2D Marine Seismic Survey
Bass Strait, Victoria and Tasmania

Environment Plan: Public Summary

Introduction

This document is a summary of the Environment Plan (EP) in support of Drillsearch's two dimensional (2D) marine seismic survey undertaken in Commonwealth waters of the Bass Strait administered by the Victorian Department of Primary Industries (VIC DPI) and Mineral Resources Tasmania (MRT).

The EP was submitted to VIC DPI and MRT, as required by the *Offshore Petroleum and Greenhouse Gas Storage Act 2006* (OPGGS Act) and Regulations 11(7) and 11(8) of the Offshore Petroleum and Greenhouse Gas Storage (Management of Environment) Regulations 2009.

Drillsearch is to conduct a 2D marine seismic survey in Commonwealth marine waters of the Bass Strait in water depths ranging from 20 to 70 m (chart datum). The survey will take place within Permit Areas VIC/P 63, VIC/P 64 and T/46P, with extensions into adjacent Exploration Permit Areas.

Coordinates of the Activity

The survey area is bounded by the coordinates listed in Table 1. Seismic data will be acquired along 1,785 full-fold line kilometres, over an area of approximately 6,430 km^2. All acquisition activities will occur within this area.

Table 1: Coordinates of the Survey Area

Location Point	Latitude (GDA94)	Longitude (GDA94)
A	146° 59' 52.444'	-38° 55' 10.619'
B	147° 59' 11.812'	-38° 44' 46.230'
C	148° 9' 43.841'	-38° 53' 14.180'
D	148° 9' 52.293'	-39° 11' 8.300'
E	148° 18' 48.025'	-39° 11' 33.730'
F	148° 21' 23.192'	-39° 19' 24.961'
G	148° 18' 3.959'	-39° 44' 53.784'
H	148° 1' 24.467'	-39° 35' 31.522'
I	147° 46' 36.934'	-39° 34' 58.389'
J	147° 34' 57.711'	-39° 19' 50.969'
K	147° 34' 39.056'	-39° 3' 49.333'
L	147° 10' 42.723'	-39° 11' 58.081'

Description of the Activity

The seismic survey will map sub-surface geology via the acquisition of 2D seismic data to ascertain potential sub-surface oil and gas deposits of the survey area.

The survey will be undertaken by Drillsearch and will involve a specialised seismic survey vessel, the M/V *Aquila Explorer,* towing seismic equipment in a predetermined pattern within the survey area. The survey operations will be conducted 24 hours per day. The selected seismic survey vessel will be accompanied by a support/scout vessel (*Lady Roula)* for logistical, safety and equipment management support.

The seismic energy source will be provided by a single airgun array towed astern of the seismic survey vessel at a depth of approximately 6 m with a seismic discharge occurring at intervals of approximately 5 seconds. Seismic reflections from subsurface layers will be detected by hydrophones inside a single 'solid' streamer of 3,000 m in length, towed behind the survey vessel at depths of approximately 8 m.

The survey is scheduled to commence towards the end of January 2010 and take approximately 20 to 25 days to complete.

Description of the Receiving Environment

Physical Environment

The survey area is located in Bass Strait, approximately 32 km south-east of mainland Victoria and approximately 16 km north-east of Flinders Island, on the continental shelf region which separates Victoria and Tasmania. The seabed rises generally from the deeper water in the north to shallower waters towards Flinders Island in the south.

The substrate across Bass Strait comprises a variety of sediment types related to tidal currents, with sediment grain size linked to wave energy, therefore it is expected that sediments will become progressively finer with distance from the shore, consisting of fine, muddy sands in the mid-shelf regions. Due to the proximity to Flinders Island, the substrate in the survey area is expected to consist of loose, calcareous and mainly relict sands.

The region's climate is described as cool temperate, with cool wet winters and cool summers. It is influenced by rain bearing cold fronts which move from south-west to north-east across the region, producing strong winds from the west, north-west and south-west.

In winter, cold fronts generally create sustained west to south-westerly winds and frequent rainfall in the region. In summer, frontal systems are often more shallow and occur between two ridges of high pressure, bringing more variable winds and rainfall. Average monthly temperatures on Flinders Island range from 22.6º°C in February to 13.3º C in July.

Occasionally, intense mesoscale low pressure systems occur in the region, bringing very strong winds, heavy rain and high seas. These events are unpredictable in occurrence, intensity and behaviour, but are most common between September and February.

Tides are semi-diurnal with some diurnal inequalities, generating tidal currents along a north-east/south-west axis, with speeds generally ranging from 0.1 to 2.5 m/s.

Water circulation in the Bass Strait is determined by a complex mix of oceanic and tidal currents. During the winter months, cool water predominately flows eastwards, passing to the north-east of the Kent Group. During the summer, water movement is influenced by the East Australian Current, creating a weak westerly flow through the Bass Strait and onto the shelf of the Great Australian Bight.

Water temperatures range between approximately 20 °C in summer and 13 °C in winter.

Biological Environment

Benthic communities across Bass Strait are determined by the seafloor habitat and have a wide distribution with high diversity. A series of benthic surveys were conducted by the Victorian Museum on the continental shelf of the Bass Strait between 1979 and 1984. Infauna communities were reported to be rich and diverse, and benthic invertebrate communities were

identified as some of the most diverse soft sediment ecosystems, comprising mainly sponges, octocorals, ascidians and bryozoans.

Fish / invertebrates

The Bass Strait contains numerous pelagic and demersal fish species which support recreational and commercial fisheries. Important pelagic commercial species include pilchards, anchovies, and blue sprat. Commercially important demersal species include school whiting and flathead, and to a lesser extent gummy shark, school shark, jackass morwong, jack mackerel and snapper.

Direct physical damage may occur to fish if they approach within a few metres (<5 m) of the seismic source however, the majority of fish in the survey area are highly mobile. Such animals are likely to move away from the source if the sound levels become uncomfortable, hence physiological impacts are unlikely.

Valuable recreational and commercial invertebrate species include abalone, giant crab, rock lobster, octopus / squid and scallops.

Scallop peak spat settlement period near the survey area in eastern Bass Strait generally occurs between November and December. The survey has been scheduled to commence in late January, approximately one month after the recognised peak scallop spat settlement period, as requested by AFMA.

The scallop industry and AFMA refer to areas of high and moderate abundance as 'dense' scallop beds. Areas with abundance of 10 kg per 1000 m² sample tow or more are therefore considered part of a dense scallop bed. Two commercially important scallop settlement beds were identified in the region and were referred to as the eastern and western zones.

The survey plan includes five data acquisition lines that enter the western zone (as described by AFMA), and one line that extends into the eastern zone, however the majority of survey activity will be conducted in areas well away from dense scallop beds.

Generally, marine invertebrates, including scallops, are considered to have comparatively poorly developed mechano-sensory systems, due to the absence of air-filled voids, such as swim bladders and would be little affected by seismic survey noise. Instead, marine invertebrates detect sound vibrations through other external and internal structures, such as hairs, statocysts and muscles. Because of this physiology, marine invertebrates are considered to be little affected by noise generated by seismic surveys, with some research postulating that they only 'hear' seismic sounds at very close range. Recent studies in the Bass Strait of the effects of seismic activities on scallops found no adverse effects on scallops held within 16 m of a seismic array. The seismic survey will be conducted in depths greater than 20 m and most activity will occur more than 6 km from areas of dense scallop beds.

Macrofauna

Some marine migratory species with broad distributions such as fish, sharks, seabirds and marine mammals may traverse the survey area, at least on occasion. The *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) lists 31 Migratory and 26 Threatened marine species that could occur in the survey area, although a number of these have seasonal migration patterns that make their presence during the survey period unlikely:

- Ray-finned fishes
- Shark species
- Seabirds (including terrestrial and wetland migratory species)
- Several mammal species

The Threatened and Migratory species listed above are considered to be widespread throughout the region. The survey area does not contain recognised critical habitat for any Threatened or Migratory fish, sharks, seabirds or cetaceans.

The majority of fish in the survey area would be pelagic species and highly mobile. The survey area is not considered critical habitat for any of the shark species that may occur in the region and significant numbers of threatened or migratory sharks are not expected to occur in the survey area. Birds that are present during seismic operations could be temporarily deterred from foraging in the immediate vicinity of the airgun.

Although several species of baleen whale may periodically occur in the region of the survey, the survey is scheduled to avoid the periods when southern right whales and humpback whales migrate through the region. Other species known from the region are not thought to occur in high numbers in the area.

Beagle MPA

The Beagle CMR surrounds several islands including the Kent, Hogan and Curtis Island groups to protect a variety of benthic habitats representative of the south-east marine region. The Beagle CMR is classified as a Managed Resource Protected Area (IUCN category VI) which allows for mining exploration and development activities.

No data acquisition will occur within the boundaries of the Beagle CMR and no marine discharges will occur within 15 km of the boundaries of the Beagle CMR, so that the potential impacts of the proposed survey on designated conservation areas are minimised.

Socio-Economic Environment

The petroleum exploration and production industry is a significant stakeholder in the region. Several exploration wells have been drilled in the survey's permit areas however no fixed hydrocarbon platforms or pipelines have been installed.

Existing oil and gas activities are present within the eastern region of Bass Strait. Due to the high density of petroleum facilities, the International Maritime Organization (IMO) has designated 'An Area to be Avoided' surrounding most of the offshore operational area in eastern Bass Strait. The survey is approximately 30 km from the border of the designated area; therefore it is not anticipated that the survey will overlap with other operations in the region.

The survey area overlaps with fishing zones for the following Commonwealth and State managed fisheries:

- Bass Strait Central Zone Scallop (Commonwealth)
- Eastern Tuna and Billfish (Commonwealth)
- Eastern Skipjack Tuna (Commonwealth)
- Small Pelagic (Commonwealth)
- Southern and Eastern Scalefish and Shark (Commonwealth)
- Southern Bluefin Tuna Fishery (Commonwealth)
- Southern Squid Jig (Commonwealth)
- Abalone (Tasmania and Victoria)
- Rock Lobster (Tasmania and Victoria)

AFMA has advised that the following fisheries have been active in the seismic survey area in 2007 and 2008:

- Southern and Eastern Scalefish and Shark Fishery:
- Bass Strait Central Zone Scallop Fishery.

The Southern and Eastern Scalefish and Shark Fishery brings together the Commonwealth Trawl Sector and Gillnet Hook and Trap (formerly the Southern Shark and South East Non-trawl) fisheries under a common set of management objectives. The value of the fishery is approximately $24 million annually.

The Commonwealth Trawl Sector targets twenty-six finfish species including flathead, school whiting, blue grenadier and orange roughy, and four shark species using predominantly otter trawls. Its annual average catch is approximately 15,000 tonnes with a value of around $601,000. This fishery is consistently active throughout the year.

A Fishery Independent Survey (FIS) is scheduled to occur concurrently to the survey with the aim to assess fish stocks in the Eastern Bass Strait region. Drillsearch has committed to ensure that sufficient time and distance is given between the FIS survey and the seismic survey, so that there is no perceived disturbance of the FIS by seismic operations.

The Bass Strait Central Zone Scallop Fisheries (BSCZSF) is managed by the Commonwealth. Harvesting in 2009 was limited to a seventy-five square nautical mile area around 40 km north-east of the top of Flinders Island. Up to $5 million worth of the scallops are expected to be harvested, with a maximum catch of 2,500 tonnes.

Drillsearch made an agreement with AFMA to maximise the time gap between seismic acquisition and FIS, and between seismic acquisition and peak scallop spawning and settlement periods. Drillsearch have committed to shooting lines in Permit Area VIC/P64 first, to avoid disruption to the FIS and will ensure a minimum time period of one month has elapsed between the end of the peak spat settlement period and data acquisition in dense scallop beds.

The Victorian rock lobster fishery's total annual catch is limited to 386 tonnes. Most fishing occurs between mid-November and March. The rock lobster fishery is the second most valuable commercial fishery in Victoria, with landings valued at $15 million.

The Tasmanian rock lobster fishery has a limit to the number of rock lobster fishing licences and applies a total allowable catch to each commercial fishing season. In 2006–2007, a production value of a little over $59 million was harvested in Tasmanian waters.

Commercial rock lobster fishers in the area will be kept informed of the survey through ongoing consultation with TRLFA. The support vessel will remove any fishing gear found in the path of the survey vessel.

Major Environmental Hazards and Controls

A risk analysis was undertaken for all aspects of the seismic survey, in accordance with the procedures outlined in the Australian and New Zealand Standard AS/NZS 4360:2004 (Risk Management) and HB 203:2006 (Environmental Risk Management – Principles and Process). The results of the risk analysis have been used to determine risk likelihood and severity and to evaluate the environmental risks and effects (Table 2).

The risk analysis indicates that the risk of significant adverse environmental impact from the survey is low and likely effects are limited to:

- Temporary and localised changes in water quality from routine discharges of grey water, sewage and putrescible wastes during the survey.
- Temporary displacement of commercial fisheries operations.
- Temporary and localised increase in ambient underwater noise levels as a result of acoustic discharges.
- Temporary disruption to behaviour patterns of sensitive listed marine fauna.

These sources of potential impacts to the marine environment are limited in duration, scale and intensity. The ecological consequences are expected to be insignificant from both local and regional perspectives. Furthermore, the Standard Management Procedures contained in the *EPBC Act* Policy Statement 2.1 - *Guidelines for Interactions between Offshore Seismic Exploration and Whales* (DEWHA, 2008), in addition to the additional measure of a Marine Mammal Observer (MMO) onboard will be implemented throughout the survey.

Management Approach

The environmental management approaches relevant to key aspects of the seismic survey are summarised in Table 2. The survey will be conducted in accordance with all legislative and regulatory requirements. Drillsearch's overall environmental objective for the program is to avoid or minimise environmental risks to as low as reasonably practicable (ALARP).

Table 2: Summary of Potential Major Environmental Risks and Management Approach

Hazard/ Incident	Potential Hazard Consequence	Risk and Management Approach
Acoustic discharge from airguns during seismic operations.	Physiological damage or disruption to behaviour patterns or breeding activities of sensitive marine fauna.	Low risk. Soft start would encourage animals to move away from the airgun array. Implementation of Standard Management Procedures set out within the EPBC Policy Statement 2.1 - *Guidelines for Interactions Between Offshore Seismic Exploration and Whales*. An MMO will be onboard the survey vessel to maximise the detection and identification of marine mammals.
Collision or entanglement with marine mammals.	Injury or death.	Low risk. Soft start and option of continued low power during turns. Sensitive animals are likely to avoid operating seismic vessel.
Routine discharges of grey water, sewage and putrescibles waste from survey vessels.	Adverse effects on marine life due to reduction of water quality (e.g. nutrient enrichment).	Low risk. Low volumes/high dispersion-dilution factor. Grey water / treated sewage only. Offshore discharge (>12 nautical miles from land) only. No discharge with 15 km of Beagle MPA. Biodegradable detergents only. Scuppers will be plugged while chemicals are in use (outside bunded area) onboard the vessel.
Temporary displacement of commercial fisheries operations.	Potential disruption of commercial fishing/ shipping activity.	Low risk. Avoidance of sensitive scallop periods. Liaise with AMSA, AFMA fishermen and other commercial mariners to minimise conflict.
Interaction with fisheries surveys	Potential interference with fisheries surveys, through fish displacement or disturbance	Low risk. Allow sufficient time and distance between the FIS survey and the seismic survey.

Consultation

Drillsearch recognises that its Bass Strait 2D marine seismic survey is located in an environmentally and socio-economically sensitive region, and is committed to a full and open public consultation process.

Consultation was initiated with key stakeholders, including fishing interests, and has been ongoing since October 2009. The main objectives are to:

- Identify all key stakeholders and possible stakeholder issues.
- Ensure that stakeholders are aware of the survey plan and have an opportunity to comment.
- Identify areas of possible concern.
- Develop mitigation measures in consultation with stakeholders.

- Develop and maintain a good working relationship with all stakeholders.
- Assist finalisation of project EP.
- Satisfy regulatory requirements for stakeholder engagement.

Consultation with AMSA indicates that shipping traffic is present in the survey area including the main east west shipping route between Bass Strait and Cape Leeuwin. The survey vessel will be operated by accredited seamen with sophisticated navigation equipment at their disposal and standard maritime safety procedures will be adhered to including posting a Notice to Mariners. Therefore shipping traffic is not considered to be a significant risk to the seismic activities within the survey area.

The BSCSZF occurs within the survey area and has been raised as a concern by AFMA. Drillsearch will ensure that the survey design is modified as requested by AFMA to avoid the scallop spat settlement period by over a month and minimise the potential impact of the survey to the fishery.

SETFIA and AFMA raised the issue of a Fishery Independent Survey (FIS) scheduled to occur concurrently to the survey with the aim to assess fish stocks in the Eastern Bass Strait region. Drillsearch has committed to start acquiring data in VIC/P64 first, followed by VIC/P63 to ensure that sufficient time and distance is given between the FIS survey and the seismic survey, so that there is no perceived disturbance of the FIS by seismic operations. Data in T/46P will be acquired post-FIS.

Further Details

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