timor leste

TERMS OF REFERENCE EXPLORATION DRILLING IN TIMOR LESTE EXCLUSIVE AREA: PSC S06-03

TL-HSE-RP-005

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Document Title

Terms of Reference: Exploration Drilling In Timor Leste Exclusive Area: PSC S06-03

Abstract:

These Terms of Reference describe the proposed drilling of a petroleum exploration well, the receiving environment, the potential effects to the environment and the measures used to minimise or avoid these effects. The Terms of Reference have been prepared for submission to the Direcção Nacional do Meio Ambiente (DNMA) as the designated authority, as required under the *Government Regulation No. 51/1993 on Environmental Impact Assessment (Regulation 51/1993)*.

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ABBREVIATIONS

BOP	Blow-out preventer
DNMA	Direcção Nacional do Meio Ambiente
EIA	Environmental Impact Assessment
EIS	Environmental Impact Statement
EMP	Environmental Management Plan and Monitoring Program
Eni	Eni Timor Leste S.p.A.
ERP	Emergency Response Plan
HSE	Health, Safety and Environment
JPDA	Joint Petroleum Development Area
KCl	Potassium Chloride
OSRM	Oil Spill Response Manual
PHG	Prehydrated gel
PHPA	Partially-hydrolyzed polyacramide
PSC	Production Sharing Contract
ROV	Remotely Operated Vessel
WBM	Water based drilling fluids/muds

1. INTRODUCTION

1.1 BACKGROUND

Eni Timor Leste S.p.A. (Eni) has Production Sharing Contracts (PSC) with the Timor-Leste Government over five permit areas in the Timor-Leste Exclusive Area (TLEA). As part of the PSC for permit area S06-03, Eni committed to undertake petroleum exploration activities including seismic surveys and drilling within a specified time frame. Seismic surveys were carried out in 2007 and 2008, and a number of oil and gas prospects were identified. Eni now proposes a program of exploration drilling in Permit Area S06-03 (see Figure 2.2), to better define oil and gas reserves in the area.

Drilling is scheduled to begin in October 2010 at the Cova well. An environmental impact assessment (EIA) process for this single drilling activity has already commenced, with the Terms of Reference submitted in February 2010, and an environmental impact statement (EIS) submitted in April 2010.

At least one additional exploration well, and up to three more depending on drilling results, is now proposed as an extension to the exploration program for permit area S06-03. Drilling of the second well is proposed to begin in November 2010, using the same drillship used for Cova (the *Saipem 10000*). Any additional wells may be drilled straight after, or at a later stage (up to the end of the PSC agreement in 2013), using the *Saipem 10000*.

The exact location for the second well is currently under investigation, and will be selected from one of three prospects identified in seismic surveys (Lupal, Leolima or Manapa; see Figure 2.2). The location of any additional wells would depend on the results of these initial drilling investigations.

This document presents the Terms of Reference for assessing the environmental impacts of the extended exploration drilling program. The document has been prepared to provide details on the activities, identify the environmental issues and their significance, and agree on the scope, direction and content of the EIA. In reviewing this it should be noted that the environmental impacts, mitigation and management controls are very similar to those used for the Cova well. This document is therefore based on the Terms of Reference submitted for the Cova well.

1.2 THE PROPONENT

Eni Timor Leste S.p.A. (Eni) proposes to conduct exploration drilling within Timor Leste waters. The drilling program would be located within Permit Area S06-03, which is regulated by the national Autoridade Nacional do Petróleo (ANP) under a Production Sharing Contract (PSC) between Eni and the government of Timor Leste. Environmental approval of petroleum exploration and production proposals in Timor Leste is regulated by the Direcção Nacional do Meio Ambiente (DNMA).

Eni is one of the world's major integrated energy companies. In the Timor Sea, Eni has activities in the Joint Petroleum Development Area (JPDA) as well as five PSCs in Timor Leste's sovereign area. Eni is committed to achieving the highest practicable standard of environmental protection and this commitment is documented in the Eni Health, Safety and Environment (HSE) Policy (Appendix A).

In January 2008, Eni's HSE Integrated Management System achieved certification with ISO 14001:2004 Environmental Management Systems for its drilling and seismic survey activities. This certification provides audited assurance of a best-practice environmental management system based on continual improvement.

1.3 PURPOSE OF THE TERMS OF REFERENCE

DNMA is the designated authority for the environmental assessment of petroleum proposals in Timor Leste sovereign waters. According to *Government Regulation No. 51/1993 on Environmental Impact Assessment* (Regulation 51/1993), all petroleum exploration and production proposals are "Type A" proposals and therefore require an Environmental Impact Assessment (EIA). By inference, all seismic surveys and exploration drilling programs are "Type A" proposals.

Under the Timor Leste constitution, Indonesian laws which were in effect on 25 October 1999 are applicable in matters where there is an absence of comparable Timor Leste laws. As such, the Indonesian *Regulation 51/1993* defines the process and requirements for conducting environmental impact assessment (EIA) in Timor Leste. According to Article 2 of *Regulation 51/1993*, significant impacts on the "environment" also include impacts to the social and cultural environment. Thus, the process for conducting EIA in Timor Leste is interpreted in this report to include both the biophysical and social aspects of the environment in which the project is situated.

Documentation to be prepared, as a result of the EIA process, includes this document, the Terms of Reference, the Environmental Impact Statement (EIS), and a combined Environmental Management Plan and Monitoring Program (EMP).

The objective of this Terms of Reference document is to provide sufficient detail for DNMA to understand the proposal, confirm the environmental issues and their significance and agree on the scope, direction and content of the EIA.

2. OVERVIEW OF PROJECT

2.1 FIELD LOCATION

The exploration drilling program will be located in permit area PSC S06-03. Prospect areas identified by Eni's seismic surveys and studies of the area include Cova, Lupal, Leolima and Manapa (see Figure 2.2). (Note that the Cova-1 well is the subject of a separate environmental assessment process that is already underway.)

The project area is situated in the northern Bonaparte Basin in the Timor Leste Exclusive Area. It is located approximately 100km from the southeast coast of Timor Leste, approximately 125km south of Dili and approximately 725km northwest of Darwin.

2.2 PROPOSED DRILLING PROGRAM

The proposed well will be drilled between November 2010 and February 2011, as a vertical exploration well. Drilling will be undertaken using the drillship, *Saipem 10000* (Figure 2.1). The specifications of the *Saipem 10000* are presented in Appendix B. On arrival at site, the drillship will move into position and remain in position using the Class III Dynamic Positioning system.

Figure 2.1: Saipem 10000

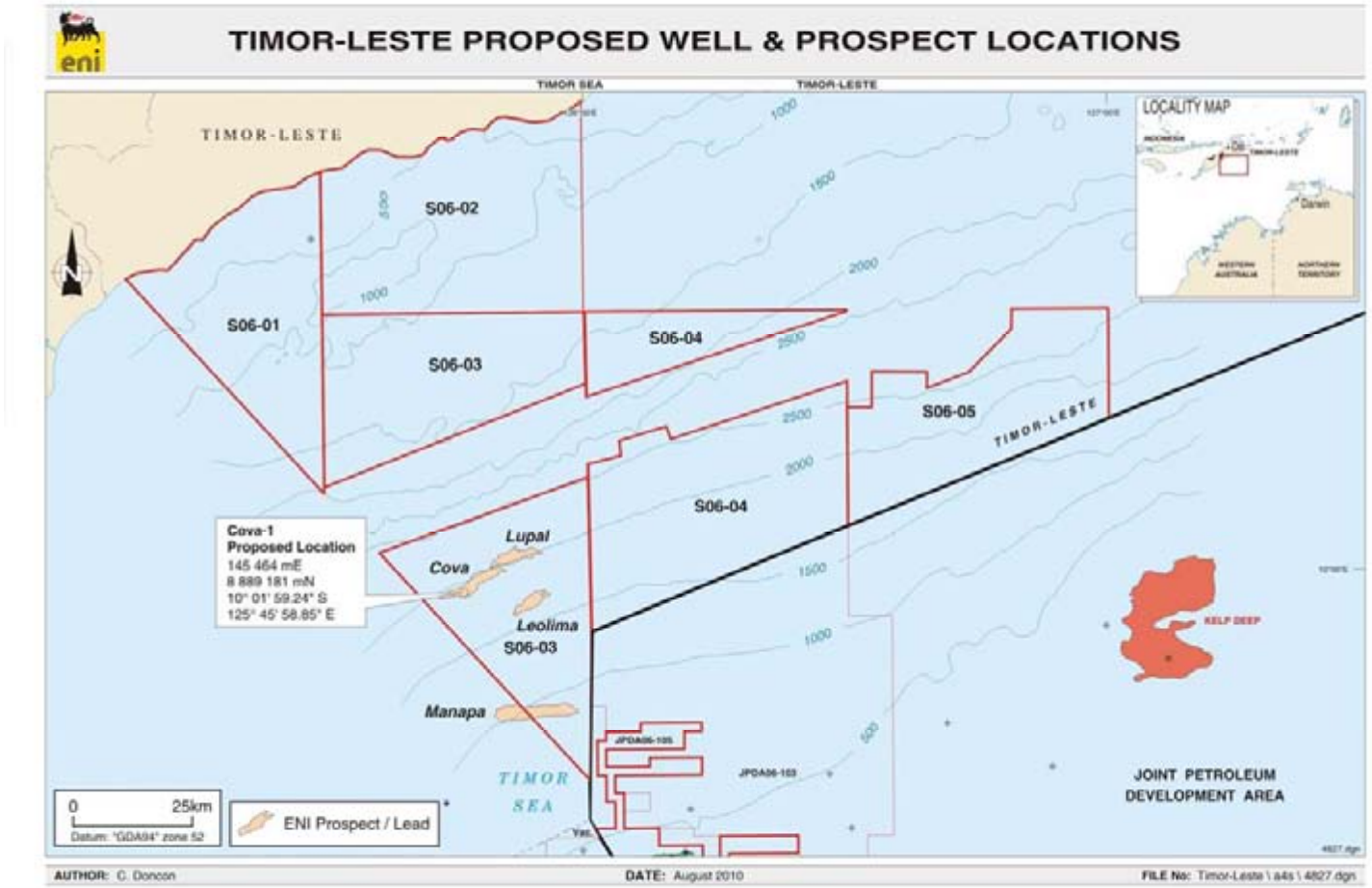


Figure 2.2: Location of petroleum prospects in Permit Area S06-03

During drilling of the top riser-less section of the well, Eni proposes to use seawater and prehydrated gel (PHG) sweeps. The drill cuttings would be continuously discharged directly onto the surface of the seabed.

The bottom part of the well would be drilled using a riser and a partially-hydrolyzed polyacramide (PHPA) water-based gel with potassium chloride (KCl). Both the PHG and PHPA gels have low toxicities, degrade rapidly in the marine environment and are routinely accepted for use by regulatory authorities (Hinwood et al 1994).

Remotely Operated Vessel (ROV) surveys will be undertaken pre- and post-drilling.

2.3 OPERATIONAL WASTES

Normal drilling operations generate the following types of waste:

- drill cuttings, discharged overboard continuously during drilling after screening and centrifuging to separate the drilling fluids;
- water based drilling fluids/muds (WBM), generally discharged overboard at completion of the well;
- sewage, greywater and putrescible wastes discharged overboard after treatment;
- cooling waters, discharged overboard continuously during drilling;
- domestic and industrial solid wastes and hazardous solid and liquid wastes, collected and segregated on the drillship for transport to shore for appropriate disposal at intervals during drilling; and
- engine and waste oil, which will be collected and transported to shore for appropriate disposal.

The drillship will have containment zones and bunding in all areas where oil products are stored and oily residues will be stored in drums and shipped onshore for disposal at authorised sites. Minor deck spills will be washed with bio-degradable detergents and polluted deck drainage water will be collected in a settling tank for later disposal onshore.

2.4 WELL CONTROL PROCEDURES

Eni's Well Control Procedures are based on three key elements. These include:

- thorough assessment of the geology and formation pressures prevalent in the area;
- design of the drilling fluid programme; and
- well control procedures used by the drilling contractor.

Eni's drilling programme will fully incorporate these three key well control elements to provide an industry 'best practice' approach to well control. This will include training and accreditation of both the drilling contractor Saipem's and the operator's site supervisory personnel.

2.5 DRILLING SAFETY

The positioning and operation of the drillship will be closely supervised by Saipem's marine personnel and the Eni Drilling Supervisor.

During the drilling programme, a temporary safety exclusion zone with a radius of 500m around the drillship will be declared and appropriately gazetted. Few vessels are expected to be operating in the area, but those that do will be informed of the location of the drillship and the exclusion zone by radio.

Wells will be designed and engineered to approved standards to ensure that well pressures remain within the safety limits. Most wells within the nearby JPDA show a normal pressure regime down to total depth (e.g. Kitan-1 and -2, Capung-1a, Jahul-1, Krill-1, Kuda Tasi-1, -2 and -3). Blow-out preventers (BOPs) will be used to contain pressures in excess of those encountered in earlier wells.

Casing sizes and lengths and the intervals where the hole is cement sealed around the casing will be selected to maximise well control. Experience gained with previously drilled exploration wells in permit area JPDA 06-105 will be taken into consideration in the well design. Standard safety margins will be allowed to control any pressures that are higher than anticipated.

A vessel-specific Emergency Response Plan (ERP) will be developed for the *Saipem 10000*, which will complement the regional Eni Timor Leste ERP (ETL-HSE-PL-005). An Oil Spill Response Manual (OSRM) for the permit area is currently under development, and details strategies to be applied in the event of an oil spill. These plans and processes will be introduced in the environmental induction process undertaken by all employees.

3. REGIONAL SETTING

3.1 CLIMATE

The Timor Sea has two distinct seasons: "winter" from April to September and "summer" from October to March. The short period between the two seasons is termed the transition season. During this period, either winter or summer regimes could dominate.

Winter

The "winter" dry season (April to September) is characterised by steady easterly (northeast to southeast) winds of 5 to 13ms^{-1} driven by the South East Trade Winds over Australia.

Summer

The "summer" season (October to March) is the period of the predominant North West Monsoon. It is characterised by mostly westerly (west-southwest) winds of 5ms^{-1} for periods of 5 to 10 days with surges in the airflow of 10 to 18 ms^{-1} for the period of 1 to 3 days. Tropical cyclones can develop between November and April resulting in short lived, severe storm events often with strong but variable winds. Figure 3.1 shows the cyclone tracks logged over a 36 year period that cross within 200km of the drilling location.

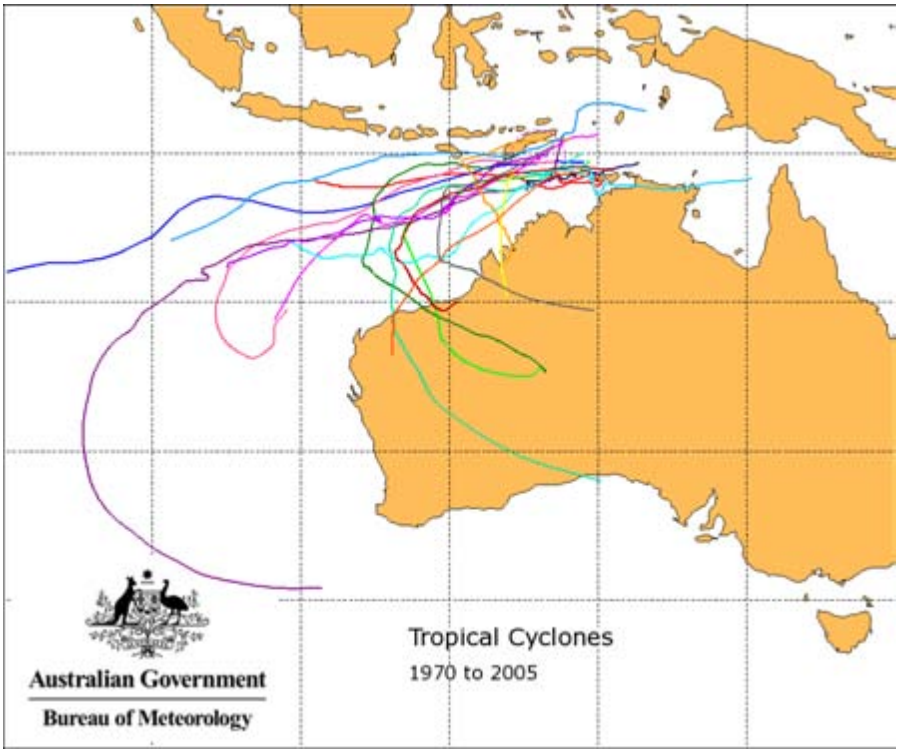


Figure 3.1: Tropical cyclones crossing within 200km of the S06-03 permit area (1970 to 2006) (BOM, 2009)

3.2 WIND

Figure 3.2 presents wind roses for a site in the Timor Sea, in the same region as the proposed drilling location. These display the expected seasonal variation in prevailing wind direction, with westerlies (southwest-northwest) persisting from November to March (summer season), and a fairly rapid shift to easterlies (northeast – southeast) in late March or early April (transitional) that then persist until late October or early November (winter) before the return to the westerlies.

3.3 BATHYMETRY

Water depths at the three prospect areas under consideration range from 900m to 2100m (see Figure 2.2). To the north of permit area S06-03 the continental slope continues to decline steadily reaching depths in excess of 2500m in the Timor Trough.

3.4 OCEANOGRAPHY

3.4.1 Currents and Tides

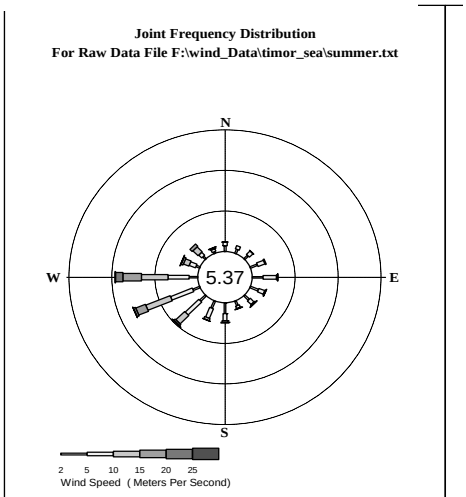
The main forces contributing to surface water motions in the proposed drilling area are general oceanic circulation, astronomical tides and wind stress.

The Pacific Indian Throughflow flows south through the Indonesian Archipelago and into the Eastern Indian Ocean. This current may introduce a small ($0.1ms^{-1}$) southwesterly component to the current regime in the proposed drilling area. The throughflow appears to be subject to the pronounced interannual variations of El Nino-Southern Oscillation events. Current speeds vary depending on the season. Lowest speeds would occur in April at the end of the northwest monsoon when winds blow towards the Pacific whilst highest speeds would occur in September associated with the southeast monsoon (Wijffels *et al*, 1996).

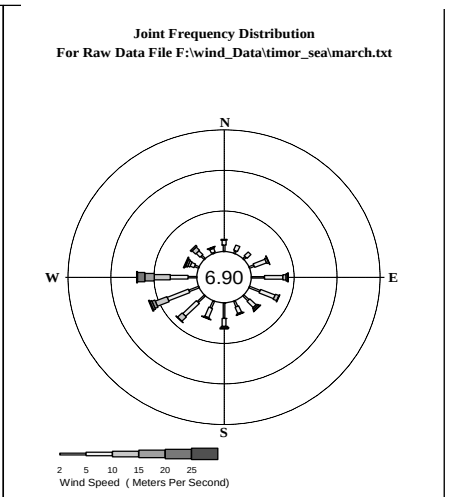
Near-surface tidal currents in the region are anti-clockwise rotational, directed towards the south-southeast during mid flood and towards the north-northwest during mid ebb. Speeds will range from about $0.2ms^{-1}$ on neap tides to $0.4ms^{-1}$ on springs.

The tides in the vicinity of the proposed drilling area are semidiurnal (two highs and lows each day) with a slight diurnal inequality (difference in heights between successive highs and low). There is a well defined spring-neap lunar cycle, with spring tides occurring two days after the new and full moon. Table 3.1 provides the standard tidal levels for Northern Endeavour, the nearest tide station to the drilling location. Highest astronomical tide is 3.9m and the mean ranges for spring and neap tides are 2.7m and 0.8m, respectively.

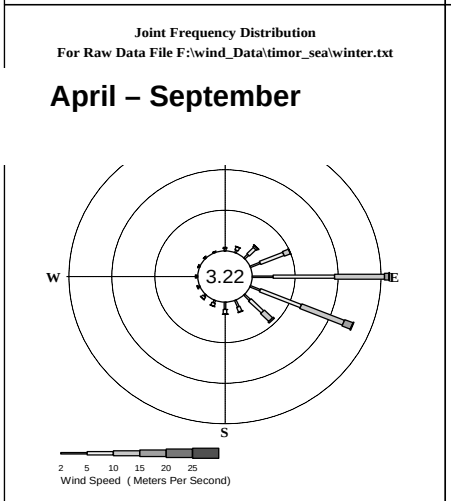
November – March



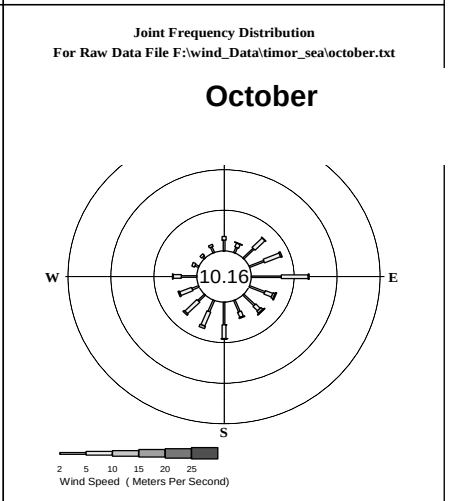
March



April – September



October



Note: Frequency rings drawn at 10% intervals

Figure 3.2: Wind Roses for the Timor Sea (Northern Endeavour 1999-2004)

Table 3.1: Standard Tide Levels for Northern Endeavour (Australian Hydrographic Services, 2003)

Northern Endeavour	Level (m)
Highest Astronomic Tide	3.9
Mean High Water Springs	3.3
Mean High Water Neaps	2.3
Mean Sea Level	1.9
Mean Low Water Neaps	1.5
Mean Low Water Springs	0.6

3.4.2 Sea and Swell

Waves at the proposed drilling location comprise contributions from:

- Southern Ocean swells;
- summer monsoonal swells;
- winter easterly swells; and
- locally generated seas.

The most persistent swell will arrive from the west and southwest with typical heights of 2m in winter and 1m in summer. Since longer period swell suffer less dissipation, periods of long-travelled swell commonly reach 18 seconds and occasionally exceed 20 seconds.

Shorter period swell (6 to 10 seconds), may result from tropical cyclone, winter easterlies over the Arafura Sea and the eastern portions of the Timor Sea, and summer westerlies over the western portions of the Timor Sea.

Local wind generated sea is highly variable but typically ranges in period from 2 seconds to 6 seconds with heights of up to 6m in strong persistent forcing at some locations (Swan *et al*, 1994).

3.4.3 Seawater Temperature

The mean monthly surface water temperatures in the proposed drilling location vary between about 26°C and 31°C. Studies by Creswell *et al* (1993) in the Timor Sea showed that over a 6 day period in October 1987, seawater temperatures decreased gradually with depth to 12°C at 300m.

Waters are expected to be stratified all year round with the thermocline nearer the surface in summer (50m) than in winter (100m). Temperature differences of up to 19°C are expected between surface and bottom waters (Cresswell *et al*, 1993).

3.5 BIOLOGICAL ENVIRONMENT

3.5.1 Regional Overview

The marine fauna of the Timor Sea is part of the Indo-West Pacific biogeographical province (Figure 3.3). The majority of species are widely distributed in this region, with the northern part of the Australian continent being a small part of the wider ranges of most species. The relationships between areas within tropical Australian waters have been discussed by a number of authors, but most recent studies consider there to be one Tropical Australian Province extending from Shark Bay or North West Cape in Western Australia across the top of the continent to the southern end of the Great Barrier Reef in Queensland. A small proportion of the species west of Cape York occur only in Australian waters, however they are generally widespread within the region (Wilson and Allen, 1987).

Figure 3.3: Indo-West Pacific biogeographical province

3.5.2 Continental Shelf

Across the northern continental shelf, the predominant animals living within seabed sediments (infauna) are polychaetes (burrowing worms) and crustaceans (eg prawns, shrimp, crabs). These two groups comprise 84% of the total species in sediment samples with a high diversity of species but a low abundance of each individual species (Heyward *et al*, 1997). The remaining 16% of species include echinoderms (eg sea stars, sea urchins, feather stars), molluscs (both gastropods and bivalves), nemerteans (ribbon worms), sponges and fish.

Epibenthic communities (animals living on or near the seabed) in deeper waters are generally low in fauna abundance and diversity. Heyward *et al* (1997) noted that with little sea floor topography and hard substrate, such areas offered minimal habitat diversity or niches for animals to occupy. The main taxa found in these areas include sponges and gorgonians (sea whips and sea fans). The absence of hard substrate is considered a limiting factor for the recruitment of epibenthic organisms (Heyward and Smith, 1996).

Whilst the abundance may be low, the diversity of shelf slope invertebrates may however be high. A wide variety of crustaceans including scampi, prawns, carids, bugs and crabs are regularly recorded from commercial deepwater trawl catches in the North West Shelf Trawl Fishery and that the additional non commercial crustacean captures included hundreds of species (Caton and McLoughlin 1999). The continental slope of the Timor Sea can be expected to support similar crustacean diversity.

3.5.3 Timor Trough

The Timor Trough, in which the Lupal prospect is located, is classified as the bathypelagic zone (defined as between 1000m and 4000m deep). Sunlight does not penetrate the bathypelagic zone and bioluminescence is the only light. Despite the lack of light, the biota of the bathypelagic zone is diverse and sperm whales (*Physeter macrocephalus*) are capable of diving to the bathypelagic zone to feed on deep sea cephalopods and other megafauna. Fish are common in the bathypelagic zone, typically feeding by ambushing prey or by attracting prey using bioluminescent lures.

3.5.4 Fauna

Whales and Dolphins

The region of the proposed drilling location could support nineteen whale and other cetacean species (Table 3.2).

Table 3.2: Cetaceans expected to occur in the Timor Sea (IUCN 2009)

Common Name	Scientific Name	Status (IUCN Red list)
Whales		
Common Minke Whale	*Balaenoptera acutorostrata*	Least Concern
Sei Whale	*Balaenoptera borealis*	Endangered
Blue Whale	*Balaenoptera musculus*	Endangered
Fin Whale	*Balaenoptera physalus*	Endangered
Pygmy Sperm Whale	*Kogia breviceps*	Data Deficient
Dwarf Sperm Whale	*Kogia simus*	Data Deficient
Humpback Whale	*Megaptera novaeangliae*	Least Concern

Common Name	Scientific Name	Status (IUCN Red list)
Blainville's Beaked Whale	*Mesoplodon densirostris*	Data Deficient
Melon-headed Whale	*Peponocephala electra*	Least Concern
Sperm Whale	*Physeter macrocephalus*	Vulnerable
False Killer Whale	*Pseudorca crassidens*	Data Deficient
Dolphins		
Risso's Dolphin	*Grampus griseus*	Least Concern
Fraser's Dolphin	*Lagenodelphis hosei*	Least Concern
Killer Whale	*Orcinus orca*	Data Deficient
Indo-Pacific Humpbacked Dolphin	*Sousa chinensis*	Near Threatened
Striped Dolphin	*Stenella coeruleoalba*	Least Concern
Rough-toothed Dolphin	*Steno bredanensis*	Least Concern
Bottlenose Dolphin	*Tursiops truncatus*	Least Concern
Cuvier's Beaked Whale, Goose-beaked Whale	*Ziphius cavirostris*	Least Concern

Reptiles

The region supports marine turtles and sea snakes. Marine turtles include the vulnerable Flatback (*Natator depressus*) and Green (*Chelonia mydas*) turtles and the endangered Leatherback (*Dermochelys coriacea*) turtle.

Fish

Fish densities in the region of the drilling programme are likely to be low, with some pelagic species traversing the area, however waters with greater fish abundance are likely to occur in the shallow, coastal fringe and around reefs and shoals on the edge of the continental shelf (CSIRO, 1999a). The broader area of the Timor Sea region supports pelagic fish species that are utilised in traditional and commercial fisheries.

The region supports large populations of cartilaginous fishes such as sharks and rays. The most prolific of the sharks are the whalers, represented by at least twelve species in the region. They are common in all environments and the oceanic white tipped sharks (*Carcharhinus longimanus*) occur in the deeper offshore areas. Whale sharks may occur occasionally in the permit area, although little is known of their movements through the region.

Birds

Birdlife at the proposed drilling location is expected to be limited given the oceanic environment.

4. IMPACTS AND MANAGEMENT

Eni's philosophy to managing environmental risks is to remove or mitigate the risk during the design phase. Table 4.1 describes the potential impacts likely to be associated with the proposed drilling and the unlikely event of oil & fuel spills. Each of the effects is discussed in terms of the source, characteristic, potential environmental effect and management.

Additionally, Table 4.1 details "Additional Investigations" that Eni will carry out as part of the preparation of the EIS to demonstrate whether unavoidable impacts are found to be environmentally acceptable.

Based on Table 4.1, the main environmental issues associated with the drilling project are:

- the effects of drilling cuttings on benthic organisms;
- the effects of vessel and drilling noise and operations on cetaceans; and
- the fate (transport and weathering) of spilled oil in the event of an accidental oil spill.

Given the distance of the permit area from land and the deep water environment, the effects of operational wastes on the marine environment are expected to be negligible.

Table 4.1: Potential Impacts, Management and Additional Investigations

Source of Risk	Potential Environmental Effects	Mitigating Factors and Management Controls	Additional Investigations
Physical Disturbances to Marine Fauna			
Noise/ vibration caused by drilling	Disturbance to cetaceans, turtles, seabirds and fish	• Proposed drilling area is not in a known feeding, breeding or aggregation area for marine megafauna, nor in a confined area (such as a bay) where fauna could be "trapped" when disturbed by noise. • Expected noise levels (McCauley 1998) are below the guideline threshold, the level of noise that may cause interference to cetaceans of 150 db, published by Environment Australia (DEH 2001). • The dominant frequencies of drilling are below the hearing range of turtles (100 – 700 Hz). • An 'alarm' response is displayed by turtles approximately 2 km from a seismic survey source (McCauley et al. 2000). The noise intensity of drilling is far less, so the range of disturbance would be decreased. Cetaceans may demonstrate avoidance behaviour from 2 – 8 km away. • Drilling noise frequencies and intensities (McCauley 1998) are not in the most sensitive range for cetaceans or turtles. • The relatively constant noise source of drilling is less likely to traumatise fauna than erratic sources.	• Consultation with Australian Institute of Marine Science regarding cetacean surveys in the Timor Sea and evaluation of potential risks from drilling
Noise caused by drillship, support and supply vessels	Disturbance to cetaceans, turtles and fish	• Proposed drilling not in known feeding, breeding or aggregation areas for marine fauna. • Supply vessels are under low propulsion power when in close proximity to the drillship.	• N/A
Noise caused by support aircraft	Disturbance to roosting seabirds and marine fauna	• Helicopter noise is usually experienced for 30 seconds or less.	• N/A

Source of Risk	Potential Environmental Effects	Mitigating Factors and Management Controls	Additional Investigations
Light from drillship	Disturbance to turtles and seabirds	• Lighting may result in a short term abundance of some species (e.g. fish) attracted by the light. The proposed drilling program is of short duration and will not cause irreversible fauna behaviour. • Proposed drilling not in known feeding, breeding or aggregation areas for marine fauna.	• N/A
Waste Discharges			
Drilling fluids	Disturbance to sensitive environment Adverse effects on water quality Smothering of benthic organisms	• Low toxicity drilling fluids are to be used, comprising seawater and PHG sweeps for the top section holes and a PHPA water based gel with KCl for the bottom sections. • Drilling fluids are reviewed and selected based on technical suitability and by having a minimum overall effect on environment (including ecotoxicity and dosing requirement characteristics). • Use of drilling chemicals will be minimised as far as is practicable. • High dilution rates – dilutions of > 1:100 within 20 m of the discharge are predicted during all sea conditions (APASA 2001). • Bunded drill floor catches any chemical spills.	• Review drill cuttings modelling completed for Cova-1 drilling, in same permit area • Obtain seismic and geophysical data on the local seabed, to determine whether sensitive benthic habitats could occur in the area
Drill Cuttings	Increased turbidity in the water column Disturbance to marine fauna	• Proposed drilling not in known feeding, breeding or aggregation areas for marine fauna. • The drilling program is of short duration. • Turbid plumes are minimised by cuttings shakers equipment aboard the rig.	• Review drill cuttings modelling completed for Cova-1 drilling, in same permit area • Obtain seismic and geophysical data on the local seabed, to determine whether sensitive benthic habitats could occur in the area • Undertake ROV surveys prior to, and upon completion of drilling

Source of Risk	Potential Environmental Effects	Mitigating Factors and Management Controls	Additional Investigations
Drill Cuttings	Smothering of benthic organisms	• Deep water environment means that benthic habitats in the area are sparse. • Burrowing invertebrates will tolerate moderate levels of sedimentation, and heavily sedimented areas are likely to be recolonised in the short to medium term.	• Review drill cuttings modelling completed for Cova-1 drilling, in same permit area • Obtain seismic and geophysical data on the local seabed, to determine whether sensitive benthic habitats could occur in the area • Undertake ROV surveys prior to, and upon completion of drilling
Deck drainage	Localised adverse effects on water quality	• Sealed rig floor drains to a sump. • Low concentration of contaminants when combined with wash down water. • Low volumes of overboard discharges involved. • Absorbents and containers will be available on the drillship to clean up small accumulations of oil and grease around work areas and decks. • Process bunding has many times the capacity of the chemical tank volume with the facility to overflow to a main skid bund. • Oily water from the drillship machinery space bilges captured and directed to a sludge tank, which in turn drains into a slops tank. • The discharge of oily water from machinery spaces in the drillship is regulated by MARPOL 73/78 oil in water requirements. • Deck areas occasionally washed down with biodegradable industrial detergent to avoid build up of oily contaminants.	• N/A
Laboratory wastes	Localised adverse effects on water quality	• Oil soluble chemicals will be disposed to the drillship oil storage holds. • Other laboratory chemicals will be disposed of to hazardous waste containers for transport to the mainland for disposal at approved facilities.	• N/A
Cooling water	Localised adverse effects on water quality	• High dilution rates would mean that no change in salinity would be detectable outside a localised area. • Cooling water will be discharged at less than 3°C above ambient sea surface temperature.	• N/A

Source of Risk	Potential Environmental Effects	Mitigating Factors and Management Controls	Additional Investigations
Reject water	Localised adverse effects on water quality	• Small volumes discharged and high dilution rates would mean that no change in salinity would be detectable outside a localised area.	• N/A
Waste oil and chemicals	Localised adverse effects on water quality	• Waste oil and chemicals will be stored aboard the drillship and transferred to the mainland for disposal.	• N/A
Sewerage, grey waters and putrescibles wastes	Localised adverse effects on water quality Nutrient enrichment and biostimulation of the water column surrounding the drillship	• No sensitive resources are known to occur in immediate vicinity of proposed drilling. • The estimated volume of sewage water produced is 60 L/person/day. Sewage effluent on the drillship will be treated in an extended aeration system and comminuted to pass through a screen of less than 25 mm diameter prior to discharge, in accordance with MARPOL 73/78. The effluent is then discharged directly to the ocean. • The small volumes of sewage water discharged ensure that only a localised area would be affected by the waste discharge. • The estimated volume of grey water produced is 140 L/person/day. The small volumes of grey water discharged ensure that only a localised area would be affected by domestic waste discharge. • Domestic wastes discharged after being macerated to a size less than 25mm. • The grey water is comprised of potable water, soap and detergents so none of the identified components of grey water are inherently toxic.	• N/A
Ballast water	Localised adverse effects on water quality Displacement of endemic species with introduced pests	• Quarantine regulations and guidelines are followed. • Ballast water exchange procedure in place. • The drillship ballast water is contained in segregated tanks with dedicated pumping and distribution systems, so is isolated from the crude oil storage tanks, and cannot be polluted with hydrocarbons. • No chemicals are added or discharged with the ballast water.	• N/A
Displacement fluid discharge	Leakage of fluids to environment	• KCl brine will be used as the displacement fluid during drilling.	• N/A

Source of Risk	Potential Environmental Effects	Mitigating Factors and Management Controls	Additional Investigations
Solid and Hazardous Wastes			
General rubbish	Localised adverse effects on water quality	• All waste material will be returned to mainland Australia for appropriate onshore disposal. • Selection of offtake tankers and vessels will include a procedure to ensure that they conform to the requirements of MARPOL 73/78 with respect to the handling and disposal of wastes. • Induction of all personnel. • Good housekeeping practices.	• N/A
Hazardous wastes	Localised adverse effects on water quality	• No discharge of solid and/or hazardous wastes from the drillship (mainland Australia onshore disposal). • Wastes stored onboard in appropriate containers. • Hazardous wastes will be labelled and transferred to the mainland, in accordance with the Material Safety Data Sheet instructions. • Induction of all personnel includes information on waste management procedures.	• N/A
Atmospheric Emissions			
Power generation	Localised effect on air quality Global contribution to greenhouse gases	• Fuel usage will be minimised through the sound maintenance and tuning of engines.	• N/A
Emergency flaring	Localised effect on air quality Global contribution to greenhouse gases	• Gas will be flared only when hydrocarbons are encountered unexpectedly during drilling. • Equipment will be maintained to a high standard to minimise smoke generation.	• N/A
Ozone depleting substances	Localised effect on air quality	• Ozone depleting substances will not be used.	• N/A

Source of Risk	Potential Environmental Effects	Mitigating Factors and Management Controls	Additional Investigations
Physical Presence Causing Social Disturbances			
Interference with commercial/ traditional fishing	Disruption to fishing vessels Entanglement of trawling equipment (e.g. nets) on rig anchors or tethers	• No commercial fisheries occur in the vicinity of the proposed drilling. • A temporary exclusion zone will apply around the drillship. • Navigation lighting and permanent watch aboard the rig and support vessels. • Watch is kept at all times.	• N/A
Interference with shipping	Disruption to shipping routes	• No major shipping lanes in vicinity of the proposed drilling. • Australian Marine Safety Authority (AMSA) and Timor Leste Maritime Police and Customs offices notified of location of the drillship. • Navigation lighting and permanent watch aboard the drillship and support vessels.	• N/A
Interference with recreational vessels	Disruption to recreational users	• No recreational vessels utilise this area.	• N/A
Oil, Fuel and Chemical Spill			
Loss of well control and blow-out	Oil spill	• Development of comprehensive safety case and validation auditing for the *Saipem 10000* prior to arrival in permit area • Test the BOP prior to commencement of operations and regularly during operations. • Pressure test casing strings. • Continuously monitor for abnormal pressure parameters during drilling. • Ensure the drill crew is fully trained in emergency well control and oil spill response procedures.	• Review oil spill modelling completed for Cova-1 drilling, in the same permit area
Leak from fittings and connections	Oil or chemical spill	• Pressure tested equipment. • Pressure low switch on flowlines.	• N/A

Source of Risk	Potential Environmental Effects	Mitigating Factors and Management Controls	Additional Investigations
Refuelling incident	Localised adverse effects on water quality, toxic effects to biota	• Refuelling will be undertaken only during periods of calm weather and in daylight hours. • Transfer hoses will be fitted with 'dry break' couplings. • Refuelling operations will be overseen by the vessel's Master or First Officer.	• N/A
Vessel collision	Localised adverse effects on water quality, toxic effects to biota	• Hydrocarbons (both diesel and potential oil from the reservoir) likely to have high evaporation and dispersion rates. • Vessel-based and regional ERPs and OSRM • AMSA and ANP aware of location of the drillship.	• Review oil spill modelling completed for Cova-1 drilling, in the same permit area
Leaks of hydraulic fluids	Localised adverse effects on water quality, toxic effects to biota	• Preventative maintenance. • Manned operation (visual detection of release). • Drip pans/bunds.	• N/A
Chemical spills	Localised adverse effects on water quality, toxic effects to biota	• Transfers will be undertaken only during periods of calm weather and in daylight hours. • Transfer operations will be overseen by the vessel's Master or First Officer.	• N/A

5. STAKEHOLDER CONSULTATION PROGRAMME

Public engagement and consultation for the drilling program will be conducted in conjunction with the DNMA, following the processes described in Regulation 51/1993.

The DNMA have provided a list of twenty stakeholders, including representatives from various government departments, non-government organisations and industry bodies. This list forms the basis for distribution of the EIS and EMP documents, and invitations to public forums where Eni will present information on the project and provide opportunity for stakeholders to raise questions.

Eni would be happy to include additional stakeholders on this base list, and to provide electronic copies of documents that can be uploaded to websites accessed by the Timor Leste community.

Following the preparation of the EIA documentation, Eni will distribute copies of the EIS and EMP among stakeholders for public review and comment.

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APPENDICES

APPENDIX A

ENI'S HSE POLICY

A1. ENI HEALTH, SAFETY AND ENVIRONMENT POLICY

eni timor leste

Health, Safety & Environment Policy

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

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

Eni Timor Leste will:

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

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

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

Country Representative
Eni Timor Leste S.p.A.

Tony Heynen

24 March 2010

APPENDIX B

SAIPEM 10000 SPECIFICATIONS

B1. SAIPEM 10000 SPECIFICATIONS

Unit Type:	Ultra deep water Drillship; completely outfitted for 10000 ft water depth operations.
Unit Flag:	BAHAMAS
Unit Classification:	ABS, +A1(E), "Drilling Unit", +FPSO,+AMS,+ACCU,+DPS-3,OMBO,DLA, +CDS
Unit Enviromental Limits: of interest summer time)	more than 99% in all areas (North Sea : UK sector
Water depth capability	10,000 ft (3,000 m)
Drilling depth w/ 5" DP	30,000 ft (9,100 m)
Main Generators	3 + 3 Wartsila 9910 HP
Helicopter Landing deck	27 x 27 m(Certified for Chinook)
Accommodation	for max. 172 People
Drawworks:	2 x Wirth GH 4500 EG, 4200 hp rated input AC Driven, Gear Box Driver
Top Drive:	2 x Hydralift HPS 750 ZE, AC driven
Mud Pumps:	4 x Wirth TPK 7 1/2" x 14" - 2,200Hp-7,5kpsi
High Pressure Circulating Sys.	7,500 psi.
BOP	Shaffer 18 ¾" 15kpsi
VDL and storage capabilities	17,500t (transit mode) and 20,000t (drilling mode) – the storage capabilities allow to have on board equipment for two wells
Transit speed	8-10 knots
Dual activity concept	