Gippsland Basin 2008 Drilling Environment Plan: Public Summary

February 2008

This summary of the Gippsland Basin 2008 Drilling EP has been submitted to comply with Regulation 11(7)(8) of the Petroleum (Submerged Lands) (Management of Environment) [P(SL)(MoE)] Regulations 1999.

Introduction

Apache Energy Limited (Apache) has prepared a generic Drilling Environment Plan (EP) for its 2008/2009 drilling programme in its existing offshore acreage (Figure 1) within the Gippsland Basin, including additional drilling that may extend beyond this timeframe, up to and including 2012.

This generic drilling EP was approved by the Victorian Department of Primary Industries (DPI), in accordance with the *Petroleum (Submerged Lands) (Management of Environment) (PSLMoE) Regulations 1999*.

Project Description

Apache proposes to drill a number of exploration, appraisal as well as potentially production wells within its Gippsland Basin permits during the 2008 to 2012 approval period covered by this EP (see **Table 1**). For any given well, the type of well will be provided in the environmental bridging document.

Well-specific environmental 'Bridging Documents' will be prepared on a well-by-well basis to provide additional detail specific to each well and will include information such as the exact well location, consultation undertaken with the various stakeholders, the drill rig and drilling fluids to be used including the technical justification for Synthetic Based Mud (SBM) use (if required), volume of cuttings to be discharged to the ocean as well as information on any additional identified risks that that differ from those addressed in the generic EP.

All drilling will be undertaken in accordance with the regulations and guidelines set out in the *Petroleum (Submerged Lands) Act, Schedule: Specific Requirements as to Offshore Petroleum Exploration and Production – 2005*.

Apache's drilling program is expected to commence in February 2008 using the West Triton jack-up Mobile Offshore Drilling Unit (MODU) to drill the Wasabi-1 well in Vic/P58, the Coelacanth-1 well in Vic/P45 and the Speke South-1 wells in Vic/P42, before being released to other operators undertaking offshore drilling in the Gippsland Basin. This initial shallow water drill program is expected to take one and a half months to complete.

Other deeper wells (greater than 90 to 00 m) will be drilled using the Ocean Patriot semi-submersible MODU when it becomes available to Apache in July 2008. The Ocean Patriot drilling programme is expected to take 24 months to complete with its current contract ending with Apache in mid June 2010. The specific details of the drilling programme beyond mid 2009 have not been finalized at this stage and are likely to include a possible extension of the Ocean Patriot contract or the contracting of other drill rigs to the Gippsland drilling program.

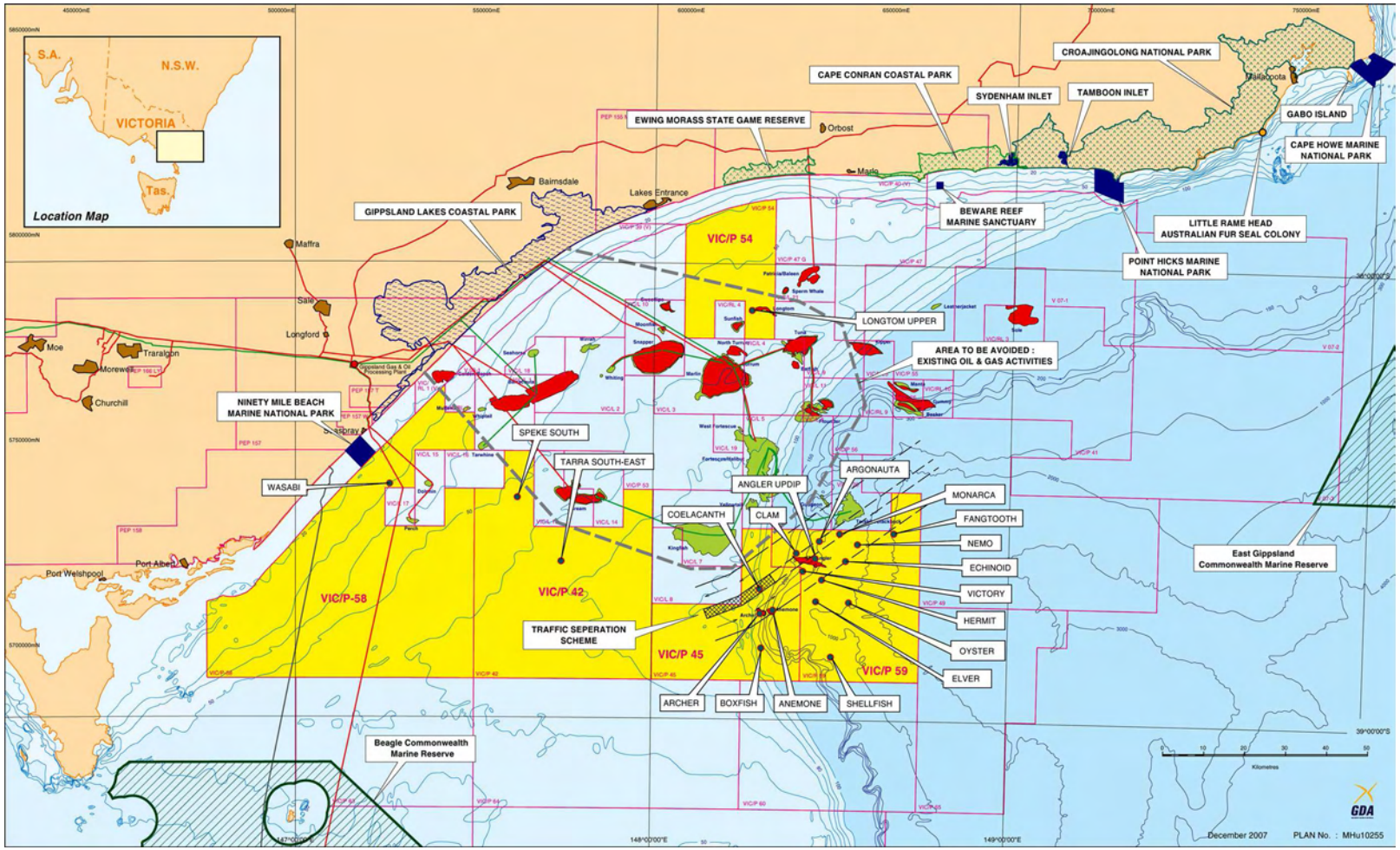

Figure 1: Apache operated permits in the Gippsland Basin and proposed drilling program

Table 1: Gippsland Basin notional drilling programme

Well Name	Permit Area	Proposed Drill Rig	Water Depth (m)	Proposed Total Depth of well (m)	Proposed Dates		
					Start	Finish	Duration (Days)
Wasabi-1	Vic/P58	West Triton Jack-up	37	2,600	1 Feb 08	16 Feb 08	16
Coelacanth-1	Vic/P45	West Triton Jack-up	100	2,925	17 Feb 08	4 Mar 08	17
Speke South-1	Vic/P42	West Triton Jack-up	55	2,700	5 Mar 08	20 Mar 08	16
Nemo-1	Vic/P59	Ocean Patriot Semi-Submersible	600	2,600	1 Jul 08	24 Jul 08	23
Hermit-1	Vic/P59	Ocean Patriot Semi-Submersible	250	4,100	24 Jul 08	20 Aug 08	28
Elver-1	Vic/P59	Ocean Patriot Semi-Submersible	500	2,600	20 Aug 08	8 Sept 08	20
Victory-1	Vic/P59	Ocean Patriot Semi-Submersible	250	2,800	8 Sept 08	26 Sept 08	19
Monarca-1	Vic/P59	Ocean Patriot Semi-Submersible	350	4,100	26 Sept 08	24 Oct 08	29
Argonauta-1	Vic/P59	Ocean Patriot Semi-Submersible	280	4,250	24 Oct 08	20 Nov 08	28
Echinoid-1	Vic/P59	Ocean Patriot Semi-Submersible	350	3,100	20 Nov 08	11 Dec 08	22
Clam-1	Vic/P59	Ocean Patriot Semi-Submersible	200	NYD	11 Dec 08	4 Jan 09	25
Anemone-1	Vic/P59	Ocean Patriot Semi-Submersible	250	NYD	4 Jan 09	28 Jan 09	25
Boxfish-1	Vic/P59	Ocean Patriot Semi-Submersible	150	NYD	28 Jan 09	21 Feb 09	25
Shellfish-1	Vic/P59	Ocean Patriot Semi-Submersible	350	NYD	21 Feb 09	17 Mar 09	25
Archer	Vic/P45	Ocean Patriot Semi-Submersible	150	NYD	18 Mar 09	6 Apr 09	20
Angler Updip	Vic/P59	Ocean Patriot Semi-Submersible	300	NYD	6 Apr 09	5 May 09	30
Longtom Upper	Vic/P54	Ocean Patriot Semi-Submersible	55	NYD	5 May 09	3 Jun 09	30
Appraisal	Vic/P42-59	Ocean Patriot Semi-Submersible	NYD	NYD	3 Jun 09	2 Jul 09	30
Appraisal	Vic/P42-59	Ocean Patriot Semi-Submersible	NYD	NYD	2 Jul 09	31 Jul 09	30
Appraisal	Vic/P42-59	Ocean Patriot Semi-Submersible	NYD	NYD	31 Jul 09	29 Aug 09	30
Exploration	Vic/P42-59	Ocean Patriot Semi-Submersible	NYD	NYD	29 Aug 09	Sep 2010	365
Oyster-1	Vic/P59	Drill-Ship	700	3,100	STA	STA	29
Fangtooth-1	Vic/P59	Drill-Ship	2,000	Unknown	STA	STA	35

NYD – Not yet determined
STA – Subject to availability

The drilling programme will use a combination of jack-up and semi-submersible drilling rigs (both anchored and dynamically positioned which don't require anchors) for both shallow and deep waters, respectively, and possibly a dynamically positioned drillship to drill the wells located in the deepest waters in the Vic/P59 Permit.

Before drilling operations commence, routine precautions will be undertaken by the drilling contractor to ensure the stability of the drilling rig/s and to minimise the risk of movement during storm conditions. Previous drilling in the region has provided information on the nature and stability of the seabed and the underlying strata, particularly with respect to the expected depth of penetration by the rig legs. The positioning and jack-up operation will be closely supervised by the drilling supervisor, rig supervisor and vessel skippers. Site surveys will also be undertaken for each proposed drill site location to determine the structure of the seabed as well as confirming if there are any seabed features such as corals or rocks within the jack-up tow route or semi-submersible anchor span or at the proposed drill site.

An Oil Spill Contingency Plan (OSCP), detailing the response procedures in the event of an accidental chemical or hydrocarbon spill will be available on the drilling rig and support vessels. Copies of this document are introduced in the Environmental induction process and are made available to crew members prior to the commencement of any work.

The proposed drilling programme detailed in **Table 1** has been designed to use entirely water-based mud (WBM) wherever possible and practical to do so. WBM consist of between 92-98% fresh or saline water. The remaining 2-8% of the WBM is made up of drilling fluid additives that are either completely inert in the marine environment, naturally occurring benign minerals or readily biodegradable organic polymers with a very fast rate of biodegradation in the marine environment. The WBM systems and additives proposed to be used in the combined drilling programme are outlined in

Table 2. It is standard industry practice at the end of a well to discharge the residual volume of WBM to the ocean as it has limited value for reuse.

All chemicals used on the drill rigs will be listed on the Master List of material data safety sheets (MSDS). No chemicals are permitted on the drill rig unless they are accompanied by a MSDS.

During drilling, a 500 m radius temporary exclusion zone around the rigs will be declared under legislation and gazetted accordingly. The vessels that do operate in these waters will be informed by radio on approach about the exclusion zones applying around the rigs.

Table 2: WBM system proposed for the Gippsland Basin Drilling Programme

Hole Size / Section No.	Drilling Fluid (Mud) System (92-98%)	Drilling Fluid Additives (2-8%)
311 mm (12") Hole / # 1	Sea Water / Bentonite Fresh Water Sweeps	Sea Water, Fresh Water, Caustic Soda, Soda Ash, Bentonite
216 mm (8 ½") Hole / # 2	Potassium Chloride / Polymer / Barite Water Based mud	Fresh Water, Caustic Soda, Soda Ash, Barite, Potassium Chloride, Biocide, Flowzan, Drispac, PolyPlus, Calcium Carbonate, Asphasol D
Completion / # 3	Fresh Water or Sea Water / Sodium Chloride Brine	Sea Water, Fresh Water, Sodium Chloride, Caustic Soda

Following the completion of the well, it will be abandoned in accordance with a DPI approved program. Cement plugs will be set at various depths to seal the well, the casing will be cut off below the surface of the seabed and all the seabed obstructions will be removed. A remotely operated vehicle (ROV) will then be used to survey the seabed to ensure that no debris remains. The ROV survey is undertaken whilst the rig is still onsite. This standard Apache underwater survey is undertaken after the plug and abandonment (P&A'd) of the well and as the rig commences its preparation for relocating from site. If the well is considered to be commercially viable, the well will be sealed using mechanical and cement plugs under government approved programs, and suspended until a decision regarding the development can be made.

During and at the completion of drilling the well, logging tests and well tests may be undertaken.

Well tests may be required during appraisal and production drilling and are managed according to the Drill Rig's Testing Manual as part of the Drilling Management System. Specific information related to individual well tests such as the exact type of burner, the days of flow and target flow rates will be included in the Well Testing Programme which is submitted to DPI for approval once the reservoir has been drilled.

Well tests will only commence under suitable current and predicted weather conditions, as determined by the Drilling Supervisor and Drill Rig's Person-in-Charge (PIC). The environmental objective of all tests is to conduct operations without release of hydrocarbons to the marine environment and to minimise the production of black smoke.

Following the completion of the drilling programme, the drill rig and support vessels will demobilise from the field.

Receiving Environment

Physical Environment

The water depth at the various drill sites for the proposed drilling program varies and is given in **Table 1**. Regionally, Bass Strait has a unique geometry consisting of a broad shallow region, which descends abruptly to very deep water on each side. The Gippsland Basin is the broad shallow region on the eastern side of Bass Strait. The flux of water through the Strait and its variations are key components of many physical and biological processes in the region

The climate of the Gippsland Basin can be described as moist cool temperatures with warm summers, with a regular winter-spring rainfall. The region of Bass Strait is located on the northern edge of the westerly wind belt known as the Roaring Forties. Wind direction and speed depend on the position and movement of synoptic systems.

Bass Strait is a high-energy environment exposed to frequent storms and significant wave heights. The highest wave conditions are generally associated with strong west to southwest winds caused by the eastward passage of low-pressure systems across Bass Strait. Monitoring of the wave climate has been undertaken within the Gippsland Basin (at the Kingfish B platform) since 1977. Storms may occur several times a month resulting in wave heights of 3 to 4 m or more. In severe cases, southwest storms can result in significant wave heights of greater than 6 m.

Summer air temperatures in coastal Victoria range from early morning lows of 12 to 15℃ to afternoon highs of 22 to 24℃. Equivalent w inter ranges are 6℃ rising to 12 to 15℃ in the afternoons. Temperatures tend to be at the higher end of the range in Gippsland because of the rain shadow effect of the Great Dividing Range. Offshore, the 50% exceedence temperature and relative humidity are approximately 15℃ and 77% respectively.

Average annual rainfall along the coast ranges from approximately 500 to >1,000 mm, being dependent mostly on the proximity to the Strzelecki Ranges and the Great Dividing Range.

Biological Environment

Bass Strait is an area of high faunal diversity and species endemicity, for several reasons:

- It has been isolated in geological time and by climatic barriers, with a history of variable exposure and immersion during sea-level changes in the last few million years.
- It is influenced by water masses from the west, northeast and south.
- It has sediment complexity and a high biogenic component.

Bass Strait also contains a number of species of high commercial and conservation value including:

- More than 170 species of zooplankton, with copepods making up approximately half of the species encountered;
- A high level of benthic invertebrate diversity, dominated by crustaceans and polychaetes. This high diversity continues into deep water, with a rich crustacean and mollusc fauna observed in samples collected from the continental slope off the Gippsland Basin in depths between 200 and 3,000 m;
- Over 500 species of fish, including a number of species of importance to commercial and recreational fisheries. EPBC-listed fish species comprise pipefish, pipehorse and seahorse. These species normally inhabit shallow reefs and kelp beds;
- Three EPBC-listed shark species may occur in the region: the grey nurse shark (*Carcharias taurus*), the great white shark (*Carcharodon carcharias*) and the whale shark (*Rhincodon typus*);

- Many important coastal and migratory bird species including a number of threatened species, such as albatross, skua and petrel species. There are no islands or seabird colonies in the Gippsland Basin. However, there is the potential for coastal migratory species, protected by international agreements (Bonn Convention, JAMBA and CAMBA), to fly over the area since many of the birds undertake large annual migrations across the south Pacific. The main species of migratory bird in the area are various albatross species, which use the area as a feeding ground;
- A number of species of whales, dolphins and fur seals occur in Gippsland Basin waters. The humpback whale (*Megaptera novaeangliae*), the blue whale (*Balaenoptera musculus*), and the southern right whale (*Eubalaena australis*), are listed as threatened under the EPBC act. The humpback whale occurs regularly in the region while migrating to and from the north eastern Australian coast from the sub-Antarctic. However, it does not feed, breed or rest in Bass Strait and the Victorian coastal waters are not a key location for this whale species. Sightings of the other species are less common.

  The Gippsland Basin is outside the known southern right whale calving and nursery zone, which is located in the inshore waters of Western Victoria around Warrnambool, a considerable distance from Apache's proposed exploration permits.

  One non-cetacean marine mammal is listed, the fur seal (*Arctocephalus pusillus*), which is distributed throughout Bass Strait. The nearest breeding colonies are at The Skerries (near Rame Head) and Kanowna Island (off Wilsons Promontory). The fur seals also use resting sites at Wilson's Promontory, The Skerries and at Cape Conran.

  Seals are frequently seen resting and foraging on the Bass Strait oil and gas platform structures. As platforms create artificial reefs that attract encrusting and free-swimming organisms, it is likely that seals are attracted by both the resting and feeding opportunities offered by the platforms.

<u>Heritage, Conservation or Culturally Significant Areas</u>

Marine National Parks, Sanctuaries and Special Management Areas along the east Gippsland Coast, and their proximity to the proposed drill site, are listed in

Table 3.

The Commonwealth government has recently established one of the world's largest marine park networks (reserves) in the South-east Marine Region which was proclaimed in June 2007 and came into effect in September 2007. Each area in the reserves network is subject to the provisions of the EPBC Act and its regulations. Thirteen areas make up the Commonwealth Marine Reserves (CMR) for the South-east Marine Region of which only Beagle CMR lies in the Gippsland Basin (see **Figure 1**). The East Gippsland CMR is in proximity to the eastern portion of the basin. These two areas comprise of 2,982 and 4,137 km^2 respectively. Both of these areas are currently zoned as Multiple Use Zones (IUCN category VI).

Table 3: Marine conservation areas in East Gippsland

Conservation Category	Location	Approximate Distance from closest point of Apache well (km)	Well & Permit Area
Marine National Parks	Wilson's Promontory Corner Inlet Ninety Mile Beach Point Hicks Cape Howe	81 57 13 91 163	Wasabi-1, Vic/P58 Wasabi-1, Vic/P58 Wasabi-1, Vic/P58 Longtom Upper, Vic/P54 Longtom Upper, Vic/P54
Marine Sanctuaries	Beware Reef (Cape Conran)	54	Longtom Upper, Vic/P54
Marine Special Management Areas	Gabo Island The Skerries	160 134	Longtom Upper, Vic/P54 Longtom Upper, Vic/P54
Ramsar Wetlands	Lakes Entrance	36	Longtom Upper, Vic/P54

The majority of archaeological sites in Victoria are found within a kilometre of the coast, including along Ninety Mile Beach. There are also a number of shipwrecks of historic interest in the area and all shipwrecks older than 75 years are designated under the Commonwealth Historic Shipwrecks Act 1976. In October 1991, an RAAF Boeing 707 crashed off Woodside Beach. The site is not officially a designated grave site, although not all bodies were recovered.

Socio-Economic Environment

A number of current socio-economic uses in the Gippsland Basin include commercial fishing, oil and gas production and commercial shipping.

Commercial fishing in the region includes inshore coastal waters (mainly State administered fisheries) and the areas along the continental slope (mainly Commonwealth fisheries). Most of this commercial fishing (volume basis) occurs within Commonwealth waters along the continental shelf and the upper continental slope.

Most fishing vessels operating in eastern Bass Strait operate from Lakes Entrance, although not exclusively; many trawl, shark and scallop vessels may come from other Victorian and interstate ports.

Commercial fisheries of eastern Bass Strait include:

- Southern and Eastern Scalefish and Shark Fishery (SESSF)
- Bass Strait Central Zone Scallop Fishery
- Small Pelagic Fishery
- Tuna and Billfish Fisheries
- Rock Lobster and Giant Crab fishery

Recreational fishing is a significant activity in the nearshore area along Ninety Mile Beach, comprising beach-based fishing and boat-based fishing. Only a small proportion of recreational boating activities venture offshore. Most marine recreational fishing in the area is coastal, surf, inland lakes and estuary fishing.

The Esso and BHP Billiton Joint Venture has been the dominant oil and gas producer in the Gippsland Basin since the early successful discoveries in the mid 60s. Their major oil and condensate reservoirs include the Bream, Flounder, Fortescue, Halibut, Kingfish, Tuna, West Kingfish and the West Tuna fields (**Figure 1**). The Barracouta, Marlin, and Snapper fields are the key natural gas fields within the Basin (**Figure 1**). All of these production fields are joined by a network of pipelines to the eighteen offshore production facilities and transported via pipelines to the Longford gas processing and oil stabilisation plants near Sale.

Other producers in the Basin include Santos with the Patricia – Baleen gas fields in the Vic/L21 production license and Anzon Australia with the Basker/Manta/Gummy (BMG) oil field in Vic/L26.

Seismic and drilling activities are undertaken as a regular occurrence within the Gippsland Basin by, amongst others, the Esso/BHP joint venture, Apache, Santos and Bass Strait Oil Company Ltd (BSOC).

Given the high density of petroleum facilities, the International Maritime Organization (IMO) has designated 'An Area to be Avoided' (see **Figure 1**) surrounding most of the offshore operational area in eastern Bass Strait. Under the Petroleum (Submerged Lands) Act, 1967, unauthorized vessels larger than 200 gross tonnes are not permitted within this area.

Two traffic separation schemes were implemented to enhance safety of navigation by separating shipping into one-direction lanes for vessels heading north eastwards and those heading south westwards. One separation area is located south of Wilson's Promontory, outside the Gippsland Basin, and the other south of Esso/BHP Billiton's Kingfisher B platform. A number of Apache's proposed wells are located within and adjacent to the traffic separation schemes (**Figure 1**) in Vic/P45 and Vic/P59.

Standard 'Notice to Mariners' will be issued to alert shipping traffic of the location of the rigs and dates for drilling activities. The Australian National Shipwreck Database was searched for any shipwrecks recorded in or in the vicinity of the proposed drill sites. None were recorded in the database.

Major Environmental Hazards and Controls

The potential environmental impacts resulting from routine activities and accidental discharges associated with exploration, appraisal and development drilling in the Gippsland Basin are outlined in detail in the Generic Drilling Program EP.

Table 4 summarises the potential environmental impacts and management measures of the proposed drilling program and **Table 5** summarises the accidental discharge impacts and management measures.

Table 4: Summary of effects of routine operations

Potential Hazard (Risk)	Potential Environmental Effect (Consequence)	Mitigating Factors and Measures	Risk Ranking
Rig and Vessel Anchoring			
Disturbance to Seabed	The area of seabed and associated benthic and epibenthic disturbance associated with rigs anchoring is typically in the order of 100 m2. The area of seabed and associated benthic and epibenthic disturbance associated with running a mooring buoy for supply vessels is negligible. Benthic organisms are expected to recolonise quickly after drilling operations cease.	Side scan sonar surveys and coring of seabed done prior to drilling. Data used to position rigs Adherence to anchoring procedures to minimise anchor and chain drag. ROV inspection of seabed after drilling complete to check for debris on seabed.	Negligible
Noise			
Underwater noise generated by drill rigs, supply vessels, helicopters, vertical seismic profiling	Physiological effects or disruption to behaviour of fauna Noise generated at small spatial scale, confined to near drill sites Noise may displace whales over small spatial scales No long-term changes in feeding behaviours (dependency) or population dynamics due to short time frame on one location.	Most species that may be affected are mobile and have ability to move away from noise source WA DoIR Guidelines on minimising acoustic disturbance to Marine Fauna are followed during VSP. Helicopters fly at a minimum altitude of 500 feet (except for take offs, landings and adverse weather conditions) and on longer trips over open water may fly at 3,000 feet. Supply vessel speed reductions and/or detour will be taken around any whale sightings. Potential impacts of noise on fauna included in environmental education material and inductions on rigs. Bridging document will address risks from noise more specifically for wells located near or within migration pathways during whale migration.	Negligible
Interference with Third Parties			
Interference with Shipping, Fishing and Recreational Operators	Potential disruption to commercial or recreational fishing and tourist activity. Trawling gear snags with rig anchors/chains. Risk of collision with other vessels.	Commercial fishing groups will be consulted and will be advised of the location and schedule of the drilling programme. Contractors shall remain vigilant for commercial fishing vessels during the operation and establish communications to avoid conflict. A record of consultation with commercial fisheries groups shall be kept and made available to regulatory authorities upon request. AMSA will be formally contacted regarding the	Negligible

Potential Hazard (Risk)	Potential Environmental Effect (Consequence)	Mitigating Factors and Measures	Risk Ranking
		campaign & their conditions implemented (Section 5.1.4). Standard maritime safety procedures shall be adopted. Commercial fishing users may have temporary interruption or displacement of fishing activities during the proposed drilling. Recreational fishing and tourism effort in permit areas is minimal. Minor disruption to shipping activities. AMSA proposing altering the locations of the TSS.	
Light Emissions			
Continuous lighting of the drill rigs for the duration of operations.	May attract marine species (such as fish, seals and seabirds) and depending on the foraging range of some species, may result in a short-term abundance or concentration of species in the immediate vicinity. May result in increased predation of attracted fauna.	Standard maritime safety procedures shall be adopted (e.g. AMSA). Lighting selected to meet safety requirements. Minimise unnecessary lights directed downwards to the water.	Negligible
Drill Cuttings, Muds and Pipe Dope			
Discharges of cuttings, muds and pipe dope to seabed	Increases suspended sediment load in the water column thereby increasing turbidity and decreasing light attenuation locally. Reduced amount of light may temporarily impact physiological processes of flora and fauna. Localised and temporary burial of benthic communities and sediment anoxia within 100-200 m of discharge point. Recovery of benthic communities within months for WBM Potential for bioaccumulation in marine fauna, however, WBM is non-toxic, and pipe dope brand is selected based on least toxicity. Pipe dope is amalgamated with the drill fluid and retained on drill cuttings and dispersed in open ocean conditions.	Low toxicity drilling fluids will be used for drilling. WBMs used whenever possible. Cuttings and associated drill fluids shall be treated to achieve solids separation and meet statutory requirement for discharge. Use pipe dope that has lowest concentration of heavy metals and hydrocarbons but still meets safety and performance criteria. Impacts minor and localised, not significant given the wide distribution of infaunal species and the homogeneity of the benthic habitat.	Acceptable risk, risk reduction measures should be considered depending on proximity to sensitive resources
Sewerage, Putrescible and Solid Domestic Wastes			
Sewage and putrescible wastes discharged to sea	Biodegradable matter (i.e. macerated food scraps and sewage) may result in localised increases in nutrient	Solid waste discharges to sea shall be limited to food scraps and sewage.	Negligible

Potential Hazard (Risk)	Potential Environmental Effect (Consequence)	Mitigating Factors and Measures	Risk Ranking
	levels, which may stimulate microbial activity and therefore act as a food source for scavenging birds and/or marine animals. Low level contamination of organisms is also possible as a result of ingestion of this material: isolated population numbers of some organisms may be affected in the short term. Increases suspended sediment load in the water column thereby increasing turbidity and decreasing light attenuation locally. Possible modification in feeding habitats for pelagic fish and seabirds.	Sewage and food scrap disposal will conform to the requirement of MARPOL Annex IV; • macerated to less than 25mm diameter prior to disposal. • No sewage or putrescible waste will be discharged within 12 nm of any land. Biodegradable soaps to be used on rig. All other waste shall be retained onboard for appropriate disposal on-shore (i.e. all domestic, solid, plastics and maintenance wastes). All waste containers will be closed (i.e. with lid or netting) to prevent loss overboard.	
Waste Oil, Chemicals and Oil Contaminated Drainage Water			
Oil or chemical spills or contaminated deck drainage entering marine environment	Low level contamination of organisms is possible as a result of ingestion, some organisms may be affected in the short term. Localised reduction in water quality including suspended sediment loads and turbidity	All waste management shall comply with the P(LS)A, appropriate hazardous waste legislation and local government disposal guidelines. A complete inventory will be kept of all chemicals to allow sufficient and appropriate recovery materials to be on hand in the event of a spill (i.e. safety data sheets, labelling and handling procedures). All waste containers will be closed (i.e., with lid or netting) to prevent loss overboard. Drums containing oil or chemicals will be stored within a bunded area on the rigs. Fuel and diesel will be stored in large, internal tanks onboard. Spent oils and lubricants shall be securely containerised and returned to shore upon completion of drilling for disposal at appropriately licensed facilities All hazardous wastes shall be documented, tracked and segregated from other streams of operational wastes. Any drainage from decks and work areas shall be collected through a closed drain system and processed through an oil water separation system. Scuppers will be closed in the event of spills to ensure pollution from the deck is not discharged	Negligible

Potential Hazard (Risk)	Potential Environmental Effect (Consequence)	Mitigating Factors and Measures	Risk Ranking
		into the ocean.	
Cooling Water and Atmospheric Emissions			
Discharge water used for cooling machinery may be at temperatures slightly above ambient seawater temperature (<2ºC).	Slight localised increase in ambient water temperature.	Cooling water will be discharged ~ 15 m above sea level to facilitate cooling and oxygenation. Mixing and dispersion of heated discharge plume.	Negligible
Atmospheric emissions are expected to occur from on-board machinery and any well testing.	Atmospheric emissions will add to local, regional and global airsheds, resulting in reduced air quality.	Green burners to be used to minimise black smoke during any well tests. Engines will be tuned to run at maximum efficiency, thereby reducing volume of emissions. Technical experts to be on rigs at all times during well testing. The rigs will be remote from any sensitive receptors such as population centres and any emissions are therefore considered insignificant.	Negligible

Table 5: Summary of effects of accidental discharges from drilling activities

Potential Hazard (Risk)	Potential Environmental Effect (Consequence)	Mitigating Factors and Measures	Risk Ranking
Leakage from Engine or Machinery			
Engine oil, hydraulic fluid or diesel spills of up to 50 L.	Due to the small volumes involved, only limited consequences may occur. Consequences limited to: • Slips and trips on rig deck. • Water pollution. • Pathological effects to fish larvae and plankton	Containment on rigs, therefore, unlikely to reach ocean. If small volumes released to ocean, then will dilute and disperse rapidly. Drip trays and sumps shall be placed/installed under all engines outside of bunded areas. Oil collected in deck sumps and tanks, emptied on regular basis and shipped to shore. Daily inspections by barge engineer of machinery and equipment. Minor spills are cleaned up as they occur. Oil spill clean up materials available on main deck and in working areas where oils and fuels occur.	Negligible
Spillage of Chemicals			
Spillage of chemicals from drums (up to 1,500 L).	Localised impact on water quality due to small volumes. Low level contamination of organisms is also possible as a result of ingestion of this material: isolated population numbers of some organisms may be affected in the short term. Potential coating of or ingestion by seabirds and cetaceans.	Chemicals Quantity on rigs is small. A complete inventory will be kept of all chemicals to allow sufficient and appropriate recovery materials to be on hand in the event of a spill (i.e. safety data sheets, labelling and handling procedures). Any drainage from decks and work areas shall be collected through a closed drain system and processed through an oil water separation system. Drums are stored on pallets and in bunded areas away from open grates wherever possible. Injection chemicals placed on skids. Material Safety Data Sheets and handling procedures for hazardous chemicals and materials. Appropriate absorbent material and spill cleanup equipment. Use low impact chemicals and materials as far as practicable.	Negligible
Leakage or Spillage of Diesel from Transfer Hose			
Spills during refuelling or mud transfer can be caused by hose	Due to the small volumes involved, limited consequences of:	Detailed refuelling procedures developed and followed covering diesel transfers.	Acceptable risk, risk reduction measures

Potential Hazard (Risk)	Potential Environmental Effect (Consequence)	Mitigating Factors and Measures	Risk Ranking
breaks, coupling failures or tank overfilling, and generally involve volumes less than 2,500 L (contents in the transfer hoses).	Oiling of seabirds, seals and cetaceans. Ingestion by seabirds, seals and cetaceans. Pathological effects to fish larvae and plankton.	Refuelling only to occur at the discretion of the skipper of the vessel and master of the rig. Transfer of diesel from supply vessels will be undertaken in accordance with normal operating procedures. Specific procedures for transfer loss will be prepared by Contractor. Transfer hoses will be fitted with dry break couplings, will be fit for purpose, not outside design life limits and regularly checked for leaks, including prior to refuelling. A crane will be used to lift the refuelling hose up to gravity drain fuel left in hose after completing transfer. Drip trays shall be provided under all refuelling hose connections. Refuelling will occur during daylight hours only, if weather and sea conditions are suitable. Oil spill contingency plan (OSCP) established, tested and updated Oil spill recovery and clean up materials and equipment within the region. Oil spill modelling of a 8,000 L diesel spill (worst case) specific to the well location will predict the trajectory and fate of spills in terms of the probability of contacting shorelines, time taken to contact shorelines and volume of oil to reach shorelines (provided in bridging document).	should be considered depending on proximity to sensitive resources
Production Testing – Oil Fallout			
Fallout from incomplete or loss of combustion during well testing.	Fallout during testing could result in the loss of 500 L oil from the burner. Impacts on water quality Potential oiling of or ingestion by seabirds, seals, cetaceans and other fauna.	'Green' burners to be used to minimise potential hydrocarbon fallout. Incorporate sensors to monitor fluid pressure, temperature and flow rate. Combine sufficient quantities of compressed air and water with the oil to allow an optimal burn, to ensure maximum combustion of all hydrocarbons. Incorporate remote control operation of the burner panels that allows optimisation of the atomisation process and orientation of the burners in all weather conditions.	Acceptable risk, risk reduction measures should be considered depending on proximity to sensitive resources

Potential Hazard (Risk)	Potential Environmental Effect (Consequence)	Mitigating Factors and Measures	Risk Ranking
		Trained operators to be on site at all times. Minimise testing activities to shortest period practical, usually 12 to 24 hours. Compliance with regulatory requirements. Shutdown of testing of excessive fallout occurs.	
Diesel Tank Rupture from Support Vessel/Oil Rig Collision			
As a worse case, 80,000 L of diesel could be potentially released in the unlikely event of a vessel collision.	Potential oiling of or ingestion by seabirds, seals, cetaceans and other fauna. Potential for impact on shoreline habitats Oil spill modelling of an 80,000 L diesel spill specific to the well location will predict the trajectory and fate of spills in terms of the probability of contacting shorelines, time taken to contact shorelines and volume of oil to reach shorelines (provided in bridging document).	*Diesel spill controls* • Fuel tanks on the rigs are located above the surface of the water and are contained within the hull of the rigs. • Hull of drilling rigs are double skinned. • Fuel tanks also protected by ballast tanks. • Radio contact between rigs and supply vessels at all times. • Supply vessel stands away crane arm distance from rig during offloading and onloading. • Work near rigs only in suitable seastate - to the discretion of the skipper of the vessels and PIC of the rigs. • Weather forecasts sent directly to the rigs by the Met Bureau twice a day. Can be increased to hourly basis in emergencies. • oil spill contingency plan (OSCP) established, tested and updated. *Spill Response* • Ensure rigs equipment and personnel preparedness. • Preparation of project specific (or appropriate bridging documents) Emergency Response and OSCP documents. • Emergency response plans which address oil spill incidents must be prepared in the planning phase for specific drilling locations. • Oil spill trajectory modelling capability based on site specific metocean conditions and knowledge of oil weathering rates. • Identification of oil-sensitive marine and coastal resources and priority protection areas. • Identification of internal and external emergency	Acceptable risk, risk reduction measures should be considered depending on proximity to sensitive resources

Potential Hazard (Risk)	Potential Environmental Effect (Consequence)	Mitigating Factors and Measures	Risk Ranking
		organisations, responsibilities and resources (human and equipment and materials) for oil spill response, and callout details. • Spill response and cleanup strategies (offshore and shoreline). • Include OSCP and Emergency Response Plan (ERP) requirements, roles, responsibilities, procedures and objectives in induction sessions.	
Well Blowout			
As a worse case, 600,000 L of crude could be released in a well blowout.	Widespread and longer term impacts on water quality Potential oiling of or ingestion by seabirds, seals, cetaceans and other fauna. Potential for impact on shoreline habitats and shallow water habitats. Oil spill modelling of a 600,000 L crude spill specific to the well location will predict the trajectory and fate of spills in terms of the probability of contacting shorelines, time taken to contact shorelines and volume of oil to reach shorelines (provided in bridging document).	*Blowout controls* • International, National and State applications to be complied with. • All management procedures specified in Vessel Safety Case which must be approved by DA. • Only trained, certified personnel (assistant drillers, drillers, tool pushers) used on rig floor. • Three blow-out preventers (BOPs) used. • Routine pressure testing of BOPs and casing to legislative standards. • Utilize drilling fluid weight designed to known reservoir pressure. Oil spill contingency plan (OSCP) established, tested and updated. *Spill Response* • Ensure rigs equipment and personnel preparedness. • Preparation of project specific (or appropriate bridging documents) Emergency Response and OSCP documents. • Emergency response plans which address oil spill incidents must be prepared in the planning phase for specific drilling locations. Plans must include: • Oil spill trajectory modelling capability based on site specific metocean conditions and knowledge of oil weathering rates. • Identification of oil-sensitive marine and coastal resources and priority protection areas. • Identification of internal and external emergency organisations, responsibilities and resources (human and equipment and materials) for oil spill	Acceptable risk, risk reduction measures should be considered depending on proximity to sensitive resources

Potential Hazard (Risk)	Potential Environmental Effect (Consequence)	Mitigating Factors and Measures	Risk Ranking
		response, and callout details. • Spill response and cleanup strategies (offshore and shoreline). • Include OSCP and Emergency Response Plan (ERP) requirements, roles, responsibilities, procedures and objectives in induction sessions.	

Environmental Management

Extensive environmental management guidelines are prepared for each Apache-drilled well. Apache management documents used to guide the implementation of well-specific environmental management procedures include:

Document	Number
Environmental Management Policy (April 2006)	N/A
Refuelling Management Plan	AE-91-IQ-098
Production Testing Fallout Guidelines	N/A
Incident Reporting Procedure	AE-91-IF-002
Drilling and Completions Manual	AE-91-ID-001
Drillings and Completions Process Manual	AE-91-ID-002
Drillings and Completions Standards Manual	AE-91-ID-003
Gippsland Basin Oil Spill Contingency Plan	AE-00-EF-013
Emergency Response Management Manual	AE-00-ZF-025
Incident Reporting Procedure	AE-91-IF-002

Consultation

Due to the fishing interests and activity undertaken in the area of the proposed drilling program, the following fishing interest groups and government authorities have been informed of the proposed drilling programme in the Gippsland Basin:

- Commonwealth Fisheries Association
- Department of Primary Industries
- South-east Trawl Fishing Industry Association
- Lakes Entrance Fisherman's Co-operative (LEFCOL)
- South-east Non-Trawl Fishing Industry Association
- Australian Fisheries Management Authority
- Seafood Industries Victoria
- Victorian Scallop Industry Association

There is a current Native Title Application (Native Title Claim VC97/4) that has been lodged by the Gunai/Kumai People and has been accepted by the High Court, covering the area where Apache intends to drill the Wasabi-1, Speke South-1 and Longtom Upper wells in Vic/P58, Vic/P54 and Vic/P42 – see **Figure 1**). Apache has written to the Native Title Services of Victoria informing them of our intention to drill the Wasabi-1, Speke South-1 and Longtom Upper wells within the area associated with their claim.

Further Details

For further information about the Gippsland Basin 2008/2009 drilling program, please contact:

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