



Cliff Head Project Operations Environment Plan Summary

AGR Asia Pacific Controlled Document

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ROC HSE Policy

Health, Safety and Environment - Vision, Goals, Policy and Guiding Principles



Vision & Goals

Our vision at ROC is to continually make measurable improvements in the Health, Safety and Environmental ("HSE") aspects of our business.

To realise this vision, we are committed to the following goals:

- Zero harm to our employees, contractors and the communities in which we operate;
- Conduct our business in a way that minimises the risks to the environment;
- Integrate HSE into all of our business activities; and
- Demonstrate industry leadership in HSE performance.

Policy

It is the policy of ROC to carry out its business activities in a manner consistent with sound HSE management practices and to comply with applicable HSE laws and regulations. This will be achieved by management, employees and contractors working together adopting ROC's HSE systems and standards. Performance will be monitored, reviewed and audited to achieve best practice.

ROC undertakes to regularly review this policy to take account of changes in legislation and ROC's activities.

Guiding Principles

We are committed to integrate the following "Guiding Principles" into all decisions affecting our Operations:

- **Safety Culture**
We will foster positive safety culture characterised by a shared commitment to safety and hazard prevention.
- **Leadership & Accountability**
We will establish HSE responsibility and accountability at every level of our organisation.
- **Environmental Stewardship**
We will ensure that potential impacts on the natural environment, including biodiversity, are minimised and water, energy and other natural resources are conserved where practicable.
- **Risk Management**
We will identify and assess HSE risks through a formal and structured process to facilitate effective risk reduction plans and action.
- **Asset Integrity**
We will ensure that systems are established, documented and maintained to ensure the ongoing integrity of plant and equipment.
- **Job Competency**
We will ensure that employees are suitably trained, supervised and provided with the resources to perform their work in a competent manner. ROC will foster an awareness of shared responsibility and accountability for the environment.
- **Contractors**
We will only engage contractors who share our vision and will work with us to implement these guiding principles whilst working on any of our facilities.
- **Management Systems & Standards**
We will develop, implement and continuously improve effective health, safety, and environmental management systems and develop standards that reflect best industry practices.
- **Performance Review**
We will set measurable goals for HSE performance and track progress against these goals.

Alan Linn



Chief Executive Officer
23 February 2011

Roc Oil Company Limited



AGR HSEQ Policy



Health, Safety, Environmental and Quality Policy

AGR Field Operations recognises that management of health, safety, environment and quality is fundamental to the success of our business. We will systematically aim to become a best-in-class performer in our work towards the prevention of:

- Injuries to personnel
- Work related illnesses
- Hazardous environmental discharges
- Economic loss caused by HSE incidents

We will achieve this by:

- Maintaining an effective management system that complies with internationally recognised standards on quality, safety, health and environmental management, focused on continuous improvement and meeting the requirements of both our internal and external customers.
- Working jointly with our employees and contractors to ensure a safe and healthy working environment for all personnel and controlling workplace risks to personnel to as low as reasonably practicable.
- Responsibly and sustainably managing impacts to the environment.
- Promoting safety, environmental and quality awareness and continuous improvement amongst our personnel and establishing and monitoring measurable targets and objectives.
- Complying, as a minimum, with all applicable statutory requirements wherever we operate.

Signed by:

Brett Smith / Senior Vice President

15/02/2010

1 Activity Description

Roc Oil (WA) Pty Ltd (ROC), a wholly owned subsidiary of Roc Oil Company Limited, together with AWE Oil (WA) Pty Ltd and CIECO E&P (Australia) Pty Ltd are the participants of the Cliff Head Development Joint Venture (JV).

The Cliff Head Development consists of:

- The Cliff Head Alpha (CHA) Platform and production pipelines, the offshore portion of this development, which lie in Commonwealth and Western Australian State water jurisdictions; and
- The Arrowsmith Stabilisation Plant (ASP) and onshore pipelines forming the onshore portion of the development operate under Western Australian legislation.

ROC is the operator of the Production Licence area WA-31-L (CHA Platform), Pipeline Licence WA-12PL (Commonwealth waters), Pipeline Licence PPL-18 (State Waters) and Pipeline Licence PL70 (onshore infrastructure) on behalf of the JV Participants. The ASP site also operates under EPA Licence 8096/1.

1.1 Scope of Work

1.1.1 Overview

Production from the Cliff Head Oil Field involves piping oil and produced formation water (PFW) from the offshore wellhead platform (CHA) to the ASP via the offshore and onshore pipeline. At the ASP the PFW is removed from the crude product stream, the crude oil is stabilised and then transferred to road tankers and transported to the BP Refinery at Kwinana for refining.

Cliff Head crude is a waxy crude with API gravity of 31.5°, a wax content of 30.2%, pour point of 33°C and it has an extremely low gas content (Gas/Oil Ratio or 31scf/stb).

The main components of the Cliff Head development are as follows:

Offshore

- Up to six production wells with Electronic Submersible Pumps (ESPs) at the Cliff Head oil field location;
- Two water injection wells;
- An offshore well head platform (CHA) which is fully banded to contain spills/leaks;
- An insulated offshore subsea pipeline to transport the produced fluids to shore, crossing beneath the shoreline and the dune system, by means of horizontally drilled holes;

Onshore

- An onshore pipeline linking the offshore pipeline to the onshore oil stabilisation plant;
- An oil stabilisation plant with oil storage and road tanker loading facilities (ASP);
- Onshore source water well to supply make-up for reinjection (as required);
- A subsea water injection pipeline from the onshore plant to the two injection wells at the CHA Platform; and
- Umbilical power, control and chemical supply lines running from the onshore stabilisation plant to the wellhead platform.

1.1.2 CHA Platform

The CHA wellhead platform normally operates on an unmanned basis except for periodic maintenance and inspection visits. During normal operations (i.e. unmanned) helicopter visits are fortnightly. During Hydraulic Workover Unit (HWU) or Coiled Tubing Unit (CTU) operations, the platform will be manned 24hrs per day with two helicopter trips daily.

CHA is controlled remotely from the Central Control Room (CCR) at the ASP. All critical operating and safeguarding parameters are monitored at this location, with facility for the operator to adjust set points and reset limited trips. Closed circuit television security cameras allow the onshore Control Room operators to monitor platform activities.

The wellhead platform covers an area of approximately 10m by 30m and stands 12m clear of the sea surface. It is designed and constructed to enable complete removal upon decommissioning. The platform facilities are spread over four levels with the Helideck located on main deck at the eastern end and sized to accommodate a Sikorsky S76 helicopter.

A 25tonne platform crane is located at the North West corner of the main deck and is sized for boatlifts, ESP support operations and well work-overs. The crane on the CHA has a fuel tank capacity of 1100L. Well intervention equipment (i.e. CTU or HWU) is located on main deck with access to all wells through deck hatches. Deck areas are fully contained during work activities to contain any leaks on the platform.

The mezzanine deck accommodates the chemical injection break tank skid, instrument room, high voltage transformer room and transformer room. These rooms are pressurised to protect the unrated equipment. The wellheads and wellhead control panel are located on the mezzanine deck. The cellar deck houses the Heating, Ventilation & Air Conditioning (HVAC) equipment, production manifold and chemical distribution skid. Located on the sub-cellar deck are the pipeline isolation valves, the emergency escape ladder and Umbilical and Power Cable Termination Units.

Note that the CHA platform does not support both CTU and HWU operations simultaneously. Periods of assembly and disassembly of units will be required at CHA to support these activities. During well intervention activities a Standby Vessel will be present at the platform and a support vessel will assist with the installation and supply/provision activities.

1.1.3 Pipeline System

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, transporting treated PFW and additional make-up injection water (as required) from the ASP to CHA.

The two pipelines are 273.1mm in diameter, constructed from steel (wall thickness 14.3mm), insulated with special high-density polyurethane foam and encased in concrete (concrete thickness is 25-40 mm) (*offshore section only*). 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. Both the power cable and umbilical are strapped to the production line.

At CHA the pipelined are tied into the platform riser using flanged connected spool pieces. The offshore pipeline runs 10.4km along the seabed from the CHA to the HDD shore crossing. The offshore component of the pipeline is unburied and uses the concrete coating weight and rock bolting to provide stability. The pipeline shore crossing was installed by HDD. The pipelines enter the HDD at a point approximately 500m from the shoreline (onshore) and exits through the seabed approximately 500m offshore. The

onshore (buried) component of the pipeline runs 2.4km from the HDD point to ASP. The total length of the Cliff Head pipeline is approximately 14 km.

The onshore pipeline also contains a 'corrosion monitoring trench' (15m (length) x 4m (wide) a 1.8m (deep)) to facilitate the monitoring of corrosion rates in the injection water pipeline. The trench walls are retained with an interlocking non friable stone pitched wall over a GeoFabric underlay and the whole excavation is enclosed in a permanent galvanised locked chainmesh fence with a 1.5m wide firebreak at the base of the fence.

1.1.4 ASP

The ASP is located approximately 3km from the shoreline and 25km 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 m³ 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. The site has a perimeter security fence and the main gate is electrically operated from the plant control room and incorporates an intercom and Closed Circuit Television (CCTV). CCTV cameras are also used to monitor tanker-loading operations.

The site has the following features:

- All drainage around major vessels/load-out facilities onsite is collected in local containment bunds which consist of a bunded concrete slab and collection sump. These fluids are educted from the sumps by a contracted waste disposal vehicle and either disposed offsite or re-injected directly into the process.
- CHA's chemical injection package is located at ASP, and comprises of pumps, tanks and control devices. The chemicals are supplied to CHA via four stainless steel tubes (encapsulated in a flatpack).
- ASP 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 downs in the case of loss of fuel gas or generator trip.
- 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.
- General area lighting is provided on a 24 hours per day basis.

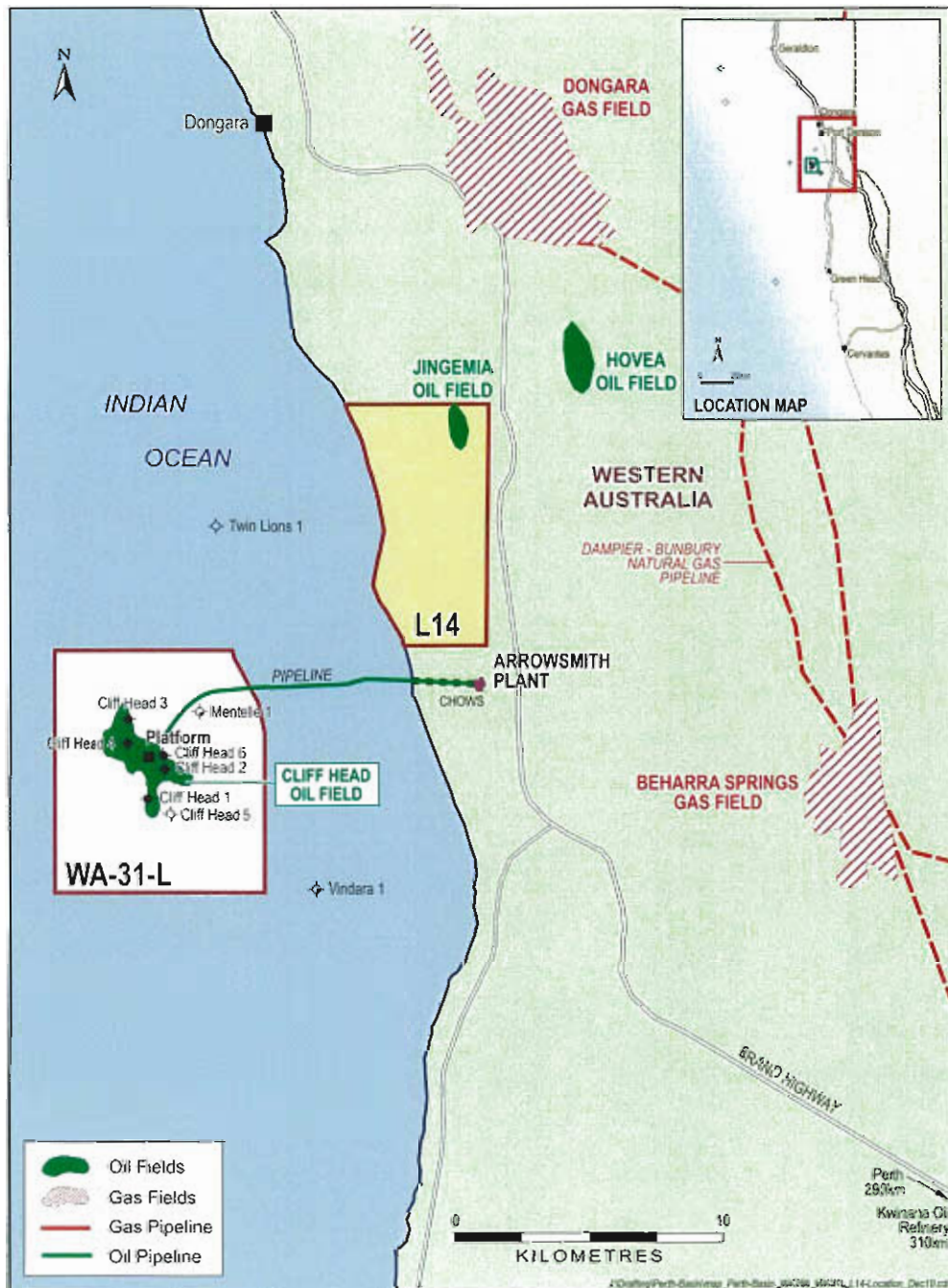
1.2 Location

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 **Table 1** and **Figure 1**). The water depth in the vicinity of the field is approximately 16m and the closest landfall is some 10km due east. A PSZ of 500m has been gazetted around the CHA Platform facility. The onshore ASP is located about 3 km inland of the coast and approximately 20 km south of Dongara.

Table 1: CHA Platform Location

| MGA Coordinates (GDA94) UTM 80 Zone 50 | | | |
|--|-----------------|-----------------|-------------|
| Locations | Longitude | Latitude | Water Depth |
| CHA | 114° 52' 11"E | 29° 27' 0" S | 16 |
| ASP | 115° 0' 8.016"E | 29° 25' 43.51"S | NA |

Figure 1: Cliff Head Development Location



NOTE: * CH Field outline is PSDM Robertson outline
* Well locations are TD

2 Receiving Environment

2.1 Climate

The oil field is located in 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.

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.

2.2 Marine Environment

2.2.1 Meteorological Ocean Conditions

Water circulation in the area is primarily influenced by wind-driven currents, although localised wave-forced currents may occur around the shallow reefs, particularly during large swell events. The currents at the surface to mid-depth have typical mean speeds of 0.08 to 0.15 ms⁻¹ and near the seabed this is reduced to 0.06 to 0.1 ms⁻¹. The currents run mostly parallel to the local bathymetry/shoreline (WNI, 2000) with the regionally-dominant Leeuwin Current not having significant influence in the inshore areas where the CHA Platform is located. As a result of the strong land/sea breezes, seas are slightly greater than swell in summer. Oceanic swells predominantly arrive from the southwest during summer.

Tides are diurnal, with a small maximum range of less than one meter, and have very limited effect on water circulation in the area.

2.2.2 Marine Benthic Environment

The offshore seabed environment generally consists of smooth calcarenite rock strata of varying thickness with a thin layer of sand overlaying. The offshore pipeline corridor varies in sand thickness by approximately 0.2m to 1m. The region is characterised by a relatively narrow continental shelf with diverse moderate energy coastal landforms (IMCRA, 1997). The area has a range of temperate marine species and is also at the southern limit of a suite of sub-tropical and tropical marine species.

Limestone ridges, a relic of previous sea level rises/recessions are present in the offshore marine area. The ridges, now below sea level form sub-littoral reefs, often undercut and cavernous on the seaward side. The sea floor in the near shore areas is characterised by seagrass and macroalgae of varying densities and types. The predominant seagrass is *Amphibolis*, *Thalassodendron* and *Heterozostera* species.

The offshore environment is a mosaic of limestone reefs and platforms, sandy mobile seafloor and beds of algae and seagrass.

ROV surveys have indicated that the platform location comprises sandy sediment overlying limestone pavement. Seagrass meadows are not a significant feature at the CHA platform location.

Emergent reefs present in the area (i.e. Horseshoe Reef) support an abundant cover of attached invertebrate, particularly rich in sponges and ascidians. The brown macroalgae species *Ecklonia radiata* (kelp) and *Sargassum* spp. are generally the dominant macrophytes, with numerous species of smaller red, brown and green algae. Coralline

algae and encrusting corals are often present on shallow parts of the reefs, but are rarely dominant.

2.2.3 Marine Fauna

The following marine mammal species may be present in the vicinity of the CHA platform:

- Blue whales while possibly present normally remain in deeper waters off the shelf break (Rafic, 1999) and would be unlikely to occur in the vicinity of the CHA Platform;
- Humpback whales migrate between their summer feeding grounds near Antarctica to their winter breeding grounds adjacent to Australia's Kimberley coastline. On the west coast, northbound migration occurs between mid-June and mid-July, while the southbound migration occurs between October and November (Jenner et al., 2001). Within the region, it is considered that the whales follow a predictable migratory pattern within the continental shelf boundary (200m bathymetry) and between the Houlman Abrolhos Islands and the mainland (>30nm offshore). Northward migration is generally offshore, whereas southward migration is typically closer to the coastline.
- The Southern Right Whale migrates from sub-Antarctic feeding grounds to breeding grounds on Australia's south coast during winter and spring (Bannister, 1994) with regular calving occurring between Augusta in Western Australia and Port Lincoln in South Australia and less regular calving occurring around the southwest coast up to Perth. During the winter and spring period, occasional sightings of southern right whales have been made as far north as Geraldton.
- Bryde's whales are the smallest of the baleen-type whales and are found in oceanic and nearshore tropical and subtropical waters. Bryde's whales have previously been recorded near the Abrolhos Islands (Bannister et al, 1996) and may occasionally pass near to the Cliff Head development area.
- Sei and fin whales generally tend to stay in deeper oceanic waters and migrate to the sub-Antarctic, below latitude 35°S, to feed during the warmer months (Bannister et al., 1996).
- Australian sea lions are regularly observed feeding around the larger reefs in the area. The nearest breeding grounds are on the Beagle Islands some 35 km to the south and the Abrolhos Islands approximately 100km northwest of the area.

Leathery turtles generally frequent deeper offshore waters; however, it is common for them to be sighted in the shallower coastal habitats.

The following fish species may be present in the vicinity of the CHA platform:

- The Great White Shark, Grey Nurse Shark and Whale Shark may have habitat in the area. Whale sharks, occurring in both tropical and temperate waters, are known to aggregate in the waters adjacent to North West Cape in late March to early May, with the largest numbers being recorded in April. The season is, however, somewhat variable and whale sharks have been recorded between mid March and the beginning of June. It is unlikely that the whale shark would occur in the CHA Platform area, however, they migrate long distances and have been observed further south than Dongara so their presence cannot be discounted.
- The diverse range of ecological niches afforded by the patch reefs across the area is expected to provide suitable habitat for the listed *Osteichthyes* species of seahorses, sea-dragons and pipefish.
- The varieties of benthic habitats support diverse and abundant fish communities. Reef associated fishes, such as scalyfin (*Parma spp.*) and wrasse (*Labridae spp.*) are common, along with commercial species such as baldchin groper (*Choerodon*

rubescens) and dhufish (*Glaucosoma hebraicum*) on outer reefs. Offshore, pelagic fishes such as Spanish mackerel (*Scomberomorus commerson*) and Samson fish (*Seriola hippos*) also occur.

Migratory seabirds, some protected by international agreements (Bonn Convention, JAMBA, CAMBA, ROKAMBA), may pass through the CHA platform area. They are uncommon due to the lack of suitable roosting and breeding habitats, however foraging groups of seabirds are sighted occasionally.

The western edge of the CHA Platform area is an area of lobster breeding. The western rock lobster (*Panulirus cygnus*) supports the most valuable single species fishery in Australia. The life cycle of the western rock lobster has been well studied. Breeding occurs in spring and early summer in waters near the edge of the continental shelf of 35 to 90m depth.

2.3 Terrestrial Environment

2.3.1 Landform

The Cliff Head Development is situated within the Perth Basin geological province on the coastal fore-plain, part of the Quindalup dune system. 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.

The soils have variable calcium carbonate content, are typically alkaline in pH (up to 9.5), are variable in salinity levels and have high porosity and low water holding capacity.

2.3.2 Vegetation

Vegetation condition across the pipeline area varies between very poor in the eastern part adjacent to the plant site to excellent in the western parts. There is some weed invasion on the fore-dunes but the vegetation structure is still intact. The vegetation mapped varies between tall thickets and low heaths. The coastal heath communities dominate the more exposed sites closer to the coast on dune crests and in exposed sites on flats with little soil covering the limestone basement. The predominantly *Acacia rostellifera* thicket communities occur in primary dune swales closer to the coast where water is harvested from the dunes and shelter from the prevailing winds provides conditions suitable for plant growth. Thicket communities become more dominant further from the coast east of the secondary dunes. None of the plant communities are Threatened Ecological Communities as defined by the Department of Environment and Conservation (DEC).

Via surveys undertaken, there is no clear evidence supporting the presence of *P. cinnamomi* within the Cliff Head Development area.

2.3.3 Fauna

The following terrestrial species, together with their conservation significance level under Western Australian and Commonwealth legislation which may be present in the area are:

- Conservation Significance Level 1¹: Ramsay's python (woma) (*Aspidites ramsayi*), South-west carpet python (*Morelia spilota variegata*), Carnaby's black cockatoo (*Calyptorhynchus latirostris*), and Peregrine falcon (*Falco peregrines*).
- Conservation Significance Level 2²: Hooded plover (*Thinornis rubricollis*), Australian bustard (*Ardeotis australis*), Striated fieldwren (*Calamanthus campestris*), White-browed babbler (*Pomatostomus superciliosus ashbyi*), Crested bellbird (*Oreioica gutturalis gutturalis*), Brush wallaby (*Macropus Irma*), Water rat (*Hydromys chysogaster*), and Bush rat (*Rattus fuscipes*).
- Conservation Significance Level 3³: Marbled gecko (*Phyllodactylus marmoratus*), Burton's legless lizard (*Pletholax gracilis*), King's skink (*Egernia multiscutata*), Pacific gull (*Larus pacificus*), Square-tailed kite (*Lophoictinia isura*), White-breasted robin (*Eopsaltria Georgiana*), Cricket (*Hemisaga vepreculae*), and Native bee (*Hyaleus globuliferous*).

2.4 Social Environment

The CHA Platform and ASP are located in the Mid-West region of Western Australia. The twin towns of Dongara and Port Denison are the nearest townships to the development.

The Mid West region has a population of approximately 52,000 people. The two largest shires in the region are the City of Geraldton (18,916 persons) and the Shire of Greenough (14,035) persons, which account for about 60% of the region's population. The population of the Shire of Irwin is small in comparison, comprising 3,052 people.

The most common industries of employment for persons aged 15 years and over usually resident in this Shire were Sheep, Beef Cattle and Grain Farming (9.5%); Fishing (4.4%); School Education (4.4%); Supermarket and Grocery Stores (3.8%); and Accommodation 3.5%.

The Cliff Head oil field is located in an area of high commercial rock lobster fishing activity, which represents the main economic activity in the project area.

The region has also historically supported petroleum exploration. The Perth Basin has become a prominent oil and gas production province supporting a number of onshore operators. Similarly, mineral extraction is undertaken in the onshore area, primarily for mineral sands.

2.5 Heritage

The CHA Platform lies on a coastline with many historic shipwrecks although no known significant shipwrecks lie nearby to the development.

No archaeological or ethnographical evidence or sites were identified to be associated with the development area.

3 Major Environmental Hazards and Controls

A risk analysis has been undertaken for all aspects of the CHA/ASP operations in accordance with the requirements of ISO14001 – *Environment Management Systems*, AS/NZS 31000 *Risk Management* and HB203-*Environmental Risk Assessment – Principles and Process*. The analysis indicates that, with the proposed management/mitigation

¹ Species listed under State or Commonwealth Acts.

² Species not listed under State or Commonwealth Acts, but listed in publications on threatened fauna or as Priority Species by DEC

³ Species not listed under Acts or in publications, but considered of at least local significance because of their pattern of distribution

measures implemented, no significant environmental impacts are expected and the activities carry a low to medium residual environmental risk. Further details of key environmental aspects of CHA/ASP Operational activities are provided in **Table 3**.

4 Summary of Management Approach

ROC has established a Corporate Health Safety and Environment Management System (HSEMS) for all of its activities within Australia and internationally. The pinnacle document of the Corporate HSEMS is the ROC HSE Policy. The ROC HSE Policy applies to all ROC subsidiary companies such as Roc Oil (WA) Pty Ltd.

As Production Licence 'operator', ROC has engaged AGR Asia Pacific (AGR) to act as 'contract operator' of the Cliff Head facilities managing day-to-day activities such that the risk of negative impacts to the environment is as low as reasonably practicable (ALARP). Well intervention activities (i.e. ROC Drilling) are integrated into this management system structure.

For this activity, ROC adopts the AGR Integrated Management System (IMS) to fulfil the company's environmental policy, objectives and ensure environmentally responsible management of activities. AGR's IMS is certified to ISO 14001 and provides a framework to management of environment during the installation and work-over activities. The IMS applies to all employees, contractors and other associated third parties.

Accordingly ROC and AGR have, using a systematic approach, identified and assessed the Cliff Head Development operational activities, their associated impacts and environmental risk after environmental control measures have been implemented. This process has also established objectives, performance standards and criteria to manage and measure environmental performance during operational activities.

5 Consultation Process

ROC, throughout the history of the Cliff Head development has undertaken comprehensive stakeholder consultation. Parties consulted specific to the operations phase of the Cliff Head Development include:

- Local communities of Dongara and Port Denison.
- Commercial fishing organisations (i.e. Western Rock Lobster Council, Dongara Professional Fishermen's Association, Geraldton Professional Fishermen's Association, United Mid-West Professional Fishermen's, Longline Association, Western Australian Fishing Industry Council, Kalbarri Professional Fishermen's Association and Western Australian Fishing Industry Council).
- Local government (i.e. Irwin Shire Council, Greenough Shire and Geraldton City).
- Western Australian Government Departments.
- Commonwealth Government Departments.
- AMSA.
- Geraldton Port Authority.
- Western Australian Conservation Council.
- Active Community Environmentalists Inc.

Stakeholder consultation has continued through the operational phase and specifically for well intervention activities.

Consultation and information dissemination will be undertaken through a range of media including:

- Meetings with regulators.



- Consultation with stakeholders.
- Support Vessel communication with maritime traffic
- Notification of well intervention activities to fishermen.

A system is in place to ensure that there is a response to the stakeholders' expectations and concerns are addressed through the Complaint Management and Community Liaison Procedure.

6 Contact Details

Further information associated with the environmental aspects of the Cliff Head Development Operations Environment Plan may be obtained from ROC by writing to:

Barry Ashwin
Cliff Head Development Asset Manager
Roc Oil Company Limited
Level 2, 201 Adelaide Terrace
Perth, WA, 6004

Table 3: Summary of Environmental Risk Assessment

| Aspects | Impacts | Management/Mitigation Measures | Residual Risk |
|--|---|--|---------------|
| PLANNED ACTIVITIES: | | | |
| All Operational Activities: | | | |
| | | Noise Impacting Marine Fauna | |
| Noise generated offshore from all activities | Disturbance and displacement of marine fauna | <ul style="list-style-type: none"> Equipment offshore minimised and equipment selection minimises noise emissions Likely to evoke avoidance response in whales (if present) but unlikely to displace species from key habitat or migration paths Compliance with the requirements of the Australian National Guidelines for Whale & Dolphin Watching (DEW, 2005) is required Cetacean sighting data will be collected during activities and will be forwarded to Department of Sustainability, Environment, Water, Population and Communities (SEWPC) | Low |
| Support Vessel: | | | |
| | | Discharges to the marine environment | |
| Support vessel introducing marine pests- Ballast Water Discharge & Bio-fouling | Disturbance and displacement of endemic flora/fauna | <ul style="list-style-type: none"> No hull cleaning at CHA location No ballast water discharge in CHA location For international vessels, prior to entry into Australian waters a biofouling risk assessment will be undertaken with any inspection, cleaning and coating reapplication undertaken as appropriate During international transit, the requirements of the Australian Quarantine and Inspection Service's (AQIS) Australian Ballast Water Management. This includes: <ul style="list-style-type: none"> - Mandatory ballast exchange in deep water where sediment is not visible; - Tank flooding and flushing at least three times during the exchange process; and - Documentation of all ballast exchange activities (including AQIS clearances). Additionally, while the vessels are on location no ballast water exchange activities will be permitted. All vessels to have current Statement of Compliance for Anti-fouling Systems | Low |
| Support vessel – deck drainage | Toxicity impacts to marine flora and fauna | <ul style="list-style-type: none"> High standards of house-keeping maintained on vessels Bunding (temporary or permanent) is provided for those areas/activities with increased risk of oil/chemical spill; | Low |



Cliff Head Project Operations Environment Plan
Summary



| Aspects | Impacts | Management/Mitigation Measures | Residual Risk |
|--|---|--|---------------|
| PLANNED ACTIVITIES: | | | |
| | Reduction in water quality | <p>OFFSHORE (PLATFORM & SUBSEA PRODUCTION PIPELINES)</p> <ul style="list-style-type: none"> • Spill clean-up materials (e.g. absorbents, containers) located in accessible locations; • Spill material removed prior to any deck washing activities; • Absorbent material, used for clean-up, is containerised and sent to shore as hazardous waste; • Material Safety Data Sheets are available for all chemicals used (includes spill response requirements); • Chemicals used are assessed for environmental impact prior to purchase (e.g. fully biodegradable detergent). • Bunded oil areas directed to shipboard oily water system (refer below) | |
| Support vessel- Equipment/Machine Space Drainage | Toxicity impacts to marine flora and fauna Reduction in water quality | <ul style="list-style-type: none"> • Equipment and machine spaces are fully contained and have dedicated drains leading to the bilge water system for oily waste products • Oily residues collected in this system are containerised in transit tanks and returned to shore for disposal • Whilst en route OIW discharge is monitored and meets MARPOL Annex 1 discharge criteria (<15ppm) • When stationary, oily water mixtures contained on-board | Low |
| Support vessel- Domestic Waste (Sewage, greywater and foodscraps) | Toxicity impacts to marine flora and fauna Reduction in water quality | <ul style="list-style-type: none"> • MARPOL Annex IV compliant sewage treatment plant (comminutes/disinfects) else all sewage stored in on-board for onshore disposal • Food scraps to be containerised given proximity to CHA and WA coastline (i.e. <12nm) | Low |
| Support vessel- Collision with Cetaceans | Death or injury of large cetaceans | <ul style="list-style-type: none"> • Whales tend to display avoidance behaviour and so risk of collision is very low • Low speed of support vessels allow greater response time for whale or vessel to avoid collision • Whale & Dolphin sighting reports will be completed and submitted by all vessels to Department of Sustainability, Environment, Water, Population and Communities (SEWPC) • All mobile vessels will adhere to proximity distances contained in the 2005 Australian National Guidelines for Whale & Dolphin Watching (DEWHA, 2005) • All crew will be provided with environmental induction to ensure requirements are | Low |



Cliff Head Project Operations Environment Plan
Summary



| Aspects | Impacts | Management/Mitigation Measures | Residual Risk |
|---|---|--|---------------|
| PLANNED ACTIVITIES: | | | |
| OFFSHORE (PLATFORM & SUBSEA PRODUCTION PIPELINES) | | | |
| | | <p>understood</p> <ul style="list-style-type: none"> Roc Oil Whale Interaction Guidelines detailing observation, response and reporting procedures employed for cetaceans near work site | |
| CHA Platform: | | | |
| Interference with recreational, commercial fishing & shipping | Disruption to vessel activities | <ul style="list-style-type: none"> There is a 500m-radius PSZ maintained around the platform for all third party vessels except Zone B commercial rock lobster fishers. CHA has navigational lights at all times and is identified on Navigation Charts. CHA is located a significant distance from shipping channels | Low |
| Contaminated Drainage and Waste Oils | Impacting on sea life and coastal environment including reef and sea grass habitat. | <ul style="list-style-type: none"> All hydrocarbons and contaminated water that are released during maintenance activities are collected and stored in leak-proof containers and removed from site for disposal onshore. Deck drainage during manned activities on the platform is controlled via the Controlled Use of Drains on CHA Platform Procedure (10/HSEQ/ENV/PC02) which describes this process. At the end of each maintenance period the equipment is cleaned, the decks washed-down and all liquids collected for disposal onshore. When this is complete the overboard drain lines are opened, to enable disposal of rainwater to the sea. The main and cellar decks on the platform are designed with plating and perimeter bunds (inverted half-pipe or kick-plate) to contain spillage and wash water. | Low |



Cliff Head Project Operations Environment Plan
Summary



| Aspects | Impacts | Management/Mitigation Measures | Residual Risk |
|--|---|--|---------------|
| PLANNED ACTIVITIES: | | | |
| OFFSHORE (PLATFORM & SUBSEA PRODUCTION PIPELINES) | | | |
| Waste Management | <p>Waste discharge to sea will result in litter/pollution that will impact the planktonic or benthic communities due to reduced water quality</p> <p>Injury or death to marine fauna and seabirds from ingestion or entanglement with rubbish</p> | <ul style="list-style-type: none"> Roc Oil will maintain a zero production waste emissions from offshore operations Solid wastes will be contained in a single container and transported offsite for recycling or disposal onshore Care will be taken to ensure all wastes are contained and not blown overboard (e.g. waste skips and rubbish bins will be covered to contain wastes) Waste tracking register maintained to record waste management practices Induction covering waste management to all project personnel working offshore Any spills or leaks of chemicals or hydrocarbons to deck will be cleaned up immediately Cuttings are generated in milling will be separated by the shale shaker and collected in skips for disposal onshore. | Low |
| | <p>Harmful low-level radioactive discharges (NORM) to the marine environment and impact on health on humans</p> | <ul style="list-style-type: none"> Identify materials with radiation levels above background levels (undertaken by trained radiation specialists) in accordance with Radiation Management Plan (10/HSEQ/GEN/PL09) Cap pipe, segregate and containerise all NORM wastes clearly identifying and send onshore for further onshore assessment and possible treatment/disposal via water injection system. Carry out offshore radiation surveys to confirm exposure risks and identify above-background radiation areas (undertaken by trained radiation specialists). Implement NORM awareness, management and OHS protection measures for all personnel Establish area entry protocols with clear identification of potential hazards. | Low |
| CTU/HWU Operations | | | |
| Work Over Emissions, Moorings, & Dropped Objects | | | |
| Hydrocarbon Release during Work-over | Greenhouse Gas Contributor Lost resource | <ul style="list-style-type: none"> Low GOR crude reservoir Well circulated to brine prior to work-over and fluid maintained over balance (fluid monitored) Degasser unit vents gas to safe location | Low |



Cliff Head Project Operations Environment Plan
Summary



| Aspects | Impacts | Management/Mitigation Measures | Residual Risk |
|---|--|--|---------------|
| PLANNED ACTIVITIES: | | | |
| Combustion products- HWU engines, helicopter, support and stand-by vessels | Reduction in air quality Aesthetic impacts of smoke Greenhouse Gas Contributor | <p>OFFSHORE (PLATFORM & SUBSEA PRODUCTION PIPELINES)</p> <ul style="list-style-type: none"> • Regular equipment monitoring and maintenance undertaken to ensure maximum efficiencies; • Fuel use monitored and equipment performance assessed; • Emissions from marine utilities in accordance with MARPOL Annex IV Prevention of Air Pollution from Ships. | Low |
| Seabed Disturbance- Support vessel Mooring | Localised disturbance to benthic habitats and epi- benthic organisms | <ul style="list-style-type: none"> • Permanent mooring for support vessels and temporary mooring installed for SBV • Seabed area around CHA sandy (readily recolonised) and does not have high environmental sensitivity • Temporary mooring removed after HWU activity. | Low |
| Seabed Disturbance- Dropped Equipment | Seabed disturbance to benthic habitats Fishing snag | <ul style="list-style-type: none"> • CHA crane and rigging appropriately rated for lifts • Lifting equipment inspected and maintained • Lifts occur under a PTW and after a JSEA • Weather limitations on lifting events • Dropped Objects Program (report & retrieval where practicable else position recorded) • Environmental Induction | Low |



Cliff Head Project Operations Environment Plan
Summary



| Aspects | Impacts | Management/Mitigation Measures | Residual Risk |
|--|--|--|---------------|
| UNPLANNED ACTIVITIES: | | | |
| OFFSHORE (PLATFORM & SUBSEA PRODUCTION PIPELINES) | | | |
| CHA Spills: | | | |
| Well Blowout ~780.44bbbl/day | Oil Spill causing injury or death of marine fauna and pollution of coastal habitat | <p>Crude Oil Diesel, Chemical & Work Over Spills</p> <ul style="list-style-type: none"> Some wells are low flow reservoir- artificial lift required. Three are free flowing. Fully plated and banded cellar deck to minimise oil spilling into sea. The banded area on CHA is 19.6m². Each flow-line is equipped with a choke valve, oil-water flow meter and sample collection point to allow monitoring of each production well. Automatic low-pressure shutdown. Remote shutdown capability from onshore control room to isolate the well. Personnel on vessels and platform trained Emergency Response Plan and Oil Spill Contingency Plan (OSCP) procedures such that the initial response to a spill in carried out efficiently. The waxy nature of the crude helps to enable leaks to be identified (Via local inspection or via CCTV) and to minimise environmental damage by cooling and solidifying on the cellar deck and on grating and pipe work in the vicinity of the leak. Oil spill equipment will be maintained at the ASP, at Port Authorities and Roc Oil is a member of AMOSC for spill response. All necessary equipment maintained functional and accessible. Oil spill trajectory modelling undertaken to aid response planning and implementation. Inductions covering oil spill prevention, response, recovery, and waste management for all relevant personnel. Safety procedures followed. | Medium |
| Blow Out (Con't) | Oil Spill causing injury or death of marine fauna and pollution of coastal habitat | <ul style="list-style-type: none"> The composition of the work-over fluid is constantly monitored to ensure sufficient density to control subsurface pressures Blow-out Preventers (BOP) and related well control equipment are installed, operated, maintained and tested in accordance with manufacturer's recommendations and recognised Australian/International standards The wells are designed and constructed in accordance with regulated international standards. | Medium |

| Aspects | Impacts | Management/Mitigation Measures | Residual Risk |
|---|---|--|---------------|
| UNPLANNED ACTIVITIES: | | | |
| Pipeline (Corrosion Interference) | Leaks or death of marine fauna and pollution of coastal habitat | <p>In the extremely unlikely event of a well blowout, a hydrocarbon release rate of 0.33kg/s (max) would be expected (significant impacts).</p> <ul style="list-style-type: none"> A heavy walled pipe (rated to the full well pressure possible for any production wells) will carry the hydrocarbons and produced formation water. The pipelines are designed and tested in accordance with the relevant codes and standards for pipelines. A continuous corrosion control system has been put into place. This is accomplished by utilising electrical resistance probes that measure the rate of corrosion in the pipeline. The rate of corrosion will be continuously monitored and recorded. By utilising this data, the corrosion inhibitor dosage rate will be adjusted to effectively eliminate corrosion in the pipeline. The pipeline route is provided on marine charts. Standard maritime safety procedures will be adopted. Low Level of marine traffic in vicinity of the pipeline The capacity to conduct remote shutdown from onshore control room to isolate the down-hole Pipeline designed to withstand certain fishing vessel collisions & accommodate rock lobster fishermen. | Low |
| Unauthorised access to platform posing a risk to infrastructure from damage due to sabotage resulting in spills (activists/terrorists)- worst case see well blowout | Spill causing injury or death of marine fauna and pollution of coastal habitat or navigation hazard | <ul style="list-style-type: none"> CHA is in a remote location i.e. offshore of a low density populated area Limited access to the platform - basis of design specifies that CHA shall be inaccessible to public Gates are provided that will prevent unauthorised access Closed circuit TV security cameras are provided to enable the onshore control room operators to monitor petroleum activities Appropriate warning notices/signage erected Remote well shut-down capability. | Low |
| CHA Spills: Diesel Spills | | | |



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Summary



| Aspects | Impacts | Management/Mitigation Measures | Residual Risk |
|---|--|---|---------------|
| UNPLANNED ACTIVITIES: | | | |
| Fuel Transfer | Water quality impacts Marine fauna impacts Shoreline Pollution Disruption to fishing activities | <p>OFFSHORE (PLATFORM & SUBSEA PRODUCTION PIPELINES)</p> <ul style="list-style-type: none"> • No hose bunkering activities from a vessel to CHA will be undertaken during HWU installation and well intervention activities. Fuel requirements will be satisfied via complete tank interchange. On CHA fuel will be bunkered by hose from the tank to the power units for daily consumption (within platform bunds); • CHA crane, rigging and lifting connections (designed, constructed and installed to appropriate standards and codes) are inspected and maintained fit-for-purpose; • Lifts will occur after pre-planning/JSEA, in favourable weather conditions and under a PTW. • Controls for refilling fuel tanks/IBCs on the back of vessels include: <ul style="list-style-type: none"> ◦ Refuelling hoses to be inspected prior to use with activity to be undertaken during stable weather conditions and under constant supervision; ◦ Deck drainage on vessel and ◦ Vessels have Shipboard Oil Pollution Emergency Plan (SOPEP) in place. | Medium |
| Diesel spill - Rupture of support vessel fuel tank (collision/grounding/loss of vessel) (by Third Party Vessel) | Water quality impacts Marine fauna impacts Shoreline Pollution Disruption to fishing activities | <p><u>For Third Party Vessels</u></p> <ul style="list-style-type: none"> • CHA Development not located within commercial shipping lanes but located in rock lobster fishing area • A 500m petroleum safety zone declared around CHA. Moored vessels for HWU activity located within the PSZ; • Navigation charts identify CHA Facilities • Notice to Mariners issued for HWU Activities; • Navigation lighting and continuous radar/radio monitoring during HWU activities; • SBV to ward off errant vessels; • Consultation/notification to fishing industry groups on activity - no fishing vessels within PSZ during HWU activity • Operation under an implemented Emergency Response/ OSCP. | Low |
| Diesel Spill - Third Party/Errant Vessel Collisions or Intra-field Vessel Collisions with | Water quality impacts Marine fauna impacts | <ul style="list-style-type: none"> • Rigorous Marine Contractor selection (i.e. suitably qualified and experienced); • Vessels maintained (navigation/communication systems, propulsion and steering); • Marine operations undertaken in fair weather only visible to all other vessels; | Low |



Cliff Head Project Operations Environment Plan
Summary



| Aspects | Impacts | Management/Mitigation Measures | Residual Risk |
|---|--|--|---------------|
| UNPLANNED ACTIVITIES: | | | |
| Loss of Supply Vessel | Shoreline Pollution Disruption to fishing activities | <p align="center">OFFSHORE (PLATFORM & SUBSEA PRODUCTION PIPELINES)</p> <ul style="list-style-type: none"> • Intra-field vessels to observe the OSV Code • Approved SIMOPS Plan • Dedicated transit routes to/from CHA to avoid reef areas and to reduce collision hazards • Vessel navigation and communication systems regularly maintained and tested. • Low-speed in PSZ • Mooring locations located to allow for drift away from CHA in the event of mooring failure | |
| Diesel spill - Rupture of support vessel fuel tank (collision/grounding/loss of vessel) (Intra-field) | Diesel fuel spill causing injury or death of marine fauna and pollution of coastal habitat | <p><u>For Intra-Field Vessels</u></p> <ul style="list-style-type: none"> • Rigorous Marine Contractor selection (i.e. suitably qualified and experienced); • Vessels maintained (navigation/communication systems, propulsion and steering); • Marine operations undertaken in fair weather only visible to all other vessels; • Intra-field vessels to observe the OSV Code • Approved SIMOPS Plan • Dedicated transit routes to/from CHA to avoid reef areas and to reduce collision hazards • Vessel navigation and communication systems regularly maintained and tested. • Low-speed in PSZ • Mooring locations located to allow for drift away from CHA in the event of mooring failure | Low |
| Leakage or Spillage from Support Vessel | Diesel fuel spill causing injury or death of marine fauna and pollution of coastal habitat | <ul style="list-style-type: none"> • Vessels refuelling done in port at Port Denison, Geraldton or Fremantle not offshore. • Fuel handling procedures are in place. • Leaks on board can be mopped up before spill to sea. • A SOPEP is in place with training and drills as part of vessel operations. Oil spill equipment is located on the vessel. | Low |
| CHA Spills: | | | |
| Chemical Spills | | | |



Cliff Head Project Operations Environment Plan
Summary



| Aspects | Impacts | Management/Mitigation Measures | Residual Risk |
|---|--|--|---------------|
| UNPLANNED ACTIVITIES: | | | |
| Chemicals may be spilt offshore | Spill may cause changes in plankton or benthic communities due to reduced water quality | <p align="center">OFFSHORE (PLATFORM & SUBSEA PRODUCTION PIPELINES)</p> <ul style="list-style-type: none"> Fuel stored in leak proof containers when not in use. Chemicals are handled and used in areas designed to prevent any discharge to the environment and will be handled with extreme care to prevent spillage MSDS kept on board for all chemicals and hazardous, and available for personnel review and use There are 3 chemical tanks CHA, these have a capacity of 190 L each (total capacity is 570L). Shutdown of the chemical injection pumps can be controlled from the control room (onshore) as well as on the platform | Low |
| Chemical Injection Process- damage to chemical umbilical from vessel anchors, cray pot snag | Chemical spill (corrosion and scale inhibitor) releases causing injury or death of marine fauna and pollution to coastal habitat | <ul style="list-style-type: none"> Personnel on vessels and platform trained in Emergency Response Plan and Oil Spill Contingency Plan (OSCP) procedures for an efficient initial response to a spill Inductions covering spill prevention, response, recovery and waste management for all relevant personnel Pipeline coated with weighted concrete to provide stability and protection Use of biocides and chemical inhibitors used in lowest effective concentrations Pressure monitoring will detect leaks immediately leading to auto shutdown minimising the volume lost Shutdown of chemical injection pumps controlled from the onshore control room as well as the platform | Low |
| CHA Spills: | | | |
| Work Over Spills | Spill may cause changes in plankton or benthic communities due to reduced water quality | <p align="center">Work Over & Produced Water Spills</p> <ul style="list-style-type: none"> The preferred disposal method of the brine (and other workover chemicals) is either reprocessing via the CHA production system for separation into the produced formation water (PFW) stream, injection into an offshore well, or collection in tanks for onshore disposal (i.e. no discharge to marine environment). The proposed work-over fluids are considered to be of low environmental hazard. The chemical additives, under the North Sea Offshore Chemical Notification Scheme (OCNS), have been assessed as Gold (low environmental hazard), PLONOR (pose little or no risk) and OCNS Groups E (low environmental hazard). Work-over fluid additives | Low |



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Summary



| Aspects | Impacts | Management/Mitigation Measures | Residual Risk |
|--|---|--|---------------|
| UNPLANNED ACTIVITIES: | | | |
| Produced Water Spills (6.5m ³ - pipeline or valve/flange leak on CHA) | Spill may cause changes in plankton or benthic communities due to reduced water quality | <p>are monitored and minimised where possible.</p> <ul style="list-style-type: none"> Work-over fluid releases will be minimised as far as possible and when they occur, the volume will be recorded. | |
| | | <p><u>CHA</u></p> <ul style="list-style-type: none"> Low pressure alarm in onshore control room; CCTV; and Shutdown capability from onshore control room to isolate the reinjection water feed to CHA in event of leak. <p><u>Pipeline</u></p> <ul style="list-style-type: none"> A heavy walled pipe (rated to the full well pressure possible for any production wells) carries the reinjected produced formation water. The pipeline is designed and tested in accordance with the relevant codes and standards for pipelines; A continuous corrosion control system has been put into place. This is accomplished by utilising electrical resistance probes that measure the rate of corrosion in the pipeline. The rate of corrosion will be continuously monitored and recorded. By utilising this data, the corrosion inhibitor dosage rate will be adjusted to effectively eliminate corrosion in the pipeline; The pipeline route is provided on marine charts; Standard maritime safety procedures for attendant vessels will be adopted. Low Level of marine traffic in vicinity of the pipeline; The capability to shutdown onshore reinjection water to CHA; Pipeline designed to withstand certain fishing vessel collisions & accommodate rock lobster fishermen; Monthly pipeline easement inspection (of the onshore pipeline route); and Low pressure alarm in onshore control room. | Low |



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Summary



| Aspects | Impacts | Management/Mitigation Measures | Residual Risk |
|--|---|---|---------------|
| Planned Activities: | | | |
| Pipeline Activities: | | | |
| Disturbance to Flora, Fauna & Soils | | | |
| Soil Disturbance | Soil Erosion Reduction of local biodiversity, loss of fauna habitat | <ul style="list-style-type: none"> Maintenance wherever practicable of the existing vegetation cover since this protects the mobile sands from being lifted and eroded by winds. A Rehabilitation Plan (Woodman Consulting, 2006) was prepared by Roc Oil 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. | Low |
| Pipeline access: disturbance to native vegetation and wildlife | Reduction of local biodiversity, loss of fauna habitat | <ul style="list-style-type: none"> No vehicle access permitted on pipeline easement in Beekeepers Reserve. Inspections undertaken by foot in areas without access via easements Revegetation with indigenous species (Refer: Rehabilitation Plan Woodman Environmental Consulting, 2006) In areas of poor vegetation cover, where further impacts are likely, appropriate corrective actions shall be taken Where possible, areas that have been recently revegetated should be avoided by vehicular machinery movements No disturbance to areas of native vegetation Revegetation success to be monitored in accordance with Rehabilitation Plan Further restoration works may be required in areas where vegetation establishment has been less than acceptable Access to easement will be via existing tracks Physical barriers (including revegetation) will be used to stop public 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 If area requiring earthworks is within a sensitive environment only weed free certified soil should be used Consult with DEC and DMP regarding disturbance to native vegetation and wildlife on a case by case basis | Low |



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Summary



| Aspects | Impacts | Management/Mitigation Measures | Residual Risk |
|--|--|--|---------------|
| UNPLANNED ACTIVITIES: | | | |
| OFFSHORE (PLATFORM & SUBSEA PRODUCTION PIPELINES) | | | |
| | | <ul style="list-style-type: none"> Easement rehabilitation to consist of local endemic species Access tracks should be kept navigable by adequately controlling vegetation growth Use of appropriate signage to deter third party access Regular monitoring to be undertaken along the easement to observe for erosion, sedimentation and associated environmental impacts If significant erosion is encountered, erosion and sediment control structures will be constructed | |
| Pipeline Access- Introduction of weeds or pathogens along easement | Reduced Rehabilitation success, loss of biodiversity and loss of habitat | <ul style="list-style-type: none"> Regular inspection, monitoring and auditing of the pipeline route includes an assessment of weed impacts. (Refer: Rehabilitation Plan – Woodman Environmental Consulting, 2006) The presence of noxious weeds will be reported to local authorities and their control conducted in conjunction with local authorities Maintenance crews made aware of weed control requirements 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 The pipeline corridor shall not be used for access into the Beekeepers Reserve Physical barriers to stop public access to pipeline easement | Low |
| Plant operations- Pest animal invasion | Loss of fauna diversity and abundance and loss of fauna habitat | <ul style="list-style-type: none"> Facilities kept clean and litter free to discourage vermin from being attracted to site Discourage weeds generally so as not to provide habitat for vermin | Low |
| Bushfire originating from maintenance activity | Loss of fauna, personnel or public third party damage | <ul style="list-style-type: none"> Compliance of all equipment with relevant fire safety standards Fire break will be maintained around the ASP outside the perimeter fence Vehicles and machinery not parked in areas of high fire risk (i.e. over tall grass or cleared vegetation debris) All operations and maintenance vehicles have a fire extinguisher, communications units and first aid kit Where flammable or combustible materials are required to be stored on site, | Low |



Cliff Head Project Operations Environment Plan
Summary



| Aspects | Impacts | Management/Mitigation Measures | Residual Risk |
|--|---|---|---------------|
| UNPLANNED ACTIVITIES: | | | |
| OFFSHORE (PLATFORM & SUBSEA PRODUCTION PIPELINES) | | | |
| Plant Operations- fire emanating from facilities | Bushfire, damage to vegetation and fauna, possible injury to personnel or public, possible third party damage | <p>appropriate fire prevention (e.g. spark guards for welding) and fire fighting equipment will be available on site.</p> <ul style="list-style-type: none"> • Incompatible chemicals will not be stored together • When undertaking hot work, the immediate area is clear of flammable materials • Consult with FESA regarding weather conditions, fire hazards, fire restrictions, notifications and permitting requirements prior to any maintenance “hot works” activities on easement • No fires for recreational purposes or rubbish disposal on the easement • Provide maps showing the location of all onshore project infrastructure to the relevant authorities (FESA, DMP, Shire of Irwin) • FESA and Roc Oil will be notified as soon as possible in the event of a fire outbreak that is outside the control of the operations or maintenance personnel <p>Smoke detection in equipment rooms</p> <ul style="list-style-type: none"> • Portable fire extinguishers • Pipeline operations and maintenance conducted in accordance with Fire Emergency Services Authority of WA (FESA) requirements including complying with relevant fire restrictions, notification requirements and permitting procedures • Ensure all equipment complies with relevant fire safety standards • Vehicles and machinery parked in designated areas • Regular vehicle checks to ensure that combustible materials such as grass and debris have not built up in critical areas where ignition could occur • All vehicles contain a fire extinguisher, satellite phone and first aid kit • 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 available on-site (e.g. fire extinguishers, water knapsacks and rake hoes) is available • Incompatible chemicals not stored together • When undertaking hot work, ensure the immediate area is clear of flammable materials • Create and maintain fire breaks around the ASP outside perimeter fence | Low |



Cliff Head Project Operations Environment Plan
Summary



| Aspects | Impacts | Management/Mitigation Measures | Residual Risk |
|--|---|--|---------------|
| UNPLANNED ACTIVITIES: | | | |
| OFFSHORE (PLATFORM & SUBSEA PRODUCTION PIPELINES) | | | |
| | | <ul style="list-style-type: none"> • Consult with FESA regarding weather conditions, fire hazards, fire restrictions, notification and permitting requirements prior to any maintenance hot works • Do not light fires for recreational or rubbish disposal • 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) • 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 • Evacuate any site subject to fire that cannot be immediately extinguished • Notify FESA and Roc Oil as soon as possible in the event of an outbreak that is outside the control of site personnel • Power generator enclosure equipped with fire and gas detection and fire suppression systems • A flare system is provided for safe disposal of flash gas and emergency release. Vegetation cleared from flare area for a 50m radius • In the event of fire, a fire water pond is available to provide water for local fire crews hydrants • In addition, 2 plastic fire water storage tanks will be available each containing 46,000 L capacity • A fire water booster pump (stand-alone diesel unit) and fire water distribution system (3 hydrants) is available • All plant instrumentation and control systems will be contained in air-conditioned rooms to reduce the risk of over-heating in summer | |
| ASP Operations | | | |
| Plant operations - excessive noise emissions | Disturbance to fauna & surrounding neighbours | <p style="text-align: center;">Noise</p> <ul style="list-style-type: none"> • Generators are housed in specially designed acoustic enclosures which reduce the noise emissions • Generators are fitted with exhaust silencers • ASP has been designed to produce noise levels in the order of 85 dB (A) at 1m from | Low |



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Summary



| Aspects | Impacts | Management/Mitigation Measures | Residual Risk |
|---|---|--|---------------|
| UNPLANNED ACTIVITIES: | | | |
| OFFSHORE (PLATFORM & SUBSEA PRODUCTION PIPELINES) | | | |
| the noise source and approximately 62dB (A) at the nearest sensitive receptor. | | | |
| ASP Operations | | | |
| Air Emissions | | | |
| Gas emissions from maintenance vehicles | Short term impacts to local air quality | <ul style="list-style-type: none"> Gas emission from maintenance vehicles are minor All maintenance vehicles are equipped with appropriate pollution devices e.g. mufflers | Low |
| Plant operations- air pollution from equipment (generators, flare) | Short term impact to local air quality | <ul style="list-style-type: none"> Regular maintenance of vehicles and power generations equipment to minimise emissions Monitoring of fuel and flare rates | Low |
| ASP Operations | | | |
| Waste Management | | | |
| Plant operations- Handling and transport of hazardous materials that may result in spillage | Pollution of the environment that could affect flora, fauna and humans | <ul style="list-style-type: none"> Chemicals stored in leak proof area during transit Transfer of chemicals not undertaken during extreme weather conditions Chemicals handled with extreme care to prevent spillage MSDS's on site for all chemicals and hazardous goods, and available for personnel use and review | 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 | <ul style="list-style-type: none"> All produced water is injected into the CHA reservoir Tanks are contained in fully bunded and sealed areas Handling procedures adopted which aim to avoid spills to land or water Appropriate spill response equipment for containment and recovery available on site Detailed spill response procedures are detailed in OSCP Workforce training conducted in chemical handling, spill response and recovery procedures | Low |
| Plant operations- waste management | Contamination of soil and water, damage to flora and fauna, | <ul style="list-style-type: none"> MSDS's available to personnel which identify hazardous materials and their safe handling, storage and disposal | Low |



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Summary



| Aspects | Impacts | Management/Mitigation Measures | Residual Risk |
|--|---------------------------------------|---|-------------------|
| <p>UNPLANNED ACTIVITIES:</p> | <p>reduction in visual amenity</p> | <p>OFFSHORE (PLATFORM & SUBSEA PRODUCTION PIPELINES)</p> <ul style="list-style-type: none"> • Personnel trained in the safe handling, storage and disposal of all wastes streams • Wastes created by personnel conducting operations or maintenance activities at the ASP and along the easement will have a carry-in/carry-out policy • Hazardous wastes managed in compliance with relevant regulatory requirements including: <ul style="list-style-type: none"> - Safe storage (in accordance with AS 1940 Storage and Handling of Combustible and Flammable Liquids) prior to collection and transport off-site for reuse, recycling, treatment or disposal at approved locations - Storage areas designed to prevent contamination of soil and water and adequately contain any spills - Spill response equipment stored in the vicinity of storage facilities, where immediate access is unhindered - Spillages immediately contained and cleaned up - Contaminated soils managed according to the concentration of contaminants and leachability. • Vehicles, plant and equipment are checked and operating correctly, including identification and rectification of any leaks • Non-prescribed wastes managed in accordance with the policy of avoid, reduce, reuse and recycle • Reusable and recyclable wastes such as timber skids, pallets, drums and scrap metal stockpiled for salvage • Designated collection bins at work sites for aluminium cans, glass and paper recycling • Sewage and sullage will be via approved septic systems and disposed to municipal sewage treatment plant • ASP maintained to an orderly and hygienic standard | <p>Low</p> |
| <p>Onshore drainage system operation</p> | <p>Pollution to local environment</p> | <ul style="list-style-type: none"> • Local containment bunds (concrete slab and a collection sump) • Processes to control of Water Discharge from Process Bund Areas 10/HSEQ/ENV/PC01 and Storm and Ground Water Management 10/HSEQ/ENV/PC05 • All the oily waste fluids are educted and removed to the Tanker Loading Oil | <p>Low</p> |



Cliff Head Project Operations Environment Plan
Summary



| Aspects | Impacts | Management/Mitigation Measures | Residual Risk |
|------------------------------|---------|--|---------------|
| UNPLANNED ACTIVITIES: | | | |
| | | OFFSHORE (PLATFORM & SUBSEA PRODUCTION PIPELINES) | |
| | | 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. | |

| Aspects | Impacts | Management/Mitigation Measures | Residual Risk |
|-----------------------------------|--|---|---------------|
| UNPLANNED ACTIVITIES: | | | |
| ASP Spills: | | | |
| Transfer of crude oil via tanker | Pollution to local environment | <ul style="list-style-type: none"> The ASP Load-out Work Instruction (10/OPPPSPC/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 All oily waste liquid is recovered from the process bunds and returned to the process or removed and disposed offsite A weather shelter located over the loading equipment minimises impact of weather Road tanker filling control system and auto shut-off Road tanker contractor selection Collection pit installed to contain spills CCTV cameras used to monitor the tanker loading operations Tanker loading bay designed to contain potential spills within concrete pad and collection drains and sump Onshore OSCP available to deal with spills | Low |
| Failure of Crude Oil Storage tank | Oil spill causing injury or death of flora and fauna and | <ul style="list-style-type: none"> All released hydrocarbons and dirty water is collected and all oily waste liquid recovered from the process bunds and returned to the process | Low |



Cliff Head Project Operations Environment Plan
Summary



| Aspects | Impacts | Management/Mitigation Measures | Residual Risk |
|--|---|--|---------------|
| UNPLANNED ACTIVITIES: | | | |
| Failure of pipeline (oil spill) | contamination of environment Oil spill causing injury or death of flora and fauna and contamination of environment | <p>Onshore (ASP Processing Plant & Production Pipelines)</p> <ul style="list-style-type: none"> • The storage tank is fully banded and contained in a sealed area • Regular tank inspection program • The plant is illuminated 24hrs/day • Continuous corrosion control and monitoring program minimises the risk of leaks in piping and flanges (includes pipeline pigging) • Routine inspections undertaken to measure rate of corrosion in the pipeline • Use of corrosion inhibitor with the rate adjusted to effectively eliminate corrosion in the pipeline • All relevant personnel undergo a corrosion awareness training program • Reduced number of flanges, valves and connection points (leak locations) • Heavy walled pipe • Absorption materials on site for clean-up of spills • Onshore OSCP available to deal with spills • Personnel trained in Emergency Response Plan and Oil Spill Contingency Plan (OSCP) procedures for efficient first response • All oil spill equipment maintained to ensure it is functional and accessible • Inductions covering oil spill prevention, response, recovery, and waste management for all relevant personnel • 24hr observation via control room | Low |
| ASP Spills: | | | |
| Plant Operations- Chemical Injection process failing causing chemical spill from storage tank or pump failure | Pollution to environment | <p>Chemical & Produced Water Spills</p> <ul style="list-style-type: none"> • Tanks are contained with fully banded and sealed areas • Chemical injection package located onshore to enable more frequent monitoring and maintenance • Pumps status is monitored continuously • The minimum practicable volume of chemicals is stored on-site • MSDS available on-site where chemicals are stored and handled • Chemicals are not stored or handled in the vicinity of water storage areas | Low |



Cliff Head Project Operations Environment Plan
Summary



| Aspects | Impacts | Management/Mitigation Measures | Residual Risk |
|---|---|---|---------------|
| UNPLANNED ACTIVITIES: | | | |
| Onshore (ASP Processing Plant & Production Pipelines) | | | |
| Produced Formation Water Spills (valve or pump leak) | Pollution to environment tie soils, groundwater, vegetation | <ul style="list-style-type: none"> • Appropriate handling procedures adopted which avoid spills to land and water • Appropriate spill response equipment, including containment and recovery equipment available on site • Onshore OSCP available to deal with spills • Workforce training in chemical handling and spill response and recovery procedures | |
| | | <ul style="list-style-type: none"> • Major vessels onsite (Production Separator, IGF, Tanks) are contained within separate bunded areas • Bunds are graded towards one corner where a normally-closed bund valve is provided for the discharge of clean storm-water to the nearest soak pit • Routine surveillance of onshore facilities (note that plant is permanently manned) • Inductions to all personnel, contractors and visitors covering PFW management. • The onshore pipeline is inspected on a monthly basis as per the Pipeline Inspection Procedure (10/HSEQ/GEN/PC36). Additionally, onshore there is a 'corrosion monitoring trench' for the reinjection water line. | Low |