



AC/L7 and AC/L8

Montara Development

**Production and Exploration Drilling
Environment Plan - Summary**

***Petroleum (Submerged Lands) (Management of
Environment) Regulations 1999 (Cth)***



1 PURPOSE AND SCOPE

This is a summary of the Environment Plan for Montara development and exploration drilling in AC/L7 and AC/L8 (“EP”) which has been prepared by PTTEP Australasia (Ashmore Cartier) Pty Ltd (hereafter referred to as “PTTEPAA”) in accordance with Regulation 11(7) of the *Petroleum (Submerged Lands) Management of Environment Regulations 1999*.

PTTEPAA proposes to drill a number of hydrocarbon production and exploration wells in the area of the AC/L7 and AC/L8 production licences, located in the East Timor Sea, Australia. AC/L7 production Licence Area and the AC/L8 production Licence Area are referred to individually as Licence Area AC/L7 and Licence Area AC/L8 and collectively as the Licence Areas. The scope of the EP covers the environmental risks and impact associated with the drilling and completion operations for the Montara Development. .

The technical aspects of the proposed drilling operations are very similar to previous wells drilled in nearby fields. The assessment of the environmental effects of drilling and completion operations in the Licence Areas is based on experience gained during the drilling of those previous wells, reviews of the natural history and geological features of the area, and the direct experience of the environmental consultants and PTTEPAA gained during previous drilling programs in the Timor Sea and in the course of production activities at the nearby Challis and Jabiru fields.

2 DESCRIPTION OF THE ACTION

The activity covered by this EP is the Montara Development drilling and completion operations in respect of wells at the Montara, Skua, Swift and Swallow fields, as well as the drilling of two exploration wells in the AC/L8 Licence Area. The following wells are proposed:

- *Montara Field (Licence Area AC/L7)*

Phase 1: Two production wells (Montara H1 and Montara H4) and one gas injection well (Montara GI) are proposed.

Phase 2: Two production wells (Montara H2 and Montara H3) are proposed.

These production wells will be drilled and completed through a wellhead platform (“WHP”) which will be installed in Licence Area AC/L7. In addition, the WHP is being constructed with one spare slot as a contingency for a future well.

- *Skua Field (Licence Area AC/L8)*

Phase 1: Two subsea production wells are proposed be drilled and completed at the Skua field (Skua 10 and Skua 11). The wellheads will incorporate annulus valving for gas lifting.

- *Swift and Swallow Fields (Licence Area AC/L8)*

Phase 1: Two existing cased and suspended wells located at the Swift and Swallow fields (Swift North-1ST1 and Swallow-1) will be completed.

Phase 2: An additional production well may be drilled and completed in the Swift field.

- *Exploration (Licence Area AC/L8)*



Phase 1: Two exploration wells (Sea Eagle-1 and Spruce-1) will be drilled in Licence Area AC/L8.

The drilling and completion operations for each well will be carried out using a jack-up type mobile offshore drilling unit ("MODU"). .

3 LOCATION AND TIMING

The Montara field is located in Commonwealth waters within Licence Area AC/L7 in the Timor Sea, approximately 200km offshore from the Australian mainland and 60 km south of the existing Challis oilfield. The Skua, Swift and Swallow fields are located in Licence Area AC/L8, which lies approximately 700 km west of Darwin (Figure 3.1). Skua and Swift (includes Swallow) are located approximately 23 km and 17 km respectively to the north-northwest of the Montara field (Figure 3.1). The proposed locations of the Sea Eagle-1 and Spruce-1 exploration wells are in the near vicinity of the Swift and Swallow fields (Figure 3.1).

Table 3.1 below provides the co-ordinates for the drilling and completion operations for the Montara Development.

Table 3.1 - Proposed Exploration Well Co-ordinates (GDA 94, Zone51)

Well Name	Latitude	Longitude
Well Head Platform (Montara)	8598603	667183
Swift North 1 (completion of existing cased and suspended well)	8614953	658563
Swallow 1 (completion of existing cased and suspended well)	8613134	656840
Skua 10	8617602	654108
Skua 11	8617602	654103
Sea-Eagle-1	8612651	657162
Spuce-1	8617252	658449

The drilling programme is scheduled to commence in the fourth quarter of 2007 with the drilling of the Sea Eagle-1 exploration well using the jack-up MODU Wilcraft. All subsequent wells in the programme will be drilled with the West Atlas jack-up MODU, commencing in approximately January 2008. The drilling of the new production wells (Montara, Skua and Swift) is expected to take up to 40 to 50 days to complete each well; the exploration wells and the completion of the existing wells may be completed in slightly shorter time frames.

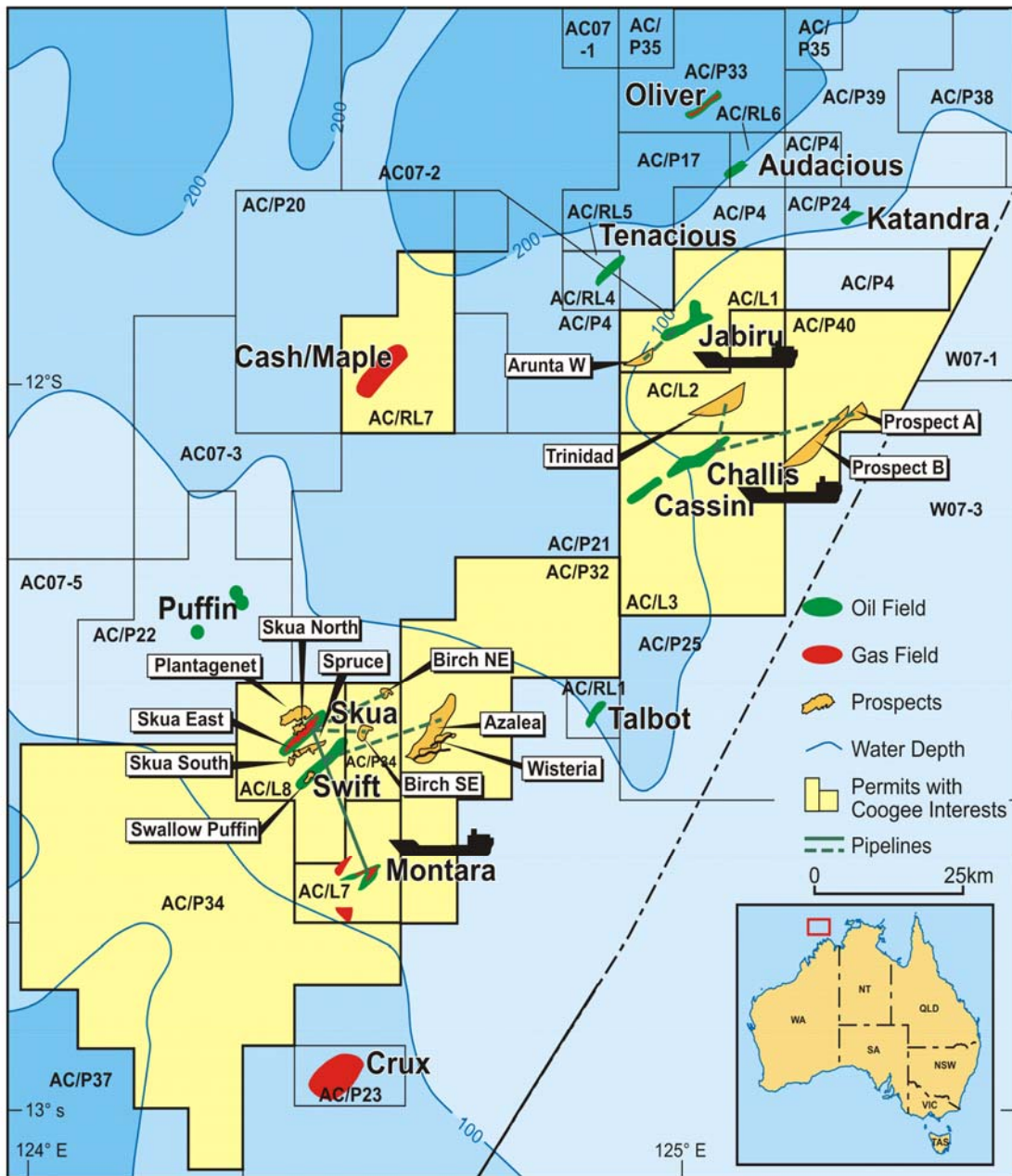


Figure 3.1- Map showing Oil and Gas Fields of Timor Sea and Location of Licence Areas AC/L7 and AC/L8



4 DESCRIPTION OF THE ENVIRONMENT

The Montara, Skua, Swift and Swallow fields are situated in the tropics and experiences a monsoonal climate with two predominant seasons: a summer wet season (October - April) and a winter dry season (May - September). These are referred to as the northwest and south east monsoons, respectively. During the north west monsoon (wet season), prevailing winds are typically from the west and north west and during the south east monsoon (dry season), winds are from the east and south east.

4.1 Flora and Fauna

4.1.1 Benthic and Epibenthic

Across the northern continental shelf, the predominant animals living within sea floor sediments are polychaetes (burrowing worms) and crustaceans (prawns, shrimps, crabs etc). Other species located in the area, in lower abundance include echinoderms (sea stars, sea urchins, feather stars etc) molluscs (both gastropods and bivalves), nemertean (ribbon worms), sponges and fish.

In the Licence Areas, the epibenthic communities are generally depauperate (low in fauna abundance and diversity) due to the depth of water. There are few species in the area due to the lack of sea floor topography, however there are sponges, gorgonians (sea whips and sea fans), ascidians (sea squirts), echinoderms, crustaceans, bryozoans (lace coral), and soft corals.

4.1.2 Marine Reptiles

A number of species of sea snake and sea turtle are expected to pass through the Licence Areas during their migrations. The open oceanic conditions of the Licence Areas means that there are no features such as feeding or breeding grounds that will result in concentrations of these species. Five species of turtle are known to inhabit areas of the Timor Sea are the Flatback (*Natator depressus*), Green (*Chelonia mydas*), Hawksbill (*Eretmochelys imbricate*), Loggerhead (*Caretta caretta*) and Olive Ridley (*Lepidochelys olivacea*).

4.1.3 Marine Mammals

There are no features such as feeding or breeding grounds that will cause marine mammals to concentrate in the Licence Areas. Identified marine mammal species tend to move singly or in small pods and do not aggregate. Winter and spring-time calving grounds for humpback whales (*Megaptera novaeangliae*) have been identified in Camden Sound, near the Kimberley coast approximately 200 km to the south of the Montara field location.

4.1.4 Seabirds

Numerous species of birds frequent the Timor Sea or over fly it on annual migrations. Seabird feeding grounds, roosting and nesting areas are found on the offshore atolls, particularly Ashmore Reef. Many of these species are listed under JAMBA and CAMBA and it is expected that some individuals of these species would pass through the Licence Areas during their annual migrations and may form temporary feeding aggregations, subject to availability of food.

4.2 Endangered and Vulnerable Species

Although there are no known environmentally sensitive areas within the Licence Areas, the Timor Sea is a Commonwealth marine area through which a number of both listed and migratory species pass.

There are ten species of marine organisms are listed as endangered under the EPBC Act. Four of these species are known to occur in the Timor Sea and may pass through the Licence Areas. A further eight species, listed as vulnerable under the EPBC Act may also occur in this region (sometimes only during specific periods such as when calving or nesting). Endangered marine species that occur in the Timor Sea are the Loggerhead Turtle (*Caretta caretta*), Pacific Ridley Turtle (*Lepidochelys olivacea*), Abbott's Booby (*Sula abbotti*) and the Blue Whale (*Balaenoptera musculus*). Vulnerable marine species that occur in the Timor Sea are the Green Turtle (*Chelonia*



mydas), Hawksbill Turtle (*Eretmochelys imbricata*), Flatback Turtle (*Natator depressus*), Lesser Noddy (*Anous tenuirostris melanops*), Christmas Island Frigatebird (*Fregata andrewsi*), Humpback Whale (*Megaptera novaeangliae*), Leatherback Turtle (*Dermochelys coriacea*) and the Whale Shark (*Rhincodon typus*).

Some of these organisms may migrate through, or forage in, the Licence Areas, however it is unlikely that any of these species have been affected by the existing operations within the Timor Sea.

4.3 Areas of Environmental Significance

There are no known areas of environmental significance in the vicinity of the Licence Areas. There are no World Heritage properties, Ramsar Wetlands or Commonwealth Lands in the Licence Areas.

5 ENVIRONMENTAL RISKS AND EFFECTS

The potential environmental effects of the drilling operations include:

- Physical effects to marine ecological communities and habitat;
- Disruption to marine fauna activities;
- Drilling cuttings discharges;
- Chemical discharges; and
- Hydrocarbon spillages.

A risk assessment was undertaken to identify the main environmental risks associated with the drilling and completion operations within the Licence Areas. The identification of potential risks has been based on generic risks, previous risk assessments conducted by PTTEPAA for previous drilling operations in the Timor Sea and the design risk assessment undertaken at well design stage.

The environmental risk assessment of the drilling and completion activities proposed for the development of the Montara, Skua, Swift and Swallow fields and associated exploration identified no activities assessed as potentially presenting a 'high' residual risk. This reflects the temporary and low impact nature of the activities and the application of appropriate mitigation measures. For clarity, only residual risk levels are presented, which is the level associated with an activity after any safeguard or mitigation measures have been taken into consideration.

The conclusions of this environmental risk assessment are as follows:

- Normal drilling operations in open waters, including the discharge of routine wastes in accordance with standard oil industry practice and legislative requirements, will have minimal impact on the environment;
- The drilling programme is most unlikely to have significant adverse ecological effect due to the low risk of activities, the distance to sensitive habitats, low intensity of social or economic use, and the low abundance and sparsely distributed flora and fauna within the depauperate marine biological communities on the seafloor of the Licence Areas;
- Use of low toxicity, rapidly biodegradable, water based drilling fluids ensures that minimal impact will be experienced from drilling discharges on the marine environment. Low volumes of discharged sewage and the implementation of a comprehensive waste management programme will result in no significant impact by waste disposal;
- The probability of an accidental oil spill occurring is recognised as being extremely small, given the Australian oil and gas industry's record to date, and the technology and practices available to minimise such risk. Despite this, oil spills remain the principal environmental concern associated with offshore drilling. However, the likelihood of adverse ecological effects from a spill is low because weathering of any spilled oil



will be rapid in the warm, tropical waters of the Licence Areas. Modelling of spill trajectories for well locations and period show that impact on sensitive areas is most unlikely.

6 SUMMARY OF MANAGEMENT APPROACH

PTTEPAA is committed to proactive management of its environmental responsibilities. This commitment extends to all aspects of its activities including seismic acquisition, drilling, construction, production, logistics support and onshore management support.

PTTEPAA's environmental management strategies and procedures that will be in place for the proposed drilling and completion program include the specific systems, procedures and practices which are used to ensure that the environmental impacts and risks of the drilling operations are reduced to as low as reasonably practicable and that the environmental performance objectives are met. The elements of the implementation strategy include roles and responsibilities of personnel, training and awareness of personnel in environmental management roles and responsibilities, reporting framework, mitigation and emergency response arrangements and compliance monitoring and auditing procedures.

Table 6.1 identifies the performance objectives and commitments that are to be implemented for the Montara Development drilling and completion programs and exploration drilling programs.

Table 6.1 Summary of Environmental Objectives and Criteria

Activity	Performance Objective	Measurement Criteria
MODU Position		
	Minimise collision risk by avoiding interference with commercial fishing and shipping vessels	<ul style="list-style-type: none"> • MODU logs of Position Reports show notification to AMSA of MODU locations and navigation markings. • MODU maintenance system verifies navigation lights operable. • MODU logs show visual, radar and radio watch and 500 m exclusion zone enforced.
Drilling Program		
(A) Waste Disposal	Maximise recovery of drilling fluid from cuttings before discharge to avoid and minimise mortality of sensitive marine fauna	<ul style="list-style-type: none"> • MODU logs shows shale shaker and solids control equipment is tested and operational to design specifications during drilling programme. • Daily Reports of drilling operations show performance of shale shaker is monitored by PTTEPAA Drilling Supervisor. • MODU log records show drilling mud volume re-used.
	Minimise adverse impacts of disposal of drilling fluid to avoid and minimise mortality of sensitive marine fauna	<ul style="list-style-type: none"> • Well programs demonstrate well casing design/placement will not release water based mud to the marine environment. • Well programs show water based mud with low ecotoxicity and high biodegradability selected for hole sections where technically feasible. • Adherence to the well programs will be monitored by the PTTEPAA Drilling Supervisor and recorded in the Daily Report of drilling operations. • MODU logs show an auditable record of volume of drilling fluids discharged overboard is maintained.



Activity	Performance Objective	Measurement Criteria
	Minimise potential for oil contamination of the sea from MODU and support vessel deck drainage discharge	<ul style="list-style-type: none"> • Audit to confirm that deck drainage does flow to the MODU's oil/water separation device that is regularly checked for functionality. Audit to confirm machinery space drainage flows to MODU's slops tank and shipment of waste oils to shore. MODU oil record book contains auditable record of oil content of discharge stream and separation system testing. • MODU logs confirm there is monitoring of the sea visually to confirm lack of visible sheen.
	Minimise potential for unaesthetic discharge of domestic wastewater and food scraps	<ul style="list-style-type: none"> • Domestic wastewater treatment apparatus to be tested and checked to be operating according to design specifications during drilling programme. • MODU waste logs show compliance with P(SL)A Schedule and MARPOL Convention and MODU Waste Management Procedures. Audit of waste logs show sewage is treated onboard MODU prior to discharge and provides an estimate of volumes of domestic greywater, sewage and putrescible food wastes discharged to the ocean.
	No solid or hazardous wastes to be discharged overboard from MODU	<ul style="list-style-type: none"> • MODU waste logs show compliance with P(SL)A Schedule of Specific Requirements and MARPOL Convention and MODU Waste Management Procedures • Records in auditable waste register (recording type and amount) show no solid and hazardous waste disposed of overboard and all solid and hazardous waste materials is stored appropriately and transported to shore.
(B) Spillage minimisation	Minimise risk of fuel spill during refuelling	<ul style="list-style-type: none"> • Audit to confirm fuel transfer hoses are fitted with "dry break" couplings. • Audit to confirm that all fuel transfers are visually monitored by MODU master and supply vessel master. • Incident reporting records show that any spillages were recorded on MODU Notice of Incident Report and reported to PTTEPAA and that hydrocarbon spills >80 litres were reported to the Designated Authority (NTDRDPIFR).
	Minimise risk of oil spillage during well testing or clean up	<ul style="list-style-type: none"> • Confirm that approval to conduct production test has been received from NTDRDPIFR prior to test proceeding. • The efficient operation of the test equipment will be monitored by the PTTEPAA Drilling Supervisor during the test. • Daily Report of drilling operations records that any overboard discharge of produced formation water complies with petroleum content limit of 30mg/l over 24 hour period required by <i>Petroleum (Submerged Lands) Management of Environment Regulations 1999</i> reg. 29(1). Audit to confirm that records of discharges of produced formation water are submitted to NTDRDPIFR at end of drilling programme. • Incident reporting records show that any spillages



Activity	Performance Objective	Measurement Criteria
		reported on a Notification of Incident Report and that: <ul style="list-style-type: none"> • Hydrocarbon spills >80 litres are reported to NTDRDPIFR; and • discharges of produced formation water exceeding permitted petroleum content are reported to NTDRDPIFR.
	Minimise risk of major oil spill through loss of well control	<ul style="list-style-type: none"> • MODU logs confirm that the BOP and well control mechanisms have been tested and found operational prior to spudding in. • MODU Safety Case safety management system contains well control procedures and confirms training/accreditation of drillers • Incident reporting records show that any spillages reported on a Notification of Incident Report and that hydrocarbon spills >80 litres are reported to NTDRDPIFR
	Minimise potential for adverse environmental effects arising from major oil spill through loss of well control, oil spill during testing or accidental fuel spillage	<ul style="list-style-type: none"> • Emergency response logs record Emergency Response Plan and Oil Spill Contingency Plan implementation including oil spill response actions and monitoring of sea at well location and dispersal of spill until completely dissipated. • Incident reporting records show that Incident reporting records show that any spillages reported on a Notification of Incident Report and reportable incidents notified to NTDRDPIFR.
(C) Atmospheric emissions	Minimise atmospheric emission arising from power generation and well clean-up or testing	<ul style="list-style-type: none"> • MODU logs and Offshore Support Vessel logs show an auditable record of volume of diesel fuel used and calculated gaseous emissions from power generation in order to assess optimum fuel efficiency is being achieved in MODU power generation. • MODU logs and Daily Report of drilling operations show an auditable record of emissions resulting from well testing is maintained in order to assess optimisation of flare burning.

7 CONSULTATIONS

The Commonwealth Department of Environment, Water Resources Heritage and the Arts and the Northern Territory Department of Regional Development Primary Industry Fisheries and Resources have been consulted regarding this proposed drilling activity in AC/L7 and AC/L8. In recognition of the importance of early consultation with the commercial fishing industry, PTTEPAA will liaise with the Australian Fishery Management Authority (AFMA) and the Western Australian Department of Fisheries to make them aware of the drilling and completion operations.

Commercial fishermen and other potential users of the marine area will be advised of the MODU and OSV locations through the daily AUSREP reports and AUSCOAST coastal warnings, issued via radio, fax and telex.

Given the remote location of the Licence Areas, the scale and nature of the proposed activities and the distance from sensitive environmental features, no further consultation was considered necessary.



Title: **Environmental Plan Summary – Montara Development
AC/L7 and AC/L8 Production and Exploration Drilling
Environment Plan**

8 CONTACT DETAILS

For further information about the drilling activities with Licence Area AC/L7 and AC/L8, please contact:

Andy Jacob

Chief Operating Officer

PTTEP Australasia (Ashmore Cartier) Pty Ltd

(08) 9483 9483

andy.jacob@au.pttep.com