors but one is for backup, therefore emissions set at zero.

<sup>8</sup> Note that there are three generators but one is for backup, therefore emissions set at zero.



**Table 2.8: Atmospheric Compliance Monitoring Requirements**

	Parameter	Unit	Concentration Limits	Method	Frequency
<b>Flare</b>	Volume	TPD <sup>9</sup>	-	Ultrasonic Flow Meter	Daily
	CO <sub>2</sub>	Mg/Nm <sup>3</sup>	-	Fuel gas analysis	During commissioning/startup. Annually thereafter
	CH <sub>4</sub>		-		
	N <sub>2</sub> O		-		
	NO <sub>x</sub>		320 <sup>10</sup>		
	SO <sub>x</sub>		1000		
	NMHC		20		
<b>Compressors</b> MS-30 MS-31 MS-32	Volume		TPD		
	Contaminants	As above		Stack monitoring	During commissioning/startup. Annually thereafter
<b>Power Generation Turbines</b> (MS-81)	Volume	TPD		Fuel consumption	During commissioning/startup. Annually thereafter
	Contaminants	As above		Stack monitoring	During commissioning/startup. Annually thereafter

<sup>9</sup> Tonnes Per Day

<sup>10</sup> Oil and Gas Development (Onshore). July 1998. World Bank Group Pollution Prevention and Abatement Handbook



## 2.9 LIGHTING

Lighting on the OGP consists of:

- roadway lighting;
- hazardous area lighting; and
- security lighting around the perimeter fence.

The general arrangement of these lights is shown in Figure 2.7.

Roadway and hazardous area lights are on continuously from dusk to dawn. Security lights will only be illuminated should there be a disturbance on the boundary. These lights can be controlled manually or automatically by remote camera.





## **2.10 NOISE**

### **2.10.1 Source and predicted noise emissions**

Table 2.9 lists the primary noise generating equipment on the Blacktip OGP. These values were used in a noise model to predict the maximum cumulative noise levels around the facility. Predictions take into account:

- noise source strength;
- spherical spreading;
- ground absorption;
- atmospheric absorption; and
- barrier/screening effects from any intervening objects.

Details of intervening terrain and buildings between the OGP and the receptors have not been confirmed, and as such, any effects from these have not been included in noise modelling. Predictions are therefore conservative.

Results are presented in Figure 2.8. The highest noise level expected at the site boundary is approximately 72 dBA, adjacent to the flare. It is noted that this is below the boundary level assumed in the Blacktip OGP EIS (Ref. [1]).

### **2.10.2 Sensitive Receptors**

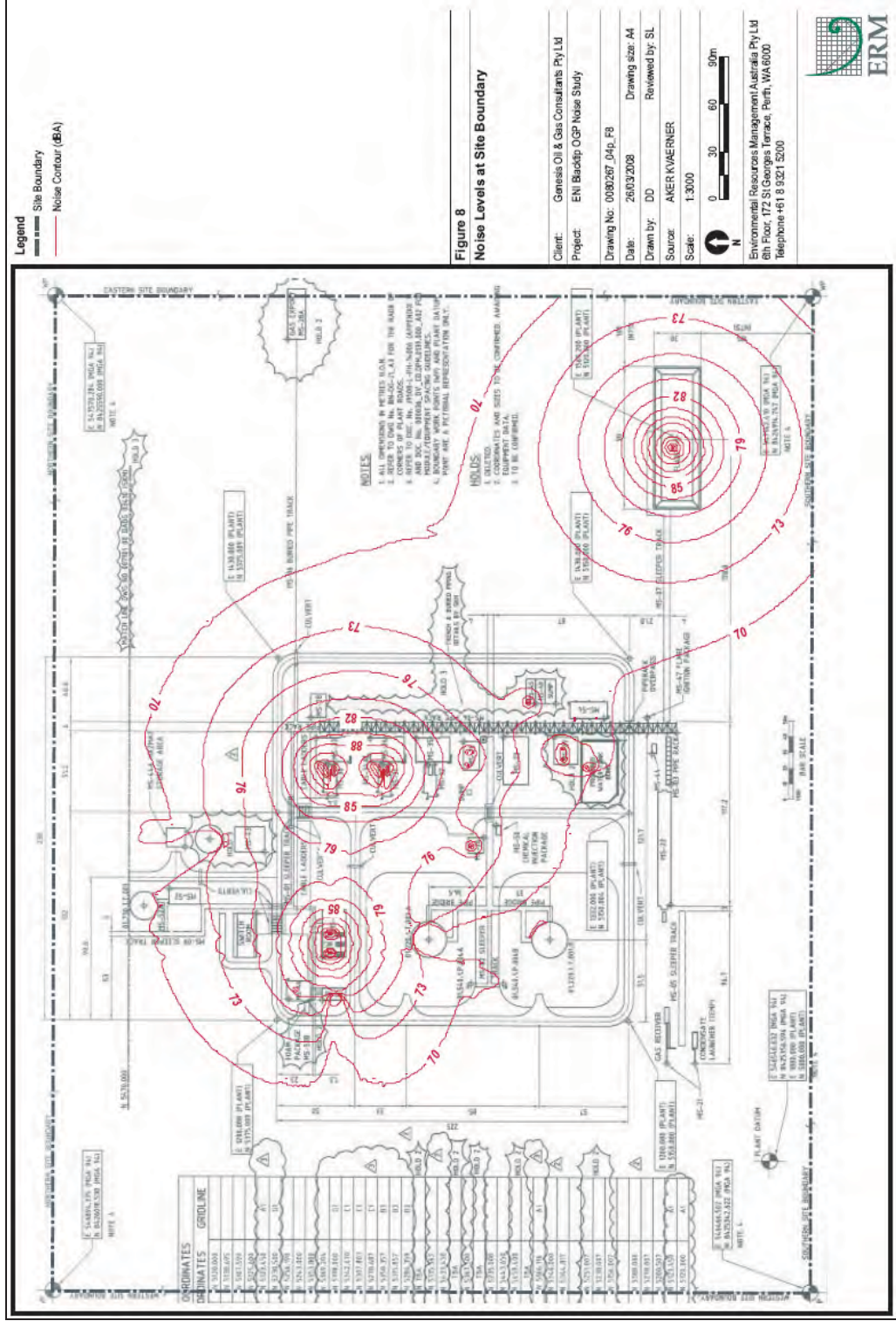
Two potentially sensitive noise receptor locations have been identified in the vicinity of Blacktip OGP. These are Tchindi Aboriginal Camping Ground, over 2 km away, and Wadeye township, approximately 8 km away.

Predictions indicate that noise levels at the two receptors from the Blacktip OGP during normal operations will be <35 dBA at Tchindi Camping Ground, and <30 dBA at Wadeye.

During emergency blowdown, flaring noise levels will be <30 dBA at Wadeye, however, may exceed 50 dBA at Tchindi. This will be noticeable by residents of the area, however, emergency flaring of this nature will be infrequent and occur for a short duration (15 minutes) so is not anticipated to cause excessive disturbance.

**Table 2.9: Primary noise generating equipment on the Blacktip OGP**

Module Number	Equipment Description	Associated Noise Level (dBA) SPL @ 1m unless otherwise specified)
Compression MS – 30 -35	Export Gas Compressor Packages	85
	Air Intake Filters	95
	Gas Turbine Exhaust Suction	100
	Gas Turbine Discharge Piping	95
	Lube Oil Coolers	92
	Export Compressor Inter stage Coolers	82
	Export Compressor Discharge Coolers	82
Power Generation MS-81	Main Power Generation Package	95
	Emergency Power Generation	82
Utilities (CPI units)	CPI Oil Pumps	69
	CPI Water Disposal Pumps	78
Water Treatment (MS-29)	Skimmed Oil Pumps	69
	Produced Water Pumps	71.5
	Produced Water Discharge Pumps	80
	Demulsifier Injection Pump	82
	Methanol Injection Pump	82
Separation (MS-23)	Condensate Rundown Pump	74
	Produced Water Drains Pumps	82
Condensate Handling (MS-26)	Condensate Export Pumps	85
Flare and Flare Knock Out (MS-54)	HP flare KO Drum	69
	LP flare KO Drum	69
	HP Flare (Emergency)	105 @ 50m
	HP Flare (Peak)	97 @ 50m
	LP Flare (Peak)	82 @ 50m
Open and close Drains (MS-45)	Closed Drains Pumps	82
Nitrogen/Instrument Air (MS-46)	Instrument Air compressors	82
Gas Treatment (MS-25)	Glycol Circulation Pumps	82
	Glycol Makeup Pump	82
	pH Control chemical Injection Pump	82





## **2.11 HYDROCARBON AND CHEMICAL STORAGE**

### **2.11.1 Condensate Storage**

Stabilised condensate will be stored in 2 x 50% above ground tanks, approx. 3200m<sup>3</sup> each (Figure 2.9). Sizing is based on tanker offload of 40000bbls/3 months storage at peak rates. The tanks have floating roofs and are bunded (Figure 2.10).

### **2.11.2 Diesel Storage**

Diesel will be required on site for intermittent use in the:

- emergency generator;
- firewater pumps;
- vehicles.

It will be stored in day tanks for the emergency generators and the firewater pumps and in drums for refuelling vehicles. Day tanks will be replenished by truck. Drip trays will be located underneath all diesel day tanks with spills routed to the hazardous open drains. Fuel drums will be stored in the bunded chemical storage area.

### **2.11.3 Chemical storage**

#### **General chemicals**

Chemicals will be stored in the dedicated chemical hazmat store (Figure 2.9). Chemicals stored on site may include:

- acids and solvents;
- glycol;
- surface active agents and detergents;
- defoamers;
- lubricating fluids and greases;
- hydraulic oils/fluids;
- inhibitor chemicals (for example corrosion and scale inhibitors);
- specialised cleaning fluids;
- demulsifier/coagulant.

#### **Injection chemicals**

Chemicals located at site for injection are:

- coagulant/demulsifier; and
- methanol

The coagulant/demulsifier is required to enhance hydrocarbon/water separation performance thus ensuring the produced water discharge specification. It will be stored in a dedicated tank and injected into the wet liquid line to the MP separator and the produced water line upstream of the Gas Flotation Units.

Methanol is provided to prevent the formation of hydrates at key locations on the plant during start-up or process upsets. It will also be stored in a dedicated tank.

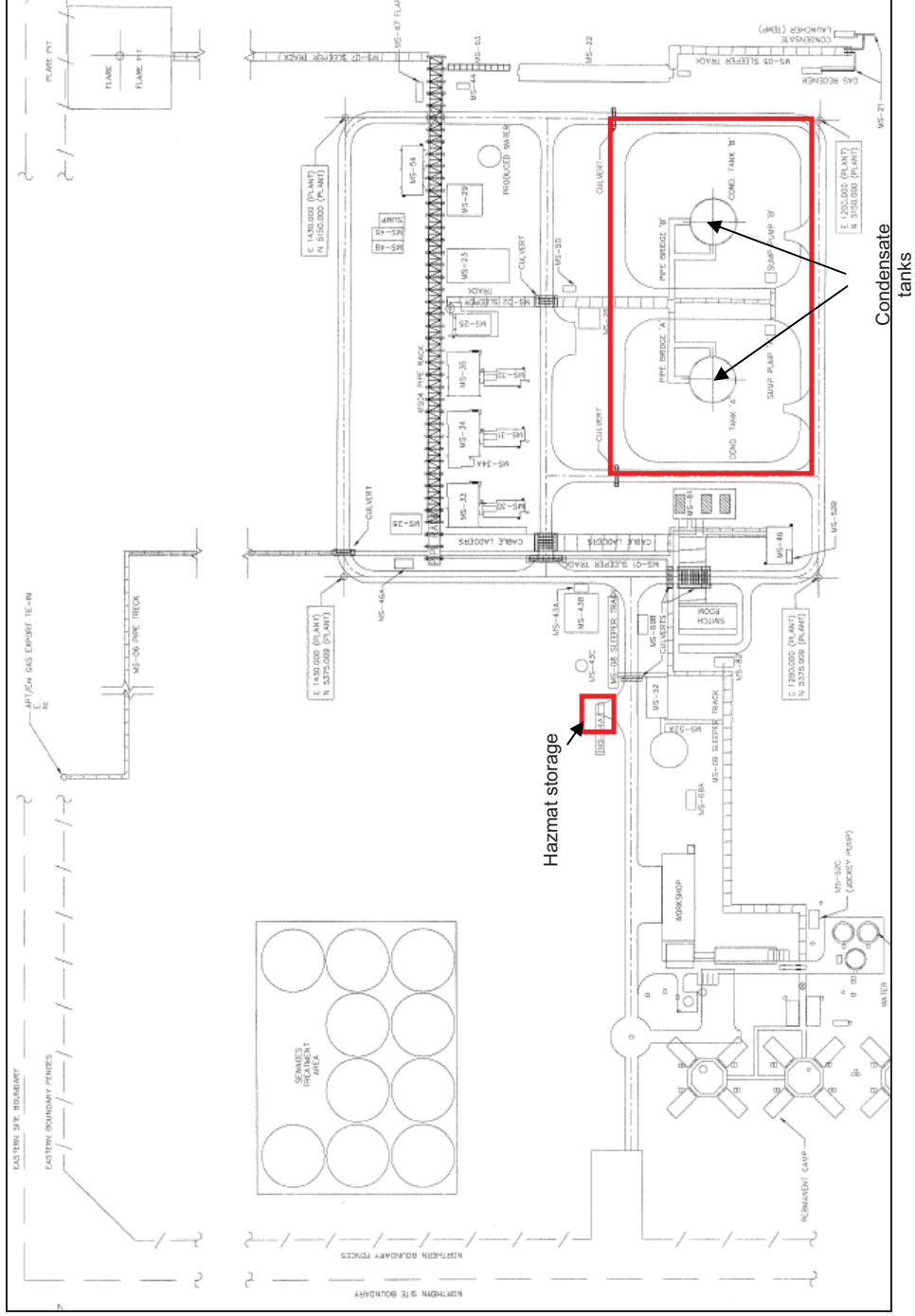


Chemicals will be delivered by road or supply boat in either tote tanks or bulk storage vessels. The chemicals supplied will then be transferred to permanent storage by gravity flow or pumping through a system of hard piping and flexible couplings.

All tanks, loading stations and pumps will have drip trays to collect any spillage. Drip trays will be directed to the hazardous open drains system. The loading area has been designed to handle the contents of one tote tank without spillage into the open drain system.

#### **2.11.4 Monitoring**

Monitoring of the chemical injection system shall be by daily checks to ensure system is operating at design conditions. Weekly capacity checks shall be carried out on the chemical inventory.



**Figure 2.9: Locations of condensate tanks and chemical Hazmat area**

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### **3. DESCRIPTION OF ENVIRONMENT**

#### **3.1 OVERVIEW**

A comprehensive description of the terrestrial environment is contained within the Blacktip Draft EIS (Ref. [1]). The following information has been taken from that document. The reader is referred to the Draft EIS and supplement (Refs. [10] and [11]) for further information.

#### **3.2 SOCIO-ECONOMIC**

##### **3.2.1 Local population and land use**

The coastal region of the Joseph Bonaparte Gulf is sparsely populated and infrastructure poorly developed. The aboriginal township of Wadeye, approximately 10km to the east of the Blacktip OGP is the only population of significance in the vicinity of the gas plant. Socio-economically, Wadeye has a low base and is represented negatively in most social indicators.

Land in the vicinity of the OGP is comprised of native bushland and is not used for agricultural grazing or farming. The principal land use in the project vicinity is traditional hunting, fishing and other food gathering activities. Land is also used for outstations.

Thamarrur Regional Council is the responsible authority in the area occupied by the Blacktip OGP. The council covers an area of approximately 320 km<sup>2</sup>; includes the estates of twenty clan groups; and has ten different languages and sub-dialects. The region became formally recognised as an incorporated council through the *Local Government Act* in 2003. The Blacktip OGP lies within the Yak Maninh and Yak Diminhin traditional Aboriginal owner clan estates within the Daly River / Port Keats Aboriginal Land Trust.

##### **3.2.2 Land use and zoning**

There is no formal zoning of land in the Wadeye Township located 12 km from the OGP or in the general vicinity. Land use organisation is in the form of the 'Wadeye Land Use Structure Plan and Infrastructure Development Strategy' which was prepared in consultation with traditional Aboriginal owners, Thamarrur Regional Council and other key agencies, to provide future planning direction for the town of Wadeye.

##### **3.2.3 Indigenous heritage values**

The archaeological and heritage survey of the OGP site identified only one archaeological site, a large shell midden located in the sand dunes immediately landward of the shore crossing (Figure 3.1).

### 3.2.4 Indigenous cultural values

Yak Maninh and Yak Diminhin traditional owners and the other Aboriginal people of the Thamarrurr region have a holistic view of their traditional country, in which all elements, physical features and people, (e.g. land, sea, estuaries, rivers, animals, plants, people etc.) are linked through creation stories, tracks of creation ancestors, kinship systems, traditional knowledge, subsistence use and other cultural mechanisms. These mechanisms are reinforced and maintained through ongoing connections and current economic usage.

A large number of species have specific utilitarian and other cultural values, and collectively they are an integral part of country for which traditional owners have an inherited responsibility. All country has inherent value to traditional owners, over and above the value or usefulness of particular animal and plant species within it.

Marine and terrestrial environments adjacent to the shore crossing (mangrove, rocky platform, intertidal zone, beach, vine thicket etc.) are rich in culturally significant resources and comprise only a small portion of traditional owners' clan estates.

### 3.2.5 Aboriginal sacred sites

Pursuant to the *Northern Territory Aboriginal Sacred Sites Act*, Authority Certificates were issued by the Aboriginal Areas Protection Authority (AAPA) in relation to all onground work undertaken for the Blacktip Project. Sacred site surveys of the Blacktip OGP area were undertaken by the NLC in consultation with traditional Aboriginal owners.

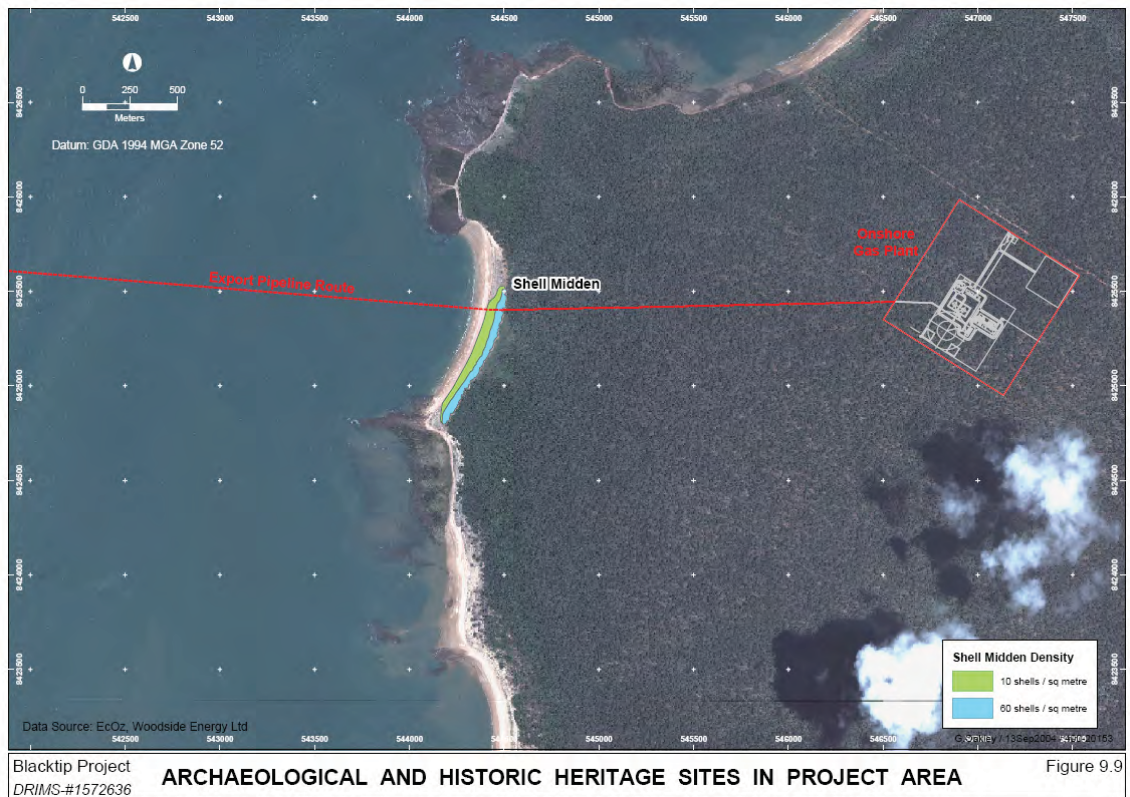
A summary description of the Aboriginal sacred and significant sites located in the vicinity of the Blacktip OGP, as communicated to Eni by the NLC is provided in Table 3.1 and Table 3.2. The sites are specific to the different Aboriginal groups, and sites sacred to the Yak Maninh People are shown separately from those sacred to the Yak Diminhin people. The indicative locations of these sacred sites are shown on Figure 3.2.

**Table 3.1: Yak Maninh Sacred Sites**

Name	Description
Maning Coastal point	covered by distinctive black rocks.
Kurlangor trees	near Maning
Two Woollybutts ( <i>Eucalyptus miniata</i> )	standing on eastern side of coastal track
Karrinthanmoi stone	A stone located among rocks on northern side of Maning Point, exposed at low tide.
Mamut trees	A cluster of seven or eight Cheesefruit trees ( <i>Morinda citrifolia</i> ) with pungent smelling fruit, located on northern side of Maning point.
Walpinthi reef	A submerged reef located approximately 1.5 km west of Yulow Point - the point or headland south of the pipeline landfall.

**Table 3.2: Yak Diminhin Sacred Sites**

Name	Description
Restricted Men's Area 4869-27	A ceremonial ground near a creek crossing south of Wadeye/Port Keats airstrip.
Restricted Women's Area	A ceremonial ground located west of the Wadeye/Port Keats airstrip, and immediately south of Wadeye/Port Keats community. A tributary of Sandfly Creek runs through the site area.
Thawytkam (Air Force Hill) 4869-28	Airforce Hill (Mt Goodwin) recorded by AAPA as MIKUMILU, but locally known as Thawytkam.



**Figure 3.1: Archaeological sites in the Project Area**



**Figure 3.2: Approximate locations of aboriginal sacred and significant sites**

### 3.2.6 European heritage values

No European historic sites were located during the survey of the onshore project area, and no sites are recorded in the Northern Territory Heritage Register records. It is highly unlikely that any historic sites will be located near the OGP as there have been only minor physical European intrusions into the region since the 1880's and these have mainly been related to the mission at Wadeye.

## 3.3 ENVIRONMENTAL CONDITIONS

### 3.3.1 Climate and meteorology

#### Climate

The climate is monsoonal with a wet "summer" and a dry "winter". The wet season commences between September and November as the southeast trade winds weaken over northern Australia and land temperatures rise. This results in two or more semi-permanent heat lows forming over central Australia, one over the Kimberley and Great Sandy Desert, and often another just south of the Gulf of Carpentaria.

The early part of the wet season is marked by frequent thunderstorms. As the season progresses, moist ocean air from the north and northwest streams into the lows and several days of heavy rain may occur.

As winter approaches, large highs centre over the southern part of the continent, the trade winds become re-established over northern Australia and the monsoon retreats. The southeast trade winds are dry winds that bring no moisture.

### **Rainfall**

Mean daily maximum temperatures for Port Keats range from about 30°C to 34°C, and minima from 14.5°C to 25°C (Ref. [20]). Annual rainfall is 1,521mm. Almost all rainfall occurs between November and April, with the greatest falls being in January and February. The frequency and severity of thunderstorms produce a large variation in the monthly rainfall. Rainfall during the dry months is sporadic and light.

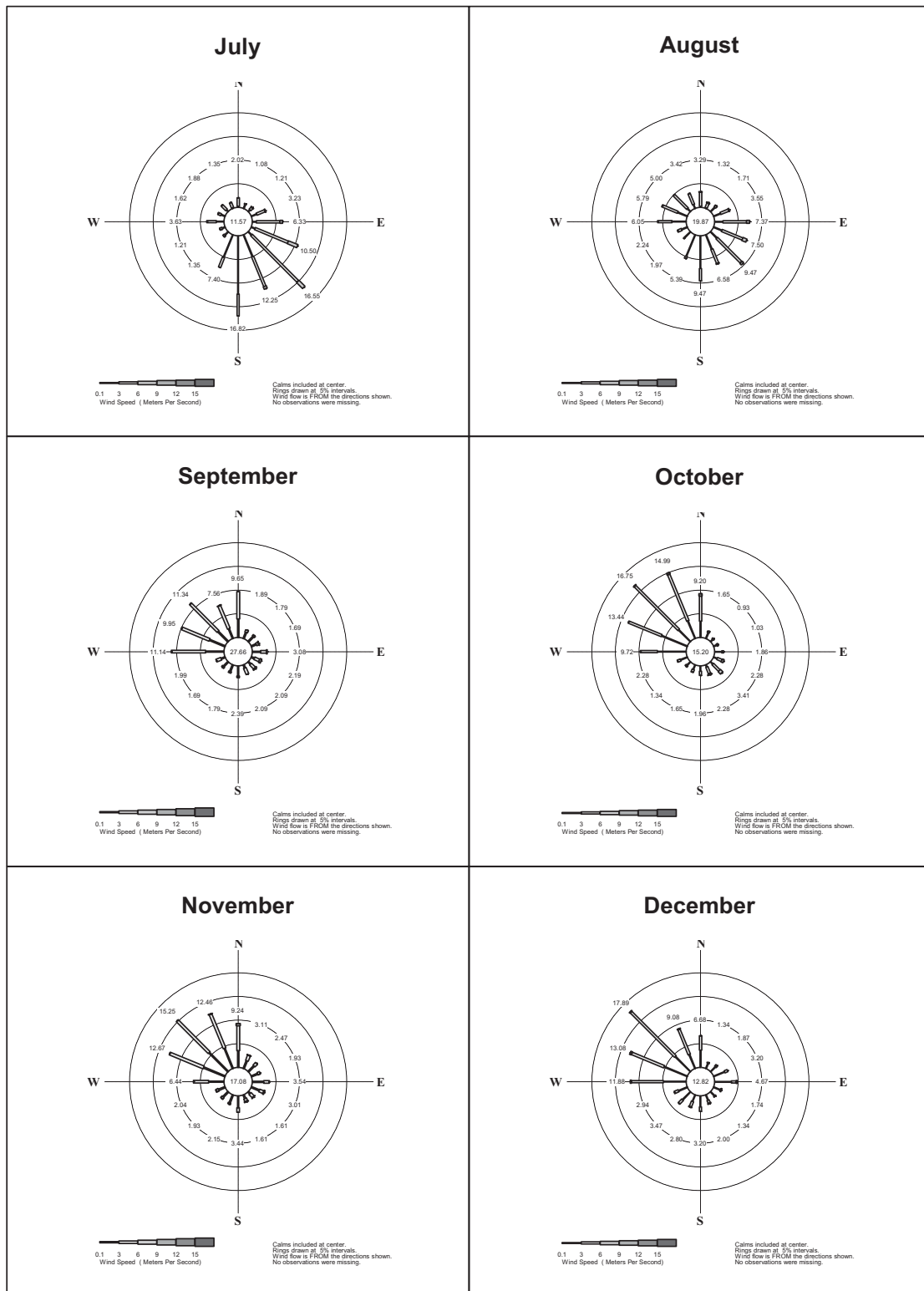
### **Winds**

Monthly wind roses for Port Keats (Wadeye) are shown in Figure 3.3. Winds are predominantly from the northwest between September and February and from the southeast between April and July. Winds are more variable during the transition periods between the two seasons in March and August. Tropical cyclones can develop between November and April resulting in short lived, severe storm events often with strong but variable winds.

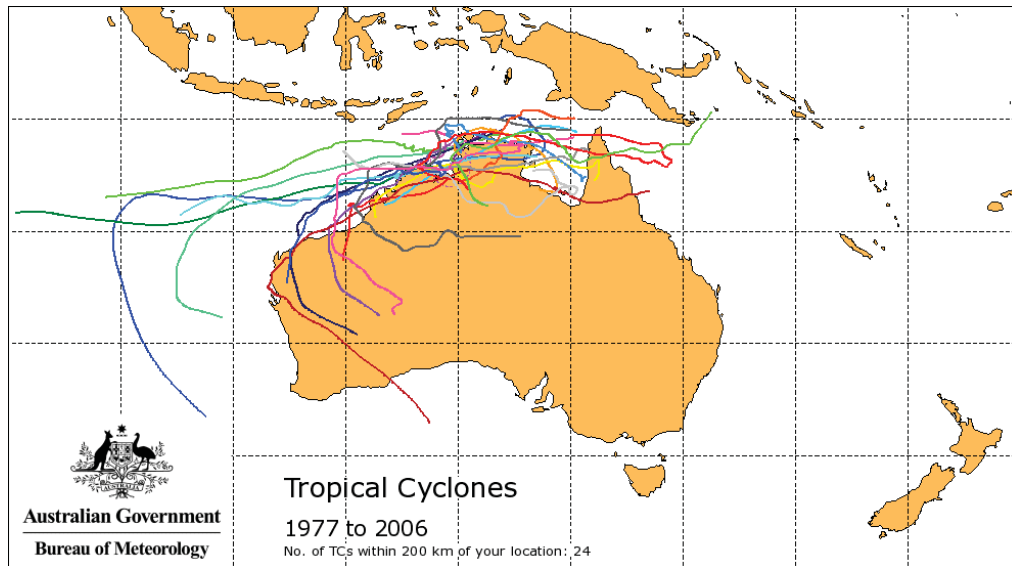
Typically, January, February, May, June and July are the windiest months, and October is the calmest. Peak wind velocities are associated with tropical cyclones that occur during the wet season, mostly between December and March. In the thirty-year period between 1977 and 2006, 24 tropical cyclones passed within 200 km of the OGP site, or around 0.8 per year (Figure 3.4) (Ref. [21]).



**Figure 3.3: Monthly wind roses for Port Keats (2000–2003)**



**Figure 3.2: Continued**



**Figure 3.4: Historical occurrence of cyclones within 200 km of the OGP (1977–2006)**

### 3.4 NOISE

The results of ambient noise monitoring at both the OGP and Wadeye township concluded that the areas are generally quiet and typical of a rural/rural residential community. In summary the Average LA90 (the noise level exceeded 90% of the time) was measured as follows:

- 34 dB(A) during day time at the OGP (the maximum average (LAMAX) was 64 dB(A));
- 28–30 dB(A) during evening and night-time at the OGP (the maximum average (LAMAX) was 43–47 dB(A));
- 40–43 dB(A) during day time, evening and night-time at Wadeye township (the maximum average (LAMAX) was 67–70 dB(A)).

### 3.5 AIR QUALITY

Ambient air quality in the vicinity of the OGP is generally high, although it can be affected by bushfires that occur in the region during the dry season.

### 3.6 GEOLOGY AND GEOMORPHOLOGY

#### 3.6.1 Geology and Soils

The land systems in the project area are shown in Figure 4.3. The proposed development traverses the:

- Moyle Land System;

- Carpentaria Dune System (NTG 2003); and
- Yelcherr Beach

The Moyle Land System is composed of colluvium, alluvium and aeolian deposits of deep red earths and sandy red earths, which are underlain by deeply weathered sandstone. Colluvium, alluvium and aeolian deposits are the result of sedimentary processes associated with the natural weathering of rock formations (Figure 4.4). Colluvium deposits result from depositional systems involving the transport of weathered materials by gravity. Alluvial deposits result from transport of weathered material by water, and aeolian deposits involve wind transport of weathered material. The parent material of these weathered soils is assumed to be the siltstones, sandstones and diamicite of the Port Keats group formation. The system undulates gently with slopes of less than 2.5% and supports an open forest vegetation type.

The Carpentaria Dune System extends along Yelcherr Beach and generally consists of dunes and swales, beach deposits and sands. The dune system supports woodlands, monsoon thicket, grasslands, or is bare of vegetation. The sandy beach and dunes are alluvium and aeolian deposits, which under the current depositional environment would be constantly eroded and replenished by tidal movement and storm events.

### **3.6.2 Yelcherr Beach**

The large tidal variation reveals a broad intertidal zone extending from the base of the dune 200m seawards. The beach is flanked by Manning Point to the north and Yullov Point to the south. The headlands are most likely Permian aged igneous diamicite. Geomorphology of the area suggests the thickness of marine sediments at Yelcherr Beach may be limited due to shallow Permian Age bedrock.

## **3.7 HYDROLOGY AND HYDROGEOLOGY**

The OGP is located in the southern sub-catchment of the Moyle River Basin, which has an area of approximately 250 km<sup>2</sup>. The average annual runoff is estimated to be around 600,000 ML/annum. There are no well-defined surface drainage features in the OGP site. The closest surface water system is the coastal inlet and seasonally inundated swamp that occurs landward of Yelcherr Beach approximately 1 km to the north of the proposed barge landing. Ephemeral surface water runoff from the project area supports this coastal wetland ecosystem.

A study of water resources of the Wadeye and Nauiyu region, undertaken by Haig and Matsuyama (2003), indicates that the OGP is underlain by upper Permian sedimentary rocks of the Kulshill formation. The lithology consists of sandstone, siltstone and claystone sediments with relatively shallow aquifers. A high yielding, widespread shallow aquifer system underlies the OGP. An impervious claystone at a depth of 50 to 100 m marks the base of the aquifer. The shallow aquifers in the region commonly yield greater than 5 L/s and less often 10 L/s, although higher yielding bores are associated with fracturing or a local source of recharge.

The aquifers are a source of potable groundwater for the community of Wadeye and the outstations of Ditchi, Nangu, Kuduntiga, Ngardinitchi, Old Mission, Kuy and

Yedderr. Ngardinitchi is the closest outstation to the OGP (10 km to the north-east) that relies on groundwater for its potable water supply. Aquifers in the vicinity of the OGP are considered to be a significant resource that will underpin agricultural and residential development in the Wadeye region into the future.

### 3.8 ECOSYSTEMS AND VEGETATION COMMUNITIES

#### 3.8.1 Flora

Figure 3.5 shows the vegetation communities in the vicinity of the OGP. The Eucalyptus woodland is dominated by:

- Darwin Stringybark *Eucalyptus tetradonta* and
- Darwin Woollybutt *E. miniata*.

Other species that typically occur in the canopy include: Ironwood *Erythrophleum chlorostachys* and Billy-goat Plum *Terminalia ferdinandiana*. Species that are common in the mid-storey of these communities include:

- Billy-goat Plum *Terminalia ferdinandiana*,
- Red-flowered Kurrajong *Brachychiton megaphyllus*,
- Cocky Apple *Planchonia careya* and
- Cycad *maconochiei* ssp. *maconochiei*.

The ground layer is typically comprised of tussock grasses: *Sarga* sp. and *Heteropogon* sp. This habitat is widespread and well represented in the Darwin Coastal Bioregion and is the dominant vegetation association across the Northern Territory.

Low open woodland: The low open woodland community that occurs on the hind dunes in damp sandy soils is comprised of a mixture of tree and shrub species including:

- Red Bush-apple *Syzygium suborbiculare*,
- Pandanus *Pandanus spiralis*,
- Black Wattle *Acacia auriculiformis*,
- Billy Goat Plum *Terminalia ferdinandiana*,
- Broad-leaved Cabbage-gum *Corymbia confertiflora* and
- the Cycad *Cycas maconochiei* ssp. *maconochiei*.

The ground layer is comprised of tussock grasses *Heteropogon contortus* and *H. triticeus*.

#### 3.8.2 Weeds

Weeds are present in low numbers around the OGP. Scattered Rubber-bush *Calotropis procera* plants occur on the beach dunes, and scattered infestations of

*Hyptis suaveolens* were observed in the hind dunes and in monsoon vine forests adjacent to the project area.

The extensive eucalypt forests in the Darwin Coastal Bioregion are affected by the rapid spread to dominance in the understorey of the exotic pasture grasses Gamba Grass *Andropogon gayanus* and Mission Grass *Pennisetum pedicellatum* and *P. polystachion*, which exacerbate the detrimental impacts of an increasing frequency of extensive hot, late dry season fires. These species are present in Wadeye township and common along the access routes between Darwin and Katherine, and along access routes to the OGP.

### 3.8.3 Terrestrial fauna

**Mammals:** Only one species of mammal, the agile wallaby, was recorded during field surveys [12]. The agile wallaby is a common and wide spread species found in many environments in northern Australia. A further five species were recorded or predicted in the Northern Territory Fauna Atlas.

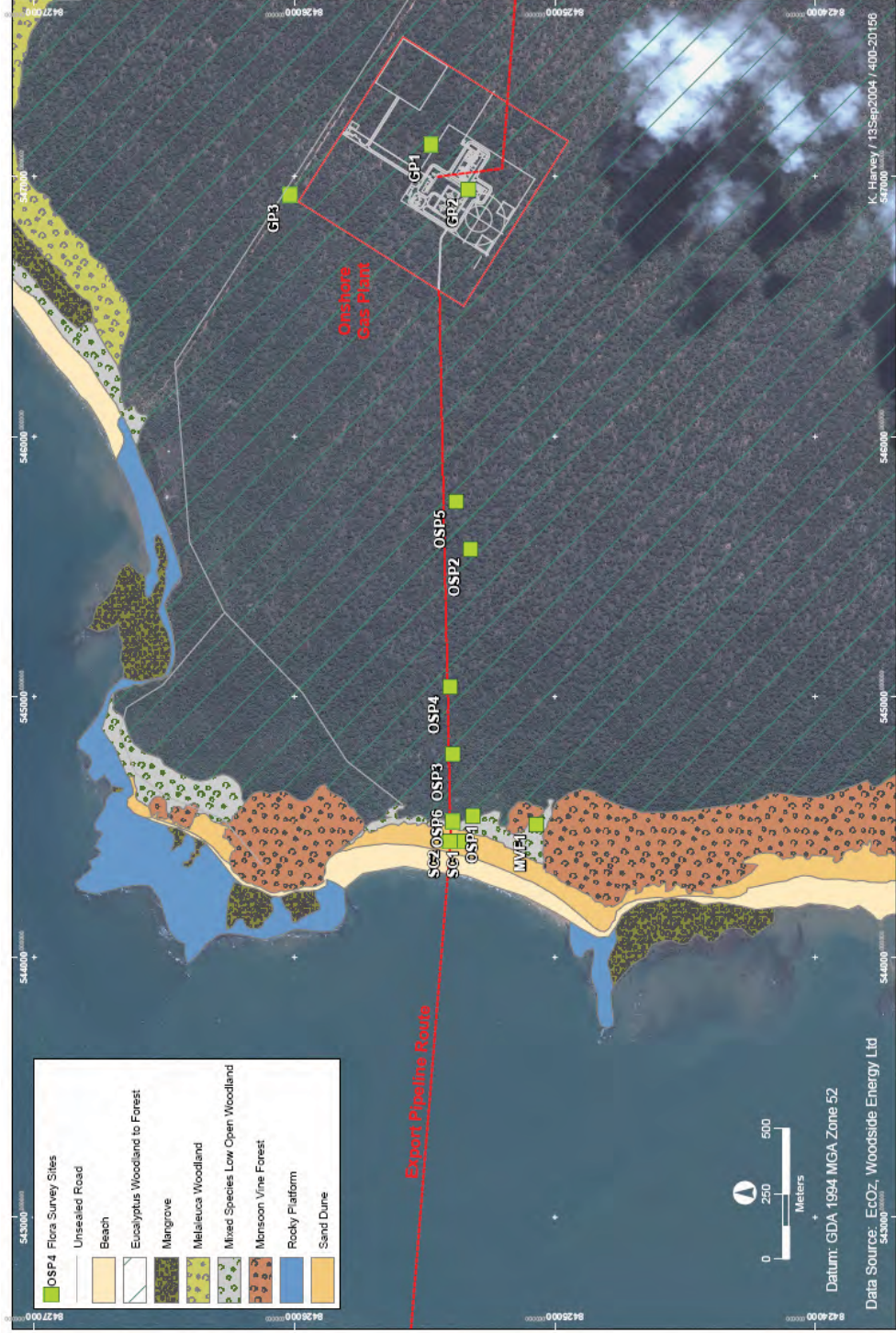
**Birds:** Forty-six bird species were recorded during field surveys [12]. The surveys added 19 species to the original list of species recorded in the Northern Territory Fauna Atlas bringing the total actually or potentially present to 117 species. Of these species, a large number, about one third, are coastal species, not found in the forests. Some of the bird species are strongly associated with monsoon vine forests, and others strongly associated with the eucalyptus forests and woodlands.

**Reptiles:** Eleven terrestrial reptile species were recorded during the field surveys [12], including two snakes, two geckoes, five skinks and two goannas. Six of these species were new records for the region, and added to the list recorded on the Northern Territory Fauna Atlas, bringing the total to thirty. None of these are considered to be of conservation significance.

Marine turtles nest on Yelcherr Beach, where the pipeline shore crossing is located. It is expected that up to 20 flatback turtles (*Natator depressus*) nest on this beach annually, with nesting season peaking in June–August. A small number of olive ridley turtles (*Lepidochelys olivacea*) may also nest at Yelcherr Beach [13]. Neither species is listed as threatened under the *Territory Parks and Wildlife Conservation Act* (NT), but under the EPBC Act flatbacks are listed as Vulnerable and olive ridleys as Endangered.

**Amphibians:** Only two frog species were recorded during field surveys [12]. Both were new records for the region, resulting in nine amphibian species being recorded for the region. Previously, seven species were recorded in the Northern Territory Fauna Atlas as occurring or potentially occurring in the region. None of the species is considered to be of conservation significance.

**Introduced Species:** Introduced species that occur in the Darwin Coastal Bioregion include the feral cat, feral pig, buffalo and cane toad (Ref [35]). Pigs and buffalo are known to damage native vegetation, particularly monsoon vine forest and riparian vegetation. Cats are predators of native birds, mammals and reptiles. The ecological impacts of cane toads relate to the effects of predation, competition and lethal toxic ingestion on native species.



**Figure 3.5: Vegetation communities**

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## 4. HAZARD IDENTIFICATION AND RISK ASSESSMENT

### 4.1 INTRODUCTION

Hazard identification and risk assessment processes were applied throughout the design stages of the Project, and have been reviewed as the OGP moves into a steady state of operations.

The Blacktip Operations HSE Hazard Register (Ref. [22]) documents the environmental hazard identification and risk assessment of the as-built facilities. The Hazard Register and EMP are working documents and will be reviewed and revised as required during the lifetime of the facility to ensure they accurately reflect the current environmental risk profile of the operations.

### 4.2 METHODOLOGY

The facility description (Section 2), facility piping and instrumentation diagrams (P&IDs) and operating and maintenance procedures are used as a basis for identifying the sources and causes of environmental effects, arising from operating the OGP under normal and abnormal conditions. Potential environmentally hazardous events are identified for seven broad environmental effects categories:

- atmospheric emissions;
- liquid discharges;
- physical disturbances to fauna and flora;
- solid and hazardous wastes; and
- socio-economic and cultural heritage.

Qualitative environmental risk assessment tools have been developed and applied to assess the environmental risk of each identified hazardous event, where:

$$\text{Risk} = \text{Frequency of Occurrence of Hazardous Event} \times \text{Environmental Consequence Severity}$$

The environmental risk assessment tools consist of the Eni Corporate Risk Assessment Matrix, which is based on HB 203:1999 (Table 4.1). Frequency of occurrence for a defined environmentally hazardous event is assigned based on various sources, including company experience, vendor recommendations, quantitative risk assessment and reliability modelling data. The frequency score is assigned using the frequency of occurrence descriptors defined in the Risk Assessment Matrix.

For each defined environmentally hazardous event, environmental consequence severity levels, ranging from Slight (1) to Major (5), are assigned. The applicable consequence categories are selected. According to the nature of the hazardous event, one of more categories may be relevant.

The Risk score assigned to each defined hazardous event is derived by plotting the highest individual environmental consequence severity score and the frequency of occurrence for the hazardous event on the Risk Assessment Matrix. The environmental risk scores represent residual risk levels, i.e. the likelihood of occurrence of a hazardous event and the associated consequence severity take into account risk management controls that are already in place as a result of the facility design, personnel skills training and competency assessments, operating plans and procedures, and emergency response plans and arrangements.

High residual risks are deemed to be intolerable and must be managed utilising prevention and/ or additional mitigation with highest priority.

Moderate residual risks are deemed to be tolerable, subject to on-going verification that risk management controls are effective. Change in management controls should necessitate a review of all affected hazardous events. Depending on the circumstances associated with the associated hazardous event, further risk reduction may be required to reduce the risk level, and moderate level risks should be subject to regular review as part of the HSE IMS performance effectiveness monitoring and review processes.

Low residual risks are deemed to be tolerable and do not warrant additional risk treatment within an ALARP management framework. Nevertheless, they require regular review as part of the HSE IMS performance effectiveness monitoring and review processes.

The risk reduction evaluation process requires a detailed assessment of the hazardous event, its causes, existing risk management controls, magnitude of the related environmental consequence/effect, and practical risk reduction or risk offset/mitigation options. If more than one risk reduction option is identified, cost-benefit studies may be required to identify the ALARP option that offers the optimal reduction in risk, relative to the time, effort and expenditure involved.

#### **4.3 DESCRIPTION OF GENERAL ENVIRONMENTAL RISKS AND THEIR MITIGATION**

Identified potential environmental risks and their safeguards are presented in Table 4.2. Management of the environmental hazards and risks is addressed through the Environmental Management Strategies (presented in Section 5) to ensure that environmental risk levels are maintained to ALARP. The results of monitoring and auditing programmes described in Section 1.1 are used to evaluate risk management performance and to identify areas where risk reduction may be required.



**Table 4.1: Eni Australia Risk Matrix**

Severity	People	Environment	Assets	Reputation	Increasing Annual Frequency				
					O	A	B	C	D
1	<b>Slight health effect / injury</b> (not applicable)	<b>Slight impact</b> No sensitive impact on ground/air/water	<b>Slight damage</b> No disruption to operations/business	<b>Slight impact</b> Minor and short lived impact in the locality	<p><b>Continuous Improvement</b></p> <p><b>Risk Reduction Measure</b></p> <p><i>Typical number of PTDs:</i></p>				
2	<b>Minor health effect / injury</b> (not applicable)	<b>Minor impact</b> Impact on localised ground	<b>Minor damage</b> Possible short disruption of operations/business; repair cost <200,000	<b>Minor impact</b> Some loss of reputation in the area, which should be recovered					
3	<b>Major health effect / injury</b> 1 or more than 1 Lost Time Accident; up to 30 days off for single injury!	<b>Local impact</b> Regional stakeholder concern or 1-2 years for natural recovery or 1 week for clean-up. Spill <100m <sup>2</sup>	<b>Local damage</b> The unit has been repaired/replaced to resume operations; repair cost <2,500,000. Loss damage to public domain.	<b>Local impact</b> Significant potentially long lived damage to the regional reputation					
4	<b>PTD or 1 fatality</b> Serious permanent disability or death	<b>Major national impact</b> National stakeholder concern or 2-5 years for natural recovery or up to 5 months for clean-up or threatening to biodiversity or impact on interesting areas for science. Spill <1000m <sup>3</sup>	<b>Major damage</b> Long time/Major change to resume operations/business; repair cost <25,000,000. Interruption of public services.	<b>Major national impact</b> Serious / permanent damage to the ability of the Company to sustain business position in the location, some broader implications for the Company					
5	<b>Multiple fatalities</b> From an accident or occupational illness (e.g. chemical asphyxiation or cancer or epidemic diseases)	<b>Major international impact</b> International stakeholder concern or >2.5 years for natural recovery or > 5 months for clean-up or reduction of biodiversity or impact on special conservation areas. Spill > 1000m <sup>3</sup>	<b>Extensive damage</b> Total loss of operations/business; repair cost >25,000,000. Extensive damage to public domain	<b>Major international impact</b> Potential loss of future business position in the location / region and / or lasting significant damage to broader Eni image					

PTD = Permanent Total Disability



**Table 4.2: Blacktip Operations: Potential Environmental Risks and Their Safeguards**

Event ID	Risk Category/ Environmental Aspect	Causes / Consequences / Impact	Description	Inherent Risk		Controls in Place		Residual Risk		Management Strategy	
				Freq.	Sev.	Freq.	Risk	Freq.	Sev.		Risk
<b>Atmospheric Emissions</b>											
1	Routine operation - fuel gas consumption by gas compressors	Contribution to global GHG emissions. Potential impacts upon vegetation, waterways and cultural sites from acid deposition and potential contributions to photochemical smog (by NOx and SOx). Inefficient use of energy/natural resources	There are three solar gas turbine compressors on site. Only two will be operational at any one time with the third available as contingency. GHG emissions from two compressors operating at full capacity estimated at 87,000t CO <sub>2</sub> -e/annum.	B	2	L	Compressors and generators will be run on fuel gas produced at the plant, which has lower emissions than diesel alternative. Flow meters installed for accurate measurement of fuel consumption from which emissions can be estimated. Fuel gas from Blacktip has low sulphur content, resulting in low SOx emissions. Stack emission testing to be undertaken during plant commissioning to verify performance against vendor equipment specifications.	B	2	L	5.2
2	Routine operation - fuel gas consumption by power generation turbines	(as above)	There are three gas engine generators on site. Only two will be operational at any one time with the third available as contingency. GHG emissions from two generators operating at full capacity estimated at 4,000t CO <sub>2</sub> -e/annum.	B	1	L	(as above)	B	1	L	5.2
3	Routine operation - fuel consumption by the standby diesel generators	(as above)	Diesel fuel is supplied to the firewater system which is tested on a weekly basis, and electric power generators which run during emergency or shutdown periods. GHG emissions from diesel usage estimated at 240t CO <sub>2</sub> -e/annum	B	1	L	Diesel consumption will be monitored. Ultra low sulphur diesel to be used	B	1	L	5.2
4	Routine operation - disposal of excess hydrocarbons through the ground flare system	(as above)	The OGP will operate high pressure (HP) and low pressure (LP) ground flare systems. The LP flare system is designed to allow for continuous flaming to safely dispose of regeneration offgas, and to regulate pressure during normal operation. GHG emissions from the LP flare is estimated at 2,000t CO <sub>2</sub> -e/annum	B	1	L	Equipment and pipeline are depressurised through the flare rather than venting (methane has a higher GHG potential than CO <sub>2</sub> ). LP flare system for LP hydrocarbon inventory. High flare tip efficiency. Flare KO drums for liquids recovery. Flow meters installed in flare and fuel systems for accurate measurement of emissions.	B	1	L	5.2



Event ID	Risk Category/ Environmental Aspect	Causes / Consequences / Impact	Description	Inherent Risk		Controls in Place		Residual Risk		Management Strategy	
				Freq.	Sev.	Risk	Freq.	Sev.	Risk		
5	Non routine – Process upset and maintenance flaring through the ground flare	(as above)	The HP flare system is sized to blowdown the hydrocarbon inventory in the OGP to reduce the operating pressure by half within 15 mins. GHG emissions from each blowdown is estimated at 70t CO <sub>2</sub> -e	B	2	L	Reliability and availability of plant has been maximised thereby reducing the likelihood of process upsets and flaring. Feed gas has been isolated from product pipelines allowing the pipeline to remain pressurised during maintenance.	B	2	L	5.2
6	Routine operation – venting from condensate tanks	(as above)	GHG emissions from two condensate tanks estimated at 800t CO <sub>2</sub> -e/annum.	B	1	L	Venting reduced by floating roof	B	1	L	5.2
7	Routine operation – fugitive emissions from valves, flanges, pump seals, compressor seats and connectors.	(as above)	GHG emissions from fugitive releases estimated at 1200t CO <sub>2</sub> -e/annum	B	1	L	Utilising high specification dry gas seals on the compressors; Utilising high integrity packing in valves;	B	1	L	5.2
8	Routine operation - Storage of fuels (diesel and hydraulic lube oils)	(as above)	Minor emissions of volatile hydrocarbons (typically peaking during fuel loading operations when the vapour space in the storage tanks is displaced by liquids)	B	1	L	None	B	1	L	5.2
9	Non routine – accidental release of hydrocarbon gas from the process and/or utilities area	(as above)	Release of hydrocarbons (mainly methane) to atmosphere	B	1	L	Inventory isolation (Emergency Shutdown Valves) and emergency depressurisation through the ground flare. Gas and fire detection and emergency response systems. Preventative maintenance and regular equipment inspections.	B	1	L	5.2
10	Non routine – Loss of containment from HVAC system	(as above)	Release of R134A to atmosphere. R134A has a high global warming potential (GWP) but is not an ozone depleting substance.	E	1	L	Use of a licensed contractor for the maintenance of the HVAC systems. Small inventory. No ozone depleting substances used on the plant.	E	1	L	5.2



Event ID	Risk Category/ Environmental Aspect	Causes / Consequences / Impact	Description	Inherent Risk		Controls in Place		Residual Risk		Management Strategy	
				Freq.	Sev.	Freq.	Risk	Freq.	Sev.		Risk
11	Routine operation - -- Stormwater discharge	Potential for contaminated storm water with traces of hydrocarbons and process chemicals to spill to land and pollute groundwater.	<p>The open drains on the plant are designed to collect stormwater, washdown water, fire test water and any accidental spills from equipment. During the wet season, a large volume of water will enter the drains. Only the first flush will be treated as this is the only component likely to be contaminated. Thereafter, the water will be clean and allowed to drain to land.</p> <p>The main contaminant of concern in the equipment bund will be residual hydrocarbons related to equipment leaks or maintenance residues.</p>	E	2	M	<p>Bund and sump management procedures;            Process areas and sumps will be kept clean at all times from spills and debris.            Spills to sumps will be pumped out automatically on level control. Sumps will also be pumped out of standing clean water during the wet season to prevent contamination of large volumes of water during spill events and overflow of potentially contaminated water to grade during heavy rainfalls.            The oily water treatment system consists of:            two GFUs (MS-43-B) that remove the majority of any remaining free oil from the stream;            two 100% oily water polishing filters that remove dissolved hydrocarbon from the discharge stream.            water break tank (MS-43-C) that allows that sampling to be performed and compliance with regulations confirmed prior to discharge to natural drainage.</p>	E	1	L	5.4
12	Routine - Sewage effluent discharge	(as above)	Wastewater entering the Wastewater Treatment Plant (WWTP) originates from showers, wash basins, toilet facilities, laundries and kitchens. Each of these facilities produce a characteristic effluent that is mixed to form the raw sewage feeding the WWTP through the sewerage system.	E	2	M	<p>The WWTP is an ABACO Jacana Sequencing Batch Reactor (SBR) (Ref. [15]). Effluent will be discharged through an irrigation system to designated area. Chemical characteristics of effluent will be monitored weekly.</p>	E	1	L	5.5



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Event ID	Risk Category/ Environmental Aspect	Causes / Consequences / Impact	Description	Inherent Risk		Controls in Place		Residual Risk		Management Strategy	
				Freq.	Sev.	Risk	Freq.	Sev.	Risk		
13	Non-routine – spill of diesel during refuelling operation	(as above)	Diesel will be required on site for intermittent use in the emergency generator, firewater pumps and vehicles. It is stored in a 50,000 L above-ground, self-bunded tank, and pumped into day tanks for the emergency generators and the firewater pumps and in drums for refuelling vehicles. Day tanks will be replenished by truck.	C	2	M	Diesel storage tank is self-bunded. Drip trays will be located underneath all diesel day tanks with spills routed to the hazardous open drains. Spill kits will be maintained at high risk areas. Limited diesel inventories. Spills will be cleaned up immediately and contaminated soil quarantined and treated as required.	B	2	L	5.3
14	Non-routine – spill of chemical	(as above)	Chemicals will be stored in the dedicated chemical hazmat store. Chemicals stored on site may include: acids and solvents, glycol, surface active agents and detergents, defoamers, lubricating fluids and greases, hydraulic oils/fluids, inhibitor chemicals (for example corrosion and scale inhibitors), specialised cleaning fluids and demulsifier/coagulant. Chemicals located at site for injection are: coagulant/demulsifier, and methanol. Coagulant/demulsifier will be stored in a dedicated tank and injected into the wet liquid line to the MP separator and the produced water line upstream of the Gas Flotation Units. Methanol will also be stored in a dedicated tank. Chemicals will be delivered by road or supply boat in either tote tanks or bulk storage vessels. The chemicals supplied will then be transferred to permanent storage by gravity flow or pumping through a system of hard piping and flexible couplings.	C	2	M	Chemical selected for lowest possible environmental impact. All tanks, loading stations and pumps will have drip trays to collect any spillage. Drip trays will be directed to the hazardous open drains system. The loading area has been designed to handle the contents of one tote tank without spillage into the open drain system. Monitoring of the chemical injection system shall be by daily checks to ensure system is operating at design conditions. Weekly capacity checks shall be carried out on the chemical inventory. Spill kits will be maintained at high risk areas. Spills will be cleaned up immediately and contaminated soil quarantined and treated as required.	B	2	L	5.3
15	Non-routine – leak of well fluids from gas export pipeline	Pipeline integrity could be compromised through corrosion or puncture from an external force. Potential for release of well fluids (mainly gas but could also include small quantities of water and condensate) to environment leading to contamination of soil	The onshore Gas Export Pipeline section between the extreme high water level at the beach and OGP has the following characteristics: <ul style="list-style-type: none"> <li>• Grade 450 carbon steel</li> <li>• buried to minimum of 900mm.</li> <li>• FBE coated for buried sections and painted for above ground sections.</li> <li>• cathodically protected, approximately 2.3km in length.</li> </ul>	B	3	M	Onshore portion of the pipeline has been constructed in accordance with Onshore System: AS 2885 Part 1 (Ref [16]) Blacktip Pipeline System is designed for a 30-year design life. Pipeline material selected to minimise corrosion and all production chemicals tested for compatibility and to ensure that they do not cause damaging effects. Following plans in place: <ul style="list-style-type: none"> <li>• Corrosion management (Ref. [17])</li> <li>• Pipeline inspection, monitoring,</li> </ul>	B	3	M	Corrosion Management Plan (Ref. [25]) Pipeline inspection, monitoring, maintenance and repair plan (Ref. [26]) Emergency Repair Plan (Ref. [27])

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Event ID	Risk Category/ Environmental Aspect	Causes / Consequences / Impact	Description	Inherent Risk		Controls in Place		Residual Risk		Management Strategy
				Freq.	Sev.	Risk	Freq.	Sev.	Risk	
16	Non-routine - leak of condensate from gas export pipeline (onshore portion)	and ground water.  Pipeline integrity could be compromised through corrosion or puncture from an external force. Potential for release of condensate to environment leading to contamination of soil and ground water.	The onshore condensate export pipeline from the OGP to the extreme high water level on the beach (shore crossing area), has the following characteristics: <ul style="list-style-type: none"> <li>• Grade 360 carbon steel,</li> <li>• buried to minimum of 900mm;</li> <li>• FBE coated for buried sections and painted for above ground sections,</li> <li>• cathodically protected, 2.29km in length.</li> </ul>			<ul style="list-style-type: none"> <li>• maintenance and repair plan (Ref. [18])</li> <li>• Emergency repair plan (Ref. [19])</li> <li>• Emergency Response Plan (Ref.[25])</li> </ul> (as above)	B	3	M	Emergency Response Plan (Ref.[31])
<b>Groundwater</b>										
17	Routine operations – extraction of water from shallow aquifer	reduced available groundwater supplies at community and outstation water supply bores; induced seawater intrusion into local aquifers and hence cause groundwater quality deterioration; and reduced groundwater flows to groundwater dependent ecosystems	Shallow aquifers are present in the sandstones, siltstones and claystone sediments around the development. The aquifers supply domestic water to local communities including Wadeye, and support wetlands and spring-fed vegetation. Three production bores will be available on site. Two of these will provide the main source of potable and non-potable water whilst the third will be available as a backup.	B	3	It has been estimated that a maximum of 800kL/day water will be required. Water extraction limited by pump size.	A	1	L	5.6



Event ID	Risk Category/ Environmental Aspect	Causes / Consequences / Impact	Description	Inherent Risk		Controls in Place		Residual Risk		Management Strategy	
				Freq.	Sev.	Risk	Controls in Place	Freq.	Sev.		Risk
18	Routine operations - noise	Noise from OGP (gas turbines, compressors, pumps, valves, flaring). Potential for noise disturbance to native fauna outside the plant perimeter	Noise modelling indicates that 70dB(a) level from process equipment will be met within the plant boundary.	A	1	L	Thermal acoustic insulation provided for all equipment.	A	1	L	5.8
19	Non routine – noise from emergency flare	(As above)	Noise modelling indicates that noise levels for emergency flaring will be 72dB(a) on the boundary.	A	2	L	Low radiation/visibility ground flare system. Emergency flaring infrequent and the event occurs for only a short duration (typically less than 15 minutes)	A	2	L	5.8
20	Routine operations – Heat	Heat stress on fauna and vegetation from processing plant and flare activities.		A	1	L	Thermal acoustic insulation provided for all equipment. Low radiation/visibility ground flare system. Buffer between process equipment and plant boundary	A	1	L	5.8



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Event ID	Risk Category/ Environmental Aspect	Causes / Consequences / Impact	Description	Inherent Risk		Controls in Place		Residual Risk		Management Strategy	
				Freq.	Sev.	Risk	Freq.	Sev.	Risk		
21	Routine operations – Light	Disturbance to terrestrial fauna by light spill from processing plant and flares. Attraction of fauna to plant site. For example, fruit bats might be attracted to water collecting areas and possums, bandicoots and rats might be attracted to rubbish areas.	Lighting on the OGP consists of: roadway lighting; hazardous area lighting; and security lighting around the perimeter fence. Roadway and hazardous area lights are on continuously from dusk to dawn. Security lights will only be illuminated should there be a disturbance on the boundary. These lights can be controlled manually or automatically by remote camera.	A	1	L	Minimum lighting required for safe operation was selected. All lights face downwards to avoid light spill. The OGP is surrounded by trees which are higher than the light poles. The process flare is at ground level with surrounding bund to reduce radiated light.	A	1	L	5.8
22	Routine operations Introduction of feral animals and invasive weeds from vehicles and equipment movements	Introduction of feral animals and weeds into surrounding ecosystem results in habitat disturbance for native fauna, increased competition for resources and translocation of diseases. This may lead to a threat to subsistence and economic activities, such as hunting, fishing and cattle grazing. Additionally, the proliferation of weeds encourages excessive use of herbicides.		A	3	L	A weed monitoring program has been setup with the Tharurr Rangers and weeds known to exist locally have been treated. Domestic animals will not be permitted in the project area.	A	3	L	5.8
23	Routine operations: - stormwater discharge (including pipeline right of way)	Erosion and sedimentation	Modification of drainage lines could result in siltation and sedimentation of land and water, reduced potential for successful rehabilitation of disturbed land and ; long term stability of disturbed areas.	B	2	L	Drainage control has been incorporated into all infrastructure.	B	2	L	5.4

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Event ID	Risk Category/ Environmental Aspect	Causes / Consequences / Impact	Description	Inherent Risk		Controls in Place		Residual Risk		Management Strategy	
				Freq.	Sev.	Risk	Freq.	Sev.	Risk		
24	Non routine – Fires/explosions	Bush fires	Fires or explosion on site could result in the destruction of potentially large areas of terrestrial ecosystem	B	3	M	Separation distances between plant and adjacent perimeter and fire break around property boundary. Fire fighting systems (automatic and manual). Emergency response plans and provisions. Fire and gas detection systems and alarms. Process control and emergency shutdown and depressurisation systems. On site fire management.	A	3	L	5.9
<b>Waste management</b>											
25	Routine operations – generation of liquid hazardous wastes	Offsite disposal of hazardous liquid waste. Incorrect identification and/or segregation of waste may lead to inappropriate waste handling and disposal practices. Consequences of these may be safety incidents (explosion/fire), adverse human health effects and/or contamination of atmosphere, soil and or water resources.	There will be only minor quantities of hazardous waste associated with the gas plant during operation and maintenance. This will include oils and used batteries.	B	3	M	Waste segregation on site prior to offsite disposal. Hazardous waste will be returned to Darwin, or a facility elsewhere, that can appropriately handle hazardous waste. Waste management contractor selection and audit processes. Operations Waste Management Plan	A	3	L	5.7
26	Routine operations – generation of solid hazardous wastes	(as above but for solid hazardous wastes)	E.g. gaskets, empty drums, oily rags, fluorescent lights	B	3	M	As above	A	3	L	5.7
27	Normal operations – generation of non-hazardous wastes	(as above but for solid non-hazardous wastes)	As the gas plant will be minimally manned, only a very small amount of solid waste will be generated. The plant is expected to generate 1000kg/y of biological sludge from the WWTP. 2 tonnes of domestic waste.	A	2	L	As above	A	2	L	5.7



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Event ID	Risk Category/ Environmental Aspect	Causes / Consequences / Impact	Description	Inherent Risk		Controls in Place		Residual Risk		Management Strategy	
				Freq.	Sev.	Freq.	Risk	Freq.	Sev.		Risk
28	Routine operations – noise and visual amenity	Noise and visual impact at Wadeye and Tchindi Camping Ground	Two potentially sensitive noise receptor locations have been identified in the vicinity of Blacktip OGP. These are Tchindi Aboriginal Camping Ground, over 2 km away, and Wadeye township, approximately 8 km away.	B	2	L	OGP is surrounded by forest and will not be visible from ground level. Flare is located at ground level and surrounded by earth bund. Noise modelling Predictions indicate that noise levels at the two receptors during normal operations will be <35dBA at Tchindi Camping Ground, and <30dBA at Wadeye. During emergency blowdown, flaring noise levels will be <30dBA at Wadeye, however, may exceed 50dBA at Tchindi. This will be noticeable by Tchindi residents, however, emergency flaring of this nature will be infrequent and occur for a short duration (15minutes) so is not anticipated to be an issue.	B	2	L	Flaring Management Plan (Ref.11)
29	Non-routine – unauthorised disturbance outside facility boundary/vandalism or fire	Disturbance to indigenous cultural values (see Section 3.2.4) and aboriginal sacred sites (see figure 3.2.5). Negative impact for Eni reputation in the local community.		A	2	L	Site induction includes topics related to this issue. Security fence. Security patrols at the plant's fence line.	A	2	L	Cultural Heritage Management Plan (Ref. 11)

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## 5. ENVIRONMENTAL MANAGEMENT STRATEGIES

### 5.1 OVERVIEW

This section of the EMP outlines the Environmental Management Strategies (EMS) in place to manage potential impacts from the operation of the Blacktip OGP and to ensure compliance with all relevant regulations. The EMSs are analogous to the “performance standards” referred to in Division 2.3, Clause 13(4) of the Petroleum (Submerged Lands) (Management of Environment) Regulations 1999.

The environmental objectives defined in the EMSs are based on the identified environmental hazardous events, associated environmental effects and the assessed risks, corporate policies and performance commitments and applicable legal requirements. For the purposes of developing the EMSs for the onshore operations, environmental objectives, targets and key performance indicators (KPI’s) are defined as follows:

<b>Objective</b>	Specific performance objective tailored to the operational context, which is intended to meet the legal requirements, corporate performance commitments and standards of operation.
<b>Target</b>	A target level of performance expressed as a tangible, measurable objective, against which actual performance can be compared, including a goal expressed as a quantitative standard, value or rate.
<b>KPI</b>	Measure of performance against a reference target.

EMSs have been developed for 9 environmental hazards, as follows. These are presented in Sections 5.2 to 5.10:

- 5.2 Atmospheric emissions
- 5.3 Hazardous chemicals
- 5.4 Stormwater
- 5.5 Domestic Wastewater
- 5.6 Groundwater
- 5.7 Waste
- 5.8 Flora and Fauna
- 5.9 Fire
- 5.10 Biting Insects

## 5.2 ATMOSPHERIC EMISSIONS

<b>ATMOSPHERIC EMISSIONS MANAGEMENT STRATEGY</b>		
<b>Applicable Activities/Events</b>		
<ul style="list-style-type: none"> <li>• Flaring associated with:               <ul style="list-style-type: none"> <li>- Normal process flaring – purge and pilot gas;</li> <li>- Full or partial blowdowns (maintenance and upsets); and</li> <li>- Emergency shutdowns and start-up flaring.</li> <li>- Fugitive emissions from equipment including valves, pumps and flanges.</li> <li>- Venting from condensate storage tanks</li> </ul> </li> <li>• Exhaust emission from process and power plant equipment including:               <ul style="list-style-type: none"> <li>- compressors (MS30, MS31 and MS32);</li> <li>- power generation packages (MS81);</li> <li>- firewater system; and</li> <li>- emergency power generation.</li> </ul> </li> </ul>		
<b>Potential Environmental Effects</b>		
<ul style="list-style-type: none"> <li>• Contribution to global GHG emissions.</li> <li>• Potential impacts upon vegetation, waterways and cultural sites from acid deposition and potential contribution to photochemical smog (by NO<sub>x</sub> and SO<sub>x</sub>).</li> <li>• Inefficient use of energy/natural resources.</li> </ul>		
<b>Corporate Commitments</b>		
<ul style="list-style-type: none"> <li>• Minimise greenhouse gas emissions.</li> <li>• Continually improve our HSE performance.</li> </ul>		
<b>Applicable Regulatory Requirements</b>		
<ul style="list-style-type: none"> <li>• National Environment Protection (National Pollutant Inventory) Measure (Cwth)</li> <li>• <i>Waste Management and Pollution Control Act 1998</i> (NT), Regulations 2004</li> <li>• Environment Protection (National Pollutant Inventory) Objective (NT)</li> <li>• <i>National Greenhouse and Energy Reporting Act 2007</i> (Cwth) and Regulations 2008.</li> </ul>		
Performance Objectives	Targets	Key Performance Indicators
<ul style="list-style-type: none"> <li>• Minimise routine flaring.</li> </ul>	<ul style="list-style-type: none"> <li>• Emission no greater than design predictions (2000 tCO<sub>2</sub>-e/annum).</li> </ul>	<ul style="list-style-type: none"> <li>• Actual flared quantity compared to annual performance targets.</li> </ul>
<ul style="list-style-type: none"> <li>• Minimise flaring during commissioning.</li> </ul>	<ul style="list-style-type: none"> <li>• Flaring minimised during commissioning.</li> </ul>	<ul style="list-style-type: none"> <li>• Actual number of blowdowns and volume of gas flared compared to annual performance targets.</li> </ul>
<ul style="list-style-type: none"> <li>• Minimise non-routine flaring during operations.</li> </ul>	<ul style="list-style-type: none"> <li>• Non-routine flaring minimised during operations.</li> </ul>	<ul style="list-style-type: none"> <li>• Actual number of blowdowns and volume of gas flared compared to annual performance targets.</li> </ul>



<b>ATMOSPHERIC EMISSIONS MANAGEMENT STRATEGY</b>		
<ul style="list-style-type: none"> <li>Maximise OGP efficiency.</li> </ul>	<ul style="list-style-type: none"> <li>Greenhouse Performance Indicator target of &lt;0.1.</li> </ul>	<ul style="list-style-type: none"> <li>Comparison of actual Greenhouse Performance Indicator with performance target.</li> <li>Records show engines and equipment are serviced regularly and well maintained.</li> </ul>
<ul style="list-style-type: none"> <li>Minimise venting emissions.</li> </ul>	<ul style="list-style-type: none"> <li>Emission no greater than design predictions (800 tCO<sub>2</sub><sup>e</sup>/annum).</li> </ul>	<ul style="list-style-type: none"> <li>Actual venting quantity compared to performance target.</li> </ul>
<ul style="list-style-type: none"> <li>Optimise use of fuel gas for plant power.</li> </ul>	<ul style="list-style-type: none"> <li>Fuel gas system to be available for &gt;95% of the time from the commencement of full production.</li> </ul>	<ul style="list-style-type: none"> <li>Actual annual fuel gas system availability.</li> <li>Volumes of fuel gas consumed for power generation.</li> <li>Volume of diesel used for power generation.</li> </ul>
<ul style="list-style-type: none"> <li>Comply with Environmental Protection Licence Conditions for CO, NO<sub>x</sub> and SO<sub>2</sub> emissions.</li> </ul>	<ul style="list-style-type: none"> <li>Environmental Protection Licence Conditions (Ref. [28]).</li> </ul>	<ul style="list-style-type: none"> <li>Results of monitoring.</li> </ul>
<b>Management Strategies</b>		
<ul style="list-style-type: none"> <li>Minimise GHG emissions by ensuring equipment is correctly specified and maintained.</li> <li>Emission minimisation isolation philosophy to avoid the requirement to flare on every process upset.</li> <li>Greenhouse Gas Management Plan (000036_DV_EX.HSE.0680.000_P00) developed detailing GHG minimisation strategies, emissions forecasting methods, and abatement opportunities.</li> </ul>		
<b>Engineering (As-built) Controls</b>		
<ul style="list-style-type: none"> <li>Reliability and availability of plant has been maximised thereby reducing the likelihood of process upsets and flaring.</li> <li>Feed gas has been isolated from product pipelines allowing the pipeline to remain pressurised during maintenance.</li> <li>Equipment and pipeline are depressurised through the flare rather than venting (methane has a higher GHG potential than CO<sub>2</sub>).</li> <li>LP flare system for LP hydrocarbon inventory.</li> <li>High flare tip efficiency.</li> <li>Flare KO drums for liquids recovery.</li> <li>Flare pilot monitoring.</li> <li>Flame sensors for monitoring safe operations of flare pilots.</li> <li>Flow meters installed in flare and fuel systems for accurate measurement of emissions.</li> <li>Power generated using onsite low pressure gas supply.</li> <li>Compressor power generated from gas powered turbines.</li> <li>Diesel to be used as a backup fuel only. Ultra-low sulphur diesel fuel to be used if required.</li> </ul>		



<b>ATMOSPHERIC EMISSIONS MANAGEMENT STRATEGY</b>	
<b>Operations Procedural Controls</b>	
<ul style="list-style-type: none"><li>• Gas Plant maintenance schedule and procedures.</li><li>• Gas Plant Commissioning procedures.</li><li>• 000036_DV_EX.OPS.0478.000 Plant Operations Manual</li><li>• 000036_DV_EX.OPS.0460.000 Process Isolation Guidelines</li><li>• 000036_DV_EX.OPS.0517.000 Plant Start-up</li><li>• 000036_DV_EX.OPS.0516.000 Plant Start up after Emergency Shut Down (ESD)</li><li>• 000036_DV_EX.OPS.0518.000 Plant Shutdown</li><li>• 000036_DV_EX.OPS.0660.000 Monitoring Procedures</li><li>• 000036_DV_EX.OPS.0668.000 Data Analysis &amp; Trending Procedure</li></ul>	
<b>Environmental Performance Monitoring and Reporting Requirements</b>	
<ul style="list-style-type: none"><li>• Conduct baseline calculation of annual GHG volumes from first year of operations to verify actual plant performance against design predictions.</li><li>• Define total annual GHG volume targets for subsequent years.</li><li>• Flaring quantities recorded through the Production Reporting System.</li><li>• Emergency flaring events recorded through the Production Reporting System.</li><li>• Fuel usage recorded through the Production Reporting System.</li><li>• All occurrences of 'non-routine operation', 'significant release to the environment', 'exceedence of licence limits' and 'incidents' to be reported to NRETAS in accordance with the definitions and reporting requirements defined in the Environmental Protection Licence.</li><li>• Annual reporting of National Pollutant Inventory listed substances associated with flaring.</li><li>• Annual reporting of GHG emissions to:<ul style="list-style-type: none"><li>• Australian Government Department of Climate Change in accordance with NGERS; and</li><li>• Eni Corporate (Milan).</li></ul></li><li>• Annual reporting of flaring volumes and GHG associated with flaring to be reported as part of the Blacktip Operations Annual environmental Report.</li><li>• Periodic greenhouse gas emission and Energy Audits to assess opportunities for improvement in Greenhouse Performance Index during facility life to satisfy requirements of the EEO Act.</li><li>• Stack emission testing for NO<sub>x</sub>, SO<sub>2</sub> and CO emissions during plant commissioning to verify performance against vendor equipment specifications.</li></ul>	

### 5.3 HAZARDOUS CHEMICALS

HAZARDOUS CHEMICALS MANAGEMENT STRATEGY		
Applicable Activities		
Transport, storage, use and disposal of hazardous chemicals used during operational activities.		
Potential Environmental Effects		
<ul style="list-style-type: none"> <li>• Soil and groundwater contamination</li> <li>• Contribution to ozone depletion should ozone depleting substances (ODS) be released</li> <li>• Ecotoxic effects on terrestrial ecosystems</li> <li>•</li> </ul>		
Corporate Commitments		
<ul style="list-style-type: none"> <li>• Minimise greenhouse gas emissions, effluents and discharge that may have an adverse impact on the environment.</li> <li>• Continually improve our HSE performance.</li> <li>•</li> </ul>		
Regulatory Requirements		
<ul style="list-style-type: none"> <li>• <i>Waste Management and Pollution Control Act</i> (NT) and associated Regulations</li> <li>• <i>Water Act</i> (NT) and associated Regulations</li> <li>• <i>Dangerous Goods Act</i> (NT) and associated Regulations</li> </ul>		
Performance Objectives	Targets	Key Performance Indicators
<ul style="list-style-type: none"> <li>• To minimise the potential for environmental impact from spill and accidental emissions.</li> </ul>	<ul style="list-style-type: none"> <li>• Zero incidents of liquid spills to land or water courses.</li> <li>• Zero accidental emission of ODS or other atmospheric pollutants.</li> <li>•</li> </ul>	<ul style="list-style-type: none"> <li>• Number of spills.</li> <li>• Volume of spills.</li> <li>• Incident reports (including near misses).</li> </ul>
<ul style="list-style-type: none"> <li>• To be prepared for spills</li> </ul>	<ul style="list-style-type: none"> <li>• Current Material Safety Data Sheets (MSDS's) for all substances held on site.</li> <li>• At least three spill kits distributed around the plant.</li> <li>• Spill training undertaken</li> </ul>	<ul style="list-style-type: none"> <li>• MSDS's on site.</li> <li>• Spill kits evident and complete.</li> <li>• Evidence of training.</li> </ul>
<ul style="list-style-type: none"> <li>• Zero use of ODS.</li> </ul>	<ul style="list-style-type: none"> <li>• Zero use of ODS.</li> </ul>	<ul style="list-style-type: none"> <li>• No ODS being used on site.</li> </ul>



## HAZARDOUS CHEMICALS MANAGEMENT STRATEGY

### Management Strategies

- Hazardous chemicals used on site will be handled and stored in accordance with the National Code of Practice for the Control of Workplace Hazardous Substances (NOHSC:2007, 1994).
- PPE will be provided and must be used at all times when handling hazardous substances.
- Storage areas for fuels, oils and chemicals will be surrounded by an impervious bund that contains at least 110% of the volume of the largest container stored in the bund and according to appropriate legislative requirements.
- Refuelling plant and equipment will be undertaken within an approved area where any spills and leaks of hazardous substances can be contained.
- Re-fuelling tankers will be required to hold sufficient spill kit materials to handle spills they are capable of producing in normal operations (e.g. an inadvertently unattended or dropped filling hose).
- Refuelling tankers will be required to have automatic shut-off equipment on all filling hoses and fittings.
- Maintenance of vehicles, plant and equipment will be undertaken in banded areas, except for minor inspections and maintenance such as greasing joints and filling fuel, fluid and oil tanks and containers.
- Personnel handling hazardous substances will be skilled in the handling of hazardous materials and emergency response.
- All spills will be managed according to the requirements of the Material Safety Data Sheet(s) (MSDS). Spills will be cleaned up immediately and contaminated soil quarantined and treated as required.
- Major spills will be managed in accordance with the Blacktip OGP Emergency Response Plan. Response priorities should be in the following order:
  - the safety of all Eni and contractor personnel
  - the impact on the environment
  - the potential losses or damage to equipment and assets
  - disruption to work activities.
- Those responding to a spill should:
  - immediately remove or extinguish ignition sources and assess fire risk
  - move personnel up-wind of the spill to avoid inhalation of fumes
  - administer first aid to affected personnel
  - control the source of the spill as soon as practicable taking into consideration the risk to soils and groundwater
  - if necessary, block drains or drainage ditches with booms or absorbent material to prevent spilled material spreading
  - if external assistance is required, contact NRETAS via the Pollution Response Hotline (1800 064 567)

### Engineering (As-built) Controls

- Chemical selected for lowest possible environmental impact.
- Appropriate chemical segregation and storage on site.
- Dedicated storage vessels and transfer hoses for main production and utility chemicals.
- Bunding provided in areas of spill risk or high potential impact.
- Drain systems designed to contain and recover hydrocarbon and process chemicals.
- Dedicated compressed gasses storage area.
- Zero ODS chemicals used on site.
- Spill kits, including absorbent pads, booms adequate for containing potential spills, and absorbent granules for hazardous materials will be held on site.



### HAZARDOUS CHEMICALS MANAGEMENT STRATEGY

#### Operations Procedural Controls

- 000036\_DV\_EX.OPS.0478.000 Plant Operations Manual
- 000036\_DV\_EX.OPS.0483.000 Utilities Operations Manual
- 000036\_DV\_EX.OPS.0472.000 Permit to Work System Manual
- 000036\_DV\_EX.OPS.0533.000 Corrosion Inhibitor System Operating Procedure
- 000036\_DV\_EX.OPS.0460.000 Process Isolation Guidelines
- 000036\_DV\_EX.OPS.0515.000 Produced Water Operating Procedure
- 000036\_DV\_EX.OPS.0453.000 Blacktip Training & Competency Management Philosophy
- 000036\_DV\_EX.OPS.0454.000 Blacktip Role Competency Matrix
- 000036\_DV\_EX.OPS.0455.000 Blacktip Minimum Competencies
- 000036\_DV\_EX.OPS.0654.000 Integrated Hazard Management Strategy
- 000036\_DV\_EX.OPS.0668.000 Data Analysis & Trending Procedure
- BTP-HSE-MA-022 Blacktip Safety Manual
- HSE Awareness training
- Job Hazard Analysis Procedure
- Waste Management Plan
- Health and Hygiene Management Plan
- Workplace Housekeeping procedures
- Hazard and Incident Reporting and Investigation (Eni-HSE-PR-03)
- OGP Emergency Response Plan
- Approved chemicals and hazardous substances register

#### Environmental Performance Monitoring and Reporting Requirements

- Consumption of chemical to be recorded and tracked.
- All unplanned releases from primary containment to be reported in accordance with Procedure Hazard and Incident Reporting and Investigation (Eni-HSE-PR-03). This includes reporting to NRETAS within 24 hours if the spill could cause environmental harm (refer to Section 6.7.5).

## 5.4 STORMWATER

<b>STORMWATER MANAGEMENT STRATEGY</b>		
<b>Applicable Activities/Events</b>		
<p>Planned stormwater discharges include:</p> <ul style="list-style-type: none"> <li>• Clean stormwater runoff; and</li> <li>• Treated process and utilities areas accidentally oil contaminated storm water.</li> </ul> <p>Potential sources of unplanned discharges (spills) from primary and secondary containment includes:</p> <ul style="list-style-type: none"> <li>• Product transfer/overflowing incidents;</li> <li>• Oily water separation system failure;</li> <li>• Storage vessel failure;</li> <li>• Containment bund failures;</li> <li>• Sump containment failures;</li> <li>• Pump failures; and</li> <li>• Dropped object resulting in rupture or leakage.</li> </ul>		
<b>Potential Environmental Effects</b>		
<ul style="list-style-type: none"> <li>• Contamination of soil and groundwater with trace concentrations of hydrocarbons and other contaminants, including heavy metals.</li> <li>• Erosion and sedimentation</li> </ul>		
<b>Corporate Commitments</b>		
<ul style="list-style-type: none"> <li>• Minimise effluents and discharges that may have an adverse effect on the environment.</li> </ul>		
<b>Applicable Regulatory Requirements</b>		
<ul style="list-style-type: none"> <li>• <i>Waste Management and Pollution Control Act (NT)</i> (including licence conditions, see Ref. [28]).</li> <li>• <i>Water Act 2004 (NT)</i></li> </ul>		
Performance Objectives	Targets	Key Performance Indicators
<ul style="list-style-type: none"> <li>• Zero contamination of soil or groundwater</li> <li>• Comply with Environmental Protection Licence Conditions for wastewater discharge</li> </ul>	<ul style="list-style-type: none"> <li>• Environmental Protection Licence Conditions (Ref. [28])</li> </ul>	<ul style="list-style-type: none"> <li>• Comparison of actual chemical constituents with performance targets.</li> </ul>
<ul style="list-style-type: none"> <li>• Minimise soil disturbance, degradation and erosion</li> </ul>	<ul style="list-style-type: none"> <li>• No evidence of excessive erosion, or sediment flowing from site.</li> <li>• Vegetation is stable.</li> <li>• Unused disturbed areas revegetated and remediated.</li> <li>• No waste soil left unmanaged on site.</li> </ul>	<ul style="list-style-type: none"> <li>• Compliance with performance targets.</li> </ul>



<b>STORMWATER MANAGEMENT STRATEGY</b>	
<b>Management Strategies</b>	
<ul style="list-style-type: none"><li>• Drainage control incorporated into all infrastructure (including the pipeline right of way) to prevent erosion and sedimentation.</li><li>• Drainage controls monitored to ensure that they are in good condition, are stable and are effective.</li><li>• Repair work undertaken as required.</li><li>• First flush of storm water treated.</li><li>•</li></ul>	
<b>Engineering (As-built) Controls</b>	
<ul style="list-style-type: none"><li>• Bunding and drainage provided for all process areas.</li><li>• First flush of stormwater treated.</li><li>• Treatment system includes CPI separator, gas flotation unit (GFU) and media filter (Figure 2.4).</li><li>• Treated water held in a break tank where water is tested prior to discharge.</li><li>• Off-spec effluent directed back through system.</li><li>• Draining of condensate tank bunds is manual.</li><li>• Treated storm water and storm water overflow discharged to east corner of plant where land is flat (Figure 2.5).</li><li>• Ground naturally slopes gently towards southwest.</li><li>•</li></ul>	
<b>Operations Procedural Controls</b>	
<ul style="list-style-type: none"><li>• 000036_DV_EX.OPS.0478.000</li><li>• 000036_DV_EX.OPS.0483.000</li><li>• 000036_DV_EX.OPS.0660.000</li><li>• 000036_DV_EX.OPS.0668.000</li></ul>	<ul style="list-style-type: none"><li>Plant Operations Manual</li><li>Utilities Operations Manual</li><li>Monitoring Procedures</li><li>Data Analysis &amp; Trending Procedure</li></ul>
<b>Environmental Performance Monitoring and Reporting Requirements</b>	
<ul style="list-style-type: none"><li>• Monitoring data to be reported via the Production Reporting System.</li><li>• All unplanned releases from primary containment to be reported in accordance with Procedure Hazard and Incident Reporting and Investigation (Eni-HSE-PR-03). This includes reporting to NRETAS within 24 hours if the spill could cause environmental harm (refer to Section 6.7.5).</li></ul>	



## 5.5 DOMESTIC WASTEWATER

<b>DOMESTIC WASTEWATER MANAGEMENT STRATEGY</b>		
<b>Applicable Activities/Events</b>		
<ul style="list-style-type: none"> <li>• Generation of domestic wastewater (sewage, greywater) by the onsite camp</li> </ul>		
<b>Potential Environmental Effects</b>		
<ul style="list-style-type: none"> <li>• Contamination of soil and groundwater.</li> </ul>		
<b>Corporate Commitments</b>		
<ul style="list-style-type: none"> <li>• Minimise effluents and discharges that may have an adverse effect on the environment.</li> </ul>		
<b>Applicable Regulatory Requirements</b>		
<ul style="list-style-type: none"> <li>• <i>Waste Management and Pollution Control Act (NT)</i> (including licence conditions, see Ref. [28]).</li> <li>• <i>Water Act 2004 (NT)</i></li> <li>• <i>Public Health Act (NT)</i> and Public Health (General Sanitation, Mosquito Prevention, Rat Exclusion and Prevention) Regulations (NT).</li> <li>• NT Code of Practice for the Small On-site Sewage and Sullage Treatment Systems and the Disposal or Reuse of Sewage Effluent</li> </ul>		
<b>Performance Objectives</b>	<b>Targets</b>	<b>Key Performance Indicators</b>
<ul style="list-style-type: none"> <li>• Zero contamination of soil or groundwater.</li> <li>• Comply with Environmental Protection Licence Conditions for wastewater discharge.</li> </ul>	<ul style="list-style-type: none"> <li>• Environmental Protection Licence Conditions (Ref. [28]).</li> </ul>	<ul style="list-style-type: none"> <li>• Comparison of actual chemical constituents with performance targets.</li> </ul>
<b>Management Strategies</b>		
<ul style="list-style-type: none"> <li>• To comply with conditions of approval for the operations of the WWTP (Appendix B).</li> </ul>		
<b>Engineering (As-built) Controls</b>		
<ul style="list-style-type: none"> <li>• ABACO Jacana Sequencing Batch Reactor (SBR) (Reference [9]).</li> <li>• Effluent will be discharged through an irrigation system to designated area.</li> </ul>		
<b>Operations Procedural Controls</b>		
<ul style="list-style-type: none"> <li>• 000036_DV_EX.OPS.0478.000</li> <li>• 000036_DV_EX.OPS.0483.000</li> <li>• 000036_DV_EX.OPS.0660.000</li> <li>• 000036_DV_EX.OPS.0668.000</li> </ul>	<ul style="list-style-type: none"> <li>Plant Operations Manual</li> <li>Utilities Operations Manual</li> <li>Monitoring Procedures</li> <li>Data Analysis &amp; Trending Procedure</li> </ul>	
<b>Environmental Performance Monitoring and Reporting Requirements</b>		
<ul style="list-style-type: none"> <li>• Monitoring data to be reported via the Production Reporting System.</li> <li>• All unplanned releases from primary containment to be reported in accordance with Procedure Hazard and Incident Reporting and Investigation (Eni-HSE-PR-03). This includes reporting to NRETAS within 24 hours if the spill could cause environmental harm (refer to Section 6.7.5).</li> </ul>		



## 5.6 GROUNDWATER

<b>GROUNDWATER MANAGEMENT STRATEGY</b>		
<b>Applicable Activities</b>		
<ul style="list-style-type: none"> <li>Water is required for potable use, workstores and fire water. Approximately 800 kL/day is extracted.</li> </ul>		
<b>Potential Environmental Effects</b>		
<ul style="list-style-type: none"> <li>Reduced available groundwater supplies at community and outstation water supply bores.</li> <li>Induced seawater intrusion into local aquifer and hence cause groundwater quality deterioration.</li> <li>Reduced groundwater flows to groundwater dependent ecosystems.</li> </ul>		
<b>Corporate Commitments</b>		
<ul style="list-style-type: none"> <li>Comply with all applicable laws, regulations and other requirements.</li> <li>Ensure that contractors understand and adhere to Eni HSE procedures and standards.</li> <li>Respect the interest of those who may be affected by our operations.</li> </ul>		
<b>Regulatory Requirements</b>		
<ul style="list-style-type: none"> <li><i>Water Act (NT)</i>.</li> <li><i>Waste Management and Pollution Control Act (NT)</i> (including licence conditions, see Ref. [28])</li> </ul>		
Performance Objectives	Targets	Key Performance Indicators
<ul style="list-style-type: none"> <li>Minimise the impact of groundwater abstraction on the local and regional groundwater resources, specifically groundwater availability for the Wadeye community and surrounding outstations.</li> <li>ensure adequate monitoring and contingencies to manage unforeseen changes to groundwater supply availability and water quality.</li> </ul>	<ul style="list-style-type: none"> <li>Groundwater monitoring twice weekly.</li> <li>Water levels not to fall 12m below ground level.</li> <li>Measured electrical conductivity values of 200µS/cm or higher.</li> </ul>	<ul style="list-style-type: none"> <li>Groundwater monitoring results.</li> </ul>
<b>Management Strategies</b>		
<ul style="list-style-type: none"> <li>The following data will be collected from the production and monitoring bores as the basis for triggers for corrective action:               <ul style="list-style-type: none"> <li>groundwater levels (daily in the first week and then twice-weekly thereafter); and</li> <li>groundwater quality (in-situ pH and electrical conductivity) at same frequency as groundwater levels.</li> </ul> </li> </ul>		



<b>GROUNDWATER MANAGEMENT STRATEGY</b>
Engineering (As-built) Controls
<ul style="list-style-type: none"><li>• Size of groundwater pump limits the quantity of water that can be extracted.</li></ul>
Environmental Performance Monitoring and Reporting Requirements
<ul style="list-style-type: none"><li>• Weekly monitoring data will be reviewed on an ongoing basis.</li></ul>



## 5.7 WASTE

<b>WASTE MANAGEMENT STRATEGY</b>		
<b>Applicable Activities</b>		
<p>Generation, storage, handling and disposal of hazardous waste, including:</p> <ul style="list-style-type: none"> <li>• Oil sludge;</li> <li>• Pigging waste (scale);</li> <li>• Medical waste;</li> <li>• Waste lubricating oils;</li> <li>• Spent oils and solvents;</li> <li>• Batteries.</li> </ul> <p>Generation, storage, handling and disposal of nonhazardous waste:</p> <ul style="list-style-type: none"> <li>• Domestic (paper, cardboard, plastics, glass, putrescible);</li> <li>• Sewage treatment plant;</li> <li>• Clean paper, plastics.</li> </ul>		
<b>Potential Environmental Effects</b>		
<ul style="list-style-type: none"> <li>• Pollution from inappropriate handling and disposal.</li> <li>• Long term liabilities associated with clean-up.</li> <li>• Inefficient waste reuse and recycling due to inappropriate waste segregation.</li> <li>• Increased loading on existing land based waste management facilities.</li> </ul>		
<b>Corporate Commitments</b>		
<ul style="list-style-type: none"> <li>• Provide a safe and healthy work place.</li> <li>• Comply with all applicable laws, regulations and other requirements.</li> <li>• Ensure that contractors understand and adhere to Eni HSE procedures and standards.</li> <li>• Respect the interest of those who may be affected by our operations.</li> </ul>		
<b>Regulatory Requirements</b>		
<ul style="list-style-type: none"> <li>• <i>Waste Management and Pollution Control Act 1998</i> (NT)</li> <li>• <i>Public Health Act (NT)</i> and Public Health (General Sanitation, Mosquito Prevention, Rat Exclusion and Prevention) Regulations (NT).</li> <li>• <i>Dangerous Goods Act (NT)</i>.</li> <li>• <i>Energy Pipelines Act (NT)</i>.</li> </ul>		
<b>Performance Objectives</b>	<b>Targets</b>	<b>Key Performance Indicators</b>
<ul style="list-style-type: none"> <li>• Ensure waste requiring disposal is consigned to appropriate disposal facilities.</li> </ul>	<ul style="list-style-type: none"> <li>• Zero occurrences of inappropriate waste disposal reported by waste contractor.</li> </ul>	<ul style="list-style-type: none"> <li>• Number of Non-conformance Incidents.</li> <li>• Waste Disposal Records, including waste tracking.</li> </ul>



<b>WASTE MANAGEMENT STRATEGY</b>
<b>Management Strategies</b>
<ul style="list-style-type: none"><li>• Site induction will describe the waste management plan.</li><li>• Wastes will be sorted and amounts estimated and recorded; and a waste tracking system will be implemented.</li><li>• All hazardous waste materials will be documented and tracked, segregated from other waste streams and stored in suitable containers in accordance with AS1940 and other relevant Australian Standards. They will be stockpiled or stored appropriately in bunded, signed areas.</li><li>• Hazardous wastes will be collected regularly for disposal to licensed facilities by licensed waste contractors.</li><li>• No domestic rubbish will be burnt.</li><li>• Whenever possible suitable wastes will be reused or recycled.</li><li>• Waste oils and greases will be segregated from other waste and disposed via recycling.</li><li>• Waste and containers not able to be recycled will be disposed of at a licensed landfill site.</li><li>• The OGP site will be kept in a clean and tidy state</li></ul>
<b>Engineering (As-built) Controls</b>
<ul style="list-style-type: none"><li>• Waste segregation bins will be provided at the work site.</li></ul>
<b>Operations Procedural Controls</b>
<ul style="list-style-type: none"><li>• Wood Group's Blacktip OGP Waste Management Plan (Ref. [29]) describes specifically how all wastes from Eni operations are managed.</li></ul>
<b>Environmental Performance Monitoring and Reporting Requirements</b>
<ul style="list-style-type: none"><li>• Waste manifest and tracking system for all wastes.</li><li>• Waste disposal records will be provided to Eni by waste management subcontractor.</li><li>• Report waste handling incidents via the Eni incident reporting procedures (Ref. [30]).</li><li>• All unplanned releases from primary containment to be reported in accordance with Procedure Hazard and Incident Reporting and Investigation (Eni-HSE-PR-03). This includes reporting to NRETAS within 24 hours if the spill could cause environmental harm (refer to Section 6.7.5).</li></ul>



## 5.8 FLORA AND FAUNA

<b>FLORA AND FAUNA MANAGEMENT STRATEGY</b>		
<b>Applicable Activities</b>		
<ul style="list-style-type: none"> <li>Wastewater and stormwater management, erosion control</li> <li>Vehicle movements</li> <li>Hot work (e.g. welding), and other risks of fire or loss of containment (spills and leaks)</li> </ul>		
<b>Potential Environmental Effects</b>		
<ul style="list-style-type: none"> <li>Modification to surface water drainage features may result in instability and increased erosion and sedimentation around the plant.</li> <li>Spill and discharges of hydrocarbons and other chemicals results in direct and indirect ecotoxic effects.</li> <li>Damage to bushland habitats by wildfire</li> <li>Introduction of pests or weeds, resulting in degradation of native vegetation and habitats</li> </ul>		
<b>Corporate Commitments</b>		
<ul style="list-style-type: none"> <li>Comply with all applicable laws, regulations and other requirements.</li> <li>Ensure that contractors understand and adhere to Eni HSE procedures and standards.</li> <li>Respect the interest of those who may be affected by our operations.</li> </ul>		
<b>Regulatory Requirements</b>		
<ul style="list-style-type: none"> <li><i>Environmental Protection and Biodiversity Conservation Act 1999</i> (Cwth).</li> <li><i>Territory Parks and Wildlife Conservation Act 2000</i> (NT).</li> <li><i>Weeds Management Act 2001</i> (NT).</li> </ul>		
Performance Objectives	Targets	Key Performance Indicators
<ul style="list-style-type: none"> <li>Prevent negative impacts to flora.</li> </ul>	<ul style="list-style-type: none"> <li>No disturbance to vegetation outside the OGP boundaries</li> </ul>	<ul style="list-style-type: none"> <li>No evidence of disturbance to vegetation outside the OGP boundaries</li> </ul>
<ul style="list-style-type: none"> <li>Prevent negative impacts to flora</li> </ul>	<ul style="list-style-type: none"> <li>No increase in distribution of weeds compared to prior to construction phase.</li> <li>New weed infestations identified, reported and treated in a timely manner.</li> </ul>	<ul style="list-style-type: none"> <li>Weed monitoring program active with monthly reports and eradication, as required.</li> </ul>
<ul style="list-style-type: none"> <li>Prevent negative impacts to fauna</li> </ul>	<ul style="list-style-type: none"> <li>No change to local populations of protected species as a result of Blacktip operations.</li> </ul>	<ul style="list-style-type: none"> <li>Nesting data collected in turtle monitoring program</li> </ul>
<ul style="list-style-type: none"> <li>Prevent negative impacts on fauna.</li> </ul>	<ul style="list-style-type: none"> <li>No introduction of exotic species (weeds or pests) as a result of Blacktip operations.</li> </ul>	<ul style="list-style-type: none"> <li>No evidence of increased numbers of exotic species.</li> </ul>



Management Strategies
<ul style="list-style-type: none"><li>• Site induction will include the importance of protecting native fauna and flora.</li><li>• No driving on unsealed access tracks through bushland.</li><li>• Eni will support the Thamarrurr Rangers in conducting weed monitoring around the OGP and access roads. Declared weeds will be controlled using spraying or removal by hand.</li><li>• Plant, vehicles, equipment and materials will be required to be certified weed and pest free prior to being brought into the project area. To this end vehicles and equipment will be washed by Contractors at their own depots prior to departure for the Blacktip site.</li><li>• Eni will support the Thamarrurr Rangers in conducting monitoring of turtle nesting and hatching on Yelcherr Beach during the flatback turtle nesting season (June–August). Monitoring will include counts of nesting sea turtles, nests hatching and the numbers of hatchlings leaving the nest. Records will be collected by Eni and provided to NRETAS for information at the end of the nesting season.</li><li>• Control of spills and leaks as per Section 5.3.</li><li>• Fire control as per Section 5.9.</li></ul>
Engineering (As-built) Controls
<ul style="list-style-type: none"><li>• Erosion and sedimentation control features on drainage lines and embankments on site.</li><li>• Buffer between process equipment and plant boundary.</li><li>• Grounding of equipment for lightning strikes to prevent fire.</li><li>• Negligible effects of light spill on turtle nesting beaches due to distance to OGP and tall vegetation</li></ul>
Operations Procedural Controls
<ul style="list-style-type: none"><li>• HSE induction procedure.</li></ul>
Environmental Performance Monitoring and Reporting Requirements
<ul style="list-style-type: none"><li>• Any injuries protected species (e.g. marine turtles) as a result of Project activities will be reported as an incident in the Synergi database.</li><li>• Records of turtle monitoring will be collected from the Thamarrurr Rangers by Eni and provided to NRETAS for information at the end of the nesting season (August).</li><li>• Records of week monitoring will be collected from the Thamarrurr Rangers by Eni.</li></ul>

## 5.9 FIRE

<b>FIRE MANAGEMENT STRATEGY</b>		
<b>Applicable Activities</b>		
<ul style="list-style-type: none"> <li>• Vehicle and plant exhausts</li> <li>• BBQs at the camp</li> <li>• Cigarettes</li> <li>• Hot work, such as welding</li> <li>• Gas leaks or explosions</li> </ul>		
<b>Potential Environmental Effects</b>		
<ul style="list-style-type: none"> <li>• Damage to vegetation and habitats by wildfire</li> </ul>		
<b>Corporate Commitments</b>		
<ul style="list-style-type: none"> <li>• Comply with all applicable laws, regulations and other requirements.</li> <li>• Ensure that contractors understand and adhere to Eni HSE procedures and standards</li> <li>• Respect the interest of those who may be affected by our operations.</li> </ul>		
<b>Regulatory Requirements</b>		
<ul style="list-style-type: none"> <li>• <i>Bushfires Act (NT).</i></li> </ul>		
Performance Objectives	Targets	Key Performance Indicators
<ul style="list-style-type: none"> <li>• Prevent uncontrolled fires igniting in the project area.</li> <li>• Minimise the potential impacts of fire on the surrounding environment.</li> </ul>	<ul style="list-style-type: none"> <li>• No fires ignited by production activities.</li> <li>• Fire breaks and controlled burns implemented in accordance with advice from the NT Bushfires Council.</li> <li>• Fire fighting equipment located across the site.</li> </ul>	<ul style="list-style-type: none"> <li>• Incident reports.</li> <li>• Any unplanned fires reported and mitigation measures put in place to prevent recurrence.</li> <li>• Controlled burning carried out to manage bush fuel load around OGP.</li> </ul>
<b>Management Strategies</b>		
<ul style="list-style-type: none"> <li>• Blacktip OGP Emergency Response Plan</li> <li>• The workforce will be trained in fire awareness, prevention and safety.</li> <li>• Fuel reduction burning will be undertaken around the edges of the plant from time to time, in accordance with advice from NT Bushfires Council.</li> <li>• A fire fighting unit and persons trained in fire response will be readily available at all times.</li> <li>• Fire fighting equipment will be present in vehicles and at strategic locations across the site.</li> <li>• Fire extinguishers will be maintained in accordance with AS1851:2005 requirements.</li> <li>• Spark arrestors will be fitted on all vehicles and equipment.</li> <li>• Fire breaks will be established and maintained for the duration of operations.</li> <li>• Smoking will only be allowed in designated areas where there is minimal fire risk.</li> <li>• All activities that pose a fire risk (e.g. welding) are to be undertaken on cleared ground at least 10 m from the nearest natural fuel source and fire fighting equipment will be present at the activity site.</li> </ul>		



## **FIRE MANAGEMENT STRATEGY**

### **Environmental Performance Monitoring and Reporting Requirements**

- Inspections of fire extinguishers in all vehicles are to take place monthly.
- The NT Bushfires Council is to be informed of fire management activities, both planned and unplanned.
- All unplanned fires at the OGP are to be logged as incidents in the Synergi database.

## 5.10 BITING INSECTS

<b>BITING INSECTS MANAGEMENT STRATEGY</b>		
<b>Applicable Activities</b>		
<ul style="list-style-type: none"> <li>• Site stormwater management and drainage</li> <li>• Management of irrigated wastewater from the wastewater treatment plant</li> <li>• Management of solid waste and litter</li> </ul>		
<b>Potential Environmental Effects</b>		
<ul style="list-style-type: none"> <li>• Discomfort and skin irritations for workers and visitors to the OGP</li> <li>• Risk of mosquito-borne diseases (e.g. dengue) for workers and visitors</li> </ul>		
<b>Corporate Commitments</b>		
<ul style="list-style-type: none"> <li>• Comply with all applicable laws, regulations and other requirements.</li> <li>• Ensure that contractors understand and adhere to Eni HSE procedures and standards.</li> <li>• Respect the interest of those who may be affected by our operations.</li> </ul>		
<b>Regulatory Requirements</b>		
<ul style="list-style-type: none"> <li>• <i>Public Health Act</i> (NT) and Public Health (General Sanitation, Mosquito Prevention, Rat Exclusion and Prevention) Regulations (NT)</li> <li>• NT Code of Practice for Small On-site Sewage and Sullage Treatment Systems and the Disposal and Reuse of Sewage Effluent</li> </ul>		
<b>Performance Objectives</b>	<b>Targets</b>	<b>Key Performance Indicators</b>
<ul style="list-style-type: none"> <li>• Minimise impacts from mosquitoes and midges on the workforce.</li> <li>• All illnesses are assessed for cause.</li> </ul>	<ul style="list-style-type: none"> <li>• No mosquito- or midge-related illnesses or lost-time injuries.</li> </ul>	<ul style="list-style-type: none"> <li>• Incident reports.</li> </ul>
<b>Management Strategies</b>		
<p>Elimination of mosquito and midge habitats is not feasible, but reduction of breeding areas and personal protection can be accomplished by the following procedures:</p> <ul style="list-style-type: none"> <li>• Solid waste is removed from site in a timely manner, to prevent development of mosquito and midge habitat (e.g. in containers that could collect water)</li> <li>• Bunded areas are drained regularly after rain to prevent water ponding.</li> <li>• Materials or equipment brought to site from Queensland or overseas will be inspected to identify and treat mosquito larvae. If found, the equipment will be cleaned with chlorine solution. Advice should be sought from NT Medical Entomology Branch in this case.</li> <li>• Chemical spraying or misting (e.g. with bifenthrin) will be conducted occasionally to reduce mosquito and midge larvae around the OGP.</li> <li>• Personal protection precautions such as appropriate clothing and repellent are advised for personnel.</li> </ul>		



### **BITING INSECTS MANAGEMENT STRATEGY**

#### **Engineering (As-Built) Controls**

- Yellow lights are installed in areas used frequently at night by personnel (around the control room, office and camp) as these attract fewer mosquitoes and midges than white lights.
- Surface water drains are free-draining, preventing pooling water that could provide mosquito breeding habitat.
- Valves are installed in bunded areas to allow drainage.
- Wastewater treatment plant is designed and installed according to the NT Code of Practice for Small On-site Sewage and Sullage Treatment Systems and the Disposal and Reuse of Sewage Effluent

#### **Environmental Performance Monitoring and Reporting Requirements**

- Incidents of mosquito-related disease will be reported to the NT Department of Health (Medical Entomology Branch) within 24 hours

## **6. IMPLEMENTATION STRATEGY**

### **6.1 INTRODUCTION**

The Implementation Strategy details the procedures that will be in place for operating the Blacktip facility. The Strategy defines the management measures, chain of command and responsibilities, training, reporting frameworks, mitigation and response activities and monitoring and auditing procedures which are intended to reduce environmental risk to ALARP and to ensure that environmental performance objectives are met.

### **6.2 SYSTEMS, PRACTICES AND PROCEDURES**

#### **6.2.1 HSE Management System Overview**

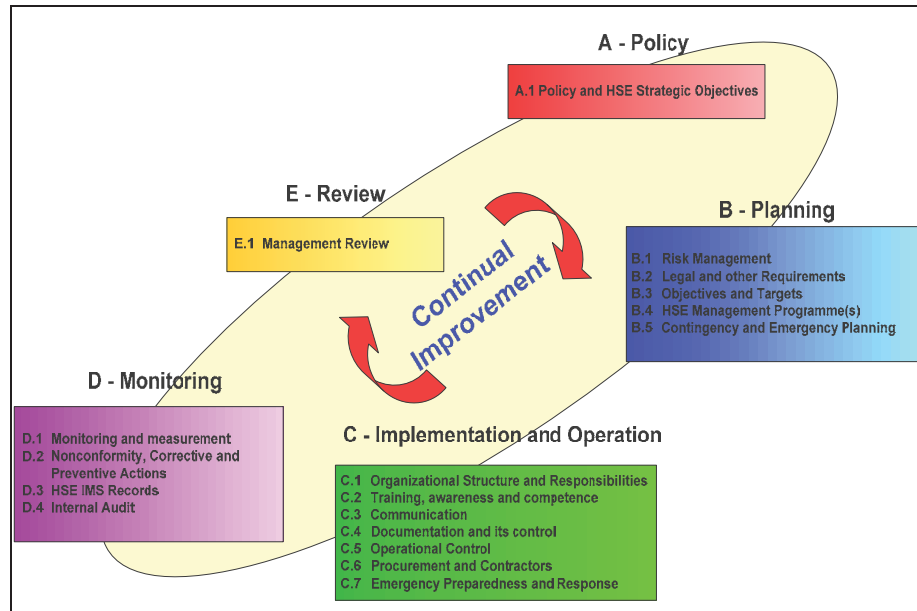
Eni's management of health, safety and environment matters are arranged hierarchically in three distinct levels:

- the parent or corporate level management system;
- the regional level management system – Eni Australia's Health, Safety and Environment Integrated Management System (HSE IMS); and
- The asset level management system – the Blacktip Operations Management System (BOMS).

#### **6.2.2 Eni SpA Exploration and Production Division**

Eni Australia adopts the guidelines provided by its parent corporate Eni SpA Exploration and Production Division. Eni SpA E&P issued a divisional directive for the development of management systems to conform to the guidelines set out in the document Division Directives: Organization of the Health, Safety, Environment and Public Safety Integrated Management System (Eni SpA document N°1.3.0.01). This document provides structure and guidance notes for HSE management system development based on the five main elements and 18 sub-elements of the system shown below in Figure 6.1.

These elements are largely based on the structure of the ISO 9001, ISO 14001 and OSHAS 18001 series of standards and therefore provide a consistent and recognisable platform for the management of safety, while also ensuring the intent of the principle of continuous improvement is followed.



**Figure 6.1: Eni Corporate SMS Development Guidelines**

### 6.2.3 Eni Australia HSE Integrated Management System

The HSE IMS Framework Document (Eni-HSE-IN-02) issued by Eni Australia serves as the key reference for Eni Australia's Health, Safety, Environment and Quality Integrated Management System and is an information source for employees, contractors and auditors of the HSE IMS. It provides an overview of the strategies that are used to manage HSE aspects of Eni Australia's operations including emergency response, risk and security, and ensure their continual improvement in line with established objectives and targets. This document also describes the core elements of the HSE IMS and their interaction and provides direction to related documentation.

The HSE IMS encompass all Eni Australia operations. Certain aspects of the company's activities are operated by contractors chosen by Eni Australia. Where appropriate, HSE IMS documents and procedures describe the interaction and interface between Eni Australia's HSE systems and those of its contractors.

Table 6.1 lists the supporting documents that provide processes, guidelines and criteria and information by which the functional requirements can be met. These documents are generally classified as either information (IN), standards (ST) or procedures (PR) documents.

**Table 6.1: HSE IMS Documentation**

Document No.	Document Name
<b>Information Documents</b>	
Eni-HSE-IN-01	Eni-HSE Policy
Eni-HSE-IN-02	HSE IMS Framework Document
Eni-HSE-IN-03	Work Policy and Standards Manual
Eni-HSE-IN-04	Office Eni-HSE Committee Charter (Substance Abuse Policy etc)
Eni-HSE-IN-05	Crisis Management Plan (CMP)
Eni-HSE-IN-06	HSE IMS Roles and Responsibilities Matrix
Eni-HSE-IN-07	HSE Strategic Plan (four year plan)
<b>Standards</b>	
ENI-HSE-ST-100	HSE Golden Rules
ENI-HSE-ST-001	Vehicle & Driving Safety
ENI-HSE-ST-002	Electrical Safety, Isolation & Lockout
ENI-HSE-ST-004	Working at Heights
ENI-HSE-ST-006	Confined Spaces
ENI-HSE-ST-007	Lifting Operations
ENI-HSE-ST-009	Hazardous Materials Management
ENI-HSE-ST-010	Ground & Seabed Disturbance
ENI-HSE-ST-011	Personal Protective Equipment
ENI-HSE-ST-013	Diving
ENI-HSE-ST-014	Aviation
ENI-HSE-ST-016	Gas Testing
ENI-HSE-ST-019	Permit to Work
ENI-HSE-ST-020	Fitness for Work incorporating Fatigue Management and Hours of Work
ENI-HSE-ST-022	Produced Formation Water
ENI-HSE-ST-023	Liquid and Solid Discharges
ENI-HSE-ST-024	Environmental Considerations in Chemical Use
ENI-HSE-ST-025	Waste Management
ENI-HSE-ST-026	Drilling Cuttings & Fluids
ENI-HSE-ST-027	Atmospheric Emissions
ENI-HSE-ST-028	Environmental & Social Assessments

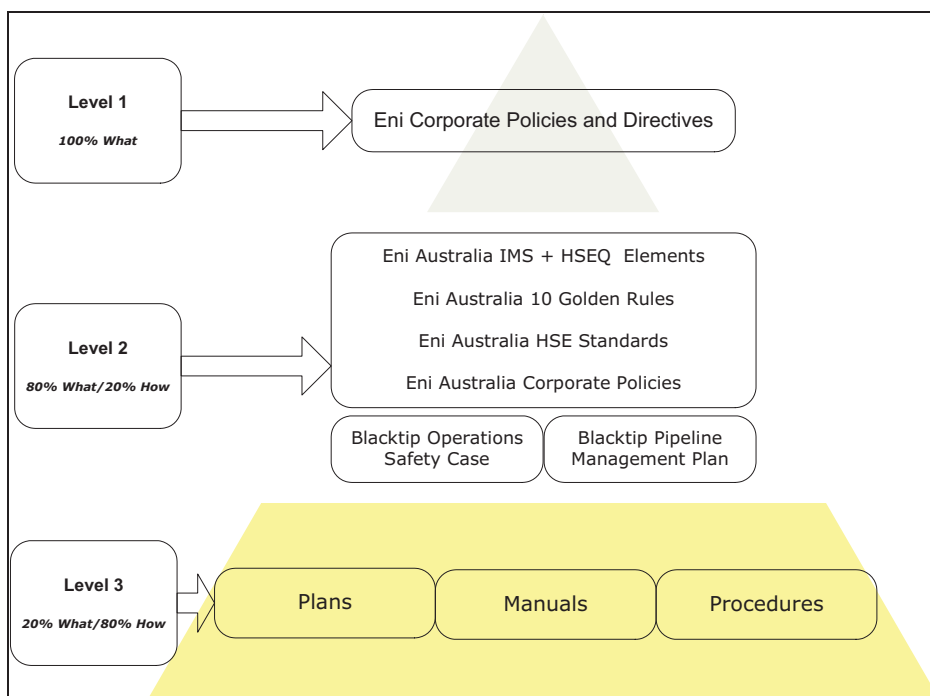


ENI-HSE-ST-029	Biodiversity Management
ENI-HSE-ST-030	Resource Consumption
ENI-HSE-ST-031	Extreme Weather
ENI-HSE-ST-032	Marine Operations
<b>Procedure Documents</b>	
Eni-HSE-PR-01	Procedure: Risk Management and Hazard Identification
Eni-HSE-PR-02	Procedure: Management of Change
Eni-HSE-PR-03	Procedure: Hazard and Incident Reporting and Investigation
Eni-HSE-PR-04	Procedure: Setting HSE Objectives and Targets
Eni-HSE-PR-05	Procedure: HSE Auditing
Eni-HSE-PR-06	Procedure: Maintaining Knowledge of HSE Legal and Other Obligations
Eni-HSE-PR-07	Procedure: HSE data monitoring and reporting to Eni E&P Division
Eni-HSE-PR-08	Procedure: Contractor HSE Management
Eni-HSE-PR-10	Procedure: Control of HSE Documents and Records
Eni-HSE-PR-11	Procedure: HSE Training
Eni-HSE-PR-12	Procedure: Office Safety
Eni-HSE-PR-13	Procedure: Emergency Response at 40 Kings Park Road
Eni-HSE-PR-14	Procedure: HSE Management Review
Eni-HSE-PR-15	Procedure: Corrective Action Tracking and Non-Conformance Reporting
Eni-HSE-PR-16	Procedure: HSE Communications

#### 6.2.4 Blacktip Operations Management System

BOMS has been developed to ensure that compliance with Eni Corporate Standards, Eni Australian Standards, Policies, Plans and Legislative requirements are all cascaded down to the operational level procedures that are used at the Blacktip facility worksites. In this way the operators in control of the OGP, WHP, SPM, pipelines, plant and equipment are using procedures that have been developed to ensure compliance with higher level requirements.

The management system pyramid illustrated in Figure 6.2 shows how BOMS – represented by Level 3 on the figure – relates to the HSE IMS and the Eni corporate management system.



**Figure 6.2: Blacktip Operations Management System**

The Blacktip Operations Team prepared the BOMS. It comprises all of the detailed procedures and work instructions needed to operate the Blacktip facilities on a day-to-day basis. A particular focus of BOMS is the integrity management schemes that will ensure the integrity of the pipeline system can be delivered on an ongoing basis. In effect, BOMS represents the outputs from applying the higher-level requirements of Eni's HSE IMS.

Operations Staff have access to BOMS via a computer based interface (*SharePoint*) that ensures they are only using the most recent, approved and up to date version of any relevant procedure. There is also a controlled, hard-copy backup maintained in the plant control building.

The table below shows a selection of Operations Manuals, Operating Procedures, HSE Manuals and Procedures and Asset Integrity and Maintenance Procedures. The information in procedures is supplemented by Vendor Equipment Manuals and Process Designer 'Operating Guides' which can also be accessed through *Sharepoint* or hard copy.

**Table 6.2: BOMS Management Documents for Pipeline System Operations**

Blacktip Operations Management System Operating Procedures	
Document No.	Document Title
000036_DV_EX.OPS.0486.000	Terminal Handbook
000036_DV_EX.OPS.0636.000	Marine Operations Manual
000036_DV_EX.OPS.0478.000	Plant Operations Manual
000036_DV_EX.OPS.0483.000	Utilities Operations Manual
000036_DV_EX.OPS.0482.000	Platform Operations Manual
000036_DV_EX.OPS.0484.000	SPM Operations Manual



<b>Blacktip Operations Management System Operating Procedures</b>	
<b>Document No.</b>	<b>Document Title</b>
000036_DV_EX.OPS.0472.000	Permit to Work System Manual
BTP-HSE-MA-022	Blacktip Safety Manual
TBA	Boat Transfer Procedure
000036_DV_EX.OPS.0514.000	Storage & Condensate Loading Onshore Operating Procedure
000036_DV_EX.OPS.0542.000	Condensate Loading Offshore Operating Procedure
000036_DV_EX.OPS.0512.000	Condensate Separation & Rundown Operating Procedure
000036_DV_EX.OPS.0530.000	Methanol Injection Operating Procedure
000036_DV_EX.OPS.0532.000	MEG Injection system Operating Procedure
000036_DV_EX.OPS.0533.000	Corrosion Inhibitor System Operating Procedure
000036_DV_EX.OPS.0460.000	Process Isolation Guidelines
000036_DV_EX.OPS.0535.000	Pig Launcher / Receiver Operating Procedure
000036_DV_EX.OPS.0537.000	Wellhead Control Panel/ Hydraulics Operating Procedure
000036_DV_EX.OPS.0510.000	Slug Catcher Operating Procedure
000036_DV_EX.OPS.0511.000	Gas Dehydration Operating Procedure
000036_DV_EX.OPS.0513.000	Gas Compression Operating Procedure
000036_DV_EX.OPS.0515.000	Produced Water Operating Procedure
000036_DV_EX.OPS.0517.000	Plant Start-up
000036_DV_EX.OPS.0516.000	Plant Start up after ESD
000036_DV_EX.OPS.0518.000	Plant Shutdown
000036_DV_EX.OPS.0453.000	Blacktip Training & Competency Management Philosophy
000036_DV_EX.OPS.0454.000	Blacktip Role Competency Matrix
000036_DV_EX.OPS.0455.000	Blacktip Minimum Competencies
000036_DV_EX.HSE.0388.000	Oil Spill Contingency Plan (Joseph Bonaparte Gulf)
000036_DV_EX.OPS.0640.000	Process Pressure Systems Integrity Strategy
000036_DV_EX.OPS.0641.000	Utilities Pressure Systems Integrity Strategy
000036_DV_EX.OPS.0642.000	Electrical Integrity Strategy
000036_DV_EX.OPS.0643.000	Instrument Integrity Strategy
000036_DV_EX.OPS.0646.000	Emergency Systems Integrity Strategy
000036_DV_EX.OPS.0647.000	Safety Systems Integrity Strategy
000036_DV_EX.OPS.0649.000	Design Engineering & Construction Management Strategy
000036_DV_EX.OPS.0652.000	Control Systems Integrity Strategy
000036_DV_EX.OPS.0654.000	Integrated Hazard Management Strategy
000036_DV_EX.OPS.0656.000	ENI Asset Integrity Assurance Process
000036_DV_EX.OPS.0657.000	Anomaly Management Procedure
000036_DV_EX.OPS.0660.000	Monitoring Procedures
000036_DV_EX.OPS.0662.000	Pipeline Repair Plan
000036_DV_EX.OPS.0663.000	Pipeline Inspection Plan
000036_DV_EX.OPS.0664.000	Fitness for purpose Assessment Procedure
000036_DV_EX.OPS.0665.000	Equipment Authoritative Review
000036_DV_EX.OPS.0666.000	Failure Analysis
000036_DV_EX.OPS.0667.000	Condition Assessment Procedure
000036_DV_EX.OPS.0668.000	Data Analysis & Trending Procedure

## **6.3 EMERGENCY PLANNING AND RESPONSE**

### **6.3.1 Blacktip Emergency Response Plan**

The Blacktip Operations Team has prepared a single Emergency Response Plan to cover all Blacktip operations (Ref. [31]). The ERP has been prepared in collaboration with Eni Australia's Operations HSE team. The ERP covers the whole range of emergencies involving a threat to the health and safety of personnel at or near the Blacktip facilities including the onshore and offshore pipelines system. It complements other Eni Australia emergency plans dealing with environmental incidents (the Oil Spill Contingency Plan – see below) and security incidents.

### **6.3.2 Crisis Management Plan**

Eni Australia has prepared a corporate Crisis Management Plan (Eni-HSE-IN-05) that details the organisation's response to crises, particularly emergency situations. In particular the Plan specifies the interface between the Eni Australia's HSE IMS and Oil Spill Contingency Plans, and each Contractors' Emergency Response Plans. The Plan details Eni Australia's crisis management team structure; roles and responsibilities; and emergency response procedures and forms. Emergency response documentation is reviewed on an annual basis; a review is also undertaken following any emergency incidents requiring use of the documentation.

Eni Australia organises crisis management exercises at least once a year to train and drill the Eni Australia Crisis Management Team and Emergency Management Team in their roles and responsibilities. Evaluation of these exercises provides a system to monitor the effectiveness of the entire emergency and crisis management system.

Eni Australia engages external consultants to provide training to designated staff on their emergency roles and responsibilities. Eni will also evaluate the effectiveness of the emergency management system via independent audits undertaken on an annual basis.

### **6.3.3 Oil Spill Contingency Plan**

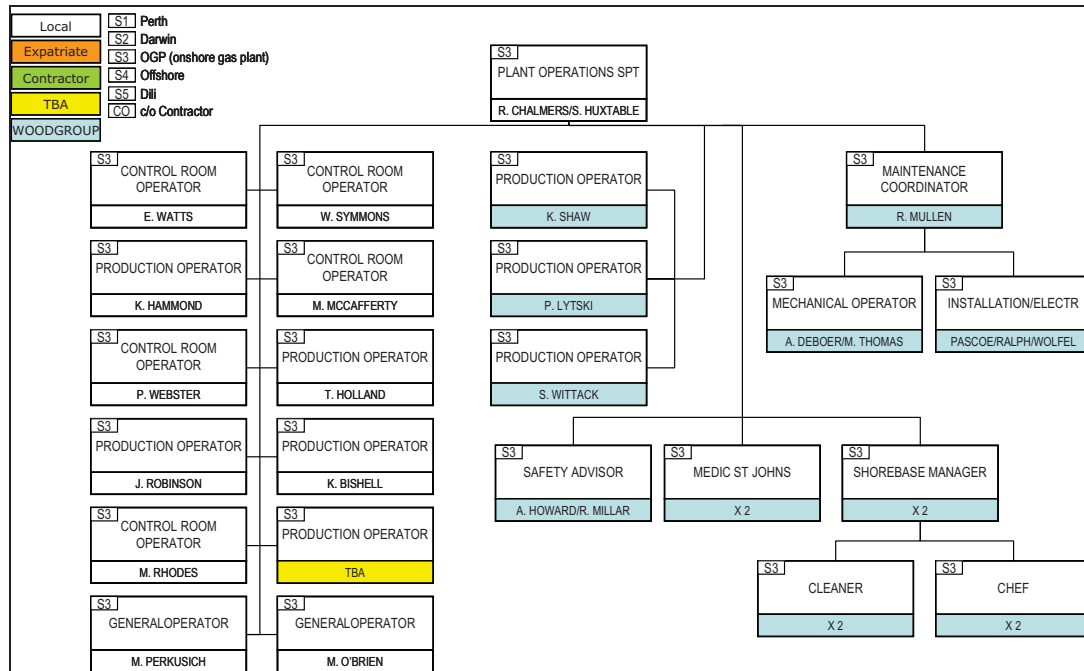
Eni Australia has developed an Oil Spill Contingency Plan (OSCP) (Ref. [1]) for the Joseph Bonaparte Gulf which covers all of its offshore operations including Blacktip. It has been developed to be fully integrated with the national response framework, which involves Federal, State/territory and industry levels.

The OSCP describes the procedures to be followed in the event of any marine pollution incident. It contains essential information about potential oil spill hazards, key responsibilities, organisations and resources, priorities for managing an incident and notification procedures.

## **6.4 CHAIN OF COMMAND AND ROLES AND RESPONSIBILITIES**

### **6.4.1 Overview**

The Blacktip organisational structure in place for the start of operations, following the introduction of hydrocarbons, is shown in Figure 6.3.



**Figure 6.3: Blacktip Operations Organisation Structure**

### 6.4.2 Eni Production Manager

The Eni Production Manager will be responsible for:

- supervising the Eni Plant Operations Superintendent;
- immediately notifying the HSE Manager of any spill of hydrocarbons of greater than 80L;
- assisting the Incident Management Team Leader in the event of an emergency; and
- liaising with the Eni Operations Manager and joint venture partners.

### 6.4.3 Eni Plant Operations Superintendent

The Eni Plant Operations Superintendent will be responsible for:

- the safe and efficient operation of all field production facilities;
- ensuring all operations are carried out in a manner consistent with the performance objectives detailed in this EMP;
- reporting incidents to the Eni Production Manager;
- overseeing matters relating to Condensate Offload operations; and
- taking charge in the event of an emergency.

#### **6.4.4 Eni HSE Manager**

The Eni HSE Manager will be responsible for:

- reviewing the Eni HSE Management Plans for acceptability and ensuring compliance with this EMP;
- immediately notifying NRETAS of any spill greater than 80 L;
- reporting recordable incidents to NRETAS;
- co-ordinating and reviewing environmental audits to ensure compliance with the agreed environmental performance objectives; and
- providing advice in the event of an oil spill or other environmental incident.

### **6.5 TRAINING, AWARENESS AND COMPETENCE**

#### **6.5.1 General Arrangements**

Effective training and awareness of HSE issues at Eni Australia is essential in developing and maintaining a HSE culture within the Organisation and as such plays a major role in achieving HSE objectives and targets. Specifically, communication strategies are used to:

- reinforce and communicate Eni Australia's commitment to, and importance of, complying with the HSE Policy, the HSE IMS and legislation;
- reinforce employees' and contractors' roles in complying with the HSE-IMS and achieving conformance with the HSE policy, and the consequences of non compliance;
- ensure that employees and contractors understand the HSE impacts of their work and the benefits of improved HSE performance;
- motivate employees and contractors to perform work in a responsible manner; and
- formally recognise employee HSE achievements.

Training, which is appropriate to achieving compliance with the HSE objectives and targets, is provided to all employees and contractors at Eni Australia. Details can be found in Eni Australia HSE document; Procedure: HSE Training (Eni-HSE-PR-11).

Eni Australia's HSE Training Matrix lists core HSE training courses for all positions in the organisation. Employee training is recorded within a Training Database managed by Human Resources/Training Administrator.

Staff are assigned a Position Training Plan when they commence employment with the company. In addition, all new staff arriving at the Blacktip OGP undertake a site induction on HSE issues.

The training described above has been established to ensure that training activities are interactive, effective, competency-based and auditable, in terms of frequency of sessions and attendance of individuals.

Eni Australia's HSE Training Program is reviewed and modified as required by analysing the training needs of employees and contractors. This is undertaken by the HSE Manager and the HR Manager at regular intervals.

## 6.5.2 Blacktip Operations

The Training and Competency Management Philosophy (Ref. [32]) describes the mechanisms by which training and competency is managed and outlines the process by which operations staff are trained and assessed as competent to operate the facilities. The Philosophy outlines the process for measuring operating competence against operating standards to ensure consistency in operation. It provides for a logical and structured path for operator's development and establishes an ongoing audit process to ensure that the system is implemented effectively and competence is maintained.

A Role Competency Matrix (Ref. [33]) has been developed, which captures training and competence requirements of all operations roles associated with the control of the Blacktip facilities. This document was developed based on competence requirements for safe operation and regulatory compliance. The Role Competency Matrix is a live document that tracks training completion on an ongoing basis and is used by Plant Management to assess compliance with the minimum requirements identified in the minimum competencies document (Ref. [34]). Wherever possible, training is facilitated to meet national competency standards.

## 6.5.3 Contractors

All Eni Contractors will have satisfied the general HSE pre-requisites in the Contractor Selection process and there will (normally) be a set of Contract HSEQ Requirements specific to each contract scope.

In addition to this, Eni Australia ensures that contractors and staff receive appropriate training on their HSE responsibilities in connection with Blacktip WHP and OGP operations.

## 6.6 HSE COMMUNICATION

### 6.6.1 Internal Communications

Internal HSE communication at Eni Australia is addressed through:

- Eni Intranet websites;
- use of HSE Notice boards; and
- formal and informal interaction between HSE and operations staff on a day to day basis.

Eni Intranet sites include:

- the Eni Australia Intranet (<http://intranet.Eniaustralia.pri>) including the HSE pages where the HSE IMS documents are located.
- the Safety and Environment Community of Practice (S&E CoP) (<http://wwwweandp.Eni.pri/KMP/CoPs/SE/index.asp>). The S&E CoP allows sharing of HSE knowledge and experience from across Eni global operations, providing capture and storage of HSE lessons learned in a central 'Knowledge Library'. The S&E CoP can be emailed for assistance at [CoP.SE.mbx@Eni.it](mailto:CoP.SE.mbx@Eni.it) and works as a learned community to identify potential in-house solutions or advise a way forward.

Within the Perth office of Eni Australia, HSE Noticeboards are located in the kitchen of all floors. They function to uniform the workforce about HSE issues. Regular items to be placed on the noticeboard include:

- **HSE Bulletins.** Notices on HSE topics that need to be raised in the workforce can be done so using HSE Bulletins. They can focus on a HSE theme or just raise a specific item of interest. The HSE Manager coordinates the development of new HSE Bulletins at least once a month.
- **HSE Alerts.** HSE Alerts are specific alert notices that arise from Hazard and Incident Reports. The HSE Manager will decide on whether the outcomes of the Hazard and Incident Reports/Investigations warrant the generation of a HSE Alert to inform the wider workforce.

Copies of HSE Bulletins and HSE Alerts are located in Sharepoint.

## 6.7 PERFORMANCE MONITORING AND REPORTING

### 6.7.1 Monitoring

Table 6.3 summarises the routine monitoring undertaken at the OGP.

**Table 6.3: Environmental Monitoring**

Environmental Risk	Criteria to be Monitored	Frequency of Monitoring
Flaring	Volume	Daily
Fuel gas usage	Volume	Daily
Diesel usage	Volume	Daily
Produced water	OIW concentration and volume	Prior to each discharge
Production Chemicals	Usage, concentration and total loading	Daily
Waste disposal	Type and volume	Daily
Exotic Species	Presence of exotic species	Ongoing
Weeds	Presence of weeds	Once a month during dry season and fortnightly during the wet season
Groundwater	Groundwater level and Salinity	Twice weekly water samples

### 6.7.2 Auditing

Audits against the objectives and targets of this EMP (Section 5) and compliance with the requirements of the EPL are conducted by the HSE Department at least once per year. These audits are scheduled in the HSE Audit Program & Site Visits register on Sharepoint.

Compliance with Territory and Commonwealth legislative requirements is also assessed within the annual audit against the EPL. Relevant legislation that may affect operations at the OGP is listed in Section 1.4.2.

Audits are carried out in accordance with Eni's procedure for *HSE Auditing* (ENI-HSE-PR-005).



### 6.7.3 Non-Conformance, Corrective and Preventative Actions

Non-conformances with this EMP can be identified and followed up in a number of ways, as described in the Eni procedure for *Corrective Action Tracking and Non-Conformance Reporting* (ENI-HSE-PR-015):

- accidents occurring on site that could cause environmental effects (e.g. spills) are reported to the Operations Superintendent, and are logged as incidents into the Synergi database. Synergi also provides an automated follow-up mechanism whereby corrective actions can be delegated via emails, and tracked to completion.
- non-conformances identified in Eni internal audits are described in the audit report, and subsequently logged into the Audit Action Tracking Register on Sharepoint. These are followed up by the HSE team, and closed from the register when completed.
- resolving breaches of this EMP by Eni's contractors can be approached through issuing a formal Non Conformance report, which links with legal management of the contract. This would apply to any serious or repeated breaches of Eni procedures that could cause environmental harm.

It is the responsibility of Department Managers to ensure that corrective and preventative actions relevant to their area of responsibility are undertaken, tracked and completed. The HSE Manager ensures that all corrective and preventative actions are tracked and that appropriate reminders are communicated to relevant Department Managers.

### 6.7.4 Environmental Records

Record keeping of emissions and discharges will be in compliance with the requirements of the EPL.

Flaring, fuel gas and diesel usage, produced water and production chemicals are recorded on the daily production report. These data are transferred to the master spreadsheet for analysis and trending.

Other monitoring records (e.g. groundwater sampling, weeds) are stored in folders on the Sharepoint document control system.

### 6.7.5 Reporting

#### Internal Reporting Procedure

When an environmental incident occurs the Plant Operations Superintendent immediately notifies the **Eni Australia Duty Manager on 0419 943 584**. The Duty Manager will notify either the HSE Manager or Environmental Adviser.

All environmental incidents or deviations from this EMP will be reported in accordance with Eni's *Procedure: Hazard & Incident Reporting & Investigation* (Ref. [30]). This includes logging each incident in the Synergi database.



**NT Government Reporting Requirements**

Eni will undertake routine and incident reporting to the NT Government (NRETAS) in line with the Environmental Protection License, as described in Table 7.4. In the event of a reportable environmental incident (i.e., an event that could cause environmental harm), the Plant Operations Superintendent must verbally notify NRETAS as soon as practicable. A follow-up written report would also be required; incident reporting forms can be found in Eni's *Procedure: Hazard & Incident Reporting & Investigation* (Ref. [30]).

**Table 6.4: Summary of routine and incident reporting requirements**

Requirement	Timing
<b>Incident Reporting</b>	
<p>Eni will notify the Executive Director (NRETAS) when an incident occurs. An "incident" is defined under the WMPC Act as:</p> <p>(a) an accident, emergency or malfunction; and</p> <p>(b) a deliberate action, whether or not that action was taken by the person conducting the activity in the course of which the incident occurred,</p> <p>where:</p> <p>(a) an incident occurs in the conduct of an activity (at the Blacktip OGP); and</p> <p>(b) the incident causes, or is threatening or may threaten to cause, pollution resulting in material environmental harm or serious environmental harm</p>	<p>Verbally as soon as practicable, but no later than 24 hours</p> <p>Follow up with a written report (no time limit specified)</p>
<b>Reporting of Exceedence of Licence Limits</b>	
<p>Eni will notify the Executive Director (NRETAS) of any exceedence of licence limits.</p> <p>Written notification will include details of monitoring results, explanation of the cause of the incident, and measures taken to rectify the problem.</p>	<p>Verbally as soon as practicable, but no later than 24 hours</p> <p>Follow up with a written report within 14 calendar days</p>
<b>Annual Environmental Performance Report</b>	
<p>Eni will provide to the Executive Director (NRETAS) an annual environmental performance report, for the period 1 July to 30 June inclusive. The report will include all environmental monitoring data, details on environmental incidents, an assessment of all opportunities to reduce air emissions and a summary of any environment-related complaints received.</p>	<p>Annually, by 1 August</p>

### 6.7.6 Eni Corporate Reporting

Eni Australia is required to prepare internal HSE data reports to be submitted to management at corporate level for Eni E&P Division (Milan), including a monthly HSE report and compliance reports. These reports are compiled to advise Eni E&P Division corporate management about HSE issues, initiatives and overall HSE performance of Eni Australia's operations. More information about HSE data flows to E&P Division can be found in Procedure: HSE Data Management within Eni E&P Division (Eni-HSE-PR-07). Further details can also be found in Eni E&P division standard HSE Reporting.

Eni Australia's input into company-wide HSE performance reports allows the compilation of HSE information in Eni's Annual Report and Fact Book. These documents are publicly available on the company's internet site (<http://www.Eni.it>).

Supply of external reports to regulators is a legal requirement stipulated within a number of legislations. Procedure: Hazard and Incident Reporting and Investigation (Eni-HSE-PR-03) provides details of the supply of incident reporting information to relevant regulators in Australia, E&P division Milan and joint venture partners.

## 6.8 MANAGEMENT AND REVIEW OF THE EMP

This EMP will be reviewed:

- annually in conjunction with a review of performance criteria for meeting environmental targets; or
- if any significant new environmental risk or effect, or significant increase in an existing environmental risk or effect, occurs that is not provided for in the existing plan; or
- before the commencement of any new activity or any significant modification, change or new stage of an existing activity, not provided for in the existing plan; or
- when any significant environmental incident occurs during operations.

The actual performance achieved by Eni and its contractors towards the environmental objectives and targets set in this EMP is assessed through the audit process (described in Section 6.5.6).


Eni's activities at the OGP are intended to be certified to ISO14001, and require overall management review to assess the effectiveness of the environmental management system and the implementation of controls. Key environmental data from the OGP operations (e.g. diesel use, flaring, number and type of incidents) is collated by the HSE team and presented to the Eni Australia management team and Eni E&P Headquarters in Milan once per year, as an assessment of performance against key indicators.




## APPENDICES



## **APPENDIX A: ENI HSE POLICY**



  
**eni**  
**eni australia**

**HEALTH, SAFETY & ENVIRONMENT POLICY**

In our hydrocarbon exploration and production activities, Eni Australia and its associated companies are committed to maintaining a fair and effective culture in Health, Safety and Environment (HSE) for everyone involved in our activities.

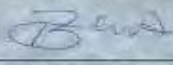
This policy applies to all operational and project activities under Eni Australia's control, including activities carried out by contractors.

Eni Australia will:

- ✓ Set Health, Safety and Environment as a core value for all business activities;
- ✓ Play a leading role in promoting best HSE practice throughout our activities;
- ✓ Set objectives and targets, implemented through appropriate programmes, thus ensuring the continual improvement in overall HSE performance;
- ✓ Implement safe working and fitness to work programmes to pursue the goals of zero harm to the health of, or injury to, people and protect the environment and business assets;
- ✓ Comply with relevant legislation and other requirements to which Eni Australia subscribes or apply company standards where laws and regulations do not exist;
- ✓ Assess and manage HSE risks across each life cycle for all business activities;
- ✓ Maintain a documented HSE Integrated Management System certified to ISO14001 which enables comprehensive reporting and review of performance;
- ✓ Include HSE performance in appraisal of staff and contractors;
- ✓ Prevent pollution and minimise greenhouse gas emissions, effluents, discharges and other impacts on the environment while safeguarding our resources; and
- ✓ Remain committed to sustainable development and the welfare of our host communities.

Eni Australia expects that everyone recognises their personal responsibility for HSE and their right to report openly any HSE issue or concern. In addition everyone is obliged to intervene in the case of unsafe acts or conditions.

To ensure we meet these objectives and respect the interests of those who may be affected by our operations, Eni Australia will consult with, listen to and respond openly to all staff, contractors, regulators, customers, local communities and public interest groups.

Managing Director   
Antonio Baldassarre

Date 15/10/2009



## **APPENDIX B: APPROVAL FOR THE OPERATION OF WWTP**

Health Protection  
Environmental Health Program  
2nd Floor, Casuarina Plaza  
258 Trower Road, CASUARINA NT 0810  
**Postal Address:** PO Box 40596  
CASUARINA NT 0811  
**Tel:** 08 8922 7522  
**Fax:** 08 8922 7036  
**eMail:** michael.kinnaid@nt.gov.au

**Our Ref:** DF 2008/15  
**Your Ref:**

Rob Phillips  
Senior Environmental Advisor  
ENI Australia  
P.O. Box 1265 West Perth  
WA, 6872

Dear Phillips,

### **Approval to Operate Blacktip Gas Project ABCO Water System 150EP**

Environmental Health hereby grants operational approval of the **ABCO Water System 150 EP** at Blacktip Gas Project with conditions.

The following conditions from the previous Approval for Design and Installation of a Wastewater Treatment Plant and Recycled Water Scheme dated 9 April 2008 will require compliance during the operational phase of the system:

1. The system is approved for a maximum daily flow of 67,500 litres of wastewater.
20. An 'as constructed' site location plan of all sewage works and facilities shall be provided to Environmental Health by the owner.
21. The owner should keep basic records of the system performance in accordance with the Table set out in Section 11.1 of the NT *Guidelines for the Management of Private Recycled Water Schemes*.

In addition, the owner shall engage an auditor to audit and prepare compliance reports every five (5) years as set out in Section 11.2 of the above Guidelines

An inspection of the wastewater treatment system was conducted by an Environmental Health Officer on 16 February 2010 and appeared to be operating within design parameters.

Should you require further information regarding this issue, please contact me at  
Department of Health and Families on 8922 7522

Yours sincerely

Mick Kinnaird  
A/Manager Top End Remote  
Environmental Health Program

29 November 2010