SUMMARY ENVIRONMENT PLAN SUPPLEMENT

(SUPPLEMENT TO THE BASS STRAIT ENVIRONMENT PLAN)

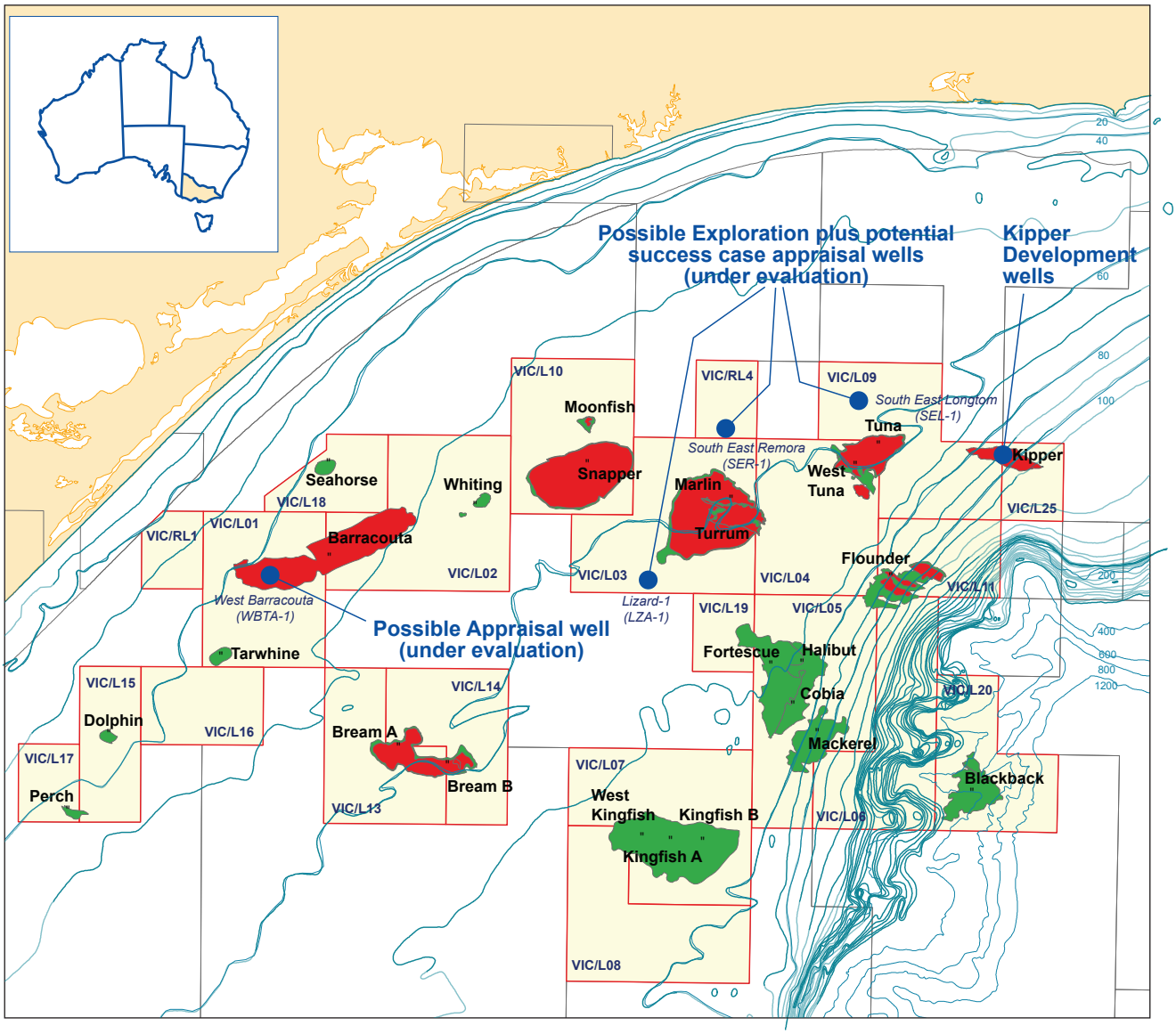
INTRODUCTION

Esso Australia Pty Ltd proposes to undertake various exploration, appraisal and development drilling activities within Commonwealth waters in Bass Strait. The specific licence areas within which these activities will occur are depicted in Figure 1.

Esso Australia Pty Ltd conducts routine operations under a Bass Strait Environment Plan.

This document provides a summary of the Environment Plan Supplement (Supplement to the Bass Strait Environment Plan) which was prepared to specifically address activities from a Mobile Offshore Drilling Unit. The Environment Plan Supplement was accepted by the Department of Primary Industries in September 2009.

Figure 1 - Location of proposed / possible drill sites, Bass Strait



THE ENVIRONMENT

Physical environment

Bass Strait is the region of the continental shelf that separates mainland Australia from Tasmania.

Climate and Meteorology

Wind speeds in Bass Strait are typically in the range of 10 km per hour to 30 km per hour, with maximum gusts reaching 100 km per hour. The wind direction in central Bass Strait is predominately westerly during winter, westerly and easterly during spring and autumn (when wind speeds are highest) and easterly during summer.

Average summer air temperatures in coastal Victoria range from early morning lows of 12°C to 15°C, to afternoon highs of 23°C to 26°C. Average winter temperatures range from minimums of 4°C to maximums of 15°C in the afternoons.

Average annual rainfall along the coast ranges from approximately 500 mm to greater than 1,000 mm. Offshore (on Deal Island in central Bass Strait) annual rainfall is comparable (average 714 mm) and shows a similar pattern to the coastal region (Lakes Entrance) with slightly higher winter rainfall.

Bathymetry, Geology and Sedimentation

The bathymetry of Bass Strait is concave-shaped, with a shallower rim on the eastern and western entrances to the strait and a deeper centre. A steep inshore profile extends to a less steep and moderate profile concluding with a flat outer shelf plain.

The seabed of Bass Strait is characterised by a variety of sediment types that are associated with tidal currents, with sediment grain size linked to wave energy. Sediments become progressively finer with distance from the shore. Offshore near 35 m to 40 m depth an irregular bed colonised by marine growth occurs. Finer, muddy sands occur further offshore in the mid-shelf regions.

The seabed in the project area is essentially flat with gently sloping bathymetry and water depths ranging from 60 m to 110 m in the immediate vicinity of the Kipper, Tuna and Turrum gas fields. The seabed is predominantly calcium carbonate comprised of calcarenite marls and marine shales and sedimentation is likely to be low reflecting low river outflow into the area.

Oceanography

Currents in eastern Bass Strait are tide and wind-driven. Tidal movements in eastern Bass Strait predominantly have a northeast–southwest orientation.

Tidal flows in Bass Strait come from the east and west during a rising (flood) tide, and flow out to the east and west during a falling (ebb) tide. The main tidal components in Bass Strait vary in phase by about three to four hours from east to west.

Temperatures in the subsurface waters of central Bass Strait range from about 13°C in August / September to 16°C in February/March. Surface temperatures in eastern Bass Strait can exceed 20°C at times in late summer.

Bass Strait is a high energy environment exposed to frequent storms and significant wave heights, with highest wave conditions generally associated with strong west to southwest winds. Storms may occur several times a month resulting in wave heights of 3 m to 4 m or more. In severe cases, southwest storms can result in significant wave heights of greater than 6 m.

Biological environment

Bass Strait contains high faunal diversity and species endemicity. Possible causes for this high endemism include the long period of isolation in geological time and climatic barriers; a history of variable exposure and immersion during sea-level changes in the last few million years; the influence of water masses from the west, northeast and south; and the complexity and high biogenic component of the sediment.

Phytoplankton biomass is greatest at the extremities of Bass Strait (particularly in the northeast) where water is shallow and nutrients are high. More than 170 species of zooplankton have been recorded in eastern and central Bass Strait, with copepods making up approximately half of the species encountered.

Bass Strait supports a diverse benthic invertebrate fauna as well as a wide variety of vertebrate species such as fish, birds, seals and whales, which nest and/or feed in Bass Strait regions. Bass Strait also contains a number of species of high commercial and conservation value.

Benthic communities in Bass Strait are varied and are principally determined by the seafloor habitat. The Museum of Victoria conducted an extensive survey of benthic invertebrates in Bass Strait from 1979 to 1983. In general, a highly diverse array of invertebrate groups was found, with several polychaete families, pycnogonids, pericarid crustaceans, opisthobranch molluscs, bryozoans and brachiopods being the most species rich. The main findings included:

- High diversity of invertebrate groups in Bass Strait when compared to equivalent areas of the northern hemisphere.
- Many species are widely distributed across Bass Strait, suggesting heterogenous sediments and many microhabitats.
- Crustaceans and polychaetes dominate the infaunal communities, many of which are unknown species.

As the seafloor of the Gippsland Basin is predominately sandy, marcroalgal communities are not common on subtidal reefs in east Gippsland possibly due to degree of exposure, poor light levels and abrasion by moving sand.

It is estimated that there are over 500 species of fish found in the waters of Bass Strait, including a number of species of importance to commercial and recreational fisheries. Fish species that may occur in the project area that are listed as threatened under the *Environment Protection and Biodiversity Conservation Act 1999 (Cth)* (EPBC Act) include the orange roughy *(Hoplostethus atlanticus)* and eastern gemfish *(Rexea solandri).*

A large number of chondrichthyans (sharks and rays) occur in Bass Strait. Shark species that may occur in the project area that are listed as threatened under the EPBC Act include the great white shark *(Carcharodon carcharias)*, the grey nurse shark *(Carcharias taurus)* and the whale shark *(Rhincodon typus)*.

There are five marine reptiles that occur as migrants along the eastern shores of Bass Strait. These include the loggerhead turtle *(Caretta caretta)*, green turtle *(Chelonia mydas)*, pacific ridley *(Lepidochelys olivacea)*, leathery turtle *(Dermochelys coriacea)* and the yellow-bellied sea snake *(Pelamis platurus).*

Birds

Bass Strait islands are nesting sites for many seabird species, many of which migrate to these islands each year. Colonies of seabirds occur to the west of the project area in Corner Inlet and on the islands around Wilsons Promontory, and to the east at the Skerries, Tullaberga Island and Gabo Island. Species that nest and breed on these islands include the little penguin *(Eudyptula minor)*, white-faced storm petrel *(Pelagodroma marina)*, short-tailed shearwater *(Puffinus tenuirostris)*, fairy prion *(Pachyptila turtur)*, common diving petrel *(Pelecanoides urinatrix)*, black-faced cormorants *(Phalacrocorax fuscescens)* and the pacific gull *(Larus pacificus)*.

Fifty-eight bird species listed under the EPBC Act may occur, or are likely to occur, within the Gippsland Basin and coastal fringe areas. Many of these species, some of which may be protected by international agreements, may periodically pass through Bass Strait on their way to or from the islands in Bass Strait and the mainlands of Victoria and Tasmania.

Seals

Two Otariid seal species, the Australian fur seal *(Arctocephalus pusillus doriferus)* and the New Zealand fur seal *(A. forsteri)* have breeding colonies in Bass Strait. Both species are listed under the *Environment Protection and Biodiversity Conservation Act 1999 (Cth)*.

Cetaceans

Twenty seven cetacean species have been recorded in eastern Bass Strait, with the blue whale, southern right whale, humpback whale, sperm whale, bottle-nosed dolphin and common dolphin most commonly recorded.

Introduced marine pests

Marine pests have been introduced to Australia by a variety of human and natural means including ballast water, biofouling, aquaculture operations and aquarium imports. The New Zealand screw shell *(Maoricolpus roseus)* is one exotic marine species known to be introduced to Bass Strait which forms extensive and dense beds on the sandy seafloor.

Areas of conservation significance

The closest Marine Protected Area to the project area is Beware Reef Marine Sanctuary, located approximately 5 km southeast of Cape Conran. Beware Reef Marine Sanctuary is located approximately 35 km north of the project area.

DESCRIPTION OF THE ACTIVITY

The Environment Plan Supplement describes an exploration, appraisal and development drilling campaign in the Commonwealth waters of Bass Strait using the Diamond Offshore General Company Mobile Offshore Drilling Unit "Ocean Patriot".

The objective of the Kipper Drilling Campaign is to address well work requirements for development of the Kipper field. The objective of the exploration and appraisal programme is to test a number of potential targets which, if successful, will expand the Gippsland Basin's resource volumes inventory.

The activities specifically addressed in the Environment Plan Supplement include drilling, well clean-up and completion (where applicable) of the Kipper field Stage 1A. Outside the Kipper field (subject to final review) three possible exploration wells and one possible appraisal well may also be drilled.

Four directionally drilled subsea wells and completions are planned. The Stage 1A development of the Kipper field compromises:

- Installing the structural casing, cap and protective frame for well A1.
- Installing the structural casing, protective frame, drilling, completion and clean-up for Well A2.
- Installing the structural casing, cap and protective frame for well A3.
- Installing the structural casing, protective frame, drilling, completion and clean-up for Well A4.

The possible exploration and appraisal wells include:

- South East Remora – 1 (SER-1)
- South East Longtom – 1 (SEL-1)
- Lizardfish -1 (LZA-1)
- West Barracouta (WBTA-1) (Appraisal)

Potential success case appraisal wells may be contemplated in the event of a discovery.

The proposed drilling campaign is located within Production Licences Vic/L1, Vic/L3, Vic/RL4, Vic/L9 and Vic/L25 within the Gippsland Basin as illustrated in Figure 1. Coordinates for the proposed drilling locations are provided in Table 1. These proposed well locations may change as the project design progresses.

The campaign is scheduled to commence in early 2010, or sooner, subject to final project approvals.

*Table 1: Drilling Campaign Well Coordinates *1, 2 & 3*

Well ID	MGA	MGA
KPA A1	639,530	5,772,892
KPA A2	639,537	5,772,905
KPA A3	639,582	5,772,930
KPA A4	639,596	5,772,923
SEL-1	621,492	5,779,922
SER-1	606,550	5,775,580
LZA-1	596,400	5,758,100
WBTA-1	553,530	5,758,605

**Notes:*

1 Geodetic Datum: GDA94

2 Ellipsoid: GRS80

3 Projection: MGA94 Zone 55, Central Meridian 147° East

Drilling Muds

Esso Australia Pty Ltd's standard drilling fluid in Bass Strait is water based mud which is composed mainly of seawater with added compounds such as barite (barium sulphate mineral), a weighting agent, and other additives for specific functions.

For this drilling campaign water based mud will be used where possible. However, some of the exploration / appraisal wells require the use of synthetic based mud where the well is more complex due to higher pore pressures and where the directional profile of the well results in higher frictional forces. Synthetic based drilling mud has been selected for the following technical reasons:

- To manage drilling conditions as the transition zone between normally pressured sands and higher pressured sands is drilled.
- To reduce the potential that the drill string will become differentially stuck as the mud weights are increased while normally pressured sands are exposed.
- To enhance wellbore stability in inclined open hole sections.

The Kipper wells will also be drilled with a combination of water based mud and synthetic based mud. Both the structural hole and surface hole will be drilled riserless using seawater with gel sweeps.

The use of a synthetic based mud is required for the Kipper wells for the following technical reasons:

- To ensure that high quality completions can be installed successfully.
- To minimise future well workover operations caused by lower completion failures.
- To manage washout and hole instability problems within the Lakes Entrance formation.

The proposed synthetic based mud has been shown to require less inventory than conventional drilling fluids due to a reduction in downhole mud losses and pump pressures.

Drilling Mud Recovery and Cuttings Drying

Muds will be treated to remove formation solids and will be recycled and recovered while drilling. Crushed rock cuttings from the hole will be separated from the muds by vibrating screens (shale shakers) and to a lesser extent, by the de-sander and de-silter, which remove the sand and silt from the mud centrifuge for mud treatment.

Drilled cuttings will be continuously discharged overboard after separation from the mud by the process equipment. To minimise the retention of synthetic fluid on cuttings (and allow the recovery of valuable drilling fluid), a cuttings dryer system and centrifuge will be used to process the cuttings and mud prior to discharge. The recovered mud will be returned to the active mud system.

While the majority of used synthetic based muds will be returned to shore for reconditioning and future use, not all the drilling fluid can be removed. A coating of residual drilling fluid will remain attached to the cuttings. Discharge of synthetic based mud will be confined to material adhering to the surfaces of the cuttings. Following treatment with the cuttings dryer and the centrifuge, the synthetic fluid retained on cuttings will be less than 10% by weight averaged over all wells.

After drilling

The exploration wells will not be completed or cleaned-up as part of this campaign. They will be drilled, plugged and abandoned. They will be filled with cement and the casing cut off below the sea floor.

Two of the Kipper wells are intended to be completed as gas producers. These wells will be cleaned-up to flow back the underbalance fluid and any fluids lost to the formation during the completion, leaving the well shut-in with gas. This mitigates any formation damage and leaves the well ready for production start-up.

ENVIRONMENTAL RISK ASSESSMENT AND MANAGEMENT

A comprehensive risk assessment was conducted for drilling campaign. All environmental aspects associated with this campaign have been assessed to be low risk.

The major difference between the activities contemplated for this drilling campaign and those addressed by the Bass Strait Environment Plan is the use of synthetic based mud. Therefore, this section focuses on the risks associated with the use of synthetic based mud. Existing safeguards and additional controls for management of the risks associated with the use of synthetic based mud are outlined in Table 2.

Table 2: Environment risk assessment relating to use of synthetic based mud

Activity and impact	Management / Mitigation Measures
Discharge of drill cuttings to the seabed – impact on the seabed immediately surrounding the rig.	Ensure compliance with drilling procedures. Vessel procedures including management of synthetic based mud.
Discharge of drilling muds adhered to cuttings. Impacts to water quality and planktonic organisms in the water column during descent of cuttings. Impacts to seabed quality and potential mortality of sessile benthic organisms in the immediate vicinity of the settled cuttings.	Vessel procedures including regular inspection of storage facilities to control onboard management of synthetic based mud. Water-based and biodegradable drilling fluids to be used as first choice where practicable. Use of synthetic based mud only when technically and geologically justified or where significant cost or schedule benefits exist. Recovery of synthetic based drilling fluids with use of shale shakers and cuttings dryer system. Discharge to be minimised to that which is adhered to cuttings. Retain daily monitoring records of mud concentrations and volumes.
Spills of drilling muds to ocean – impacts to water quality and planktonic organisms in the water column during descent.	Vessel procedures including regular inspection of storage facilities to control onboard management of synthetic based mud. Company expectations on spill elimination. Offshore and Drilling Environmental Awareness Training to be conducted during induction of key personnel and contractors. Ensure all relevant personnel and contractors are appropriately trained in spill management. Ensure that the transport of synthetic based mud is carried out in the shortest and safest time possible. Synthetic based mud transfer to be conducted outside of extreme weather periods. New hoses provided for synthetic based mud. Ensure that all spill equipment is functional and accessible. Company and contractor supervisor approved work permit required for each operation of mud tank discharge manifold. Physical barrier to be in place to prevent discharging of mud.

Toxicity testing and field monitoring

Esso Australia Pty Ltd has undertaken toxicity testing as part of another drilling campaign (Rig 175) which is using the same synthetic based mud as proposed for this campaign. The drill cuttings that will be discharged are generally inert and are expected to have limited impact on benthic fauna and flora, apart from the physical smothering and possible sediment grain size alterations.

A number of field monitoring studies to assess seabed impacts of drilling discharges have been completed within Bass Strait and around the world. The impacts from the discharge of synthetic based mud cuttings are described in the literature with consistency across all geographical locations and depths where monitoring has occurred, and with little (if any) significant deviation with differences in base fluids or blends of synthetic based mud used.

While the recovery of the benthic communities is dependent upon the type of community affected, the thickness, area and persistence of the cuttings (due to a combination of seafloor redistribution and biodegradation), and the availability of colonising organisms, degradation of synthetic based mud and the recovery of benthic diversity is substantially advanced one year after cessation of drilling. Given this uniformity of observation, it seems most likely that smothering and organic enrichment during the biodegradation of synthetic based muds are the primary causes of the observed impacts.

The synthetic based mud Accolade system has been shown to require less inventory than conventional drilling fluids due to a reduction in downhole mud losses and pump pressures, and the base oil provides greater biodegradability, lubricity and reduced toxicity than other conventional synthetic-based fluids.

The drilling fluids are comprised of compounds with low toxicity and have no long lasting effect on the seabed or benthic communities. Short term effects on diversity and abundance are restricted to the area around the mobile offshore drilling unit.

Risk analysis concluded that the potential environmental impacts and consequent environmental risk associated with using synthetic based muds for this drilling campaign are low.

IMPLEMENTATION STRATEGY

To ensure that the environmental performance objectives and standards in the EPS are met, and to ensure the release of synthetic based mud to the marine environment is kept to a minimum, an implementation strategy including the following items has been developed:

- Key environmental roles and responsibilities have been identified.
- All personnel will participate in environmental awareness training as part of the induction process.
- All operating equipment is to be maintained in good working condition in compliance with an appropriate inspection, testing and maintenance program.
- Spill prevention and response measures including personnel training and provision of appropriate storage, handling and spill response equipment will be implemented. Emergency response training and preparedness is to be tested prior to the commencement of drilling operations.
- Synthetic based mud is to be used only when technically and geologically justified or where significant cost or schedule benefits exist. Regular inspections of storage and handling facilities, vessel procedures and environmental training will specifically address the management of synthetic based mud.
- Synthetic based drilling fluids will be recovered by using shale shakers and cuttings dryer system so that any discharge to the ocean is minimised to that which is adhered to cuttings.
- Drilling fluid concentrations and volumes as well as volume of drill cuttings produced will be monitored.
- Written and approved procedures including a work permit will be adopted for all operations of the mud tank discharge manifold.
- Physical barriers will prevent discharging of mud.
- An environmental compliance audit will be conducted.
- Approved contractors will control the storage and handling of the drilling fluid chemicals in conjunction with the National Code of Practice for the Control of Workplace Hazardous Substances and the National Code of Practice for Storage and Handling of Workplace Dangerous Goods.

CONSULTATION AND CONTACT DETAILS

Esso Australia Pty Ltd maintains an active community consultation program that includes regular contact with regulators, businesses, community leaders and interest groups. Project-related consultation activities completed to date have included telephone calls to all identified stakeholders as well as a number of project information bulletins which have been distributed.

Project representatives last met with interested stakeholders in March 2009. Once the final drill locations are confirmed, the project will contact the identified stakeholders and advise of the location and the expected timing of the drilling campaign. A new project bulletin will be issued prior to the commencement of activities.

All queries and comments should be directed to:

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