Esso Australia Pty Ltd

BASS STRAIT ENVIRONMENT PLAN SUMMARY

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1. INTRODUCTION

Esso Australia Resources Pty Ltd (EARPL) is the operator for the Gippsland Basin Joint Venture (GBJV) with BHP Billiton Petroleum (Bass Strait) Pty Ltd (BHPB), and undertakes production activities to produce oil and gas from the Commonwealth waters of the Gippsland Basin in Bass Strait.

EARPL is a subsidiary of ExxonMobil Australia Pty Ltd ('ExxonMobil') which forms part of the ExxonMobil Corporation group of companies, and is the operator of both the GBJV and the Kipper Joint Venture (KUJV) under the respective joint venture operating agreements.

Esso Australia Pty Ltd (Esso) provides services to EARPL as its wholly owned subsidiary. Esso has the overall responsibility for the day-to-day management and operation of the production facilities and as such is the designated operator under the Offshore Petroleum and Greenhouse Gas Storage (Environment) Regulations 2009 (Cth) (OPGGS (Environment) Regs 2009).

Esso has recently conducted an extensive revision of its existing Bass Strait Environment Plan (BSEP). The BSEP was accepted by the Victorian Department of Primary Industries in May 2011. This document provides a summary of the BSEP.

Esso operates 23 oil and gas facilities in Bass Strait. The existing operations comprise of staffed and unstaffed production platforms, monotowers and subsea completions. The oil and gas fields currently developed in Bass Strait are between 20 and 80 km offshore in water depths up to 400m. The licence and permit areas and the Gippsland onshore and offshore facilities are shown in Figure 1. Water depth and production characteristics are listed for each offshore facility in Table 1.

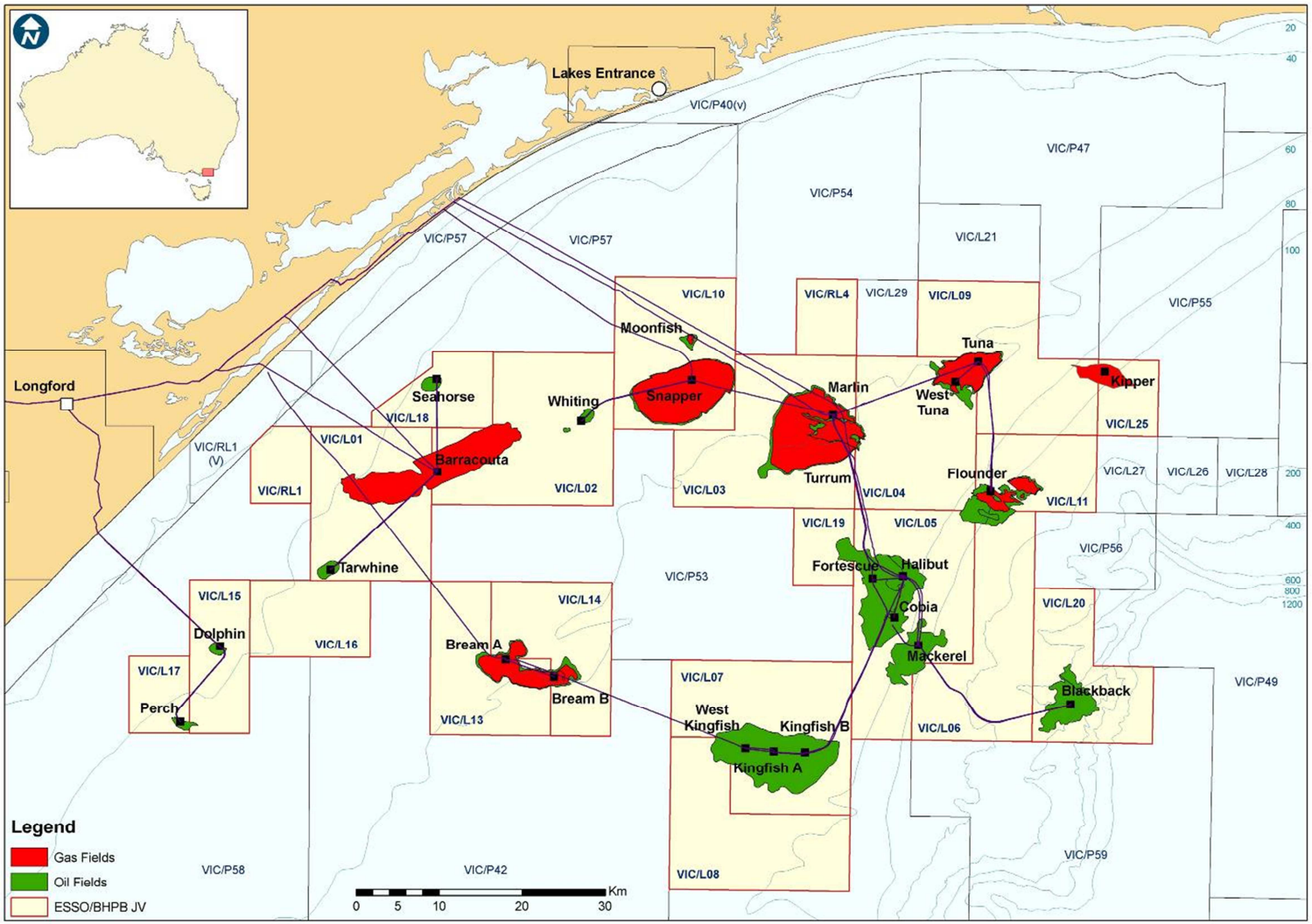

Figure 1 Permit Areas and Offshore Platforms

Table 1 Offshore Facilities

Facility Name	Distance to shore (km)	Water depth (m)	Type of Facility	Production	
				Start Date	No. of wells (as of 2009)
Barracouta	23	46	Steel jacket platform	1969	10
Marlin A	42	59	Twin steel jacket platform	1970 Oil 1978 Gas	23
Halibut	63	73	Twin steel Jacket platform	1970	22
Kingfish A	75	77	Steel jacket platform	1971	17
Kingfish B	78	78	Steel jacket platform	1971	15
Mackerel	72	93	Steel jacket platform	1977	25
Tuna	43	59	Steel jacket platform	1979	33
Snapper	32	55	Steel jacket platform	1981	19
West Kingfish	72	76	Steel jacket platform	1982	29
Cobia	68	75	Steel jacket platform	1983	17
Fortescue	62	69	Steel jacket platform	1983	31
Flounder	58	93	Steel jacket platform	1984	23
Bream A	46	59	Steel jacket platform	1988	23
Whiting	34	54	Steel jacket platform	1989	5
Dolphin	21	38	Steel gravity based monotower	1990	2
Perch	24	42	Steel gravity based monotower	1990	2
Tarwhine	23	43	Subsea completion	1990	1
Seahorse	15	42	Subsea completion	1990	1
Blackback	87	403	Subsea completion	1990	3
Bream B	51	61	Concrete gravity based platform	1996	17
West Tuna	45	61	Concrete gravity based platform	1997	46
Marlin B *	42	60	Steel Jacket platform	2011	up to 18
Kipper *	45	100	Subsea completion	2011	4-6

* planned

2. THE RECEIVING ENVIRONMENT

2.1 PHYSICAL ENVIRONMENT

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

2.1.1 Climate and Meteorology

Wind speeds in Bass Strait are typically in the range of 10 - 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℃ to 15℃, to afternoon highs of 23℃ to 26℃. Average winter temperatures range from minimums of 4℃ to maximums of 15℃ 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.

2.1.2 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 the 35 m to 40 m depth contours, an irregular bed colonised by marine growth occurs. Finer, muddy sands occur further offshore in the mid-shelf regions.

The Gippsland Basin is composed of a series of massive sediment flats, interspersed with small patches of reef, bedrock and consolidated sediment. Near shore sediments consist of coarse sands with isolated areas of gravels, shells and pebbles. Finer, muddy sands occur further offshore in the midshelf regions. Sedimentation is generally low due to the small supply from rivers and the relatively low productivity of carbonate.

2.1.3 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℃ in August/September to 16℃ in February/March. Surface temperatures in eastern Bass Strait can exceed 20℃ 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.

2.2 BIOLOGICAL ENVIRONMENT

Bass Strait contains high faunal diversity and endemic species. 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.

2.2.1 Plankton

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.

2.2.2 Benthic Communities

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 heterogeneous 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, macroalgal communities are not common on subtidal reefs in east Gippsland possibly due to degree of exposure, poor light levels and abrasion by moving sand.

2.2.3 Fish

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 operating area (Bass Strait Operations) are listed as threatened under the *Environment Protection and Biodiversity Conservation Act 1999 (Cth)* (EPBC Act).

2.2.4 Sharks and Rays

A large number of chondrichthyans (sharks and rays) occur in Bass Strait. Shark species that may occur in the operating area (Bass Strait Operations) are listed as threatened under the EPBC Act.

2.2.5 Reptiles

There are five marine reptiles that occur as migrants along the eastern shores of Bass Strait. These are the loggerhead turtle (*Caretta caretta*), green turtle (*Chelonia mydas*), pacific ridley turtle (*Lepidochelys olivacea*), leathery turtle (*Dermochelys coriacea*) and the yellow-bellied sea snake (*Pelamis platurus*). All species of marine turtles are protected under the EPBC Act in Australia, and are on the List of reptiles that are endangered.

2.2.6 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 operating area (Bass Strait Operations) 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 are 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.

2.2.7 Seals

Two 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 on the List of mammals that are vulnerable under the *Environment Protection and Biodiversity Conservation Act* 1999 (Cth).

2.2.8 Cetaceans

Twenty seven cetacean species (whales and dolphins) 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.

2.2.9 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.

2.2.10 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 northeast of the nearest platform.

3. DESCRIPTION OF ACTIVITIES

The Bass Strait operations include 23 offshore platforms and an 880 km network of underwater pipelines. The scope of the BSEP is inclusive of all operational activities relating to production of crude oil and gas in the offshore permit areas in Commonwealth waters of the Gippsland Basin, Bass Strait. This includes:

All offshore facilities (including construction/maintenance activities on the platforms, e.g. extending living quarters);

Platform-based drilling, completions and workovers;

Various geotechnical/initial exploration activities, including:

- Single- and multi-beam bathymetry surveys;
- Side-scan sonar;
- Magnetometer surveys;
- Gravity surveys;
- Grab and core sampling;
- Sub-bottom profiling;
- Vertical seismic profiling; and

Pipeline operations within Commonwealth waters.

Other activities, outside of the scope of the BSEP, are managed under separate approvals. These include:

Activities in onshore and state waters (i.e. outside of Commonwealth waters);

Longford and Long Island Point plant operations;

Exploration activities (except those listed above);

Non-platform-based drilling;

Barry's Beach Marine Terminal (BBMT) Vessel Operations and Logistics

Platform, pipeline or subsea construction activities; and

Decommissioning activities.

Typical activities conducted on or adjacent to Bass Strait platforms include:

- Production
- Reinjection
- Well Testing
- Maintenance
- Safety Function Testing
- Inspection
- Fluid Sampling
- Pipeline Pigging
- Environmental Monitoring
- Bulk Consumables Handling
- Chemical Injection
- Crane Operations
- Construction
- Blasting and Painting
- Asbestos Removal
- Scaffolding and Rope Access
- Radiography
- Remotely Operated Vehicles (ROV)
- Helicopter Operations
- Supply Vessel Operations
- Well Work - Wireline/Workover
- Drilling & Completions
- Pipeline Valve Change out

Esso's Operations Integrity Management System (OIMS) documents processes and procedures which define controls for these activities. Simultaneous operations restrictions are in place to manage the potential for adverse interaction between these activities.

4. ENVIRONMENTAL RISK ASSESSMENT AND MANAGEMENT

An environmental risk assessment (ERA) workshop was undertaken as part of the revision of the BSEP. The ERA's scope was all potential environmental impacts associated with the production activities conducted by Esso in Bass Strait. This included the potential environmental impacts associated with routine operations, as well those associated with non-routine operations and incidents. The potential environmental impacts assessed included:

The physical presence of Esso's facilities, including the potential:

- impact on marine fauna of light and noise emissions;
- interference with shipping and fishing in the region; and
- loss of communication between platforms.

The management of wastes through the Waste Management Manual and the hierarchy of waste management, including:

- **Liquid wastes** include any water containing inhibitor chemicals, deck drainage, cooling water and potable water. Liquid wastes are generally directed to the skimmer vessel/pile systems where they are highly diluted and any oil components are removed;
- **Domestic wastes**, including kitchen, bathroom and laundry wastes, and sewage and putrescible wastes. Domestic wastes also include packaging material, glass, metal and plastic containers which are returned to shore for appropriate re-use, recycling and/or disposal by licenced waste contractors;
- **Fire equipment testing**, including using seawater with low concentrations of foam in hose reels and deluge systems on all platforms, which has been evaluated to be suitable for marine discharge;
- **Biological wastes** (i.e. from first aid rooms) which are stored, accumulated and transported onshore where it's disposed of by licensed waste contractors;
- **Produced Formation Water (PFW)**. Most PFW is treated on the platforms through oil and water separators. PFW is separated from crude oil and is then treated by dissolved gas flotation and/or hydrocyclones to remove oil to below the regulatory limit of 30 mg/L. The water component is disposed of offshore in accordance with regulatory requirements and the oil component is retained onboard or piped to the Longford Crude Stabilisation Plant for further treatment. The numerous studies that have been conducted into potential impacts of discharged PFW have shown that, due to the high dilution rates, the high energy environment of Bass Strait and low levels of contaminants in the PFW, there is no cumulative effect in Bass Strait;
- **Production chemicals**, which are managed through best management practices such as effluent toxicity testing and assessment of ecotoxicity impacts. Use of production chemicals is minimised as far as is practicable to where use is necessary. Most chemicals are water soluble and are discharged with the PFW and the skids under the chemical injection packages drain to a liquid disposal facility, which is treated onshore.
- **Hazardous or prescribed wastes**. All hazardous/prescribed wastes are transported to shore in appropriate containers where they are disposed of by licensed waste contractors

Atmospheric emissions, including:

- **Flaring**, which is only approved for emergency situations and up to a set monthly limit as determined by facility flaring procedures;
- **Fuel consumption**. Equipment such as compressors, generators, turbines and pumps which use fuels contribute to atmospheric emissions. Fuel gas is used in preference to diesel as the primary fuel for turbines, and where this is not possible, Australian Standard marine diesel (which is low in sulphur, minimising the production of sulphur dioxides) is used;
- **Fugitive emissions**. Fugitive emissions are emissions of gases or vapours from pressurized equipment due to leaks and various other unintended or irregular releases of gases. This is minimised through stringent construction and maintenance procedures, and the appropriate material selection of seals for required services;
- **Ozone depleting substances**. Equipment that may have ozone depleting substances has leak monitoring equipment.

Maintenance activities. Chemical selection protocols and a detailed Work Permit System ensure that all wastes are correctly controlled, collected, stored and transported back to shore for disposal at approved facilities.

Vessel operations. All vessel operations are governed by MARPOL requirements and have an approved Shipboard Oil Pollution Emergency Plan (SOPEP). Assessed scenarios include:

- Potential impacts from routine operations, such as: noise, atmospheric emissions, wastes, ballast water and the use of anti-fouling. These were all assessed as low risk; and
- Potential impacts from incidents, such as simultaneous operations (SIMOPS) near the facilities, which are managed using a number of procedures; damage to vessel fuel tanks (fuel tanks are located inside of the hull and fuel is kept in multiple independent tanks); and shipping and transferring of cargo to the facilities, which is managed under numerous Esso procedures.

Geoscience activities, such as bathymetric surveys, side-scan sonar, sediment sampling, sub-bottom profiling and vertical seismic profiling. These activities were all assessed as low risk due to the controls in place, small footprints and low likelihood of impact.

Spills. There have been no major oil spills during the history of development and production of the Bass Strait fields since 1973. Esso has a well-established Emergency Response System (ERS) including an Oil Spill Response Plan (OSRP). The risk of spills was assessed for a number of scenarios. These included:

- **Chemical and fuel transfers**. The transfer of chemicals and fuels by bulk methods or by hoses, and segregation, handling and disposal procedures are included within Esso's management systems. The controls in place include bunding, maintenance of tanks, hazardous chemical management procedures and the use of Material Safety Data Sheets (MSDSs). Hose transfers are only conducted by trained personnel in accordance with Esso procedures. There are loading procedures in place (including SIMOPS procedures) and loading is constantly monitored from both the platform and vessel. Transfers of diesel and methanol are primarily conducted in day light hours and only in favourable weather conditions. Transfers of chemicals to the monotowers using helicopters are only conducted by appropriately trained people in accordance with written procedures.

Chemical containers and hoses are fitted with dry break couplings. Transfers only occur during favourable weather conditions. Spill kits are readily available and MSDSs are kept.

- **Small spill scenarios**. The routine operations include numerous activities whereby spills could occur if management measures were not in place. Esso's policy of continuous improvement enables these areas to be identified and has procedures in place for implementing control measures. The controls include material selection - only materials that are appropriate for the conditions are used, operational procedures - detailed work instructions outline how to prevent spills, and manage them if they occur, maintenance procedures and schedules - this includes remote monitoring as well as daily checks, and a detailed OSRP. All spills are recorded by Esso, and regular reports are provided to the Victorian DPI.
- **Blowouts**. Although the likelihood of a blowout occurring was assessed as practically impossible, the consequences, if it was to occur, were assessed as significant. There are numerous controls in place to prevent blowouts, including careful design, engineering controls, automatic shutdown systems, manual shutdown systems, and numerous automatic, manual and remote monitoring systems. If a blowout were to occur, Esso's well-practiced oil spill response systems would be immediately implemented. The offshore location and distance from any sensitive environmental receptors, and the rapid dispersion due to the high energy environment of the Bass Strait, means that if a spill were to occur, its impact would be minimised;

Dropped objects. Every effort is made to ensure equipment is not lost overboard by securing loose equipment to the platform. There are dedicated laydown areas and trained personnel conducting work on offshore facilities.

Remotely operated vehicle (ROV) and diving operations. The major risk from these activities is the potential collision of a large 'work-class' ROV with pipeline risers or subsea installations. The existing controls and procedures were determined to be suitable to control this risk.

Pipelines and subsea facilities. Damage to the oil carrying pipelines, either through corrosion or accidents, is recognised as a potential threat to the environment. Assessed scenarios include:

- **Corrosion**. Slow leaks have the potential to release significant quantities of oil over time if not identified and repaired. The rupture of a pipeline has the potential to release a large quantity of oil over a short time. Crude is still warm when it enters export pipelines, and cools as it travels through the pipeline. The presence of reservoir and condensation water in the pipeline, and the initial higher temperatures results in corrosion potential. Corrosion inhibitor is therefore injected into the pipeline at each platform. The pipeline is protected against external corrosion by the use of a combination of sacrificial anodes and an impressed current Cathodic Protection system. Helicopters and production supply vessels conduct observations during transit to check for leaks, and a stringent monitoring and maintenance program is in place;
- **Anchors or dropped objects**. Anchoring is excluded from all areas where there are pipelines or subsea facilities, and any operations that have the potential to result in a dropped object are carefully managed under numerous Esso standards and procedures;
- **Failure of subsea connections.** In addition to the environmental risk assessment conducted for the BSEP, risk assessments have been undertaken for each subsea development – considering installation and continued operation of the wellhead facilities,

the pipeline and facilities on the host platform. Careful design, ongoing monitoring and maintenance, emergency shut-down systems and regular reviews ensure their environmentally safe operation;

- **Pigging operations.** Pigging operations (pipeline cleaning) are a vital part of the ongoing maintenance and inspection of pipelines. The risk of a spill resulting from pigging operations is minimised through a number of procedures, covering the training and minimum competencies of operators, permits to work and SIMOPS controls.

Platform based drilling, including:

- **Loss of well control resulting in a large spill**. The Wellwork Operations Management Plan (WOMP) describes in detail the methods to be used to ensure safe and environmentally sound operations. Numerous controls are in place, including those listed on page 12 to prevent blowouts;
- **Discharge of cuttings and muds**. The discharge of cuttings and drilling muds has the potential to impact benthic organisms by physical smothering or introduction of toxic compounds to the seabed. A number of studies have shown that the impacts on the seabed and water column from the discharge of cuttings and muds is minimal in Bass Strait, due to the dilution, high energy environment, and generally low toxicity of muds used. The muds used are chosen so as to be the least toxic suitable for the particular project. When using synthetic based muds (SBM), the cuttings go through a number of stages, including centrifuges and dryers, to remove as much mud as possible before the cuttings are discharged;
- **Transport/transfer of muds**. The transfer of drilling muds is managed in the same manner as the transfer of fuels and other chemicals;
- **Wastes**. All wastes from platform-based drilling and workovers (including deck drainage, reject water, liquid, solid, hazardous, maintenance wastes, general refuse) is managed in accordance with the procedures used on the platform.

Wellwork operations, including:

- **Blowout preventer (BOP) failure**. The failure of a BOP is considered to be practically impossible, however because a BOP's failure could result in a large oil spill, there are numerous safeguards in place. These include detailed work instructions (i.e., WOMP), rigorous testing and the installation of Sub-Surface Safety Valves (SSSV); and
- **Spills**. Other spills, such as the inadvertent release of SBM from the workover wells, or hydraulic fluid releases have been assessed as low risks. The controls currently in place and the use of internationally recognised low environmental impact hydraulic fluids mean that these risks are minimised.

A total of 119 potential risks (including routine, non-routine and unplanned activities) were identified and assessed. The majority were assessed as ‘low’ risks. No risks were assessed as ‘high’. Those assessed as ‘upper range – medium’ and as ‘lower range – medium’ are presented in Table 2 along with their associated management and mitigation measures.

Table 2 Environmental Risks, Management and Mitigation Measures

Potential Risk and Impact	Management/Mitigation Measures
Potential Risk: The risk of collisions with pipeline risers or subsea installations, leading to an oil spill, from vessel and work class ROV operations near facilities and/or dropped objects or anchors **Impact:** Potential for promotion of acute or chronic pathology or mortality of marine organisms. Significant changes to water column biochemistry.	**Prevention:** • Gazetting safety zones around active work area. • Australian Maritime Safety Authority (AMSA) exclusion procedures for marine vessels/legislated exclusion zones and distance from shipping lanes. • Notices to Mariners. • Procedure for vessel movements within 500 metre facility safety zone as work will be conducted in the 'Area to Be Avoided'. • Traffic movement management by platform supervisor. • Platform notification. • Risers are either located inside the jacket or have a riser guard. • Radio communications with platform during loading/unloading vessel. • Procedures compliant with navigation regulatory requirements. • Monitoring of weather reports via radio, email or fax. • Review of expected sea state conditions and tidal information. • SIMOPS procedures in place. • Procedures in place for ROV and diving activities. • Work only conducted in favourable weather conditions. • ROV moves at a slow speed. • Trained personal operating equipment. • Work Permit Procedures in place. • Pipelines have a protective coating to protect them from impact. • Splash zone corrosion protection on risers. • Designated anchor positions for production supply vessels. • Dynamic positioning control on production supply vessels means anchoring is rarely required. **Mitigation:** • Personnel to be familiar with Emergency Response Manuals/Plans including Bass Strait Oil Spill Response Plan (OSRP) and SOPEP. • Emergency Response Manuals, OSRP and SOPEP exercised regularly.
Potential Risk: Fuel spill resulting from the accidental damage of support vessel fuel tanks **Impact:** Potential for promotion of acute or chronic pathology or mortality of marine organisms. Significant changes to water column biochemistry.	**Prevention:** • Fuel tanks are inside of the hull. • Tank inspection program in place. • Preventative maintenance plan in place. • Trained personnel operating equipment. • Fuel is kept in multiple independent tanks. **Mitigation:** • Absorbents are readily available for small deck spillages. • Personnel to be familiar with Emergency Response Manuals/Plans including Bass Strait OSRP and SOPEP. • Emergency Response Manuals, OSRP and SOPEP exercised regularly.

Table 2 (*Continued*) Environmental Risks, Management and Mitigation Measures

Potential Risk: Oil or chemical spill during routine operations (e.g., cold water handling start up, minor leak from platform, flowline release, deck drain blockage, MOL pump seal failure, sub cellar line failure, diesel ring main failure, pipeline rupture, flowline release). **Impact:** Potential for promotion of acute or chronic pathology or mortality of marine organisms. Significant changes to water column biochemistry.	**Prevention:** • Material selection appropriate for reservoir fluids. • Maintenance controls on platform for spill mitigation & minimisation are in place (i.e. leak detection and control systems, CFTs, PFTs & ESDs) • Piping inspection programme to manage internal and external corrosion (OPIP). • Use of low environmental impact hydraulic fluid. • Deck drains and bunds. • Waste handling in accordance with waste management procedures. • Transfer recovered oil to mainland for disposal or recycling. • Physical condition of drains is checked as part of routine inspections for blockage and serviceability. • Oil and water separators are maintained in accordance with procedures. • Operation and Maintenance Procedures in place to prevent spills including Critical Procedures. **Management/Mitigation:** • Absorbents are readily available for small deck spillages. • Personnel to be familiar with Emergency Response Manuals/Plans including Bass Strait OSRP and SOPEP. • Emergency Response Manuals, OSRP and SOPEP exercised regularly. • Confirm all spills to sea are recorded, stewarded and records maintained. • Offshore location proximity from nearest sensitive environmental receptor. • Rapid dispersion of discharged material due to high energy environment of the Bass Strait.

Table 2 (*Continued*) Environmental Risks, Management and Mitigation Measures

Potential Risk: Oil spill due to well integrity failure, leading to potential blowout. **Impact:** Potential for promotion of acute or chronic pathology or mortality of marine organisms. Significant changes to water column biochemistry.	**Prevention:** • Surface Controlled Subsurface Safety Valve (SC-SSSV) is installed in all offshore wells. • At all times, there are at least two independent and tested barriers available. • Usually barriers during the are Xmas tree valves, and the SC-SSSV, • Material selection appropriate for reservoir fluids. • Maintenance controls on platform regarding spill mitigation & minimisation are in place (i.e. leak detection and control systems, CFTs, PFTs & ESDs) • Piping inspection programme to manage internal and external corrosion (OPIP). **Mitigation:** • Personnel to be familiar with Emergency Response Manuals/Plans including Bass Strait OSRP and SOPEP. • Emergency Response Manuals, OSRP and SOPEP exercised regularly. • Offshore location proximity from nearest sensitive environmental receptor. • Rapid dispersion of discharged material due to high energy environment of the Bass Strait.
Potential Risk: Integrity of the surface casing may experience corrosion, which may cause well integrity failure **Impact:** Promotion of acute or chronic pathology or mortality of marine organisms. Significant changes to water column biochemistry	**Prevention:** • The Surface Annulus is maintained with corrosion inhibited fluid to resist ingress from shallow formations. • The Production Annulus prevents the escape of formation fluids from the wellbore completion integrity. It protects the casing from degradation caused by formation fluids. • Production Operators routinely monitor annular pressure, or tubing head pressure. • Formation fluid level checks are conducted. **Mitigation:** • Personnel to be familiar with Emergency Response Manuals/Plans including Bass Strait OSRP and SOPEP. • Emergency Response Manuals, OSRP and SOPEP exercised regularly. • Offshore location proximity from nearest sensitive environmental receptor. • Rapid dispersion of discharged material due to high energy environment of the Bass Strait.

Table 2 (*Continued*) Environmental Risks, Management and Mitigation Measures

Potential Risk: Chemical spill while unloading from helicopters on monotowers. **Impact:** Potential for promotion of acute or chronic pathology or mortality of marine organisms. Significant changes to water column biochemistry.	**Prevention:** • Procedure in place for chemical transfers (PCADPA-170201). • Chemical containers and hoses are fitted with dry break couplings. • Transfers only occur during favourable weather conditions. • Appropriately trained people for the task. **Mitigation:** • Absorbents are readily available for small deck spillages. • MSDSs of chemicals are kept in the DPIC's logbook. • Personnel to be familiar with Emergency Response Manuals/Plans including Bass Strait OSRP and SOPEP. • Emergency Response Manuals, OSRP and SOPEP exercised regularly.
Potential Risk: Spill due to dropped objects from operating facilities or vessels (including geoscience surveys) colliding with pipeline risers or subsea installations during operation. **Impact:** Potential contamination of the marine environment. Promotion of acute or chronic pathology or mortality of marine organisms. Significant changes to water column biochemistry.	**Prevention:** • “Inspection class” ROV used are small and lightweight. • Procedures in place for ROV and Diving activities. • Work only conducted in favourable weather conditions. • ROV moves at a slow speed. • Trained personal operating equipment. • Work Permit Procedures in place. • SIMOPS procedures in place. • Pipelines have a protective coating to protect them from impact. **Mitigation:** • High energy environment readily disperses/ degrades a small leak. • Personnel to be familiar with Emergency Response Manuals/Plans including Bass Strait OSRP and SOPEP. • Emergency Response Manuals, OSRP and SOPEP exercised regularly.
Potential Risk: Potential for “work class” ROV to collide with pipeline risers or subsea installations during operation. **Impact:** Potential oil spill and contamination of the marine environment.	**Prevention:** • Procedures in place for ROV and Diving activities. • Work only conducted in favourable weather conditions. • ROV moves at a slow speed. • Trained personal operating equipment. • Work Permit Procedures in place. • SIMOPS procedures in place. • Pipelines have a protective coating to protect them from impact. **Mitigation:** • High energy environment readily disperses/ degrades a small leak. • Personnel to be familiar with Emergency Response Manuals/Plans including Bass Strait OSRP and SOPEP. • Emergency Response Manuals, OSRP and SOPEP exercised regularly.

Table 2 (*Continued*) Environmental Risks, Management and Mitigation Measures

Potential Risk: Chronic (slow, small volume) releases of hydrocarbons due to pipeline corrosion or failure of subsea connections (eg. flanges, valves). **Impact:** Potential for promotion of acute or chronic pathology or mortality of marine organisms. Significant changes to water column biochemistry.	**Prevention:** • Pipeline/subsea equipment design includes corrosion allowance and external impact. • Cathodic protection of pipelines. • Internal and external inspection program for pipelines. • Pipeline/subsea well head inhibition (batching and continuous) program. • Pigging of pipelines to remove build-up and to allow inhibitor to coat the pipeline internally. • Pressure shutdown system in place. • Splash zone corrosion protection on risers. **Mitigation:** • Helicopters and production supply vessels observations to checks for leaks. • High energy environment readily disperses/ degrades a small leak. • Personnel to be familiar with Emergency Response Manuals/Plans including Bass Strait OSRP and SOPEP. • Emergency Response Manuals, OSRP and SOPEP exercised regularly.
Potential Risk: Acute (fast, large volume) releases of hydrocarbons due to pipeline corrosion or failure of subsea connections (eg. flanges, valves). **Impact:** Potential for promotion of acute or chronic pathology or mortality of marine organisms. Significant changes to water column biochemistry.	**Prevention:** • Pipeline/subsea equipment design includes corrosion allowance and external impact. • Cathodic protection of pipelines. • Internal and external inspection program for pipelines. • Pipeline/subsea well head inhibition (batching and continuous) program. • Pigging of pipelines to remove build-up and to allow inhibitor to coat the pipeline internally. • Pressure shutdown system in place. • Splash zone corrosion protection on risers. **Mitigation:** • Helicopters and production supply vessels observations to checks for leaks. • High energy environment readily disperses/ degrades a small leak. • Personnel to be familiar with Emergency Response Manuals/Plans including Bass Strait OSRP and SOPEP. Emergency Response Manuals, OSRP and SOPEP exercised regularly.

Table 2 (*Continued*) Environmental Risks, Management and Mitigation Measures

Potential Risk: Anchors, dropped objects causing damage to pipelines/subsea facilities, resulting in contamination of the marine environment **Impact:** Promotion of acute or chronic pathology or mortality of marine organisms. Significant changes to water column biochemistry.	**Prevention:** • Splash zone corrosion protection on risers. • Exclusion zones exist. • Designated anchor positions for production supply vessels. • Dynamic positioning control on production supply vessels means anchoring is rarely required. • Risers are inside the jacket or inside a riser guard. **Mitigation:** • High energy environment readily disperses/ degrades a small leak. • Personnel to be familiar with Emergency Response Manuals/Plans including Bass Strait OSRP and SOPEP. • Emergency Response Manuals, OSRP and SOPEP exercised regularly.
Potential Risk: Failure of subsea connections (e.g. flanges, valves) may cause contamination of the marine environment. **Impact:** Promotion of acute or chronic pathology or mortality of marine organisms. Significant changes to water column biochemistry.	**Prevention:** • Global practices and design specification for subsea equipment. • External inspection program for subsea facilities. • Esso Emergency Response Manual includes an OSRP. **Mitigation:** • Helicopters and production supply vessels observations to checks for leaks. • High energy environment readily disperses/ degrades a small leak. • Personnel to be familiar with Emergency Response Manuals/Plans including Bass Strait OSRP and SOPEP. • Emergency Response Manuals, OSRP and SOPEP exercised regularly.
Potential Risk: During pigging operations - the inadvertent opening of the isolation valve while the closure door is open, resulting in a spill **Impact:** Potential for promotion of acute or chronic pathology or mortality of marine organisms. Significant changes to water column biochemistry.	**Prevention:** • Barrel isolation valves locked and tagged in closed position including isolation of power/gas/air supply to valves. • 15 minute isolation integrity test conducted prior to opening closure. • All Pigging activities are covered by critical procedures. • Minimum Required Competencies for operations and maintenance. • Preventative Maintenance Plan in place. • Closure is pressure leak tested prior and post receiving of pig. • The receiver/launchers are located in bunded areas. • Permit to work and SIMOPS controls in place during pigging activities **Mitigation:** • Absorbents are readily available for small deck spillages. • Personnel to be familiar with Emergency Response Manuals/Plans including Bass Strait OSRP and SOPEP. • Emergency Response Manuals, OSRP and SOPEP exercised regularly.

Table 2 (*Continued*) Environmental Risks, Management and Mitigation Measures

Potential Risk: During platform based drilling operations – potential for large oil spill occurring through drilling into another flowing well. **Impact:** Potential for promotion of acute or chronic pathology or mortality of marine organisms. Significant changes to water column biochemistry.	**Prevention:** • WOMP provides all the required actions to prevent a blow-out. • Conservative mud weight to over balance anticipated formation pressures. • Blow out preventers in place. • SSSV in place for completed wells. • Anti-collision studies performed. • Trained personal conducting work activities. • Drilling procedures in place. **Mitigation:** • Personnel to be familiar with Emergency Response Manuals/Plans including Bass Strait OSRP and SOPEP. • Emergency Response Manuals, OSRP and SOPEP exercised regularly. • WOMP provides all the required actions to be taken in event of a blow-out, personnel competency requirements.
Potential Risk: During platform based drilling operations – potential for large oil spill occurring through loss of control of the drill well **Impact:** Potential for promotion of acute or chronic pathology or mortality of marine organisms. Significant changes to water column biochemistry.	**Prevention:** • WOMP provides all the required actions to prevent a blow-out. • Conservative mud weight to over balance anticipated formation pressures. • Blow out preventers in place. • Trained personal conducting work activities. • Drilling procedures in place. **Mitigation:** • Personnel to be familiar with Emergency Response Manuals/Plans including Bass Strait OSRP and SOPEP. • Emergency Response Manuals, OSRP and SOPEP exercised regularly. • WOMP provides all the required actions to be taken in event of a blow-out, personnel competency requirements.
Potential Risk: The failure of the blow out preventer (BOP) during wellwork operations, resulting in a large oil spill **Impact:** Potential for promotion of acute or chronic pathology or mortality of marine organisms. Significant changes to water column biochemistry.	**Prevention:** • Conservative mud weight to over balance anticipated formation pressures. • Rigorous testing on blow out preventers in place. • SSSV in place for completed wells. • Trained personal conducting work activities. • Wellwork procedures in place. **Mitigation:** • WOMP provides all the required actions to be taken in event of a blow-out, personnel competency requirements. • Personnel to be familiar with Emergency Response Manuals/Plans including Bass Strait OSRP and SOPEP. • Emergency Response Manuals, OSRP and SOPEP exercised regularly.

Table 2 (*Continued*) Environmental Risks, Management and Mitigation Measures

Potential Risk:	**Prevention/Mitigation:**
Fishing trawler boards and/or fishing nets may snap on exposed lower edges of underwater wellhead structures, not protected by a Petroleum Safety Zone. **Impact:** Loss of catch. Damage to fishing equipment. Reputation impact. Disgruntled commercial fishing operator	• Inherent weight of the trawlable cap will sink it into the seabed. • Remote operated vehicle 'as built' survey will be conducted on completion of installation of deflection cap. • Inspection for scour around deflection cap included in the existing underwater pipeline inspection programme. • Potential removal of wellhead and cap subject to future technical studies and availability of appropriate equipment.

5. IMPLEMENTATION STRATEGY

Esso's Operations Integrity Management System (OIMS) enables it to conduct its business in a manner that is compatible with the balanced environmental and economic needs of the communities in which it operates, and that protects the safety, security and health of our employees and relevant members of the community. In addition, the system is intended to facilitate:

- Compliance with all applicable environmental laws and regulations.
- Application of responsible standards where laws and regulations do not exist.

The design of OIMS has embraced the intent behind ISO 14001 (Environmental Management Systems) and has addressed all of the individual ISO 14001 system elements. The OIMS framework contains 11 elements, each with a number of systems and each containing an underlying principle and set of expectations.

Section 9 of the BSEP (Implementation Strategy) describes how OIMS is used to manage the potential environmental impacts of Esso's Bass Strait operations. It describes the:

- Systems, practices and procedures;
- Roles and responsibilities;
- Training and competencies;
- Performance and monitoring;
- Reporting, auditing and review;
- Emergency response, including the OSRP; and
- Record keeping.

6. CONSULTATION

Esso is committed to being a valued and respected member of communities in areas where we operate. Consultation and engagement are key components of our corporate citizenship strategy. It helps us identify those issues that are most material to our business operations and engage with the communities in which we operate. This engagement takes many forms, including internal and external dialogues, direct communications, meetings with key stakeholders, information provided to and distributed through the media, and direct consultation with organisations and individuals.

To be effective, our consultation efforts must be built on honest, transparent, accurate, and timely information. Our consultation activities cover a wide range of topics, including environmental, governance. Examples of topics raised that we found to be most relevant to Esso and that are incorporated into our business plans included:

- **Energy Security and Environmental Matters, Including Climate Change**

Through speeches and dialogues throughout the community, we are presenting our views on energy security and climate change, and we are working to reduce our emissions, improve the efficiency of our consumers' use of energy, and develop new energy technologies;

- **Community Development**

Through feedback and dialogue with relevant community organisations (NGOs), we tailor our corporate giving to meet the needs of the communities in which we operate.

Esso has a history of consultation with the community in the areas in which we operate. Esso continues to actively identify and consult with stakeholders of our Bass Strait operations through:

- Regular contact and consultation with offshore stakeholders including fishing groups on our seismic survey programs, drilling programs, new facilities installation and consultation on potential new developments. This includes consultation on the Kipper Tuna Turrum (KTT) projects, our exploration drilling programmes, and regular ongoing production activities;

- Regular contact and interaction with local, state and federal government representatives, including onsite operational and project briefings, and broader issues-based consultations about Esso's operations more generally;

- Regular provision of current information through Gippsland media (eg. ABC Radio Gippsland; Gippsland Times; Yarram Standard), with articles, media releases, interviews and advertisements;

- Ongoing identification of stakeholders, via direct contact with our employees, facilities, Public and Government Affairs Department and community engagement;
- Community events, where interested stakeholders are invited to meet with Esso employees who are available to discuss issues of specific interest, and provide relevant points of contact if further information exchange is required;
- Maintaining an active community consultation program that includes regular contact with regulators, business and community leaders;
- Esso engages with a broad range of sectors/stakeholders relevant to its operations or new developments, such as Community, Emergency Services, Fisheries, Government and semi-government organisations, Media, Schools/Education Institutions and other organisations including utilities, pipeline, offshore services, security, RAAF and training.

Esso participates in broader events through membership of numerous industry and business organisations and associations, and participation in conferences, community forums and exhibitions, including:

- Australian Petroleum Production and Exploration Association (APPEA);
- Australian Institute of Petroleum (AIP);
- Business Council of Australia (BCA);
- Centre for the Economic Development of Australia (CEDA);
- Australian Industry Greenhouse Network (AIGN);
- American Chamber of Commerce (AmCham); and
- Centre for Corporate Public Affairs (CCPA).

Esso maintains an active community contributions program targeted directly into the communities in which we operate, including funding for conservation and education programs such as the Phillip Island Nature Parks seal program, the Marine Discovery Centre Fisheries Victoria (DPI), the People and Parks Foundation Seasearch Program, (community volunteers monitoring Victorian marine parks) and the Dolphin Research Institute.

Support for a wide range of community organisations and activities in Gippsland through its contributions program including emergency services, schools, surf life saving clubs at Seaspray and Lakes Entrance, the Gippsland Emergency Relief Fund, a water monitoring program with Waterwatch (West Gippsland Catchment Management Authority) and Roadsafe.

In addition, Esso has two annual employee volunteering programs that assist community groups across Gippsland: the Volunteer Involvement Program (known as VIP) and the "Day of Caring:" The VIP grants supported more than 135 community groups in 2010, including 70 community organisations in Gippsland, such as emergency services, schools, environmental and cultural groups.

The Day of Caring involves approximately 270 employees helping 23 designated community groups, including Gippsland organisations.

Ongoing Consultation

- The annual community functions held near sites (Longford, Long Island Point, Barry Beach Marine Terminal) provide a regular opportunity to meet with identified community stakeholders (examples listed), and inform guests about Esso's business developments and community activities. From 2011 an offshore community liaison function will be introduced. Importantly, the relaxed environment also allows for community attitudes, concerns and questions to be raised directly with Esso employees. Each event has Esso representation, matched to the interests of the stakeholders, as well as an open-floor question and answer session following the business update.
- Regular (at least quarterly) contact with Members of State and Federal Parliament to ensure constituent concerns/queries addressed and advise about future activities provided. Mobile, office and email contact details have been provided to each office.
- Esso also conducts an independent community survey in Gippsland every three years which provides a forum for respondents to give their views on Esso.

Additional Initiatives

Written advice of non-routine offshore activity is provided as required to relevant stakeholders. All recipients are invited to contact Esso if they have any further concerns or queries, with relevant names and contact details provided.

When significant projects are underway, such as Kipper Tuna Turrum (KTT). Esso provides briefings to community leaders at significant stages of the project. This is often reinforced with media interviews and additional briefings of local community leaders.

CONTACT DETAILS

For further information about the BSEP, please contact:

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