# Cliff Head Onshore Operations Environment Plan Summary

Upstream PS Controlled Document

No. 10/HSEQ/ENV/PL09SUM

Revision 2

Issue date: 23/11/2017 [Publish Date]

This document is to be considered uncontrolled:
- When printed (unless formally issued as a 'controlled copy'); and
- When saved electronically to an area outside of the IMS

# Document control and revisions

This Cliff Head Onshore Operations Environment Plan Summary for the Cliff Head Onshore Operations is a controlled document.

The Upstream Production Solutions Pty Ltd Manager - HSSE & Regulatory Assurance is responsible for controlling this document and any revisions to it. Responsibility for managing change in this document is detailed within the Upstream Production Solutions Pty Ltd Document Control Procedure (00/SP/DOC/PC01).

Should the recipient or user become aware of any changes or corrections that are required please photocopy this page, with completed details, and the relevant pages to be changed, note the corrections and deliver them to:

Denny Stewart
Manager - HSSE & Regulatory Assurance

Upstream Production Solutions Pty Ltd
Ground Floor, 100 Havelock Street
West Perth, Western Australia 6005
Tel: (618) 9482 0642
Email: denny.stewart@upstreamps.com

This Cliff Head Onshore Operations Environment Plan Summary shall be revised in the following circumstances:

- after a period of 5 years
- on discovery of a significant new environmental effect or risk
- with a significant change to the operation.

Name: _____

Position: _____

Location: _____

Document revision number: _____

Telephone: _____

Facsimile: _____ Email: _____

Please note the following requested or recommended changes to the following pages:

Section: _____ Page: _____

Section: _____ Page: _____

Other comments: _____

_____

_____

_____

Cliff Head Onshore Operations Environment Plan Summary

# Table of Contents

# 1 References

| Document code | Title |
|---|---|
| | Australian Petroleum Production and Exploration Association Ltd (APPEA) Code of Environmental Practice, October 2008 |
| | Australian Government – Bureau of Meteorology |
| | Bamford, Wilcox and Davis 2004 proposed 3D Seismic Survey Area near Dongara – Fauna Assessment (Desktop) |
| | Beard 1976 Vegetation Survey of Western Australia – Murchison, University of Western Australia Press. |
| | Commonwealth Government 1999 Environment Protection and Biodiversity Conservation Act 1999 |
| | Commonwealth Government 1998 National Environment Protection Measures (Implementation) Act 1998 |
| | Commonwealth Government 1993 Native Title Act 1993 |
| | Commonwealth Government 2006 Energy Efficiency Opportunities Act 2006 |
| | Commonwealth Government 2007 National Greenhouse and Energy Reporting Act 2007 |
| | Department of Environment and Conservation Contaminated Sites Management Series – Assessment levels for Soil, Sediment and Water Version 4, revision 1 |
| | Department of Environment and Conservation Environmental Protection Act 1986 Licence L5765/1994/10 |
| | Department of Environment and Conservation Landfill Waste Classification and Waste Definitions 1996 (As amended December 2009) |
| | Environment Australia (EA) 2000 Revision of the Interim Biogeographic Rationalisation for Australia (IBRA) and Development of Version 5.1 - Summary Report, Environment Australia, Canberra, ACT.<br>http://www.deh.gov.au/parks/nrs/ibra/version5-1/summary-report/index.html |
| | Environmental Protection Authority (EPA) 1993 Red Book Status Report (1993), Report 15, Government of Western Australia, Perth |
| | HSA 2002 ARC Energy NL. Hovea Field, L1. Ecological Assessment. July 2002 |
| | O'Connor, R. 1999 Report on an Ethnographic Survey of the Dongara Field Area and Six Proposed Drilling Locations, July 1999 |
| | Quartermaine, G. 1999 Report of an Archaeological Survey for Aboriginal Sites Potential Drill Locations Dongara Region, Quartermaine Consultants, July 1999 |
| | State of Western Australia Petroleum Act 1967 and Environment Regulations and Schedule of Onshore Petroleum and Production Requirements 1991 (amended 2010) |
| | State of Western Australia Aboriginal Affairs Planning Authority Act 1972 |
| | State of Western Australia Aboriginal Communities Act 1979 |

| Document code | Title |
|---|---|
| | State of Western Australia Aboriginal Heritage Act 1972 |
| | State of Western Australia Bushfires Act 1954 |
| | State of Western Australia Conservation and Land Management Act 1984 |
| | State of Western Australia Contaminated Sites Act 2003 |
| | State of Western Australia Dangerous Goods Safety Act 2004 |
| | State of Western Australia Environmental Protection Act 1986 |
| | State of Western Australia Explosives and Dangerous Goods Act 1961 |
| | State of Western Australia Health Act 1911 |
| | State of Western Australia Heritage of Western Australia Act 1990 |
| | State of Western Australia Land Administration Act 1997 |
| | State of Western Australia Pollution of Water by Oil and Noxious Substances Act 1987 |
| | State of Western Australia Rights in Water and Irrigation Act 1914 |
| | State of Western Australia Soil and Land Conservation Act 1988 |
| | State of Western Australia Water and Rivers Commission Act 1995 |
| | State of Western Australia Wildlife Conservation Act 1950 |
| | Various Standards (eg ISO 31000:9009, AS1940, 3833, HB 203:2006) |
| 00/SP/CPL/PL01 | Upstream Production Solutions Pty Ltd 2009 Integrated Management System |
| 00/SP/CPL/PO03 | Upstream Production Solutions Pty Ltd 2011 Management System Standards |
| 21/HSEQ/GEN/PL01 | Upstream Production Solutions Pty Ltd/ROC 2012 Perth Basin Operations Emergency Response |
| 21/HSEQ/GEN/PL02 | Upstream Production Solutions Pty Ltd 2012 Perth Basin Operations Oil Spill Contingency Plan |
| DGS012867 | Department of Mines and Petroleum Dangerous Goods Site Licence |
| DMPMAY12_2076 | Department of Mines and Petroleum 2012 Environment Information Sheet Chemical and other substance disclosure details |
| ENV-PEB-172 Rev 2 | Department of Mines and Petroleum 2012 Environmental Assessment Processes for Petroleum Activities in Western Australia October 2012 |
| ENV-PEB-173 Rec 2 | Department of Mines and Petroleum 2012 Auditing and Reporting Requirements for Petroleum Activities in Western Australia October 2012 |
| ENV-PEB-177 Rev B | Department of Mines and Petroleum 2012 Guidelines for the Preparation and Submission of an Environment Plan 28 August 2012 |
| GWL161951 | Department of Water Licence to Take Water |

# 2 Term definitions and abbreviations

| Term or abbreviation | Definition |
|---|---|
| AIEA | Annual Internal Environmental Audit |
| ALARP | As Low as Reasonably Practicable |
| APPEA | Australian Petroleum Production and Exploration Association |
| ASP | Arrowsmith Stabilisation Plant |
| CBTA | Competency Based Training and Assessment |
| CHA | Cliff Head Alpha |
| CHOWS | Cliff Head Onshore Water Source |
| DER | Department of Environment Regulation |
| DMP | Department of Mines and Petroleum |
| DPaW | Department of Parks and Wildlife |
| EMP | Emergency Management Plan |
| EP | Environment Plan |
| IBC | Intermediate Bulk Container |
| IMS | Integrated Management System |
| IS | Implementation Strategy |
| JHA | Job Hazard Analysis |
| MSS | Management System Standards |
| OSCP | Oil Spill Contingency Plan |
| PEB | Petroleum Environment Branch |
| PFW | Produced Formation Water |
| PTW | Permit to Work |
| SDS | Safety Data Sheet |
| TEO | Triangle Energy (Operations) Pty Ltd |
| Upstream PS | Upstream Production Solutions Pty Ltd |

# 3 Executive Summary

On 22nd May 2017, Triangle (Perth Basin) Pty Ltd (TPB) and Royal Energy Pty Ltd officially acquired 100% of Roc Oil (WA) Pty Limited from Roc Oil Company Limited. Subsequently, Roc Oil (WA) Pty Limited was renamed Triangle Energy (Operations) Pty Ltd (TEO); the ABN and ACN remain the same. Details of the title holders and their interests are as follows, and the structure of the legal entity is provided below:

+ Triangle Energy (Operations) Pty Ltd (formerly Roc Oil (WA) Pty Limited): 42.5%
+ ACN 008 988 930:
  30.0%
+ ACN 008 939 080:
  27.5%

Triangle Energy (Operations) Pty Ltd (TEO) as operator on behalf of the Cliff Head Joint Venture in permit WA-31-L holds the petroleum titles and licences associated with the Cliff Head development located off the Western Australian coast, approximately 20 kilometres (km) south of the town of Dongara.

TEO is a titleholder of the Cliff Head development whilst Upstream Production Solutions (Upstream PS) is the nominated operator of the facility. TEO on behalf of the Cliff Head Joint Venture maintain responsibility for compliance with this EP and therefore work as an integrated team with Upstream PS to uphold environmental performance in compliance with this EP, utilising Upstream PS standards and procedures where appropriate to ensure effective EP implementation.

## 3.1 Details of Titleholders

The Cliff Head Oil Field development (Production Licence Area WA-31-L) lies approximately 11 km off the Western Australian coast.

TEO is the operator on behalf of the Cliff Head Joint Venture Partners (JVP). The JVP consist of:

- Triangle Energy (Operations) Pty Ltd (Operator): 42.5%
- Subsidiaries of Triangle Energy (Global) Limited:
  - A.C.N. 008 988 930 Pty Ltd: 30%
  - A.C.N. 008 939 080 Pty Ltd: 27.5%

The registered offices for the Cliff Head JVPs are:

***Triangle Energy (Operations) Pty Ltd (ABN 83 083 143 382)***

100 Havelock Street, West Perth WA 6005

Telephone Number: +61 8 9219 7111

Fax Number: +61 8 9322 9102

ACN: 083 143 382

Email: Steve.Heinemann@upstreamps.com

Liaison Person: Steve Heinemann

**A.C.N. 008 988 930 Pty Ltd**

Unit 7, 589 Stirling Highway, Cottesloe WA 6011

Telephone Number: +61 8 9286 3600

Fax Number: +61 8 9385 5184

*A.B.N: 29 008 988 930*

Email: rtowner@triangleenergy.com.au

Contact person: Robert Towner

**A.C.N. 008 939 080 Pty Ltd**

Unit 7, 589 Stirling Highway, Cottesloe WA 6011

Telephone Number: +61 8 9286 8300

Fax Number: +61 8 9385 5184

*A.B.N: 32 008 939 080*

Email: rtowner@triangleenergy.com.au

Contact person: Robert Towner

Upstream PS is the contract and nominated operator of the Cliff Head Development facilities. The operations office and address for correspondence for the contract operator is:

***Upstream Production Solutions Pty Ltd (ABN 26 166 665 952)***

Ground Floor, 100 Havelock Street, West Perth WA 6005 Australia

Telephone Number: +61 8 9482 0650

ACN: 166 665 952

Email: josh.harrison@upstreamps.com

Contact Person: Josh Harrison

## 3.2 Details of Liaison Person

***Triangle Energy (Operations) Pty Ltd (ABN 83 083 143 382)***

Suite 2, Ground floor, 100 Havelock Street, West Perth WA

Telephone Number: +61 8 9219 7111

Email: Steve.Heinemann@upstreamps.com

Liaison Person: Steve Heinemann

The objective of this Environmental Plan (EP) is to ensure all onshore Cliff Head Development operational activities and aspects are identified and assessed for foreseeable environmental impacts, environment control measures identified and the environmental risks assessed, and the identified control measures systematically implemented to manage the risk and protect the environment. This EP details the environmental standards applicable to the onshore activities, sets out environmental performance objectives and provides criteria for measuring performance against those objectives.

Table 1 summarises the environment Plan for the onshore Cliff Head development of which is outlined in the remainder of this document.

Table 1 presents a summary of TEO/Upstream PS's commitments to managing the environmental impacts of its operational activities for the CH (CH) development. The table contains the Key Performance Indicators for Cliff Head Operations and is the scope for Environmental Audits.

**Table 1 - Cliff Head Environment Plan – Key Performance Indicators**

| ID | Commitment | Responsibility | Evidence of Action |
|---|---|---|---|
| (1) | Environmental management is included in the site induction program.<br>Environmental related CBTAs completed by personnel. | Perth Basin HSEQS Manager | Signed induction forms from all TEO/Upstream PS Personnel and Visitors to the CH.<br>CBTA records in current training matrix. |
| (2) | Stakeholders. | PIC / TEO Manager Production and Development – WA | Any complaints addressed and logged by PIC.<br>Community information.<br>ASP is manned 24 hr/d. |
| (3) | Contractor Management. | PIC | SIMOPS plan in place where simultaneous activities are required.<br>Contractor is aware of the conditions in which they can operate (include EP Act1986 licence and the commitments in this EP) which relate to their activities.<br>Adequate supervision for activity being undertaken.<br>Permit to work and JHA conducted where applicable.<br>Reputable suppliers. |
| (4) | Production water bore ground water licence conditions are adhered to. | Perth Basin HSEQS Manager | Licence to take water.<br>Monthly abstraction volumes are monitored and recorded.<br>Three-monthly salinity levels recorded.<br>Annual GW Report submitted to Department of Water (DoW). |
| (5) | Injection Water is injected into the ground via the Cliff Head Onshore Water Source (CHOWS) well as and when required.<br>Records of total volumes of water injected into CHOWS kept. | PIC / Perth Basin Facilities Engineering Manager | Triennial integrity testing of the injection well casings.<br>Water disposal volume recorded and reported on Annual Environmental Report.<br>Annual Environmental Report submitted to DER. |
| (6) | Records of chemicals utilised in the Cliff Head Production System kept.<br>All leaks and spill incidents reported. | PIC | Annual Environmental Report submitted to DER.<br>Incident reports lodged in MyOSH and (where appropriate) submitted to regulators).<br>Results of a compliance audit. |

| ID | Commitment | Responsibility | Evidence of Action |
|---|---|---|---|
| (7) | Records of any flow line leaks kept, including location and extent of area affected. | PIC | Incident reports in MyOSH.<br>Site inspections undertaken as per the Workplace Inspection Procedure [10/HSEQ/GEN/PC11].<br>Annual Environmental Report submitted to DER. |
| (8) | Procedures in place for the safe handling and use (injection) of chemicals. | PIC | Results of a compliance audit. |
| (9) | Maintain and service equipment and vehicles to manufacturers recommendations. | Maintenance Personnel | Completed Maintenance Scheduler. |
| (10) | Fuel, oil and chemical storage areas appropriately segregated, labelled and bunded. | PIC | Designated hazardous storage area.<br>Drip trays in place for transfer operations.<br>Monthly inventory records.<br>Dangerous Goods Manifest kept in site emergency information box is updated annually.<br>Regular pumping out of bunds that do not connect with the water treatment system.<br>Results of a compliance audit. |
| (11) | Weekly Pigging operations. | PIC | Pig launcher/receiver facilities are bunded.<br>Pigging procedure.<br>Results of a compliance audit. |
| (12) | Tanks and bunds are regularly checked to prevent spills. | PIC | Site inspections undertaken as per the Workplace Inspection Procedure [10/HSEQ/GEN/PC11]. |
| (13) | Permit to Work system in place. | PIC | Permit to Work Procedure [00/HSEQ/GEN/PC09] in<br>Place.<br>Results of a compliance audit. |

| ID | Commitment | Responsibility | Evidence of Action |
|---|---|---|---|
| (14) | Adequate fire equipment on site and Personnel trained in its use. | PIC | Adherence to requirements of the Bushfires Act 1954.<br>Current site safety plan available (showing location and type of fire fighting equipment).<br>Training records for Operations Personnel.<br>Fire breaks.<br>Designated smoking area.<br>Site shut-in where bushfire poses a risk to CH operations.<br>Results of a compliance audit. |
| (15) | Dangerous Goods & Combustible Liquids Manifest is maintained and up-to-date.<br>All chemicals stored on site are contained in ChemAlert.<br>A current MSDS is available on site for all chemicals stored on site. | PIC/Cliff Head Site Logistics Coordinator Training | DG Manifest (Stock holdings in ChemAlert), located on Upstream PS extranet and in site emergency information box is updated 12-monthly.<br>MSDS file located in site office and chemical storage area.<br>ChemAlert available to site Personnel. |
| (16) | Minimise the impact of CH operations on declared rare, priority and other native flora and fauna. | PIC / Perth Basin HSEQS Manager | ASP is located on former Lime Facility.<br>Access to ASP is via Brand Highway (sealed road).<br>Excavation / Penetration Procedure [00/HSEQ/GEN/PC09/WI17] in place.<br>Non-routine excavations will be the subject of an Environment Plan Bridging Document except the removal of soil affected/contaminated by a spill, or unless detailed in a bridging document Open holes (such as pipeline trenches) are fenced or otherwise protected to minimise risk to fauna.<br>Pipeline ROW access is via pre-existing tracks and a 60 km / hr speed limit on ROW access tracks imposed.<br>No clearing without a permit or written notice of exemption.<br>Covered general waste skips.<br>Capping of pipework.<br>Results of a compliance audit. |

| ID | Commitment | Responsibility | Evidence of Action |
|---|---|---|---|
| (17) | Minimise impact on surface and groundwater. | PIC | Comprehensive Induction.<br>OSCP.<br>Chemical Storage, tanks and process areas are bunded.<br>Operators trained in the storage and handling of chemicals, spill response and emergency management.<br>All leaks and spills recorded in MyOSH.<br>Results of a compliance audit. |
| (18) | Protect infrastructure from fire. | PIC | Plant equipment maintained.<br>Vegetation kept to a minimum including weeds.<br>Weed spraying Designated smoke area Shut-in plant where evacuation required. |
| (19) | Solid wastes segregated and stored for offsite recycling or disposal, according to the Solid Waste to Landfill Guideline.<br>Waste oils and chemicals labelled and stored appropriately for disposal. | PIC | Comprehensive Induction.<br>Waste segregated (and where possible recycled).<br>Wastes disposed of by an approved waste management contractor.<br>Maintenance of mandatory waste records including type, source and volumes (monthly environmental reports).<br>Annual Environmental Report submitted to DER.<br>No waste left on site.<br>Results of a compliance audit. |
| (20) | Maintain integrity of Pipeline/flow lines. | PIC | Pipeline easement signposted along entire route.<br>Regular field inspections of ground conditions along flow line routes.<br>Cathodic Protection Survey reports.<br>Maintenance records.<br>Results of a compliance audit.<br>Cathodic protection.<br>Regular survey of Cathodic Protection System.<br>Annual Environmental Report documents flow line leaks.<br>Labelling and signage.<br>All flow line leaks are reported in MyOSH. |

| ID | Commitment | Responsibility | Evidence of Action |
|---|---|---|---|
| (21) | Site specific emergency response procedures developed. | PIC | EMP in place and practiced.<br>Emergency response drill records.<br>Results of a compliance audit. |
| (22) | Procedures in place for spill clean-up and disposal.<br>Oil spill scenarios included in emergency response drills.<br>Clean-up materials available in all relevant areas.<br>Clean-up materials and wastes appropriately contained for offsite disposal. | PIC | OSCP.<br>Spill response training.<br>Spill response equipment available (including spill kits).<br>Incidents reported via the MyOSH Incident Database.<br>Emergency response drill records.<br>Close-out reports of spill clean-up.<br>Waste Contractor records showing type and location of waste disposal.<br>Annual Environmental Report submitted to DER.<br>Results of a compliance audit. |
| (23) | Report as soon as practicable to DMP any spills or potential spills of petroleum of greater than 500 L or 100 $m^2$ surface area | Regional Manager (WA/NT)/ PIC /Perth Basin HSEQS Manager | Spill report logged in MyOSH.<br>Environmental Advisor to submit spill report to DMP.<br>Results of a compliance audit. |
| (24) | Report submission:<br>• Recordable incidents (monthly)<br>• Emissions and discharges (quarterly)<br>• EP Act Licence Report (annually)<br>• NGERS (annually)<br>• NPI (annually) | Perth Basin Environmental Advisor | Monthly Recordable Incident Report.<br>Quarterly E&D Report.<br>Annual NGERS and NPI<br>Reports<br>Annual EP Act Licence and DMP PEB Reports. |
| (25) | Ensure successful rehabilitation of decommissioned areas | Perth Basin Environmental Advisor | Short Decommissioning Plan in place prior to works.<br>Report decommissioning activities in Annual Environmental Report.<br>Monitor performance of decommissioned areas through auditing and inspection program outlined in individual Decommissioning Plans.<br>All spills and leaks reported using MyOSH and (where appropriate) investigated.<br>Results of a compliance audit. |

# 4 Introduction

Triangle Energy (Operations) Pty Ltd (TEO) is required to develop and implement an Environment Plan (EP) under the Petroleum Pipelines (Environment) Regulations 2012. This EP has been prepared in accordance with this legislation.

Upstream Production Solutions Pty Ltd (Upstream PS) operates the Arrowsmith Stabilisation Plant (ASP) on behalf of TEO.

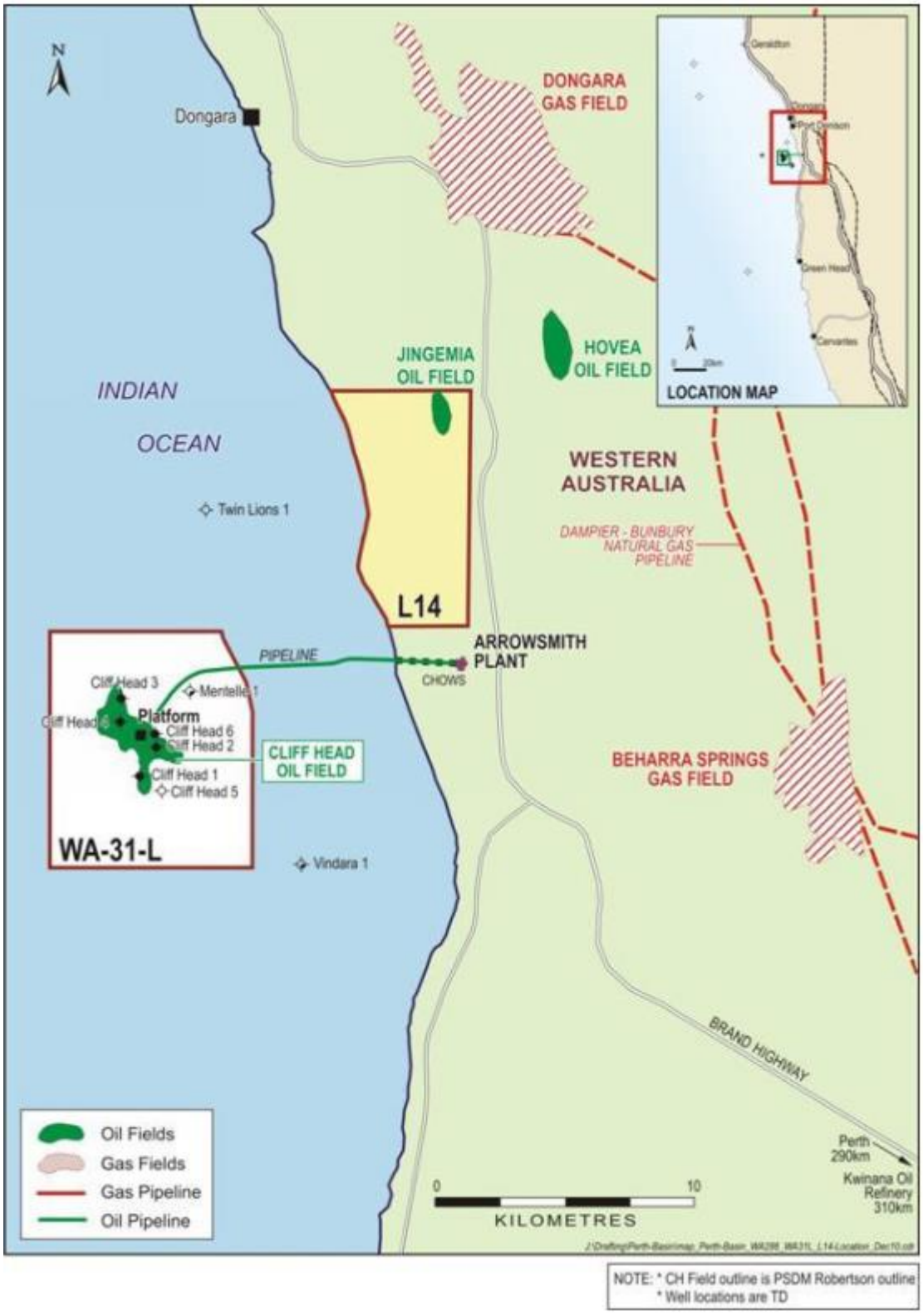
The facility is within production licences L1 and L2 and is located in the central western region of Western Australia; approximately 25 km South of Dongara, within the Shire of Irwin, and 350 km north of Perth.

The ASP is located onshore at 306 179mE  6 742 784mN. This EP is:

- Appropriate for the nature and scale of the Cliff Head Operations
- Demonstrates that the environmental impacts and risks of the operation will be as low as reasonably practical (ALARP)
- Provides for appropriate environmental performance objectives, environmental performance standards and measurement criteria
- Includes an appropriate implementation strategy (IS) and monitoring, recording and reporting arrangements
- Demonstrates that there has been an appropriate level of consultation in developing the plan
- Complies with applicable legislation

In this EP CH refers to onshore development including the Production and Injection Water Pipelines and the Main Plant Facilities. ASP refers to the Main Plant only.

**Figure 1 - Regional Location of Cliff Head Development**



## 4.1 Triangle Energy (Operations) Pty Ltd Health, Safety & Environment Policy Statement

### HEALTH, SAFETY & ENVIRONMENT POLICY STATEMENT

Triangle Energy (Operations) Pty Ltd (Triangle) is committed to protecting the health and safety of all people, ensuring that our activities have minimal impact on the environment and greater community.

Our vision is that while undertaking our activities we will cause "No Harm" and that:

- All accidents are preventable.
- No task is so important that the risk of injury to people is justified.
- Our environment will suffer no long-term effects. We will protect and minimize the impact of our activities on the environment.

To achieve our vision Triangle will:

- Create an HSE culture in which every person involved shares the HSE commitment.
- Require all workers to comply with our HSE expectations.
- Identify, assess and mitigate health, safety and environmental hazards and risks, to as low as is reasonably practicable.
- Consult, listen and respond openly to Workers, to ensure the input of all is included in decision making processes impacting on workplace health and safety.
- Continually strive to improve health and safety performance by establishing clear and measurable objectives and targets, auditing, reviewing and reporting performance.
- Provide training, equipment and facilities necessary to maintain a safe and healthy worksite
- Comply with all applicable HSE legislation, regulations and industry standards

**Triangle requires workers to STOP work if they believe their work compromises their personal safety, the safety of others or the protection of the environment.**

Robert Towner
Director
Triangle Energy (Operations) Pty Ltd

19th May, 2017
Date

## 4.2 Upstream PS Environmental Policy

### ENVIRONMENTAL POLICY

Upstream Production Solutions Pty Ltd (Upstream PS) is committed to effective environmental management based on the following principles:

- Compliance to environmental laws, regulations, codes, standards and other legal and contractual requirements;
- Assess the potential environmental impacts appropriate to the nature and scale of our activities and monitor our environmental performance in order to prevent pollution and continually improve;
- Integrate environmental factors into project planning through communication with our clients and other stakeholders;
- Manage hazardous waste in accordance with our clients and statutory requirements, and
- Promote environmental awareness amongst our employees, suppliers, and subcontractors in relation to our business activities.

**JOE CORVETTI**
**MANAGING DIRECTOR**
**Upstream Production Solutions Pty Ltd**
**27 September 2016**

**GEOFF JONES**
**MANAGING DIRECTOR**
**GR Engineering Services**
**27 September 2016**

* Upstream Production Solutions Pty Ltd is a wholly owned subsidiary of GR Engineering Services Ltd

## 4.3 Upstream PS Occupational Health and Safety Policy

### OCCUPATIONAL HEALTH AND SAFETY POLICY

Upstream Production Solutions Pty Ltd is founded on a strong belief in our core values. These values drive us to constantly improve our working environment and our commitment to occupational health and safety of all our employees and subcontractors, to ensure a safe working environment where no one is allowed to work in an unsafe manner.

Upstream Production Solutions is committed to the target of zero injuries.

The management of Upstream Production Solutions is responsible for implementing this policy through the provision of resources, systems and training across our operational areas. Health and safety considerations will be given priority in planning, supervising and execution of work.

Any aspect of the occupational health and safety procedures that is not clearly understood must be brought to the attention of the appointed manager/supervisor.

The operation, implementation and review of this policy and identification of training requirements associated with safety objectives and targets for all employees/and or subcontractors of Upstream Production Solutions will be monitored by the undersigned who are directly responsible for ensuring compliance in accordance with regulatory and legal requirements. This policy will be explained to each employee and subcontractor at induction training and displayed in all Company offices.

**JOE CORVETTI**
**Managing Director**
**Upstream Production Solutions**
**24 April 2014**

**GEOFF JONES**
**Managing Director**
**GR Engineering Services**
**24 April 2014**

* Upstream Production Solutions Pty Ltd is a wholly owned subsidiary of GR Engineering Services Ltd

# 5 Description of the Activity

The Cliff Head oil field is located off the Western Australian coast (Production Licence WA-31- L), west of the Big Horseshoe Reef; approximately 20 km south-southwest of Dongara (refer Figure 1). The water depth in the vicinity of the field is approximately 16 m and the closest landfall is some 10km due east. The field itself is approximately 1,260 m below sea level. The wells are tied to a wellhead platform located at 293385m E, 6740245m N.

Production facilities construction was completed in December 2005 after which development drilling commenced. Production commenced on 1 May 2006. The first export of crude oil from the ASP was delivered to the BP Kwinana Unloading Facility on 5 May 2006. The Cliff Head Pipeline and ASP facilities design life was 10 years. Life extension engineering assessments will commence in 2014 as the expected life of the Cliff Head Oil Field (as at 2013) is out to at least 2023.

The Cliff Head oil field facility consists of the following infrastructure:

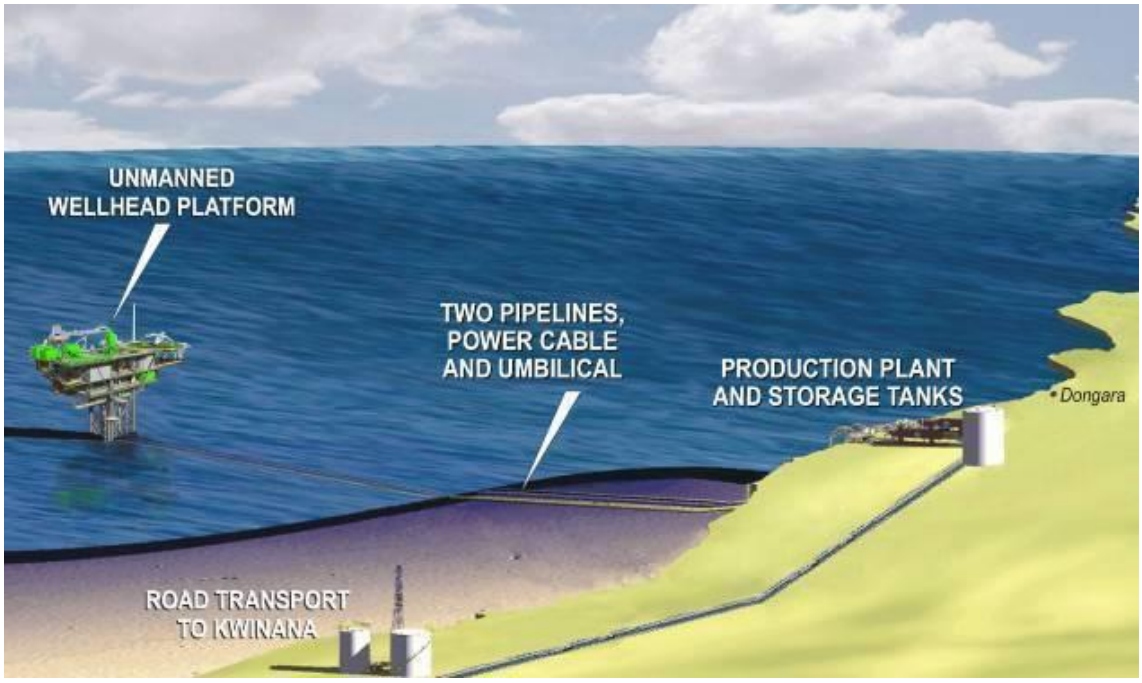
- An unmanned well head platform, Cliff Head Alpha (CHA) to accommodate the well heads and support equipment
- Up to five producing wells with electrical submersible pumps (ESPs) to enable artificial lifting of the produced fluid (i.e. crude oil and water)
- Three water injection wells
- An insulated subsea production pipeline, which transports the produced fluids from CHA to Arrowsmith Stabilisation Plant (ASP), crossing beneath the shoreline and the dune system, by means of a horizontal directionally drilled (HDD) hole
- An insulated subsea water injection pipeline from ASP to the two injection wells at CHA
- Arrowsmith Stabilisation Plant (ASP) located approximately 3km inland, which separates the oil and produced formation water (PFW) and stabilises the oil ready for transport
- Onshore source water well to supply make-up water during the early water injection phase
- A subsea power and control cable, and chemical supply umbilical running from ASP to CHA
- Crude oil load-out facilities and transport by road to BP Refinery in Kwinana for refining

## 5.1 Scope of this EP

This EP covers the onshore component of the Cliff Head operations operated under Pipeline Licence PL70. Other document for Environment Management for the Cliff Head project include:

- Cliff Head Onshore Operations Oil Spill Contingency Plan [10/HSEQ/ENV/PL08] outlines the procedure for response to an oil spill onshore
- Cliff Head Field Operations Environment Plan (State Waters) [10/HSEQ/ENV/PL01] outlines the environmental management of operations in state waters
- Cliff Head Operations Environment Plan (Commonwealth Waters) [10/HSEQ/ENV/PL11]
- CHA Offshore Operations Oil Spill Contingeny Plan [10//HSEQ/ENV/PL02] outlines the procedures for response to an oil spill in State and Commonwealth Waters

**Figure 2 - Main Components of the Cliff Head Development**




## 5.2 Pipelines

The Cliff Head development includes the operation of two pipelines:

- The production pipeline carries the well stream fluids from the wellhead platform (CHA) to the onshore plant (ASP)
- The water injection pipeline, transports PFW and additional make-up injection water from the ASP to CHA

The two pipelines are essentially identical in size (273.1mm, i.e. 10") and design, they are constructed from steel (wall thickness 14.3mm).

In addition, there is an 80mm integrated power cable complete with fibre optic cables and a 60mm umbilical flat pack for the chemical injection fluids.

The shore crossing was installed by HDD. The onshore component of the pipeline runs 2.4km from the HDD shore crossing to ASP and is buried.

The shore crossing consists of two separate boreholes, which are lined with a bund sleeve pipe. Both boreholes are approximately 1000m in length. They enter the ground approximately 500m onshore and exit through the seabed approximately 500m offshore.

Onshore are also two 'corrosion monitoring trenches'. Approval for the 270m trench was granted to excavate and leave open a 15m span of the onshore Cliff Head (CH) pipeline in order to monitor the corrosion rate of the injection water pipeline. The resulting trench is located on the eastern end of the pipeline easement at S29025'39" E114059'52" and is approximately 15m(length) x 4m(width) x 1.8m(depth). The trench walls are retained with an interlocking non friable stone pitched wall over a GeoFabric underlay. The entire excavation is enclosed in a permanent 19m x 9m galvanised chainmesh fence 1.8m high with a single strand of barbed wire at the top and a 1.5m wide firebreak at the base of the fence. The design of the monitoring trench provides a safework environment and also protects local fauna by preventing large animals from entering the trench and allowing a means of climbing out of the trench should smaller animals enter the compound.

The second monitoring trench "1130m pipeline monitoring trench" is installed 1130m west of the ASP (approximately 304916mE 6742989mN [GDA Zone 50]). The pipeline installation was managed under the 1130m Monitoring Trench & HDD Temporary Access Trench Bridging Environment plan (4716-HS-H0107).

Operational activities conducted at the 270m and 1130m trenches are defined in detail in section 6.3.6.

Approval was obtained from the DEC (both with regards to the deed of easement and the proposal implementation and monitoring).

The ASP is a Petroleum Pipeline facility (licensed under PL70) and is located on the site of the disused lime sand plant approximately 3 km inland and 20 km south of the town of Dongara. Processing at the treatment facility comprises degassing, dewatering and stabilisation of the crude oil. It also serves as the operations control base for the offshore facility.

The facility is designed to have a gross liquid (oil and formation water) capacity of approximately 4,770 $m^3$ per day (30,000 barrels per day). The site is accessed by sealed road directly from the Brand Highway with a slip lane for entry and an acceleration lane for vehicles exiting towards Perth on the highway. It is fenced with emergency exits at various locations. The main gate is electrically operated from the plant control room and incorporates an intercom and Closed Circuit Television (CCTV) coverage. CCTV cameras are also used to monitor tanker-loading operations.

The oil is of waxy consistency, therefore heating and insulation is provided to piping, tanks and equipment to keep the oil from depositing the wax. Heat is obtained from waste heat recovery units on each of the power generator exhaust systems and from two electric heaters. Pipe work containing oil is fitted with electrical trace heating cables. The main activities conducted at ASP are as follows:

- Transport of crude product is via road transport to the BP refinery at Kwinana
- Pig launching and receiving facilities for weekly pigging operations. Pigging is undertaken weekly to clear material build up in the pipeline that can render chemical treatments for bacteria ineffective

## 5.3 Associated Infrastructure

### 5.3.1 Storage Tanks

Four storage tanks are provided, each with a net working capacity of 1,600 $m^3$. These tanks are used for:

- Injection Water Storage
- Crude Oil Storage
- Produced Water Storage
- Crude Settling

These tanks are located to the South of the plant, within fully bunded, sealed areas with an impermeable liner to prevent any leakage of oil or water. Systems are in place to monitor leakage within the bunded areas.

### 5.3.2 Instrument Air

An instrument air compressor complete with dryer and air receiver is incorporated into the plant to provide conditioned air for the plant instrumentation and control system. The plant air system is distributed throughout the plant for operation of tools and to generally assist in maintenance activities.

### 5.3.3 Chemical Injection

The chemical injection package for CHA is located at ASP, and comprises pumps, tanks and control devices. The chemicals are supplied to CHA via four stainless steel tubes (encapsulated in a flatpack), one dedicated to demulsifier, one to a mixture of scale inhibitor and corrosion inhibitor, and the other two allocated as spares. On CHA, the flat-pack is terminated on the Topsides Umbilical Termination Unit (TUTU) and chemicals are routed to the allocated break tanks on the Mezzanine Deck. Chemicals from the break tanks are gravity fed to the multi-head injection pumps. Chemicals are injected continuously down-hole to each well via injection pumps on the chemical distribution package.

### 5.3.4 Source Water

A source water well at ASP is available to provide make up water as required for produced water re-injection. The Cattamarra Formation is a deep aquifer, lying some 800 to 1,000 m below the surface. The source water is highly saline (approximately 23,000 mg/L TDS), and hence unsuitable for direct use as a potable water source or for other high-end-beneficial uses without significant treatment. The Cattamarra Formation is accessed via a bore constructed through two shallower aquifers. Industry-standard techniques for bore construction have been utilised to ensure these other aquifers are not hydraulically connected to the saline Cattamarra aquifer. As the volumes of produced water from the field have increased, an increased ratio of produced water is used instead of groundwater to enhance the rate of oil recovery, thereby returning the produced water back to the reservoir.

### 5.3.5 Corrosion Prevention

Feasible corrosion threats to onshore production equipment, piping and structures, were identified and risk assessed during the design phase and appropriate mitigation procedures put in place. Regular monitoring and assessment of corrosion related parameters is maintained to ensure the effectiveness of the mitigation procedures. New inspection, monitoring and treatment procedures are adopted to deal with corrosion threats not identified in the design phase.

Inspections are conducted in accordance with Australian Standards specifications. Frequency of inspections is risk based and determined by the equipment service, results of previous inspections, assessment of monitoring data and specified limits set out in the appropriate Australian Standard.

Reporting, assessment and remediation procedures are established to ensure that anomalies are investigated and appropriately measures taken to minimise the potential for health, safety or environmental issues and are described in the Cliff Head Production Facility Corrosion Management Plan [10/MN/INT/PL01].

### 5.3.6 Corrosion monitoring at the 270m and 1130m Pipeline trench

Regular surveys of the pipelines are undertaken to assess the integrity of the pipe. As part of TEO's ongoing Pipeline and Umbilical Integrity Management Program, two monitoring trenches have been installed to allow for pipeline corrosion and integrity inspections. These include the 270m and 1130m pipeline monitoring trenches.

Both monitoring trenches are fenced with chain mesh and two strands of barbed wire.

Pipeline ROW access is via pre-existing tracks and a 60 km / hr speed limit on ROW access tracks adhered to.

Inspection of the visible section of pipelines, cables and umbilical in the excavated pit involves the following tasks:

- Visually inspect the assets for any signs of damage or deformation;
- Record any areas of coating damage;
- Record the presence and location of any debris on or within 10m of the assets
- Record presence of dents, gouges and corrosion;
- Take pictures of the excavated section of all assets;
- Record any signs of outer sheath damage;
- Record any indications of leaks and
- 6 monthly NDT. This typically involves 2-3 contractors at the inspection pit for ~2 days. To complete this task, they typically drive to the pit and utilize a portable diesel-powered generator in order to use their scanning equipment.

Events that may be observed and are applicable to this inspection:

- Corrosion
- Damage
- Debris
- Erosion/earth movement
- Incomplete burial
- Leak observations
- Restricted access
- Sabotage

## 5.3.7 Drainage System

The general philosophy for drains at ASP is to collect all hydrocarbons in local containment bunds which consist of a bunded concrete slab and collection sump. Oily water waste fluids are educted from the sumps by a contractor waste disposal vehicle and disposed offsite or re- injected directly into the process. A hard-piped drains system to a common collection sump is not provided due to the waxy nature of the oil and the likelihood of blockages in the piping. Drainage from bunded areas/sumps is regulated by locally controlled manual valves (normally closed) which are monitored by process operators.

For specific systems the following philosophy applies:

### *5.3.7.1 Hydrocarbon Service:*

- Large process equipment items in hydrocarbon service are placed in a concrete bund graded towards a sump in one corner. The sump is sized for a 100yr storm event
- Skid based process equipment in hydrocarbon service has a drain line which is routed to the nearest collection sump
- The tank storage bund is graded towards one corner where a normally-closed bund valve is provided for the discharge of clean storm-water to the nearest soak pit
- Small hydrocarbon pumps rely on a drip tray to collect spillages. These are collected and disposed to local sumps or as plant waste
- The tanker loading bay is protected from rainfall by a weather shelter. The loading area is graded such that all runoff is contained in a concrete lined bund which drains to a dedicated containment manhole. The bund and manhole are designed to AS1940 and sized for a failure of the export loading system in addition to 18m$^3$ of foam/firewater.

### *5.3.7.2 Non-Hydrocarbon Service:*

- Non-hydrocarbon pumps rely on a drip tray to collect spillages. These are collected and disposed to local sumps or as plant waste
- No permanent drains are provided for equipment in non-hydrocarbon service. Liquids from maintenance drains on this equipment are either collected in portable drums (heating medium) or allowed to run-off (injection water) as required

- The chemical injection package has a skid drain to collect spills. Spilt material is collected in drums for disposal by the chemical supplier
- Some ASP equipment are located in common bund with other equipment. Specific ASP bunding arrangements are provided in Table 2

### 5.3.8 Fire Water System

An onsite water bore provides water for the fire water sump. This abstraction is undertaken in accordance with GWL158260(1), including measurement of abstraction volume and salinity. The fire water sump is a lined pond utilised for firewater storage. Access is provided with hydrant to allow water to be drawn from the sump by the local fire crews. In addition to this sump two plastic firewater storage tanks each of 45,000-litre capacity have been installed. A firewater booster pump (stand alone diesel unit) and a small firewater distribution system with 3 hydrants completes the system.

## 5.4 Water

Bottled drinking water is available to Personnel and Visitors at the site office.

## 5.5 Electricity

The plant is self sufficient in power generation utilising a blended mixture of fuel gas and third party imported gas to feed 3 x 1.6 MW power generator units. Each generator is driven by a 12-cylinder gas engine, fitted with a WHRU and an exhaust silencer and is located within an acoustic enclosure. An emergency essential generator and uninterruptible power supply system fed by a battery bank is incorporated into the design to ensure a controlled and safe shut down of the plant in case of loss of fuel gas or generator trip. The offshore platform is powered by an 11 KV cable supply from the plant.

## 5.6 Process Control & Control Room

Process variables and alarms from oil production is monitored by the YOKOGAWA Control System located in the Central Control Room.

## 5.7 Lighting

General area lighting is provided on a 24 hours per day basis. Emergency lighting is included in the design to ensure safe egress from all areas in case of emergency or loss of main power. All lighting is directed to within the Arrowsmith Stabilisation Plant and not outside the boundary fence

## 5.8 Security

The ASP covers an area of 8 hectares and is protected by a chain-link fence, topped with barbed wire. All Visitors are required to report to the site office upon entering the facility

## 5.9 Waste Disposal

No hazardous or solid wastes will be routinely discharged to the onshore environment. Onshore wastes are stored in suitable storage containers. Licensed waste disposal operators will remove wastes to appropriate facilities in accordance with the following:

- All wastes disposed of in accordance with regulatory and statutory requirements
- No litter is left on site
- No impact on environment values, soil or water quality through the improper disposal of general and hazardous wastes; and

- There are no hazardous material spills

Waste is separated into General Waste, Oily Waste, Empty Chemical Containers and Scrap Steel.

- General Wastes are disposed of at Meru by a Waste Management Contractor.
- Liquid Oily waste are put through (where possible) the production system (at the CPI).
- Solid Oily Wastes are disposed of at Meru by a Waste Management Contractor.
- Chemical containers are recycled
- Scrap steel is recycled.
- Empty gas cylinders are returned to BOC for refilling
- Excess chemicals are taken to a licenced liquid waste disposal contractor (eg. Toxfree) All wastes removed from the ASP are logged (type and quantity).
- Crude oil captured goes to the IGF [Induced Gas Flotation (production system)] or is otherwise taken offsite by licenced contractor (eg Tox Free or Wren Oil).
- Hazardous wastes storage is bunded
- Waste disposal receptacles have lids and are clearly labelled

## 5.10 Gas Flaring

A flare system is provided for safe disposal of low-pressure flash gas. The flare is located in a cleared area to avoid any potential fires and is designed to burn 'clean', emitting minimal smoke.

The ASP Flare package consists of the flare tip, riser and ignition system. The flare is elevated and operates normally lit with a continuous fuel as purge to prevent the ingress of oxygen/air into the system. The flare package includes three continuous pilot burners and associated instrumentation to alarm on loss of a pilot.

Individual TapRooT® investigations were completed over 20-21 October 2016 as a result of three individual flare outage incidents which occurred in 2015 and 2016. The aim of the investigation was to further understand the events surrounding each flare outage incident, why they occurred, including the systemic root cause identification and to conclude recommendations in order to prevent further recurrences.

## 5.11 Clearing of Native Vegetation

TEO maintain cleared areas (including fire breaks) as part of normal operations under Ministerial Statement 0670 or exemption under the Environmental Protection Act 1986 and associated regulations. A clearing permit will be applied for non-exempt clearing activities.

### 5.11.1 Pipeline maintenance

Pipeline clearing and maintenance is required to ensure compliance with AS2885 as per specifications below:

- **AS 2885.4 – 2001; 6.2.1 General:** Pipeline surveillance shall be carried out by the operating authority to ensure a pipeline is free from identifiable leaks and to identify any new or changed threats to the pipeline, particularly any unnotified external interference near the pipeline;
- **AS 2885.4 – 2001; 6.2.2 Patrol of route:** The route shall be patrolled and inspected in an approved manner at approved intervals. The route shall accessible to authorised personnel, and clear access to valve stations shall be maintained.
- **AS 2885.4 – 2001; 6.4.1 Pipeline marking:** Signs shall be maintained along the route so that the pipeline can be properly located and identified from the air, ground, or both, as appropriate to each situation as identified in the risk assessment; and

- **AS 2885.4 – 2001; 6.4.4 Vegetation on and near the pipeline:** Unless approved, vegetation shall be restricted to allow free passage along the pipeline route. Vegetation whose roots may damage the anti-corrosion coating of the pipeline, shall not be permitted in the vicinity of the pipeline.

The proposed onshore pipeline clearing methods will involve:

- Slashing or rolling the vegetation;
- Vegetation clearing will be limited to the right of way width (ROW) of 8m for each pipeline;
- Additional work areas within the easement will be rolled flat and the vegetation left in situ to protect rootstock and topsoil

#### *5.11.1.1 Environmental management measures*

As far as practical, within the ROW stemmed vegetation such as brush, shrubs and trees shall be removed at or near ground level, thus minimising ground surface disturbance and leaving the root systems intact. This will facilitate rapid regeneration as many perennial plant species will shoot from existing root stock.

Seed stock and topsoil material is not to be removed with vegetation and is not to be mixed in timber/vegetation stacks/stockpiles.

Dozing shall only be carried out when essential for clearing of vegetation within the ROW and the blade shall not be lowered further than necessary.

ROW boundaries (i.e. limits of work) will be marked with survey tape/stakes where practicable and the Pipeline Construction Supervisor is to ensure that no clearing occurs beyond the boundaries. Exceptions will be required to accommodate truck turning areas and extra work areas however these must at all time be within the easement. Audits carried out during and post construction will monitor adherence to specified clearing boundaries.

**Table 2: Clearing requirements and Environmental Performance criteria**

| Action | Responsibility | Timing | Performance (Completion) criteria |
|---|---|---|---|
| Footprint of clearing activities is minimised to as low as reasonably practicable | Clearing Contractor /TEO operations personnel | Throughout activities | Width of ROW is to be minimised with a maximum width of 8m for each pipeline. Footprint is at all times to be within the 50metre easement. |
| ROW boundaries (i.e. limits of work) will be marked with survey tape/stakes and the Earthworks Foremen are to ensure that no clearing occurs beyond the boundaries | Clearing Contractor | Throughout activities | ROW boundary marked with survey tape stakes.<br>No disturbance from pipeline clearing and easement rehabilitation to area outside of ROW. |
| Stemmed vegetation such as brush, shrubs and trees along the ROW shall be removed at or near the | Clearing Contractor | Throughout activities | Topsoil and rootstock within ROW (other than excavation areas) to be left intact. |

| Action | Responsibility | Timing | Performance (Completion) criteria |
|---|---|---|---|
| ground level as far as practicable | | | |
| Mulched vegetation are not to create a fire hazard. | Clearing Contractor | Throughout activities | Cleared/mulched vegetation should not exceed 5 metres in width or 1.5 metres in height. |
| Control banks will be built in areas of slope to prevent erosion along ROW | Clearing Contractor | During rehabilitation | Topsoil and vegetation along ROW is not susceptible to water and wind erosion |
| Stockpiled vegetation shall be spread in filter strips over disturbed areas from which it was cleared to assist in erosion control and rehabilitation | Clearing Contractor | During rehabilitation | Vegetation material replaced along pipeline route to aid in rehabilitation of disturbed areas |
| Extent and characteristics of vegetation community regeneration is to be monitored after 6 months, 12 months and then at annual intervals | Clearing Contractor | 6 months and 12 months after clean-up and 12 month intervals thereafter | Effectiveness of rehabilitation to be monitored. |
| All materials brought onto site are to be removed | PIC | Immediately on completion of clean up and rehabilitation | No construction materials or debris are to remain on site after completion of works |

#### *5.11.1.2 Weed and Dieback Management Plan*

| Control of weeds and dieback is based on the prevention of weeds and/or dieback entering unaffected areas. All vehicles access the ROW will require cleaning and be certified as weed free prior to access to site. Action | Responsibility | Timing | Performance criteria |
|---|---|---|---|
| All crew to be advised of importance of weed/dieback control and the procedures to | Environmental Advisor | At commencement of clearing | Records of induction indicate all crew have received induction |

| | | | |
|---|---|---|---|
| implement for weed/dieback control | | | |
| Vehicle cleaning to be conducted prior to commencement of clearing works | Clearing Contractor | Prior to clearing activities | Only vehicles that have been certified as clean of dirt and plant material may enter easement west of the staging area. |

#### *5.11.1.3 Waste management*

All waste will be contained appropriately taking into consideration fire safety, pest and odour control, and protection of water and soil resources. The quantity of solid construction waste cannot be accurately defined at this stage. It will typically consist of:

Domestic waste:

- Packaging;
- Putrescibles

In accordance with the Triangle Energy (Operations) HSE policy and regulatory requirements, in particular, the waste management hierarchy will be implemented. Clearing Contractor will be instructed on waste management strategies through induction program and briefings. The waste management hierarchy sets the order of preference for various options for managing industrial waste:

1. Avoidance;
2. Reuse;
3. Recycle;
4. Treatment; and
5. Disposal.

No burning of waste material is permitted on site.

#### *5.11.1.4 Oil Spills*

All personnel will be instructed on the operations and maintenance of equipment to prevent the accidental discharge or spill of fuel, oil, lubricants and other chemicals. Personnel will be made aware of TEO's requirements regarding prevention and reporting of spills, and on pollution control regulations applicable to their work. Incorporated within this training will be skills in detection of the problem, how to assess an emergency situation and how to respond, without delay, to a spill incident.

Spill prevention training will include the following matters:

- Precautionary measures to prevent spills;
- Potential sources of spills, such as equipment failure, malfunction, refuelling operations;
- Equipment, materials and supplies available for clean-up of a spill.

Spills can result from unforeseen events such as the rupturing of fuel tanks, radiators, and hydraulic lines. Refuelling tanks, lines, hoses, pumps, couplings, valves and associated equipment are to be provided and maintained in good working order, without leaks and with appropriate level alarms, shutdown and dry break systems.

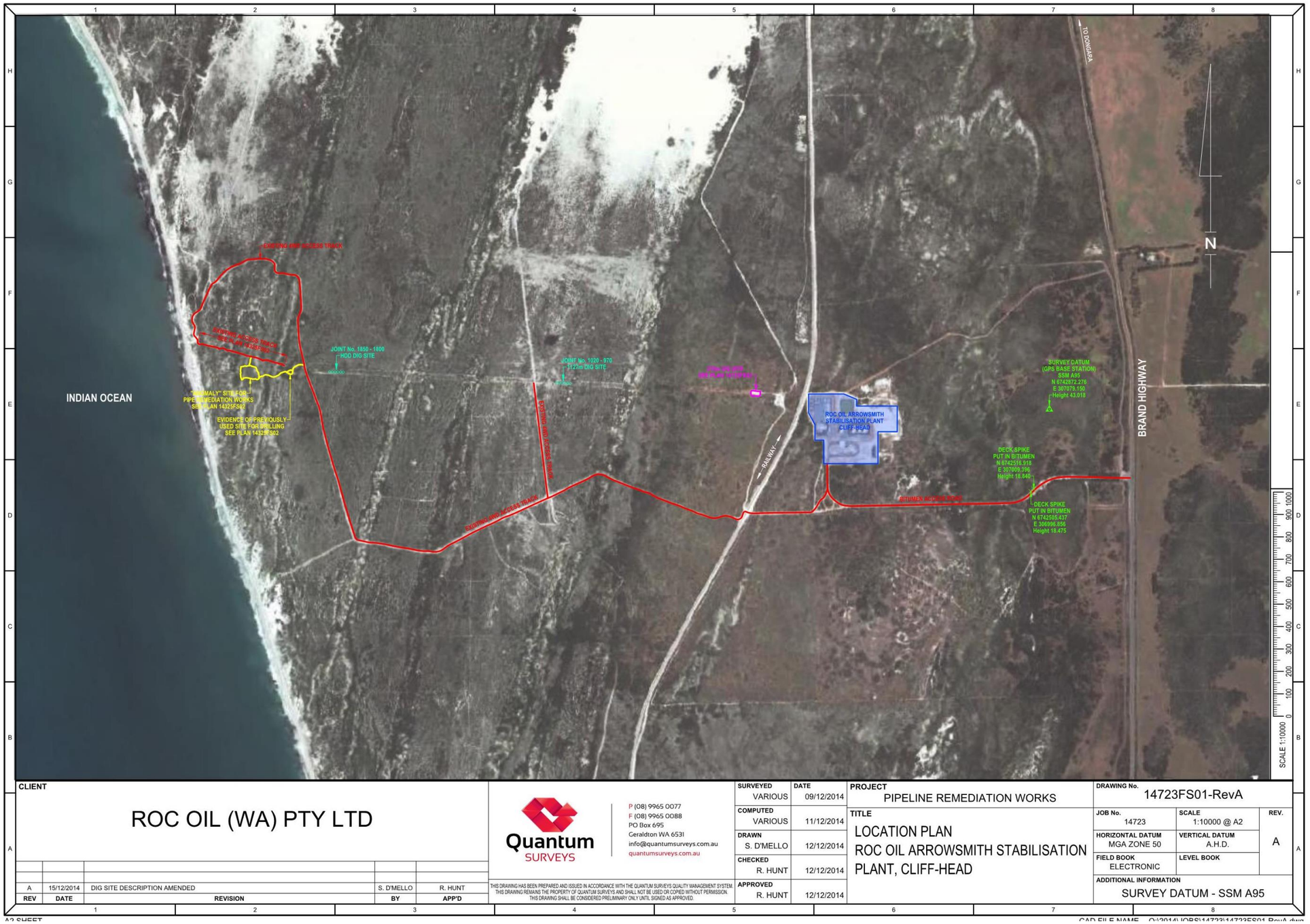
Fuel and lubricating systems on mobile machinery are to be provided and maintained in good working order, without leaks.

#### 5.11.1.5 *Pipeline rehabilitation*

A pipeline rehabilitation plan has been developed for the Cliff Head Pipeline (4716 – HS -H0078 – 0: Cliff Head Pipeline Revised rehabilitation plan (Woodman environmental consulting, October 2013). This rehabilitation plan defines the following pipeline rehabilitation components:

- Rehabilitation objectives;
- Rehabilitation strategy;
- Rehabilitation methods;
- Completion criteria;
- Monitoring program; and
- Reporting and auditing arrangements.

Pipeline ROW clearing path is provided in figure 3 below:




| | | |
|---|---|---|
| CLIENT: ROC OIL (WA) PTY LTD | Quantum SURVEYS — P (08) 9965 0077, F (08) 9965 0088, PO Box 695, Geraldton WA 6531, info@quantumsurveys.com.au, quantumsurveys.com.au | PROJECT: PIPELINE REMEDIATION WORKS |
| TITLE: LOCATION PLAN ROC OIL ARROWSMITH STABILISATION PLANT, CLIFF-HEAD | DRAWING No.: 14723FS01-RevA | |

| REV | DATE | REVISION | BY | APP'D |
|---|---|---|---|---|
| A | 15/12/2014 | DIG SITE DESCRIPTION AMENDED | S. D'MELLO | R. HUNT |

| | | |
|---|---|---|
| SURVEYED: VARIOUS | DATE: 09/12/2014 | |
| COMPUTED: VARIOUS | 11/12/2014 | |
| DRAWN: S. D'MELLO | 12/12/2014 | |
| CHECKED: R. HUNT | 12/12/2014 | |
| APPROVED: R. HUNT | 12/12/2014 | |

| | | |
|---|---|---|
| JOB No.: 14723 | SCALE: 1:10000 @ A2 | REV.: A |
| HORIZONTAL DATUM: MGA ZONE 50 | VERTICAL DATUM: A.H.D. | |
| FIELD BOOK: ELECTRONIC | LEVEL BOOK: | |
| ADDITIONAL INFORMATION: SURVEY DATUM - SSM A95 | | |



**Figure 3:** Cliff Head onshore Pipeline ROW

## 5.12 Hazardous Materials

A Dangerous Goods Manifest is held in the emergency cylinder located at the front gate of ASP and provides details of the dangerous goods stored onsite.

A Chemical Stocktake is undertaken annually and records the details and quantities of all chemicals held in storage onsite. Copies of Material Safety Data Sheets (MSDSs) for all materials listed in the chemical stocktake are held in the ASP site logistics office and at the chemical injection unit.

Bunding around the storage vessels, chemical storage area and process equipment takes the form of concrete slab base and walls capable of holding the full content of vessels, which are connected via a closed drain system to the waste water storage tank.

All chemicals are stored in drums or IBCs in the chemical storage area and are separated from other products in accordance with statutory requirements for dangerous goods and combustible liquids.

## 5.13 Emergency Planning and Response

Upstream PS maintains up-to-date Management System Standards (MSS) [00/SP/CPL/PO03] that covers emergency response and oil spill management procedures:

- Cliff Head Emergency Management Plan (EMP) [10/HSEQ/GEN/PL01]
- Cliff Head Onshore Operations Oil Spill Contingency Plan (OSCP) [10/HSEQ/ENV/PL08]

## 5.14 Decommissioning / Abandonment / Rehabilitation

In accordance with the *Schedule of Onshore Petroleum Exploration and Production Requirements – 1991*, all facilities will be decommissioned, dismantled, rehabilitated and restored as far as practicable to original condition within 2 years of surrendering the production licence.

Below ground Pipelines will be flushed and filled with water and sealed at each end.

A decommissioning plan will be submitted to the DMP at least 6 months prior to decommissioning activities. Decommissioned areas will be monitored using photographic points in accordance with Table 3.

**Table 3 - Decommissioning Monitoring Schedule**

| Monitoring Period | Factors Assessed / Activities | Reason |
|---|---|---|
| Abandonment | Infrastructure remaining<br>Rubbish<br>Contamination<br>Cleared areas remediated to landowner specifications | Identify whether further works required to remove infrastructure, rubbish or contamination |
| 12 months following abandonment | Erosion<br>Subsidence<br>Rubbish<br>Cleared areas returned to landowner | Assess early success of decommissioning and identify any issues to be remediated |

# 6 Description of Existing Environment

A detailed description of the existing environment surrounding the Cliff Head Oil Field Development was presented in Chapter 2 of the PER [Primary Environmental Review ( 2004)]. The following section provides a summary of the existing environment and describes the existing physical, biological, social, cultural, and economic environment within the L1 Licence Area.

## 6.1 Climate

The oil field is within a region that has a Mediterranean type climate characterised by seasonal patterns of hot, dry summers and mild, wet winters, with a low number of rain days. The highest temperatures occur in January and February while the lowest temperatures occur in August. There is a dominant winter rainfall with approximately 55% of annual rainfall occurring in June and August. During summer months rainfall is uncommon, resulting in a summer drought that lasts approximately four months.

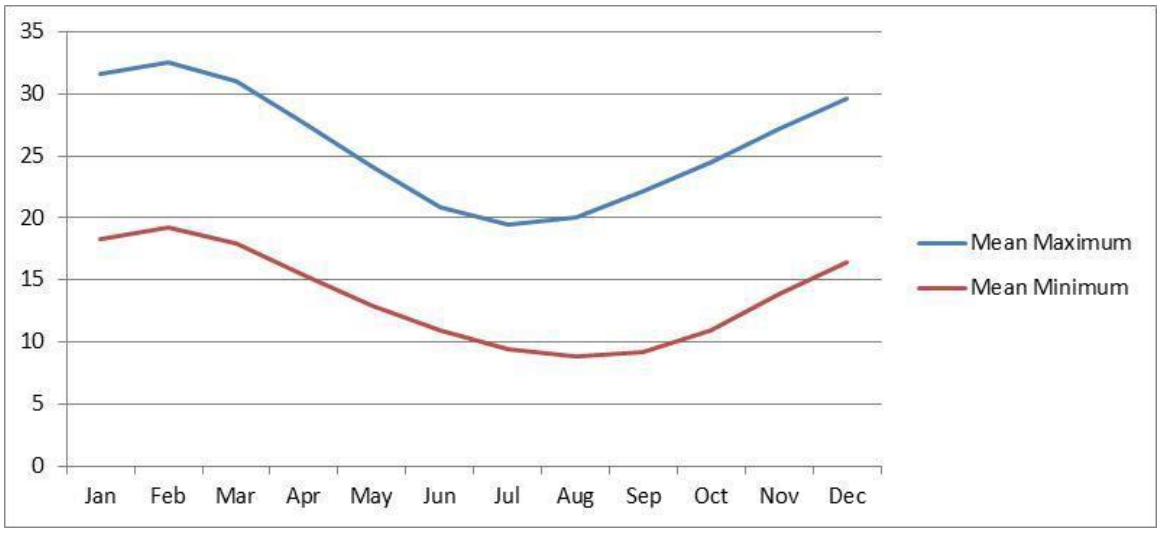
Winds over the region are relatively strong (mean 12–16 knots; maximum 30–35 knots) and are most frequently from the southern sector (southeast to southwest) during the summer months and from the eastern sector (northeast to southeast) during the winter months

### 6.1.1 Temperature

Average maximum temperatures peak in February in Geraldton, with a monthly mean of about 33°C. Hot days are usually followed by a cool change with fresh to strong southerly sea breezes.

In contrast, winters are mild with the July average maximum temperature being the lowest of any month at 20°C. August minima are the lowest on average at 9°C. Due to the position of the sub-tropical ridge during winter, winds with an onshore component are common and along with increased cloudiness help to moderate temperatures

**Figure 4 - Mean Maximum and Minimum Temperatures [°C] (Geraldton)**




### 6.1.2 Rainfall

Annual rainfall at Geraldton Airport averages 444 mm (Figure 4) over approximately 60 days (Figure 5). June is the wettest month, with a long-term average of 100 mm, whilst rain occurs on one day out of every three during an average winter.

Approximately 85% of the annual total falls between May and October, on average, mostly as a result of the passage of cold fronts. Sometimes these fronts are associated with cloud bands from the north-west, which enhance the totals.

The driest months are December and January with means of approximately 5 mm. In summer it rains on about four days over the three months. Rainfall in summer is often associated with thunderstorms, which can occasionally produce heavy localised falls in short periods. Summer months may also record scattered and irregular thunderstorm rain or the infrequent influence of a decaying tropical cyclone. Thunderstorm days total about 10-15 per annum.

**Figure 5 - Mean Monthly Rainfall (mm) (Geraldton)**

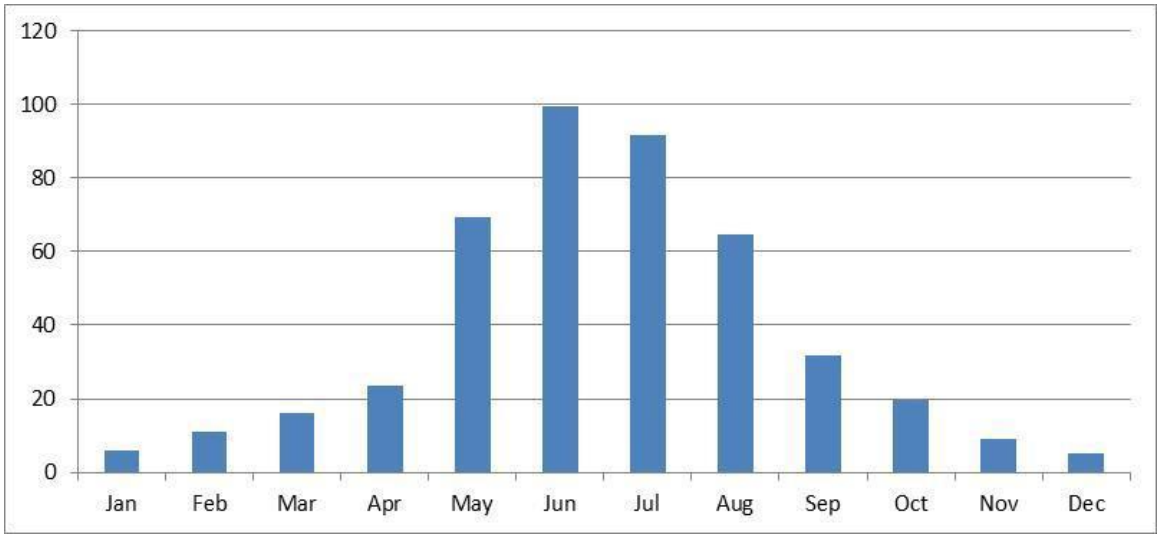
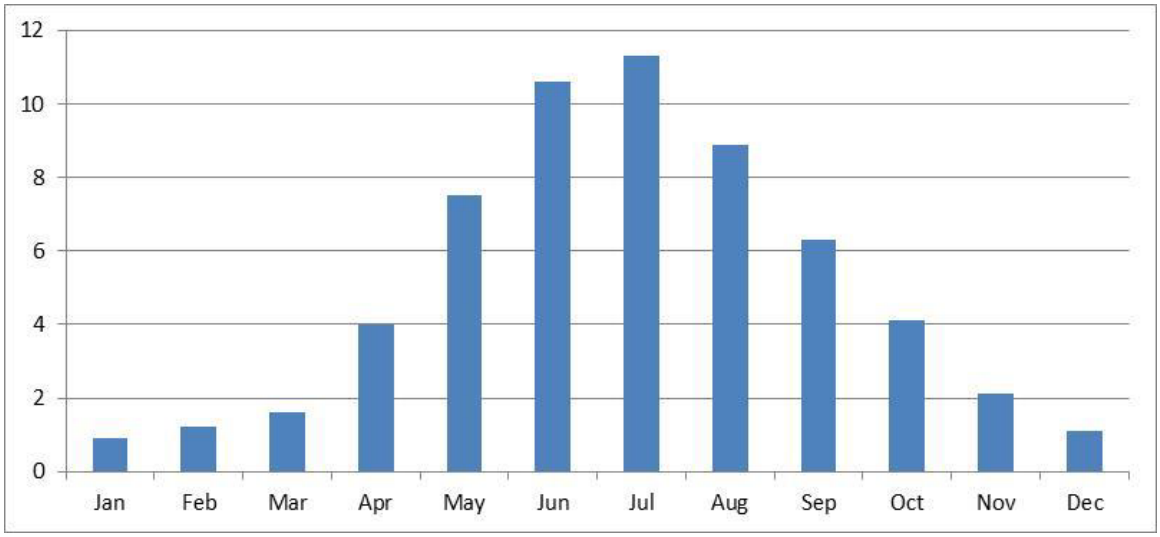



**Figure 6 - Mean Number of Rain Days per Month**




### 6.1.3 Wind and Humidity

The wind climatology at Geraldton is strongly dominated by the effects of the land-sea interface where offshore land breezes are common in the morning, whilst afternoon sea breezes are common in the warmer months. Winter tends to be the period of most variability in winds due to the latitude and mobility of the sub-tropical ridge, and a weak land-sea temperature contrast. It also tends to be the season with the lightest winds; however, cold fronts can occasionally bring strong winds and gales to the area.

During the remainder of the year, the sub-tropical ridge is generally south of Geraldton and thus winds with an easterly component prevail overnight and in the morning. The wind speeds average about 20 km/h at 9 am and 25 km/h at 3 pm. Average wind speeds in the October – March period increase to approximately 30 km/h at 3 pm, as a result of the sea breeze. Mean climatic conditions are presented in Table 4.

**Table 4: Mean climatic conditions**

| Aspect | Month | | | | | | | | | | | | Ave |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | |
| Mean 9 am wind speed– km/h(easterly) | 22 | 22 | 21 | 18 | 17 | 17 | 17 | 16 | 16 | 19 | 21 | 21 | 19 |
| Mean 9 am relative humidity (%) | 51 | 51 | 53 | 59 | 66 | 75 | 78 | 76 | 67 | 55 | 49 | 49 | 61 |
| Mean 3 pm wind speed– km/h (south- westerly) | 31 | 30 | 27 | 23 | 20 | 17 | 17 | 18 | 22 | 26 | 29 | 30 | 24 |
| Mean 3 pm relative humidity (%) | 46 | 44 | 44 | 46 | 49 | 55 | 58 | 58 | 53 | 50 | 47 | 47 | 50 |

* All figures supplied from www.bom.gov.au: refer to Geraldton Airport

## 6.2 Land Form and Soils

The Cliff Head Development is situated within the Perth Basin geological province on the coastal fore-plain. The area is part of the Quindalup dune system and dunes comprising Holocene age calcareous sands are the dominant feature of the landscape. There are no watercourses or drainage lines along the pipeline route.

The dunes are generally aligned parallel to the prevailing wind direction in a north to north-easterly direction. The frontal dunes have a parabolic profile with steep, peaked relief and are up to 40 m high. The older dunes are lower and have a more gently undulating relief.

The frontal vegetated dunes have little to no humus content and are very highly susceptible to wind erosion if the vegetation on the crests is damaged or cleared, the older vegetated dunes have a higher humus layer and the erosion is less, but still high.

Throughout the coastal plain there are a number of blow-outs (mobile unvegetated dunes)however none are present within the pipeline route. The soils are characterised by:

- Variable calcium carbonate content depending on the shell content levels of the beach and dune sands from which they originated
- A typically alkaline pH level, which varies up to 9.5 in the more calcareous patches to close to neutral in swales (depressions between dunes) or where sands overlie limestone
- Variable salinity levels caused by seawater spray, with salinity decreasing with distance inland
- High porosity and low water holding capacity

## 6.3 Surface and Groundwater Systems

The Irwin River valley is the only major coordinated drainage indentation within the area of Cliff Head. A number of swamps surrounded by dense scrub, frequent limestone outcrops and the occasional laterite outcrop are the other major features in the region; but these fall outside the CH area. The sub-surface geology of the area consists of the Late Jurassic Yarragadee Formation, which is overlain by Tertiary Sediments.

Groundwater is present in the Tertiary sediments and the Yarragadee Formation and the groundwater level is near, or at, surface in the aforementioned swamps and low lying areas; following the surface topography, but with lower relief.

The porous and permeable coastal limestones and dune systems tend to allow rainwater to percolate vertically to the water table rather than running laterally off the surface.

## 6.4 Conservation Estate

The Cliff Head pipeline traverses the Beekeepers North Class C Nature Reserve. Figure 6 shows the ASP facility and onshore pipeline with reference to the Nature Reserve.

**Figure 7 – Pipeline Locality Map (Beekeepers Nature Reserve)**

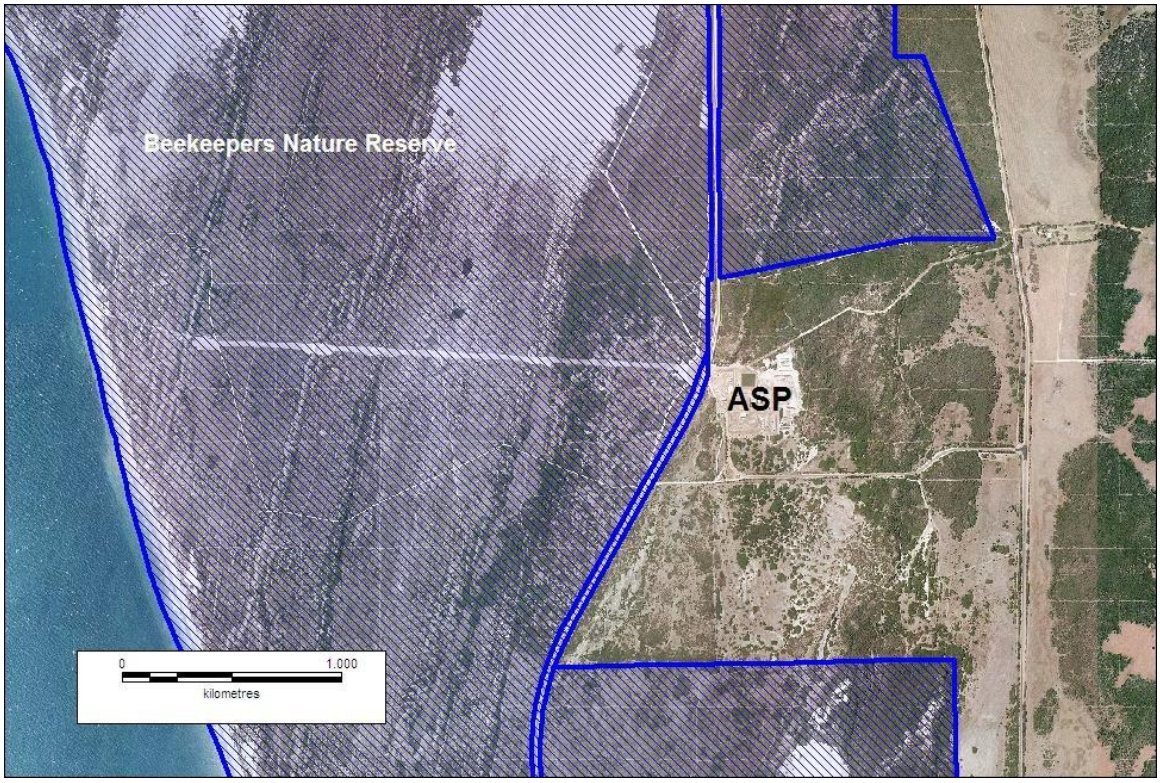
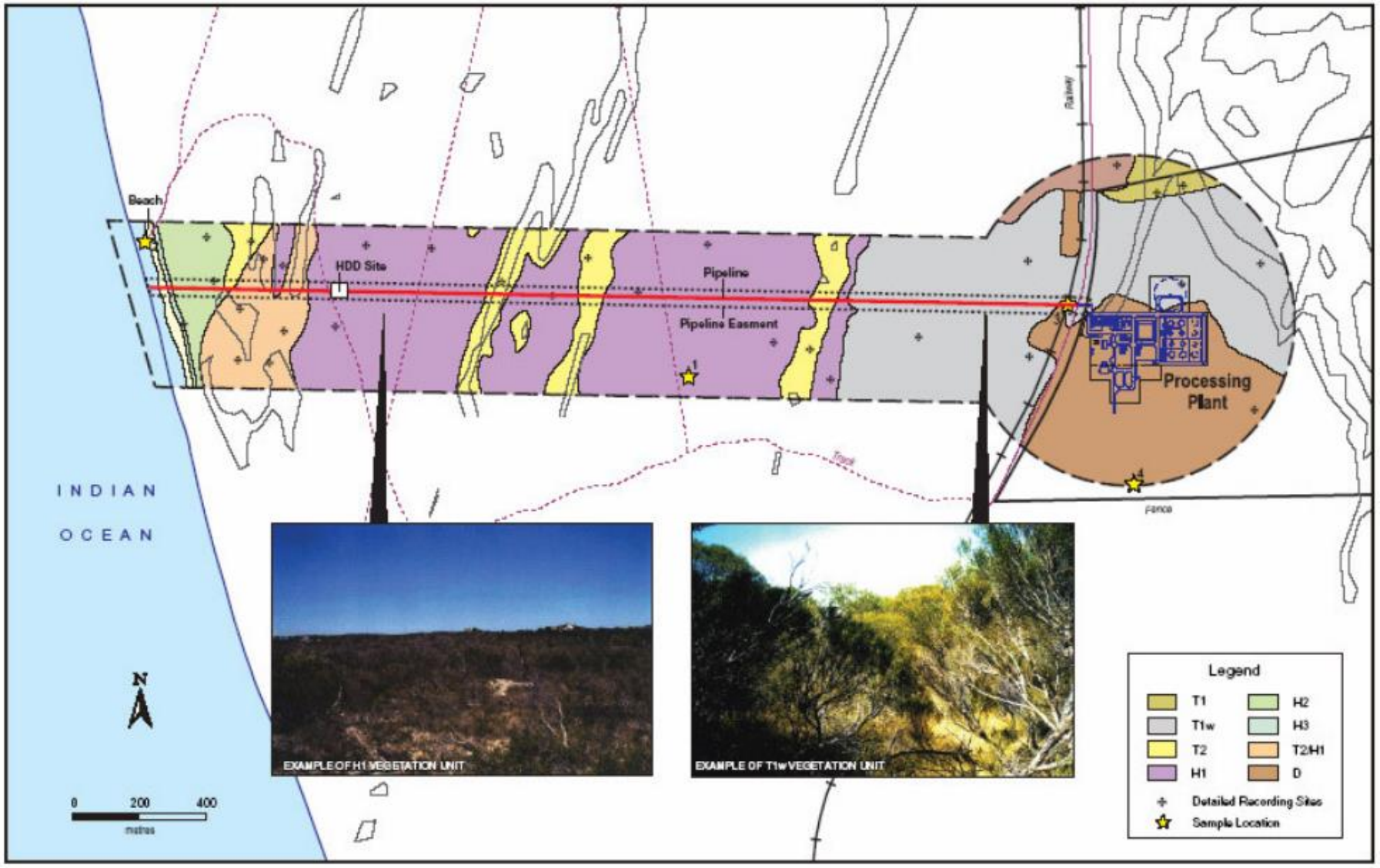


**Figure 8 – Vegetation Distribution**



## 6.5 Fauna

Fauna species included under conservation acts and/or agreements (e.g., the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* and the Western Australian *Wildlife Conservation Act 1990*) are formally recognised as having conservation significance under state or federal legislation. In addition, species that are at the limit of their distribution, those that have a very restricted range and those that occur in breeding colonies, such as some waterbirds, can be considered of conservation significance, although this level of significance has no legislative or published recognition and is based on interpretation of distribution information. On the basis of the above comments, three levels of conservation significance are recognised in this report:

- Level 1: Species listed under State or Commonwealth Acts
- Level 2: Species not listed under State or Commonwealth Acts, but listed in publications on threatened fauna or as Priority Species by DPaW
- Level 3: Species not listed under Acts or in publications, but considered of at least local significance because of their pattern of distribution.

Table 6 lists the fauna of conservation significance that may be present in the area.

**Table 5: Significant Fauna Potential Found Onsite.**

| Species | Common Name | Significance Level 1 | | Significance Level 2 | Significance Level 3 |
|---|---|---|---|---|---|
| | | EPBC Listed | WA Wildlife Conservation Act Listed | | |
| **Reptiles** | | | | | |
| Aspidites ramsayi | Ramsay's python (woma) | | ✓ | | |
| Morelia spilota variegata | South-west carpet python | | ✓ | | |
| Phyllodactylus marmoratus | Marbled gecko | | | | ✓ |
| Pletholax gracilis | Burton's legless lizard | | | | ✓ |
| Egernia multiscutata | King's skink | | | | ✓ |
| **Birds** | | | | | |
| Calyptorhynchus latirostris | Carnaby's black cockatoo | Endangered | ✓ | | |
| Falco peregrinus | Peregrine falcon | | ✓ | | |
| Haliaeetus leucogaster | White bellied sea eagle | Migratory | | | |
| Morops ornatus | Rainbow bee-eater | Migratory | | | |

| Species | Common Name | Significance Level 1 | | Significance Level 2 | Significance Level 3 |
|---|---|---|---|---|---|
| | | EPBC Listed | WA Wildlife Conservation Act Listed | | |
| Thinornis rubricollis | Hooded plover | | | ✓ | |
| Ardeotis australis | Australian bustard | | | ✓ | |
| Calamanthus campestris | Striated fieldwren | | | ✓ | |
| Pomatostomus superciliosus ashbyi | White-browed babbler | | | ✓ | |
| Oreioca gutturalis gutturalis | Crested bellbird | | | ✓ | |
| Larus pacificus | Pacific gull | | | | ✓ |
| Lophoictinia isura | Square-tailed kite | | | | ✓ |
| Eopsaltria georgiana | White-breasted robin | | | | ✓ |
| **Mammals** | | | | | |
| Macropus irma | Brush wallaby | | | ✓ | |
| Hydromys chysogaster | Water rat | | | ✓ | |
| Rattus fuscipes | Bush rat | | | ✓ | |
| Hemisaga vepreculae | Cricket | | | | ✓ |
| Hyaleus globuliferous | Native bee | | | | ✓ |

# 7 Objectives, Standards and Criteria

Upstream PS/TEO's environmental performance objectives, standards and criteria for Cliff Head Operations are presented in Table 7. The management objectives relate to risk hazards identified in Appendix C through the risk assessment methodology described in Section **Error! Reference source not found.**.

**Table 6: Summary of Environmental Management Objectives, Standards & Performance Criteria**

| # | Objectives | Standards | Criteria |
|---|---|---|---|
| (1) | Minimise erosion and sedimentation | Cliff Head Pipeline Rehabilitation Plan (Woodman Environmental Consulting, 2006).<br>Maintenance Technical Integrity Plan [10MN/INT/PC01].<br>Bunded Areas [10/HSEQ/ENV/PC01].<br>Storm and Ground Water Management [10/HSEQ/ENV/PC05]. | Verification of mitigation through inspection (logs to be kept) or audit.<br>Rehabilitation monitoring program with photographic record to verify state onshore easement |
| (2) | Minimise effects to native flora and fauna onshore | Cliff Head Pipeline Rehabilitation Plan (Woodman Environmental Consulting, 2006). | Verification of mitigation measures through inspection and photographic record Rehabilitation monitoring program.<br>Access to easement is via existing tracks at slow speed(<60 km/h) |
| (3) | Prevent introduction and spread of weeds and pathogens | Cliff Head Pipeline Rehabilitation Plan (Woodman Environmental Consulting, 2006). | As above |

| # | Objectives | Standards | Criteria |
|---|---|---|---|
| (4) | Reduce dust emissions and greenhouse gas emission and minimise impacts to air quality (combustion products) and unplanned atmospheric emissions. | Accepted Environment Plan (this document) | 'clean burn flare' Flare knock out drum Produced gas is combined with import gas where possible to minimise flaring.<br>Production, imported and flared gas is reviewed by the Senior Engineer during monthly reporting to the DMP<br>Production, imported and flared gas are reviewed monthly during monthly reporting to the DMP.<br>Fuel-burning equipment maintenance records in accordance with manufacturer requirements<br>Diesel consumption records maintained and routinely reviewed<br>Verification of mitigation through audit.<br>National Greenhouse and Energy Reporting undertaken and submitted to the Clean Energy Regulator;<br>Comprehensive FFG system and HEI system preventative maintenance, inspection and testing in accordance with manufacturer requirements |
| (5) | Reduce waste generation and avoid impacts to soil and water quality though appropriate waste management practices. | Prescribed Waste Management [10/HSEQ/ENV/PC04].<br>Control of Water Discharge from Process Bunded Areas [10/HSEQ/ENV/PC01].<br>Storm and Ground Water Management [10/HSEQ/ENV/PC05].<br>Oil Tanker Loading at ASP site [10/OP/PS/PC07/WI01].<br>Chemical Management [10/OP/GOP/PC06].<br>CHA Radiation Management Plan [10/HSEQ/GEN/PC09].<br>ASP/CHA Site Induction [10/HSEQ/GEN/PC03]. | Hazardous and general wastes segregated, containerised, labelled and retained for onshore disposal. Documented waste disposal log.<br>High standard of house-keeping<br>Radiation surveys and records on possible NORM contaminated materials<br>Chemical/Oil MSDS readily available to relevant personnel for all chemicals<br>Spill clean-up material appropriate to chemical stored onsite<br>All personnel receive environmental induction |

| # | Objectives | Standards | Criteria |
|---|---|---|---|
| (6) | Manage operations to avoid onshore spills and minimise safety and environmental risks. | Oil Tanker Loading at ASP site [10/OP/PS/PC07/WI01].<br>Cliff Head Oil Field Operations Oil Spill Contingency Plan [10/HSE/ENV/PL02].<br>Pipeline Inspection procedure [10/HSEQ/GEN/PC11]. | Upstream PS incident (& near-miss) reporting of any spills to environment (oil and chemicals).<br>Report to DMP for spills>500 L or> 100m2 onshore<br>SDS available for all chemicals<br>Approved OSCP in place.<br>All hydrocarbon storage areas bunded to AS 1940<br>Environmental Induction for all personnel<br>Verification of mitigation through audit. |
| (7) | Communicate Environmental Policy statement and procedures. | Roc Oil and Upstream Production Solutions environmental policies.<br>Upstream Production Solutions Management System Standards (00/SP/CPL/P003).<br>ASP/CHA Site Induction (10/HSEQ/GEN/PC03). | Induction workshop presentation<br>Induction log of attendees<br>Audit shows environmental policy statement in place and environmental induction undertaken for all personnel. |
| (8) | To ensure personnel are aware of their roles, responsibilities, obligations and management procedures. | Upstream Production Solutions Cliff Head Oil Field Operations Bridging Document Overview (10/SP/CPL/PL01).<br>Upstream Production Solutions Management System Standards (00/SP/CPL/P003).<br>ASP/CHA Site Induction (10/HSEQ/GEN/PC03)<br>Contractor HSEQ Evaluation (00/HSEQ/GEN/PC26)<br>Training explanatory notes | Environmental induction program conducted for all personnel.<br>Review of training log. |
| (9) | No contamination of groundwater | OSCP<br>EMP [10/HSEQ/GEN/PL01]<br>EP Act Licence<br>L/8096/2005/3<br>This EP | Comprehensive Induction<br>Chemical Storage, tanks and process areas bunded<br>Operators trained in the storage and handling of chemicals, spill response and emergency management<br>Routine integrity testing of water disposal well |
| (10) | No fires started due to Cliff Head operations | Equipment Maintenance Schedule | Maintenance of equipment<br>Vegetation kept to a minimum (including weeds) |

| # | Objectives | Standards | Criteria |
|---|---|---|---|
| (11) | Minimise impact of fires from outside sources on the CH operations | Shut down procedures | Site shut in where external fires pose a risk to ASP (as determined by PIC) |

# 8 Implementation Strategy

## 8.1 Key Performance Indicators (Targets)

Upstream PS/TEO has committed to the key performance indicators presented in Table 1 to ensure that environmental performance objectives for the CH are met.

## 8.2 General

The primary goal of the Implementation Strategy is to ensure that the environmental performance objectives and standards outlined in Section 7 of this EP are achieved.

The Implementation Strategy includes operational systems and procedures that:

- Identify specific systems, practices and procedures to be used to ensure that environmental risks and effects are reduced to as low as reasonably practicable (ALARP) (Section 8.3)
- Comply with all relevant legislation applying to the activity
- Establish a clear chain of command that sets out the roles and responsibilities of Personnel in relation to the implementation, management and review of the EP (Section 8.4)
- Ensure that each Employee or Contractor working on, or in connection with the CH is aware of their responsibilities in relation to the environment and has the appropriate skills and training (Section 8.5)
- Monitor, audit and review environmental performance and the Implementation Strategy. Maintain an up-to-date emergency response manual that includes detailed response and investigative arrangements
- Maintain quantitative records of emissions and discharges to the environment that are accurate and can be monitored and audited against environmental performance standards and measurement criteria
- Ensure that the agreed environmental performance objectives and standards are met (Section 9)
- Provide for appropriate consultation with relevant government authorities and other interested persons or organisations (Section 10)

## 8.3 Management System Standards

The feasibility, planning and assessment of all Cliff Head operations are undertaken within the framework of the Upstream PS MSS, which incorporates environmental management.

The key elements of the MSS relate to the Plan, Check, Do, Act Philosophy:

- Management Commitment and Leadership
- Hazard Identification, Risk Assessment and Control
- Legal and other Requirements
- Emergency Preparedness and Response
- Objectives and Programs
- Organisational Structures, Responsibilities and Authorities
- Materials, Wastes and Discharges
- Contractor Services
- Purchasing and Logistics
- Design, Construction and Commissioning
- Production and Service Provision
- Maintenance, Inspection and Testing

- Management of Change
- Decommissioning, Mothballing and Abandonment
- Management of Resources and Workplace
- Documentation Requirement
- Communication, Participation and Consultation
- Incident Reporting, Recording and Investigation
- Monitoring, Measurement, Evaluation and Audit
- Non-conformance and Nonconformity Corrective, Preventative and Improvement Action and Observation
- Management Review

Table 8 lists other relevant HSE procedures applicable to CH operations.

**Table 7: Relevant HSE procedures**

| Procedure | Objective of Procedure | Location |
|---|---|---|
| HSEQ Policies | To outline the main safety criteria to be observed at CH<br>Upstream PS Mission and Policies Statement | TEO HSE Policy (Section 4 of this EP)<br>Upstream PS Section 4 of this EP |
| Cliff Head Emergency Management Plan | To ensure that TEO has an effective emergency response management and recovery system | 10/HSEQ/GEN/PL01 |
| Cliff Head Onshore Operations Oil Spill Contingency Plan | To provide guidance on the management and clean-up of oil spills | 10/HSEQ/ENV/PL08 |
| Permit to Work System | Work on operating workplaces, including work covered by a work order is covered by a comprehensive Permit to Work (PTW) procedure<br>Adherence to these procedures ensures the facility is put in a safe condition before work starts, and is kept in this condition until all Personnel involved in the work have signed off completion | 00/HSEQ/GEN/PC09 |
| Oil Tanker Loading at ASP | Procedure for the loadout of crude oil from ASP | 10/OP/PS/PC07/WI01 |
| Soil Sampling Procedure | To ensure complete removal of contamination, following a chemical or hydrocarbon spill or to assess a suspected contaminated site | |
| Laboratory Procedures and methods | For water sampling/analysis to comply with DoW and DER licences | 10/OP/LT/PC01 |
| Monthly Environmental Report | Report on data required for environmental reports | |
| Incident Investigation and Reporting | To ensure that a system exists for all Employees to report all health, safety and environmental incidents; and to ensure that all incidents are investigated to an appropriate level | Upstream PS MSS 18 |

| Procedure | Objective of Procedure | Location |
|---|---|---|
| Flare ignition procedure | Procedure to increase purge gas when high winds or inclement weather is expected | 10/OP/PS/PC01/WI06 |
| Other Site Specific Procedures | Procedures to meet environmental performance throughout Cliff Head operations | |

## 8.4 Roles & Responsibilities

This section outlines the roles and responsibilities of personnel in relation to the implementation, management and review of this EP.

### 8.4.1 TEO Personnel

#### *8.4.1.1 Manager Production and Development - WA*

It is the responsibility of the Regional Manager - WA (or delegate) to:

- Ensure that the requirements of this EP are implemented (including seeking advice from HSEQ representatives)
- Maintain an easily accessible copy of this EP and the OSCP
- Ensure funds are available to ensure all Cliff Head Operations are conducted in an environmentally responsible manner
- Demonstrate “duty of care” through personal example and clearly defined team responsibilities
- Oversee management of Cliff Head Operations from the TEO Perth Office
- Ensure regulator reportable incidents are reported
- Participate in major incident investigations
- Ensure that appropriate communications are in place between TEO, Upstream PS and other stakeholders to keep them informed of project issues and developments that may affect their activities
- Liaise with external stakeholders

### 8.4.2 Upstream PS Personnel

#### *8.4.2.1 Regional Manager (WA/NT)*

It is the responsibility of the Regional Manager WA/NT or his/her delegate to ensure that the requirements of this EP are implemented.

#### *8.4.2.2 WA Operations Manager*

It is the responsibility of the Perth Basin Production Manager (or his delegate) to:

- Demonstrate "duty of care" through personal example and clearly defined team responsibilities
- Ensure that the requirements of this EP are implemented (including seeking advice from HSEQ representatives)
- Maintain an easily accessible copy of this EP and the OSCP
- Oversee management of Cliff Head Operations from Dongara, WA (including directing Upstream PS staff on required environmental actions)
- Attend HSEQ Monthly Meetings
- Establish systems that encourage free and open communication and consultation on HSEQ issues

- Ensure that all environmental incidents are recorded and reported to TEO
- Participate in major incident investigations as required

#### 8.4.2.3 PIC

It is the responsibility of the PIC to:

- Demonstrate "duty of care" through personal example and clearly defined team responsibilities
- Ensure that the requirements of this EP are implemented (including seeking advice from HSEQ representatives)
- Maintain an easily accessible copy of this EP and the OSCP
- Oversee management of Cliff Head Operations (including directing Upstream PS staff on required environmental actions)
- Attend all HSEQ meetings and daily operations meetings and raise any environmental issues
- Establish systems that encourage free and open communication and consultation on HSEQ issues
- Ensure that all environmental incidents are recorded and reported to Upstream PS Perth Basin HSEQS Manager and Environmental Advisor
- Participate in all incident investigations as required
- Participate in regular emergency response drills

#### 8.4.2.4 Operators

It is the responsibility of Operators and Maintenance Staff to:

- Carry out all aspects of this EP for which he/she is responsible
- Follow good housekeeping procedures and work practices
- Complete all activities as prioritised and defined by the PIC
- Never undertake any task that does not meet TEO / Upstream PS HSEQ standards
- Verbally report all HSEQ hazards, incidents and near misses to the PIC immediately
- Identify hazards and correct them on a “see and fix” basis where it is in their ability to do so
- Access, review and comply with MSDSs for all hazardous substances
- Participate in training as appropriate
- Attend HSEQ meetings and raise any environmental issues
- Participate in regular emergency response drills

#### 8.4.2.5 Perth Basin HSE Advisor

It is the responsibility of the Perth Basin HSEQS Manger to:

- Demonstrate "duty of care" through personal example
- Attend HSEQ meetings and raise awareness of environmental issues / aspects
- Ensure that all environmental incidents are recorded and reported to TEO Manager, Production and Development WA and the Upstream PS Regional Manager WA/NT.
- Lead all incident investigations as required
- Participate in environmental audits as required

#### 8.4.2.6 Perth Basin Environmental Advisor

It is the responsibility of the Environmental Advisor to:

- Demonstrate "duty of care" through personal example
- Ensure that the site requirements of this EP are implemented

- Maintain an easily accessible copy of this EP and the OSCP
- Ensure that the requirements of this EP are implemented
- Provide advice on environmental matters
- Maintain an easily accessible copy of this EP and the OSCP
- Participate in environmental incident investigations
- Conduct AIEA and participate in regulator environmental audits / inspections
- Keep this EP up to date
- Contact person for liaising with Environmental Regulators

### 8.4.3 Contractors and Visitors

It is the responsibility of all contractors working in the CH to:

- Undertake Comprehensive and site induction
- Ensure all licences, certificates and permits are current and valid
- Understand environmental management relevant to the tasks performed
- Follow all CH procedures and requirements
- Report all incidents

## 11.5 Training

Environmental related training courses undertaken by personnel include:

- ASP Comprehensive Induction which includes environmental management. It is an Upstream PS/TEO requirement that all employees, contractors and visitors to site undertake this induction annually
- Safety and Environment Competency Based Training
- Emergency Response Competency Based Training
- Risk analysis, risk assessment, permit to work and Job Safety Environment Analysis
- Competency Based Training
- Chemical Management Competency Based Training
- Basic Fire Fighting
- Oil Spill Response Training
- Pigging Competency Based Training
- Tanker Loading Competency Based Training

# 9 Reporting Arrangements

This section outlines the following reporting requirements:

- Reporting by Upstream Production Solutions on routine operations
- Reporting by Upstream Production Solutions on incidents
- Auditing routine operations
- Reports by Contractors to TEO
- Review of this EP

## 9.1 Reporting on Routine Operations

MyOSH is an Upstream Production Solutions Online Database which stores incident reports, hazards, audits and inspections and action tracking.

Upstream PS personnel undertake regular workplace inspections of different components of Operations. Hazard cards are raised by TEO Personnel when they observe safety or environmental concerns. Items requiring action (during workplace inspections or on hazard cards) are addressed immediately, where possible. Actions and remedial actions are documented in MyOSH and closed out on completion.

A Daily Production Report is produced by the ASP Personnel, summarising routine operations. This report also documents any unusual occurrences or accidents that occur in the Cliff Head. A Visitor's Log is maintained to record all persons visiting the site.

TEO has an Environmental Protection Act 1986 licence L8096/2005/3 for operation of the Arrowsmith Stabilisation Plant. A report on the conditions within the licence is submitted annually to the Department of Environment Regulation (DER).

An Annual Environmental Report is submitted (in October) to provide evidence that environmental performance objectives have been met and the implementation strategy of the EP has been complied with. The Annual Environmental Report includes details of:

- Summary of Activities
- Meeting of Objectives and Standards
- Summary of Audits
- Incidents
- Planned Emissions and Discharges
- Biological Monitoring/Research
- Identification of New or Increased Risks
- Training and Exercises
- Ongoing Consultation

An emissions and discharges report is submitted to DMP PEB quarterly in the Quarterly Emissions and Discharges Report Form (ENV-PEB-088). The report will include a description and quantity of:

- Injection Water Volume (metered daily
- Spill Volumes (Crude Oil, Injection Water, Chemicals and Oils) (estimated where spill occurs)
- Volume of gas flared ((mass balance based on other gas metering
- Volume of gas vented (gas to flare not vented)
- Discharges to Water (no discharges to water)
- Waste disposed (volume, type – invoices)
- Chemical Injected Down Hole (injection rates)
- Monitoring Equipment (intervals as per maintenance policy for individual equipment)

## 9.2 Reporting on Incidents

### 9.2.1 Internal

Hazards and incidents are reported in accordance with Upstream Production Solutions HSEQ Incident Investigation Procedure [00HSEQ/GEN/PC03].

### 9.2.2 External

#### *9.2.2.1 Reportable Incidents*

A reportable incident is an incident arising from the activity if the incident has caused or has the potential to cause an adverse environmental impact, this includes:

- Spill of >80 L hydrocarbons in areas of inland waters
- Spill of >500 L hydrocarbons in other areas
- Emission of petroleum in a gaseous form in excess of 500 $m^3$
- Any uncontrolled escape or ignition of petroleum or any other flammable or combustible material causing a potentially hazardous situation
- Any spillage of hydrocarbons or other material (including drilling fluids, chemicals, produced formation water or substances that have the potential to adversely affect surface vegetation, soil or subsurface ground water) that affects a ground surface area greater than 100 $m^2$.
- Fire from the Cliff Head Operation impacting the Bee Keepers Nature Reserve
- Onshore spills of hydrocarbon with the potential to impact the marine environment
- Any incident with raw consequence level of 'moderate' or higher

Reportable incidents shall be reported orally to DMP PEB on 0419 960 621 immediately and followed by a written report (to petroleum.environment@dmp.wa.gov.au) within 3 days of the first occurrence of the incident. The report will be in the DMP Environmental Incident Report Form (ENV-PEB-189).

#### *9.2.2.2 Recordable Incidents*

A recordable incident is an incident that breaches an environmental performance objective or environmental performance standard documented in the EP for the activity and is not a reportable incident. Recordable incidents shall be reported to DMP PEB on the Monthly Recordable Environmental Incident Report Form (ENV-PEB-190) by the 15th of the following month.

## 9.3 Auditing Routine Operations

Upstream PS conducts an Annual Environmental Compliance Audit annually. The audit brief includes the commitments in this EP and conditions from all Environmental Licences.

At least 6 elements of the Upstream PS MSS [00/SP/CPL/PO03] in relation to Cliff Head are audited each year. Elements for audit include:

- Management Commitment and Leadership
- Hazard Identification, Risk Assessment and Control
- Legal and other Requirements
- Emergency Preparedness and Response
- Objectives and Programs
- Organisational Structures, Responsibilities and Authorities
- Materials, Wastes and Discharges
- Contractor Services

- Purchasing and Logistics
- Design, Construction and Commissioning
- Production and Service Provision
- Maintenance, Inspection and Testing
- Management of Change
- Decommissioning, Mothballing and Abandonment
- Management of Resources and Workplace
- Documentation Requirement
- Communication, Participation and Consultation
- Incident Reporting, Recording and Investigation
- Monitoring, Measurement, Evaluation and Audit
- Non-conformance and Nonconformity Corrective, Preventative and Improvement Action and Observation
- Management Review

## 9.4 Contractors Reporting to TEO

Contractors and third parties are required to complete a HSEQ prequalification report, on request, which includes evidence of operational and technical data for the Contractor's equipment and how that equipment is maintained. Lost and damaged equipment or other incidents (eg spills) that may occur during Contractor activities shall be reported orally to the TEO Manager Production and development – WA (or delegate) immediately, and be formally reported in MyOSH.

## 9.5 Consultation

TEO/Upstream PS endeavour to consult with relevant government authorities, interested persons and organisations on all operations. TEO/Upstream Production Solutions commit to being available for ongoing consultation. Consultation on environmental management issues has historically been undertaken with the stakeholders listed in Table 9.

**Table 8:Cliff Head Environmental Stakeholders**

| Stake Holder | Area of Interest | Events Where Contact is Initiated |
|---|---|---|
| Department of Environment Regulation (DER) | All areas of the Cliff Head (onshore) | Reportable incidents, developments and environmental management<br>Annual reporting<br>Inspections |
| Department of Mines and Petroleum (DMP) Petroleum Environment Branch (PEB) | All areas of the Cliff Head (Onshore) | Reportable and Recordable incidents<br>Developments<br>Emissions and discharges reporting<br>Annual reporting<br>Audits |
| Department of Water (DoW) | ASP Abstraction Bore | Annual Reporting on conditions of licence to take water |
| Department of Fire and Emergency Services (DFES) | All areas of the Cliff Head (Onshore) | Fire emergencies (including drills) |
| Shire of Irwin | All areas of the Cliff Head (Onshore) | Any operation or development affected by local government restrictions<br>Fire |

| | | |
|---|---|---|
| Department of Parks and Wildlife | Onshore pipeline easement | Annual site visit and rehabilitation consultation |

# Appendix A Cliff Head (Onshore) Environmental Risk Assessment

| Aspects | Impacts | Management/Mitigation Measures | C | L | Residual Risk |
|---|---|---|---|---|---|
| Soil Disturbance | Soil Erosion<br>Reduction of local biodiversity, loss of fauna habitat | Maintenance wherever practicable of the existing vegetation cover since this protects the mobile sands from being lifted and eroded by winds.<br>A Rehabilitation Plan (Woodman Consulting, 2006) was prepared by Triangle Energy (Operations) Pty Ltd (TEO) to guide revegetation of disturbed areas, i.e. pipeline easement and dune areas around the ASP. Implementation of the Rehabilitation Plan has been documented in annual progress/rehabilitation monitoring reports to DEC.<br>Access to ASP via Brand Highway (sealed road) Excavation / Penetration Procedure in place<br>No clearing without a permit or written notice of exemption<br>Access to easement is via existing tracks at slow speed (<60 km/h) | 2 | B | Low |
| Pipeline access: disturbance to native vegetation and wildlife | Reduction of local biodiversity, loss of fauna habitat | No vehicle access permitted on pipeline easement in Beekeepers Reserve. Inspections undertaken by foot in areas without access via easements<br>Revegetation with indigenous species (Refer: Rehabilitation Plan (Woodman Environmental Consulting, 2006)<br>In areas of poor vegetation cover, where further impacts are likely, appropriate corrective actions shall be taken<br>Where possible, areas that have been recently revegetated should be avoided by vehicular machinery movements<br>No disturbance to areas of native vegetation<br>Revegetation success to be monitored in accordance with Rehabilitation Plan<br>Further restoration works may be required in areas where vegetation establishment has been less than acceptable<br>Access to easement will be via existing tracks at slow speeds (<60 km/h) Physical barriers (including revegetation) will be used to stop public<br>access to the pipeline easement Only clean fill certified as weed free shall be used if additional material is required. Fill material will be similar to the natural soil of the area. Top-soil will be returned to facilitate vegetation | 2 | B | Low |

| Aspects | Impacts | Management/Mitigation Measures | C | L | Residual Risk |
|---|---|---|---|---|---|
| | | If area requiring earthworks is within a sensitive environment only weed free certified soil should be used<br>Consultation with DEC and DMP regarding disturbance to native vegetation and wildlife on a case by case basis<br>Easement rehabilitation consists of local endemic species<br>Access tracks should be kept navigable by adequately controlling vegetation growth<br>Use of appropriate signage to deter third party access<br>Regular monitoring to be undertaken along the easement to observe for erosion, sedimentation and associated environmental impacts<br>Pipeline easement signposted along entire route<br>If significant erosion is encountered, erosion and sediment control structures will be constructed<br>Excavation / Penetration Procedure in place<br>Pipeline right of way is accessed via exiting tracks and speed limited to 60 km/h | | | |
| Pipeline Access- Introduction of weeds or pathogens along easement | Reduced Rehabilitation success, loss of biodiversity and loss of habitat | Regular inspection, monitoring and auditing of the pipeline route will include an assessment of weed impacts. (Refer: Rehabilitation Plan – Woodman Environmental Consulting, 2006)<br>The presence of noxious weeds will be reported to local authorities and their control conducted in conjunction with local authorities<br>Maintenance crews made aware of weed control requirements<br>In identified weed infestation areas, all vehicles and machinery brought onto the pipeline corridor or other work sites shall be washed down before entering the pipeline corridor. All soil and organic matter should be removed including under the vehicle<br>The pipeline corridor shall not be used for access into the Beekeepers Reserve<br>Physical barriers to stop public access to pipeline easement | **2** | **B** | **Low** |
| Plant operations- Pest animal invasion | Loss of fauna diversity and abundance and loss of fauna habitat | Keep facilities clean and litter free to discourage vermin from being attracted to site<br>Discourage weeds generally so as not to provide habitat for vermin<br>Maintain ASP weed free to discourage habitat for vermin | **1** | **C** | **Low** |

| Aspects | Impacts | Management/Mitigation Measures | C | L | Residual Risk |
|---|---|---|---|---|---|
| Bushfire originating from maintenance activity | Loss of fauna, personnel or public third party damage | Ensure all equipment complies with relevant fire safety standards<br>Fire break will be maintained around the ASP outside the perimeter fence<br>Vehicles and machinery not parked in areas of high fire risk (i.e. over tall grass or cleared vegetation debris)<br>Ensure all operations and maintenance vehicles have a fire extinguisher, communications units and first aid kit<br>Where flammable or combustible materials are required to be stored on site, appropriate fire prevention (e.g. spark guards for welding) and fire fighting equipment is available on site.<br>Incompatible chemicals not stored together<br>When undertaking hot work, ensure the immediate area is clear of flammable materials<br>Consult with FESA regarding weather conditions, fire hazards, fire restrictions, notifications and permitting requirements prior to any maintenance "'hot works" activities on easement<br>Do not light fires for recreational purposes or rubbish disposal<br>Provide maps showing the location of all onshore project infrastructure to the relevant authorities (FESA,DMP, Shire of Irwin)<br>FESA and TEO will be notified as soon as possible in the event of a fire outbreak that is outside the control of site personnel<br>Restricted burning permit in place (as per Bushfires Act 1954) and conditions adhered to Licence to take water | 3 | A | Low |
| Plant Operations- fire emanating from facilities | Bushfire, damage to vegetation and fauna, possible injury to personnel or public, possible third party<br>damage | Smoke detection in equipment rooms<br>Portable fire extinguishers<br>Pipeline operations and maintenance in accordance with Fire Emergency Services Authority of WA (FESA) requirements including complying with relevant fire restrictions, notification requirements and permitting procedures<br>Ensure all equipment complies with relevant fire safety standards<br>Vehicles and machinery parked in designated areas<br>Regular check vehicles to ensure that combustible materials such as grass and debris have not built up in critical areas where ignition could occur<br>All vehicles contain a fire extinguisher, satellite phone and first aid kit | 3 | A | Low |

| Aspects | Impacts | Management/Mitigation Measures | C | L | Residual Risk |
|---|---|---|---|---|---|
| | | Where flammable or combustible materials are required to be stored on site appropriate fire prevention (e.g. spark guards for welding) and fire fighting equipment is available on-site (e.g. fire extinguishers, water knapsacks and rake hoes)<br>Incompatible chemicals not stored together<br>When undertaking hot work, ensure the immediate area is clear of flammable materials<br>Create and maintain fire breaks around the ASP outside perimeter fence<br>Consult with FESA regarding weather conditions, fire hazards, fire restrictions, notification and permitting requirements prior to any maintenance hot works<br>Do not light fires for recreational or rubbish disposal<br>Establish fire evacuation procedures and an emergency assembly areas and communicate this to all personnel working or visiting at the site (verbally and via a diagram)<br>Provide maps showing the location of all project infrastructure to relevant fire authorities, such as FESA, DEC, DMP, Town of Dongara and Shire of Irwin<br>Evacuate any site subject to fire that cannot be immediately extinguished<br>Notify FESA and TEO as soon as possible in the event of an outbreak that is outside the control of site personnel<br>Power generator enclosure equipped with fire and gas detection and fire suppression systems<br>A flare system is provided for safe disposal of flash gas and emergency release. Vegetation cleared from flare for 50m radius<br>In the event of fire, a fire water pond is available to provide water for local fire crews hydrants<br>In addition, 2 plastic fire water storage tanks will be available each containing 46,000 L capacity<br>A fire water booster pump (stand alone diesel unit) and fire water distribution system (3 hydrants) is available<br>All plant instrumentation and control systems contained in air-conditioned rooms to reduce the risk of over-heating in summer<br>ASP is located on former lime facility<br>ASP is manned 24 hrs/d Designated smoking area Licence to take water | | | |

| Aspects | Impacts | Management/Mitigation Measures | C | L | Residual Risk |
|---|---|---|---|---|---|
| Plant operations – excessive noise emissions | Disturbance to fauna and surrounding neighbours | Generators are housed in specially designed acoustic enclosures which reduce the noise emissions<br>Generators are fitted with exhaust silencers<br>The ASP has been designed to produce noise levels in the order of 85 dB (A) at 1m from the noise source and approximately 62dB (A) at the nearest sensitive receptor.<br>Plant equipment maintained | 1 | B | Low |
| Gas emissions from maintenance vehicles | Short term impacts to local air quality | Gas emission from maintenance vehicles are minor<br>Ensure all maintenance vehicles are equipped with appropriate pollution devices e.g. mufflers | 1 | B | Low |
| Plant operations- air pollution from equipment (generators, flare) and unplanned atmospheric emissions | Short term impact to local air quality | Regular maintenance of vehicles and power generations equipment to minimise emissions<br>Monitoring of fuel and flare rates<br>Plant equipment maintained<br>Automatic/manual re-ignition of flare<br>Wind monitor – Wireless weather station (IC0348) used to measure wind;<br>Procedure to increase purge gas when high winds or inclement weather is expected (10/OP/PS/PC01/WI06)<br>PCS – flare pilot burner extinguished alarms and countdown alarm configured to alert of flare outage and incident reporting requirements | 2 | D | Medium |
| Plant operations- Handling and transport of hazardous<br>materials that may result in spillage | Pollution of the environment that could affect flora, fauna and humans | Chemicals stored in leak proof area during transit<br>Transfer of chemicals will not be undertaken during extreme weather conditions<br>Chemicals handled with extreme care to prevent spillage<br>MSDS's on site for all chemicals and hazardous goods, and available for personnel use and review<br>Designated hazardous storage area<br>Drip trays in place for transfer operations<br>Incident reporting via MyOSH and follow up investigation<br>Driptrays in place for transfer operations<br>Plant equipment maintained | 1 | B | Low |
| Plant operations- Hydrocarbon spill from rupture of the PW storage tank | Oil spill causing injury or death of flora and fauna and contamination of environment | All produced water is injected into the CHA reservoir or CHOWS Triennial integrity testing of CHOWS (where operational)<br>Tanks are contained in fully bunded and sealed areas<br>Handling procedures adopted which aim to avoid spills to land or water | 1 | B | Low |

| Aspects | Impacts | Management/Mitigation Measures | C | L | Residual Risk |
|---|---|---|---|---|---|
| | | Appropriate spill response equipment for containment and recovery available on site<br>Detailed spill response procedures are detailed in OSCP<br>Workforce training shall be conducted in chemical handling, spill response and recovery procedures<br>Regular pumping out of bunds that do not connect with the water treatment system<br>Plant equipment maintained | | | |
| Plant operations- waste management | Contamination of soil and water, damage to flora and fauna, reduction in visual amenity | SDS to be available to personnel which identify hazardous materials and their safe handling, storage and disposal<br>Personnel trained in the safe handling, storage and disposal of all wastes streams<br>Wastes created by personnel conducting operations or maintenance activities at the ASP and along the easement have a carry-in/carry- out policy<br>Hazardous wastes managed in compliance with relevant regulatory requirements including:<br>Safe storage prior to collection and transport off-site for reuse, recycling, treatment or disposal at locations approved in accordance with AS 1940 Storage and Handling of Combustible and Flammable Liquids<br>Storage areas designed to prevent contamination of soil and water and adequately contain any spills<br>Spill response equipment stored in the vicinity of storage facilities, where immediate access is unhindered<br>Spillages immediately contained and cleaned up<br>Contaminated soils managed according to the concentration of contaminants and leachability.<br>Vehicles, plant and equipment are checked as operating correctly, including identification and rectification of any leaks<br>Non-prescribed wastes managed in accordance with the policy of avoid, reduce, reuse and recycle<br>Reusable and recyclable wastes such as timber skids, pallets, drums and scrap metal stockpiled for salvage<br>Designated collection bins at work sites for aluminium cans , glass and paper recycling<br>Sewage and sullage will be via approved septic systems and disposed to municipal sewage treatment plant | **2** | **B** | **Low** |

| Aspects | Impacts | Management/Mitigation Measures | C | L | Residual Risk |
|---|---|---|---|---|---|
| | | ASP maintained to an orderly and hygienic standard<br>Putrescible waste receptacles covered<br>No waste left on site<br>Licenced waste contractor records showing type and location of waste disposal | | | |
| Onshore drainage system operation | Pollution to local environment | Local containment bunds (concrete slab and collection sump) processes to control Water Discharge from Process Bund Areas 10/HSEQ/ENV/PC01 and Storm and Ground Water Management 10/HSEQ/ENV/PC05<br>All the oily waste fluids are educted and removed to the Tanker Loading Oil Containment Tanks or reinjected back into the process. Waste is then removed from the manhole by a licensed liquid waste contractor for treatment and disposal in accordance with EPA regulations. | **1** | **C** | **Low** |
| Transfer of crude oil via tanker | Pollution to local environment | The ASP Load-out Work Instruction (10/OPPSPC/07/WI01) details the safe load-out of crude oil into oil tanker at the ASP site to the BP refinery in Kwinana. This document is at the load-out terminal for reference by tanker loading personnel<br>All oily waste liquid is recovered from the process bunds and returned to the process or removed from site<br>A weather shelter located over the loading equipment to minimise impact of weather<br>Road tanker filling control system and auto shut-off<br>Road tanker contractor selection<br>Collection pit installed to contain spills<br>CCTV cameras will be used within the plant to monitor the tanker loading operations<br>Tanker loading bay designed to contain potential spills within concrete pad and collection drains and sump<br>Onshore OSCP available to deal with spills | **1** | **B** | **Low** |
| Failure of Crude<br>Oil Storage tank | Oil spill causing injury or death of flora and fauna and contamination of environment | All hydrocarbons and dirty water that are released will be collected and all oily waste liquid will be recovered from the process bunds and returned to the process<br>The storage tank is fully bunded and contained in a sealed area<br>Regular tank inspection | **2** | **A** | **Low** |
| Failure of pipelines | Oil spill causing injury or death of flora and fauna and contamination of environment | The plant is illuminated 24hrs a day<br>Continuous corrosion control monitoring program to minimise the risk of leaks in piping and flanges | **3** | **A** | **Low** |

| Aspects | Impacts | Management/Mitigation Measures | C | L | Residual Risk |
|---|---|---|---|---|---|
| | | Routine Inspections to measure rate of corrosion in the pipeline<br>Use of corrosion inhibitor. The rate will be adjusted to effectively eliminate corrosion in the pipeline<br>All relevant personnel undergo a corrosion awareness training program Reduced number of flanges, valves and connection points (leak locations) Heavy walled pipe<br>Absorption materials on site for clean-up of spills<br>Onshore OSCP available to deal with spills<br>Personnel trained Emergency Response Plan and Oil Spill Contingency<br>Plan (OSCP) procedures for efficient first response<br>All oil spill equipment maintained to ensure it is functional and accessible<br>Inductions covering oil spill prevention, response, recovery, and waste management for all relevant personnel<br>24 hr observation via control room<br>Pigging to remove corrosive fluids (corrosion mitigation) Capped pipework<br>Cathodic protection | | | |
| Plant Operations-Chemical<br>Injection process failing causing chemical spill<br>from storage tank or pump failure | Pollution to environment | Tanks are contained with fully bunded and sealed areas<br>Chemical injection package located onshore to enable more frequent monitoring and maintenance<br>Pumps status is monitored continuously<br>The minimum practicable volume of chemicals is stored on-site<br>SDS will be available on-site where the chemical are stored and handled Chemicals are not stored or handled in the vicinity of water storage areas Appropriate handling procedures adopted which aim to avoid spills to land<br>and water<br>Appropriate spill response equipment, including containment and recovery equipment available on site<br>Onshore OSCP to deal with spills<br>Workforce training in chemical handling and spill response and recovery procedures | **2** | **B** | **Low** |
| Produced Water Spills (valve or pump leak) | Pollution to environment tie soils, groundwater, vegetation | Major vessels onsite (Production Separator, IGF, Tanks) are contained within separate bunded areas The tank storage bunds are graded towards one corner where a normally-closed bund valve is provided for the | **2** | **B** | **Low** |

| Aspects | Impacts | Management/Mitigation Measures | C | L | Residual Risk |
|---|---|---|---|---|---|
| | | discharge of clean storm-water to the nearest soak pit<br>Routine surveillance of onshore facilities (note that plant is permanently manned) Inductions to all personnel, contractors and visitors covering PFW management.<br>The onshore pipeline is inspected on a monthly basis as per the Pipeline Inspection Procedure (10/HSEQ/GEN/PC11). Onshore there is a 'corrosion monitoring trench'.<br>OSCP in place Investigation into spills Maintenance Scheduler | | | |
| **Pipeline maintenance and clearing Risk assessment** | | | | | |
| Soil and landform impact from Vegetation clearing | • Loss of habitat;<br>• Exceeding approved licence;<br>• Erosion;<br>• Impact to pipeline markers<br>• Increased environmental footprint;<br>• Soil compaction | • Upstream personnel and Clearing Contractor spotters to assess track prior to clearing;<br>• Internal approval by Environmental Advisor;<br>• Clearing will be dedicated to maintaining previously cleared areas;<br>• No additional clearing;<br>• Clearing plan to define use of mulched material to be spread evenly across PPL ROW (As per AS 2885 (map to be marked up and define clearing);<br>• Objective to maintain line of site - options for clearing to include leave trees in low lying gully;<br>• Maintain width of ROW as per EP;<br>• Minimal runs required (e.g. run over twice for full PPL | **1** | **B** | **Low** |
| Weeds/dieback introduction from soil for road or site stabilisation and vehicle movement | Invasive species into nature reserve | • Weed spraying program in place;<br>• Vehicle washdown / Weed and seed certification provided from CE and signed by DPAW;<br>• Environment Management Plan;<br>• Daily maintenance sheet;<br>• Vehicles/equipment to be blown down with pressure air cleaner at location (on PPL ROW);<br>• Weed and dieback procedure (10/HSEQ/ENV/PL09/WI01) | **3** | **A** | **Low** |
| Fauna impact due to vehicle movement | Loss of Fauna life | • Site meeting with client and contractor at launch of project, prior planning communicated clearly to team;<br>• Clearing plan; | **1** | **C** | **Low** |

| Aspects | Impacts | Management/Mitigation Measures | C | L | Residual Risk |
|---|---|---|---|---|---|
| | | • Clear communications between team and client<br>• Relocate fauna approximately 100 metres; CE team capable of relocating fauna as required; if hazardous then leave (e.g. hives);<br>• Upstream personnel and CE spotters to assess track prior to clearing;<br>• Operators experienced in snake/reptile handling;<br>• Pre-cleared land/PPL ROW clearing and maintenance. | | | |
| Clearing foreign Flora/priority species | • Over clearing;<br>• Damage to priority species;<br>• Regulatory impact | • Site meeting with Upstream PS and CE at launch of project, prior to planning communicated clearly to the team;<br>• Clearing plan – define pipeline clearing area;<br>• Clear direction maps given by supervisor;<br>• EP to define waste management (to reduce impact on fauna);<br>• Relocate fauna approximately 100m; CE team capable of relocating fauna as required; if hazardous then leave (e.g. Hives);<br>• Daily report to be sent to the Environmental Advisor with pre and post images of progress for clearing work. Environmental advisor to provide report to DMP/DPAW;<br>• Pipeline markers | **2** | **B** | **Low** |
| Fire due to vehicle movement, equipment and clearing activities | Impact of fire on surrounding vegetation (Flora and Fauna) | • Clearing during low/medium fire risk season;<br>• Equipment not likely to cause a spark;<br>• Fire fighting equipment (engine fire suppression, LC has 400L of water and 2 x 10L water);<br>• All personnel are trained for fire fighting;<br>• Review weather conditions each day of operation (call DFES – CE);<br>• Support from ASP available – fire trailer to be on stand by during PPL clearing and maintenance work;<br>• DFES available for support | **4** | **C** | **Medium** |
| Spills (diesel/oil spills) due to: | Impact of fire on surrounding | • Double bunded diesel tank (400L of diesel); | **1** | **B** | **Low** |

| Aspects | Impacts | Management/Mitigation Measures | C | L | Residual Risk |
|---|---|---|---|---|---|
| vehicle movement /equipment /refueling | vegetation (Flora and Fauna) | • Spill kits standard on tractor and vehicles;<br>• Refuelling will occur on bunded areas – not infield;<br>• Minimal volumes of oil held (approximately 3 x 20Lt drums) which are bunded;<br>• Work instruction for spill kit use – all part of induction for CE. Must understand spill scenarios | | | |
| Waste generation from pipeline clearing and maintenance activities | No significant consequences | All waste material will be mulched and left on site | **1** | **A** | **Low** |
| Air quality impact from emissions | No significant consequences | All waste material will be mulched and left on site | **1** | **A** | **Low** |
| Noise impact | No significant consequences | All waste material will be mulched and left on site | **1** | **A** | **Low** |