



Craigow-1 Exploration Well T/47P, Bass Basin Environment Plan Summary

December 2010

This Environment Plan summary has been submitted to comply with Regulation 11(7) of the Offshore Petroleum & Greenhouse Gas (Environment) Regulations 2009.

1. Introduction

Tap (Shelfal) Pty Ltd (Tap Oil) on behalf of the T/47P Joint Venture has contracted Australian Drilling Associates Pty Ltd (ADA) as the Project Manager for the drilling of the Craigow-1 exploration well, located in petroleum exploration permit area T/47P in Commonwealth waters of Bass Strait (Figure 1). The proposed drill site is located in a water depth of 73 metres, 155 km northwest of Wynyard on the Tasmanian north coast and 82 km southwest of Wilson's Promontory on the Victorian coast.

The Craigow-1 Environment Plan (EP) was approved by the Tasmanian Department of Infrastructure, Energy and Resources (DIER) on the 14th of December 2010 in accordance with the Offshore Petroleum and Greenhouse Gas (Environment) Regulations 1999.

2. Proponent

Tap Oil is an independent oil & gas exploration and production company with interests in Australia and South East Asia. Tap Oil was listed on the Australian Securities Exchange in September 1996. Tap Oil has acquired a significant offshore acreage position on the Australian North West Shelf and intends to continue a measured exploration and development program over the coming years.

3. Project Description

Craigow-1 will be drilled by the *Kan Tan IV* semi-submersible mobile offshore drilling unit (MODU), with drilling scheduled to commence in mid to late December 2010, subject to weather. The drilling operation will be supported by two Farstad anchor handling, tug and supply (AHTS) vessels, the *Far Fosna* and the *Far Scimitar*, working from the shore base in the Port of Melbourne.

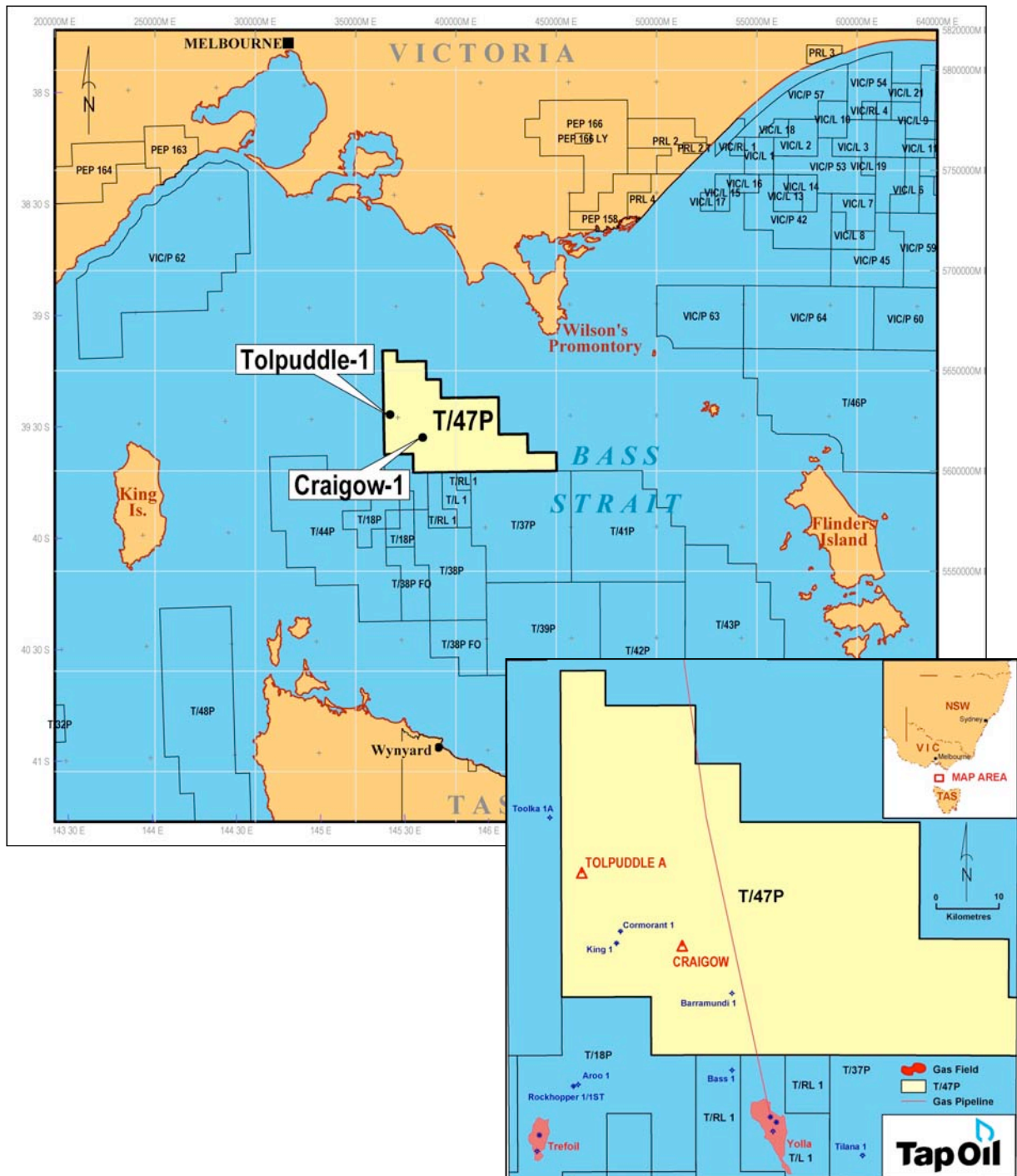


Figure 1. Location of the proposed Craigow-1 drilling location

During the drilling campaign the two supply vessels will be traversing to and from port for provisions and equipment to support the Kan Tan IV operations. Both vessels will return to port, either Melbourne or Geelong, for refuelling – there will be no at-sea refuelling for these vessels unless required in an emergency situation. Both vessels use dynamic positioning systems that enable them to remain on location using bow thrusters rather than anchoring.

The purpose of the drilling campaign is to determine economically recoverable quantities of hydrocarbons (in this case, gas and condensate). Previous exploration in the permit involved a 2D seismic survey undertaken by Tap Oil in 2008.

The Kan Tan IV semi-submersible MODU will be towed to the Craigow-1 location from a nearby permit area in Bass Strait by pumping water out of the four buoyancy tanks ('pontoons'), allowing the MODU to float and then be towed using one or more of the AHTS vessels.

Drilling will take place 24 hours a day, and is expected to take 22 days (weather dependent). The drilling procedure will be to drill a 36 inch (915 mm) hole to approximately 60 m below the seabed and then install a 30 inch (762 mm) conductor casing. A 17½ inch (444.5 mm) hole will then be drilled to a depth of 600 - 750 m below the rotary table (BRT) with seawater (90%) and gel sweeps (10%). A 13⅜ inch (340 mm) casing string is then installed into the hole and cemented into position. The blowout preventer (BOP) stack comprising two fixed pipe rams, one variable pipe ram, one shearing blind ram and one annular preventer will then be installed, along with a diverter system, and pressure tested. Drilling will continue with a 12¼ inch (311 mm) hole to total depth of 1,826 m measured depth below rotary table (MDRT) and the well evaluated as per the logging program.

The well design incorporates the use of a BOP stack to provide pressure control during the drilling program. The BOP system will be able to contain pressures far in excess of those encountered in the EVCM reservoir.

In the event the well indicates the presence of petroleum resources after the logging program, vertical seismic profiling (VSP) may be undertaken. VSP is a class of borehole seismic measurements used for correlation with surface seismic data and for obtaining images of higher resolution than surface seismic images. VSP is a process of making measurements in the vertical wellbore using geophones inside the wellbore and a source (i.e., airgun) at the surface of the well. VSP typically takes less than a day (and usually just a few hours) to perform, and the volume of each airgun is generally about 150 cubic inches, as opposed to 2,000-4,000 cubic inches for a 3D seismic survey. During VSP, a designated Marine Mammal Observer (MMO) will implement industry standards regarding the monitoring of marine mammals.

The drilling programme has been designed to use entirely water-based muds (WBM); no synthetic-based muds (SBM) or oil-based muds (OBM) will be used. WBM consists of between 92-98% fresh or saline water, with the remaining 2-8% made up of drilling fluid additives that are either completely inert in the marine environment, naturally occurring benign materials, or readily biodegradable organic polymers with a very fast rate of biodegradation in the marine environment. Drilling additives typically used include sodium chloride, potassium chloride, bentonite (clay), barite and calcium carbonate. The drilling additives selected have the lowest environmental risk ranking possible based on the Oslo-Paris (OSPAR) Convention's Offshore Chemical Notification Scheme (OCNS).

No production testing (and therefore flaring) is planned for the well. On completion of logging operations, Craigow-1 will be plugged and abandoned as per regulatory requirements. 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 while the MODU is still on location.

While anchored on location, a 500 m radius temporary exclusion zone around the Kan Tan IV will be declared under the *Offshore Petroleum and Greenhouse Gas Storage Act 2006* (Section 329) and gazetted accordingly. The vessels operating in these waters will be informed by radio on approach about the exclusion zone applying around the Kan Tan IV and a temporary Notice to Mariners will be issued.

A seabed survey has been undertaken at the proposed drill site and has confirmed that no obstructions, including shipwrecks, occur.

An Emergency Response Plan (ERP) and an Oil Spill Contingency Plan (OSCP), both detailing safety procedures in the event of an accident or emergency situation, will be available on the MODU and AHTS vessels. Copies of these documents are introduced in the safety and environment inductions on the MODU and are made available to the crew prior to the commencement of any work.

Following the completion of the drilling campaign, the MODU and AHTS vessels will demobilise from the field.

4. Stakeholder Consultation

Tap Oil and ADA prepared a Stakeholder Consultation Plan to guide the Craigow-1 consultation process. The objectives of the consultation programme are to:

- Identify all relevant stakeholders.
- Ensure all stakeholders are fully informed about the drilling campaign and its potential environmental and social impacts.

- Provide timely information to all stakeholders to ensure that have adequate time to consider the information and ask questions or raise issues of concern.
- Inform stakeholders of how they can make comments about the drilling campaign to the relevant government regulatory agencies.
- Capture concerns raised by stakeholders so that they may be assessed in the relevant regulatory documentation.
- Demonstrate to the relevant government regulatory agencies that stakeholders have been consulted in line with the requirements of the Offshore Petroleum and Greenhouse Gas Storage (Environment) Regulations 2009.
- Minimise inaccurate project information being released to stakeholders by third parties (e.g., project opponents, media, conservation organisations) by taking a pro-active lead in the provision of high quality, accurate and timely information.

Table 1 lists the stakeholders that have been identified in the Stakeholder Consultation Plan as relevant to the drilling campaign. These are the stakeholders who have been actively engaged during the planning phase of the drilling campaign.

Table 1 Stakeholders identified for the T/47P drilling campaign

Group	Stakeholder
Lead Government Regulatory Agencies	
Commonwealth	Department of Sustainability, Environment, Water, Population and Communities (DSEWPC) – Ports and Marine Section, Environment Assessment Branch
Victorian	Department of Primary Industries (DPI) – Minerals and Petroleum Division, Environment Regulation
Tasmanian	Department of Industry, Energy and Resources (DIER) – Mineral Resources Tasmania (MRT), Petroleum Administration
Referral Government Regulatory Agencies	
Commonwealth	Australian Maritime Safety Authority (AMSA) – Rescue Coordination Centre (RCC)
	Australian Hydrographic Office (AHO)
	Border Protection Control Command
	Department of Defence
Victorian	DPI – Fisheries Division
	Department of Sustainability and Environment (DSE) – Biodiversity Section
	Heritage Victoria – Maritime Unit
Tasmanian	Department of Primary Industries, Parks, Water and the Environment (DPIPWE) - Marine Resources
Commercial and Recreational Fisheries	
Commonwealth	Commonwealth Fisheries Association
	Australian Fisheries Management Authority (AFMA):

	<ul style="list-style-type: none"> – Bass Strait Central Zone Scallop Fishery – Southern Squid Jig Fishery – Eastern Skipjack Fishery – Small Pelagic Fishery – Southern and Eastern Scalefish and Shark Fishery – Southern Bluefin Tuna Fishery
Victorian	Seafood Industries Victoria (SIV)
	Lakes Entrance Fishermans Cooperative Ltd (LEFCOL)
	Victorian Scallop Fishermans Association
	Victorian Recreational Fishing (VRFish)
	Portland Professional Fishermans Association
Tasmanian	Tasmanian Fishing Industry Council (TFIC)
	Tasmanian Rock Lobster Fishermans Association
	South East Trawl Fishing Industry Association (SETFIA)
	Crustacean Fisheries Advisory Committee (CFAC)
	Scallop Fishermans Association of Tasmania
	Tasmanian Association for Recreational Fishing Inc. (TARFish)
Private Stakeholders	
Ports and Shipping	TasPorts
	ASP Ship Management Group
	TT Line Company (Spirit of Tasmania)
	Toll ANL Shipping Line
	SeaRoad Holdings
	Inco Ships
	Orient Overseas Container Line (OOCL) Australia
	Pacific International Lines (PIL)
Other	Ocean Racing Club of Victoria
	Blue Whale Study Inc.
	Australian Marine Oil Spill Centre (AMOSC)

5. Receiving Environment

Physical Environment

Climate. The region is temperate and characterised by warm, dry summers and cool winters. The climate of the region is dominated by sub-tropical high-pressure systems in summer and the sub-polar low-pressure systems in winter.

Temperatures over the sea are less variable than over the land due to the moderating effects of the ocean. In winter, the temperature is usually higher over the sea, especially at night. In summer it is usually cooler than over the land, especially during the day. Weather data from the nearest meteorological station King Island indicates that average annual minimum temperatures range from 8.1 to 12.3°C, and average annual maximum temperatures range from 13.2 to 20.7°C. The region is dominated by winter rainfall, with significant seasonal changes in monthly rainfall. The average annual rainfall at King Island airport is 856 mm, and 977 mm at Naracoopa, also on King Island.

Winds. During summer (December–March) the high-pressure ridge is usually located between 30°S and 35°S. The subtropical high-pressure belt is found to consist of an almost continuous procession of eastward moving anti-cyclones separated by troughs of lower pressure, or by depressions. Hence the weather in this belt, although fair on the average, is highly variable, with frequent changes of wind and temperature. The winds at the Craigow-1 location are often from the south or southeast as the high approaches from the west, and they back through east to northeast as the high passes into the Tasman Sea.

In winter (June–September) the high-pressure ridge is generally located further more north than during the summer. The migrating low pressure systems that exist to the south of the high pressure belt also move northward, bringing a westerly wind regime to western Bass Strait waters. The fresh westerly winds belong to the wind belt known as the “Roaring Forties”.

Ocean currents. The predominant currents in the area are typically wind-driven currents that are aligned to the bathymetry in the area. East-west directed winds produce stronger currents than the north-south winds that traverse the Bass Strait. Tidal currents within Bass Strait are likely to exhibit four reversals per day, with an upper limit on the surface velocity approaching 0.8 knots (1.5 km/hr). The combined wind driven and tidal currents produce velocities generally in the range of 0.6 to 1.0 knot (1.1–1.9 km/hr).

Waves. Waves within the permit area are represented by a combination of locally generated wind waves (sea) and long fetch waves (thousands of kilometres) generated in the Southern Ocean. Swells generated during winter months are generally higher than those occurring in the summer months as the wind storm centres are closer to the T/47P permit area. With mature southern storms that are close to the area and not moving rapidly, swells of 3 to 7 m could occur with occasional systems generating swells greater than 7 m (significant wave heights). Typically, swells within the region average between 1 to 3 m in height. The largest and most persistent waves prevail from a south-westerly direction.

Bathymetry. Bass Strait is a shallow (no deeper than 80 m) and rectangular-like basin (about 400 km east/west by 200 km north/south), which was formed during the Post-glacial Marine Transgression and is described as a perched valley. A seabed survey

undertaken for the T/47P drilling programme shows that the seabed at the proposed drilling sites are flat and featureless, with the seabed gently shoaling to the north at a gradient less than one degrees, and is composed of low relief unconsolidated silty medium sand.

Biological Environment

Vegetation. The south-east marine region has the most diverse marine benthic flora in the world, and the highest level of species endemism; up to 62% of macroalgae in southern Australia are thought to be endemic. About 1,150 species of macroalgae (seaweeds) have been recorded from southern Australian waters. Red algae have the largest numbers of species in southern Australia (about 800 species), followed by brown algae (about 240 species) and green algae (about 140 species).

Marine Invertebrates. Zooplankton include permanent planktonic organisms (e.g., copepods) and larval forms of many invertebrates (and fish) that are key components in the Bass Strait food web. More than 170 species of zooplankton have been recorded in central and eastern Bass Strait, with copepods making up about half of the species encountered. The high diversity appears to be related to the mixing of water masses from the Great Australian Bight, Tasman Sea and Antarctic Ocean.

Benthic Invertebrates. Bass Strait displays a high diversity of benthic invertebrates, with several polychaete families, pycnogonids, pericardid crustaceans, opisthobranch molluscs, bryozoans and brachiopods being the most abundant groups. Crustaceans and polychaete worms dominate the infaunal communities, many of which are unknown species. Sponges are a widespread group and one of the most common benthic species in low-light environments. In the south-east marine region, possibly over 1,000 species have been recorded, but most of these are yet to be identified.

Marine Mammals. 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 1999*. 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.

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 the proposed drilling site.

Other whale species that may occur in the region include the minke whale (*Balaenoptera acutorostrata*), Bryde's whale (*Balaenoptera edeni*), pygmy right whale (*Caperea marginata*), and the killer whale (*Orcinus orca*).

Several dolphin species occur throughout the waters of Bass Strait, including the common dolphin (*Delphinus delphis*), Risso's dolphin (*Grampus griseus*), dusky dolphin (*Lagenorhynchus obscurus*) and the bottlenose dolphin (*Tursiops truncatus*).

The Australian fur seal (*Arctocephalus pusillus*) has established five breeding areas on Tasmanian islands in Bass Strait. With the exception of Reid Rocks, these islands are all well east of the permit area, between Wilsons Promontory and Flinders Island. Seals are frequently seen resting and foraging on the Bass Strait oil and gas platform structures.

Fish. The marine fauna of temperate southern Australia is characterised by relatively low diversity and very high species endemism. Over 500 fish species are known from temperate Australian waters, many of which are important for commercial and recreational fisheries.

Four shark species are recorded under the *EPBC Act 1999* as potentially occurring in the permit area. The two threatened species are briefly described below.

The great white shark (*Carcharodon carcharias*) is listed as vulnerable under the *EPBC Act 1999*. The great white shark is widely distributed, and located throughout temperate and sub-tropical regions in the northern and southern hemispheres. In Australia, it is mostly recorded in the southern waters, its range extends primarily from Moreton Bay in southern Queensland, around the southern coastline and to North West Cape in Western Australia. They are frequently sighted in and around seal and sea lion colonies in general, such as Wilsons Promontory in Victoria.

School shark (*Galeorhinus galeus*) occurs throughout the temperate coastal waters of southern Australia. This species is mainly found in demersal waters, over the continental and insular shelves, but also over the upper slopes, in depths from near-shore to 550 m. Inshore areas are particularly important as birthing and nursery sites.

Birds. The distributions and populations of birds in offshore Bass Strait waters are not well known, whereas coastal and near-shore distributions have been more extensively studied. Coastal and marine birds may be categorised according to their seasonal and geographic presence and their migratory or resident status. A number of species are migrants that seasonally inhabit coastal waters, beaches and coastal wetlands. Some species are protected under the CAMBA and JAMBA migratory bird agreements signed between Australia and China and Japan, respectively.

Thirteen species of albatross, four petrels, a skua and the orange-bellied parrot (*Neophema chrysogaster*) are recorded as having the potential to occur in or near the drilling area under the *EPBC Act 1999*. There are no islands (and therefore no seabird colonies) in the immediate vicinity of the permit area. Almost all these species are listed as marine migratory species, and are known to feed on fish. The orange-bellied parrot is a terrestrial bird species that migrates between Tasmania and Victoria each year, and does not depend on oceanic species as a food source.

Socio-economic Environment

Settlements. King Island is the closest settlement to the T/47P permit area. It is situated at the western entrance to Bass Strait, midway between Victoria and mainland Tasmania, being 120 km in either direction. King Island has a population of approximately 1,800 permanent residents, 800 of which reside in the township of Currie situated on the west coast. Currie has a hospital, two doctors, schooling, a hotel, restaurants, two licensed clubs, two supermarkets, several speciality shops and is supported via the airfield nearby. King Island is the only tourism feature of the immediate area.

Marine Conservation Reserves. Bass Strait and its coastal areas contain several areas designated for conservation by the Commonwealth, Victorian and Tasmanian jurisdictions. The Boags Commonwealth Marine Reserve is the closest marine conservation reserve to the proposed Craigow-1 drill site, 74 km to the southwest. It covers 537 km² of Commonwealth ocean territory and has a depth range mostly between 50-80 metres. It was proclaimed in June 2007, and represents an area of shallow continental shelf ecosystems in the major biological zone that extends through central Bass Strait. It encompasses the fauna of central Bass Strait, which is expected to be especially rich based on studies of several sea floor dwelling animal groups.

Commercial Fisheries. The T/47P permit area lies within the area encompassed by the following Commonwealth fisheries, managed by the Australian Fisheries Management Authority (AFMA):

- Southern and Eastern Scalefish and Shark Fishery (Gillnet, Hook and Trap Sector);
- Bass Strait Central Zone Scallop Fishery;
- Southern Squid Jig;
- Southern Bluefin Tuna;
- Eastern Skipjack Tuna Fishery; and
- Small Pelagic Fishery (Zone C).

Consultation with these fisheries representatives indicates that there is little or no fishing effort in the permit area, with Bass Strait considered too shallow to fish for tuna and a trawl exclusion zone in place for some other fisheries.

Victorian and Tasmanian state-based fisheries, such as scallops and rock lobster are largely restricted to near coastal locations, distant from the T/47P permit area.

Petroleum Exploration and Production. Bass Strait contains large oil and gas deposits. In 1996, the Gippsland Basin, located at the eastern end of the Bass Strait, produced over 40% of Australia's total crude oil and nearly half of Victoria's natural gas requirements. As of 2009, Victoria (mostly the offshore Gippsland Basin), accounts for 19% of Australia's oil and condensate production, and 17% of Australia's gas production,

second behind Western Australia. A total of 23 offshore platforms have been installed in Bass Strait (21 Esso/BHP, 2 Origin) since first production was established in 1969.

Oil and gas reserves from the Gippsland Basin are currently on the decline. However, the relatively unexplored Sorell and Bass Basins indicate that there will be further production in the region, with the Bass Basin having an estimated 50 million barrels of commercially exploitable oil reserves.

The proposed Craigow-1 drill site is located 8 km to the west of the Yolla Gas Pipeline (operated by Origin Energy), which transports gas from the Yolla, Trefoil and White Ibis gas fields to mainland Victoria via a 147 km long sub-sea pipeline. The project has been operational since 2006.

Wells that have been drilled in the vicinity of the proposed drill site include Aroo-1, Trefoil-1, White Ibis-1, Bass-1 and 3, Yolla-1 to 4, Barramundi-1, Tarook-1 and Koorkah-1.

Shipping. Bass Strait is one of the busiest shipping routes in Australia with more than 3,000 vessels transiting through the area each year, though consultation with the main shipping lines has indicated that the shipping density around the T/47P permit area is low. By volume, most heavy shipping movements in Bass Strait are east-west and west-east, north of the permit area, between the ports of Fremantle, Western Australia, and Melbourne and Sydney.

An 'Area to be Avoided' exclusion zone exists around the operating oil and gas platforms in the Gippsland Basin, a significant distance to the northeast of the permit area, whereby unauthorised vessels larger than 200 gross tonnes are excluded.

Two traffic separation schemes were implemented to enhance safety of navigation around the 'Area to be Avoided' 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, and the other south of the Kingfisher B platform.

Maritime Heritage. The available literature and government databases indicate that no shipwrecks are known to occur within the T/47P permit area and there are no historic shipwreck protected zones in the area. Consultation with the Heritage Victoria (Maritime Unit) reveals that four shipwrecks of unknown location occur in the general region, though not in the permit area. The seabed survey conducted around the proposed drill site confirms that no shipwrecks occur in the immediate vicinity of the proposed drill site.

Offshore Infrastructure. The Basslink submarine high voltage electricity cable, which connects Tasmania with the mainland electricity network, is located to the east of the T/47P permit area, with the Victorian end of the marine cable starting at McGaurans Beach (on the Ninety Mile Beach), and the Tasmanian section starting at Four Mile Bluff, east of the Tamar River.

The Tasmanian Gas Pipeline follows a similar route to the Basslink cable. This pipeline starts its marine crossing at Seaspray on Victoria's Ninety Mile Beach and terminates at Five Mile Bluff on Tasmania's north coast.

Telstra's Bass Strait 1 and 2 cables were laid in 1995 and 2003 respectively, between Victoria and Tasmania. Craigow-1 is located about 7 km to the west of the Telstra 2 cable.

6. Environmental Impact Assessment

The potential environmental impacts resulting from routine activities and accidental discharges associated with exploration drilling in the Bass Basin are outlined in detail in the Craigow-1 Drilling EP.

Table 2 provides a summary of the detailed environmental impact assessment and mitigation measures that will be put in place to ensure that impacts are as low as reasonably practicable. The consequences, mitigation measures and risk rankings of each risk were determined in a hazard identification (HAZID) workshop with a group of personnel with offshore drilling, logistics, mud engineering, reservoir engineering and offshore safety and environmental expertise that will be involved in the drilling campaigns.

The HAZID workshop used the AS/NZS ISO 31000:2009 (Risk Management – Principles and Guidelines) risk matrices for undertaking the environment risk assessment (ERA). The risk matrices are focused on qualitatively estimating the risk of potential events associated with the drilling activities based on likelihood (exposure and probability) and consequence.

The risk assessment methodology used to undertake risk assessments for the activities associated with the drilling campaigns includes:

- Identify risks - risk causes, consequences, assumptions, existing controls;
- Analyse risks – inherent consequence, consequence, exposure, probability, likelihood, residual risk;
- Evaluate risks;
- Treat risks (where required); and
- Monitor and review.

Table 2. Summary environmental impact assessment for the Craigow-1 drilling campaign

Potential risk	Potential consequence	Avoidance, Mitigation & Management Measures	Risk ranking
<i>Physical impacts</i>			
MODU and AHTS vessel anchoring	Temporary and localised seabed disturbance, shallow seabed depressions.	<ul style="list-style-type: none"> Pre-drilling seabed survey reveals no sensitive seabed features. Depressions caused by anchors fill rapidly after drilling ceases. AHTS vessels unlikely to anchor. 	Low
Underwater vessel noise	Temporary physiological impacts on sensitive fauna, such as cetaceans. Disruption to migration, feeding or breeding patterns.	<ul style="list-style-type: none"> Drilling not undertaken during key migration time for threatened cetaceans. Region not a known breeding or feeding area. Short-term activity. VSP to be undertaken only for a few hours using recognised industry standards. 	Low
Artificial lighting	Attractant to fauna, temporary increase in predation rates on fauna attracted to lights. Nuisance to fishers.	<ul style="list-style-type: none"> Lighting will be kept as minimal as possible in accordance with safety standards. Lights directed downwards to the water will be minimised. Few light-sensitive species in region. 	Low
Atmospheric emissions	Temporary and localised reduction in air quality.	<ul style="list-style-type: none"> Marine-grade (low sulphur) diesel used. All engines and machinery maintained in accordance with maintenance systems. No production testing (flaring). 	Low
Introduction of foreign organisms from vessel hulls and/or ballast	Establishment of foreign species to open ocean and/or seabed, competing with and displacing native species.	<ul style="list-style-type: none"> MODU has been cleared by AQIS to enter Australian waters after marine experts undertook marine pest risk assessment in New Zealand. Remote operated vehicle (ROV) inspection program in place. AHTS vessels stripped to coastal status. 	Moderate
<i>Routine liquid and solid discharges</i>			
Discharge of cuttings and adhered WBM	Temporary and localised smothering/burial and disturbance of immediate seabed area.	<ul style="list-style-type: none"> WBM will be used, containing recognised lowest-impact additives. Studies show no long-term impacts from WBM cuttings on seabed. Benthic fauna likely to rapidly 	Low

	Temporary and localised loss of water quality from suspended sediments.	<p>recolonise.</p> <ul style="list-style-type: none"> No sensitive seabed features at drill site. Use of experienced mud engineers. 	
Overboard discharge of contaminated deck drainage	Temporary and localised reduction in water quality.	<ul style="list-style-type: none"> Oily water treatment systems in place, with no discharge over 15 ppm oil-in-water. Chemical storage areas banded. Fuel transfer areas banded. Decks cleaned with biodegradable detergents. 	Low
Overboard discharge of sewage and putrescible waste	Temporary and localised reduction in water quality. Modification of fauna feeding patterns.	<ul style="list-style-type: none"> MARPOL-approved sewage treatment systems used. No discharge of sewage and putrescible waste within 12 nm of land. Putrescible waste macerated prior to discharge. 	Low
Overboard discharge of solid waste	Marine pollution.	<ul style="list-style-type: none"> Solid wastes bagged and sent ashore for disposal. All bins secured to deck and covered with lids. 	Low
Waste oil, chemical and/or oil-contaminated drainage water spill/leak	Temporary and localised reduction in water quality.	<ul style="list-style-type: none"> Oily water treatment systems in place, with no discharge over 15 ppm oil-in-water. Chemical storage areas banded. Fuel transfer areas banded. Decks cleaned with biodegradable detergents. SOPEP kits available on board for rapid clean-up response. 	Low
Cooling water discharge	Localised elevation in surface water temperature.	<ul style="list-style-type: none"> Non-hazardous chemicals (e.g., biocides and anti-scalents) used in cooling water. Discharge water rapidly cools, little impact beyond 100 m of discharge point. 	Low
Brine water discharge	Localised elevation in surface water temperature and salinity levels.	<ul style="list-style-type: none"> Non-hazardous chemicals (e.g., biocides and anti-scalents) used. Most marine species able to tolerate short-term fluctuation in water salinity in the order of 20-30%. 	Low
Cement discharges	Temporary and localised loss of water quality from suspended sediments. Smothering of benthic habitat and fauna.	<ul style="list-style-type: none"> Minor volumes (1-2 m²) of cement released at seabed during grouting of upper bore casing. Cement hose flushing and minor releases rapidly diluted and dispersed by ocean currents. 	Low

		<ul style="list-style-type: none"> Minimisation of left-over product through inventory control and well planning. 	
Socio-economic impacts			
Commercial fishing	Temporary loss of fishing grounds from drill rig safety exclusion zone, resultant loss of income. Collision risk. Trawling gear snagging on anchors and anchor lines.	<ul style="list-style-type: none"> Consultation with key fisheries in the region indicates low fishing effort around drill site. Temporary Notice to Mariners will be issued. Drill rig will be gazetted. Standard maritime safety measures will be in place. 	Low
Commercial shipping	Collision risk. Minor detours required if drill rig is in path of large ships.	<ul style="list-style-type: none"> Consultation with key shipping lines in the region indicates drill site not in key shipping lanes and not of concern to shipping companies. Temporary Notice to Mariners will be issued. Drill rig will be gazetted. Standard maritime safety measures will be in place. 	Low
Recreational activities	Collision risk.	<ul style="list-style-type: none"> Recreational fishing associations indicate drill site located too far offshore to be of concern. Notices will be issued to yachting clubs potentially racing through the area during December/January. 	Low
Non-routine activities			
Loss of well control (i.e., blowout)	Marine pollution. Tainting of commercial fisheries species (e.g., shellfish). Injury and death of species such as seabirds. Pathological effects on fish larvae and plankton. Pollution of shoreline habitats such as sandy beaches and cliff faces.	<ul style="list-style-type: none"> Well bore and casing designed to minimise risks. BOP preventer tested and installed. Oil spill contingency plan (OSCP) and Emergency Response Plan (ERP) in place. Approved Safety Case Revision in place. Oil spill modelling completed, indicating that no oil would reach coastlines in a worst-case blowout scenario (based on a condensate target). 	Moderate
Refuelling spill	Temporary marine pollution.	<ul style="list-style-type: none"> Maersk and Farstad refuelling procedures in place. Use of dry-break couplings. Job hazard analysis undertaken prior to refuelling. Oil spill modelling indicates that 40% of spilled diesel would evaporate within 24 hours. 	Low

7. Environmental Management

Tap Oil manages the environmental and safety impacts of all its activities and operations, both existing and planned, through implementation of its Health, Safety and Environment Management System (HSEMS). The HSEMS is consistent with ISO 14001 (Environmental Management Systems), OHSAS 18001:1999 (Occupational Health and Safety Management Systems) to provide a formal and consistent framework for all activities undertaken by Tap Oil employees and contractors.

The HSEMS describes the organisation, responsibilities, approach, performance and review required by all assets to ensure compliance with Tap Oil HSE Policy.

An environmental implementation strategy for the Craigow-1 drilling campaign was detailed in the EP and approved by the Tasmanian DIER. This strategy involves a crew training and awareness program, environmental audits, government communication, environmental monitoring and recording and incident reporting, and is supported by the Tap Oil HSEMS.

In addition to the EP, several other documents have been submitted to regulatory agencies for review and approval before drilling can commence. These are:

- Vessel Safety Case (VSC) Revision – issued to the National Offshore Petroleum Safety Authority (NOPSA) for approval.
- Emergency Response Plan – issued to NOPSA and DIER for information.
- EPBC Referral – issued to the Commonwealth Department of Sustainability, Environment, Water, Population and Communities (DSEWPC) for approval.
- Oil Spill Contingency Plan (OSCP) – issued to the DIER for approval.
- Well Operations Management Plan (WOMP) – issued to the DIER for approval.
- Reservoir Management Plan – issued to the DIER for approval.
- Data Management Plan – issued to the DIER for approval.

8. Further Information

For further information about the Craigow-1 drilling campaign, please contact:

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