



Exmouth 3D Marine Seismic Survey - North West Shelf, Western Australia

Environment Plan: Public Summary

This document is a summary of the Environment Plan (EP) in support of WesternGeco's three dimensional (3D) marine seismic survey within exploration permit areas WA-271-P and WA-394-P in north-west Western Australia (WA). The public summary is submitted to the Western Australian Department for Mines and Petroleum (WA DMP), as required by Regulations 11(7) and 11(8) of the Offshore Petroleum and Greenhouse Gas Storage (Environment) Regulations 2009 and the Commonwealth *Offshore Petroleum and Greenhouse Gas Storage Act 2006* (OPGGs Act).

Introduction

Schlumberger Australia Pty Ltd (WesternGeco) proposes to undertake a 3D marine seismic survey within exploration permit areas WA-271-P and WA-394-P, and a small area overlapping adjacent permit areas for vessel turns. The survey area is located in Commonwealth marine waters of the North West Shelf (NWS), approximately 20 kilometres (km) offshore from the North West Cape, in north-west WA, in depths ranging between 400 metres (m) and 2,000 m (chart datum).

Coordinates of the Activity

The proposed survey area is bound by the coordinates provided in Table 1 and Figure 1. Seismic data will be acquired over a survey area totalling approximately 1,810 km², including area for vessel turns.

Table 1: Coordinates of the Survey Area (GDA94)

ID	Latitude DMS	Longitude DMS
1	21° 29' 55.2834"	113° 8' 42.2874"
2	21° 29' 55.374"	113° 20' 4.8186"
3	21° 42' 17.517"	113° 19' 57.057"
4	21° 42' 24.7788"	113° 50' 30.6162"
5	21° 45' 20.4114"	113° 50' 30.6162"
6	21° 45' 20.4114"	113° 45' 30.9168"
7	21° 50' 56.025"	113° 45' 30.9168"
8	21° 50' 56.025"	113° 21' 11.7534"
9	21° 55' 56.859"	113° 21' 11.7534"
10	21° 55' 54.5124"	113° 3' 52.0272"
11	21° 48' 44.8374"	113° 3' 52.0272"
12	21° 48' 42.426"	113° 8' 40.4484"



Description of the Activity

The survey will image the seabed subsurface geology of the survey area through the acquisition of 3D marine seismic data. Due to vessel availability, the survey will involve three specialised seismic survey vessels, towing seismic equipment in a predetermined pattern within the proposed survey area. *M/V Western Patriot* will be utilized for the first 2-3 weeks of the survey (commencing in mid-November) followed by the *WG Cook* from mid- December 2010 to early February 2011 and lastly the *Western Spirit* from early February 2011 to early March 2011 will complete the survey. The seismic survey vessel will be accompanied by a support vessel for logistical, safety and equipment management support.

On all three vessels, the seismic energy source will be provided by a dual airgun array and comprised of multiple Bolt 1500LL and 1900 LL airguns (of a total capacity of 3,147 cubic inches). The two sub-arrays will discharge alternately at an operating pressure of 2000 psi. The dual array will be towed astern of the seismic survey vessel at a depth of approximately 5 m and guns will discharge at a seismic pulse interval of 18.75 m. Seismic reflections from subsurface layers will be detected by a series of hydrophones inside an array of streamers (solid streamers for *Western Patriot*; hydrocarbon-based fluid filled streamers for *WG Cook* and *Western Spirit*). The *Western Patriot* and *WG Cook* will be towing an array of eight streamers and the *Western Spirit* will be towing an array of 6 streamers all with a maximum length of 6,000 m, at depths between 0 - 15 m (typically 8 m). Each of the streamers will be towed approximately 150 m apart.

The survey is scheduled to commence in mid November 2010 and to be completed in early March 2011. It is expected to take approximately 45 days to complete. The survey will be conducted 24 hours per day.

Description of the Receiving Environment

Physical Environment

The survey area is located approximately 20 km north-west of the North West Cape in waters ranging between approximately 400 and 2,000 m deep. There are no significant or shallow seabed features apparent in the bathymetric information for the area.

Data and information from the region is limited; however, it is expected that the substrate across the survey area is typical of that found on the NWS (comprising loose, silty carbonate sands with occasional exposed hard substrate).

The region is characterised by two seasons: a wet 'summer' between September and April, and dry 'winter' between May and August. The climate in winter is dominated by intense anti-cyclonic belts generating strong winds, predominantly from the east to south-east, and infrequent rain. Summer winds are more variable, with south-westerly winds being the most common. Transitional conditions, with variable and/or reduced winds, may occur over short periods between seasons, generally in September and April–May.

Tropical cyclones typically occur in the region three to four times per year, bringing strong winds, heavy rain and high seas. These cyclones are unpredictable in occurrence, intensity and behaviour, but are most common between December and March.

Biological Environment

There is limited information concerning the benthic communities of the survey area, primarily due to the area's remoteness and deep waters. The water depths occurring within the survey area preclude photosynthetic benthic habitats that might have significant fauna habitat, such as coral reefs or seagrass and algae communities. The sea floor is likely to be dominated by unconsolidated soft sediments inhabited by

sparse communities of relatively larger benthic species such as sea cucumbers, ophiuroids, echinoderms, polychaetes, seapens, nematodes, copepods, molluscs and crustaceans. Infaunal communities are likely to comprise smaller burrowing invertebrates. Any areas of exposed hard substrate that occur may support more diverse assemblages, including deep water filter feeding organisms, such as hydroids and sponges.

Some marine migratory species with broad distributions such as cetaceans, fish, sharks, marine turtles and seabirds may traverse the survey area, at least on occasion. The *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) Protected Matters Database lists 21 Migratory and 13 Threatened species that could occur in the area.

These include:

- five species of marine turtle
- humpback, blue, Bryde's, killer, sperm, southern right and Antarctic minke whales
- five species of shark
- three bird species
- dugongs and two species of dolphin

The Threatened and Migratory species listed above are considered to be wide spread throughout the region. The survey area does not contain recognised critical habitat for any Threatened or Migratory cetaceans, marine turtles, fish, sharks or birds. The proposed survey operations will avoid the peak humpback whale migration period (late August and early September) and will not coincide with the annual whale shark aggregation (between March and July). Given the depths of the proposed survey area, its location outside the recognised migratory routes and distance from areas of importance (feeding, breeding, resting) to cetacean species, impacts to cetacean species are not anticipated.

Migration and nesting activity of all species of marine turtles in WA generally occurs between September and April. The survey area does not contain any emergent land or shallow subtidal features, which is a requirement for nesting and feeding. The nearest known turtle breeding or feeding importance are located approximately 20 km to the south-east of the proposed survey area at North West Cape. It is therefore expected that individuals of marine turtles may occur in the area during the proposed survey.

Socio-Economic Environment

The offshore region of the NWS supports petroleum exploration and production, shipping, and low levels of commercial fishing. Recreational or game fishing is also known to occur within the region.

Petroleum

There are no fixed hydrocarbon platforms in the general survey area. Petroleum exploration and development present in the area include several operating Floating Production, Storage and Offloading (FPSO) vessels located north-east of the area of the proposed survey (Woodside's Enfield and Vincent oil field developments and BHP Billiton's Stybarrow, Griffin and Pyrenees oil field developments).

Fisheries

Consultation with the Australian Fisheries Management Authority (AFMA) indicated that vessels in the Commonwealth-managed Western Deepwater Trawl Fishery operated in exploration permit areas WA-271-P and WA-394-P between 2008 and 2010. The fishery is considered quite small with a recent low level of fishing effort and therefore it is unlikely that commercial fishing vessels involved with this fishery will be encountered during the proposed survey.

There has been no further fishing activity from Commonwealth licensed operators since 2005 in the survey area.

The AFMA managed Southern Bluefin Tuna Fishery does not occur in the survey area, however, southern bluefin tuna (SBT) spawning occurs approximately 150 km north of the survey area. Through September to April, adult SBT migrate to their spawning grounds of the Indian Ocean, therefore it is expected that some migrating individuals may pass through the survey area during the survey.

Consultation with the State Department of Fisheries indicated the following state managed fisheries are found in the vicinity of the survey area:

- Mackerel Managed Fishery
- West Coast Deep Sea Crab Managed Fishery
- Marine Aquarium Fish Managed Fishery
- Specimen Shell Managed Fishery
- West Coast Rock Lobster Fishery
- WA North Coast Shark Fishery.

The main operational area of the Mackerel Managed Fishery is from Perth to Dampier. The spawning period for Spanish mackerel occurs between October and January. Fishing operations are located around reefs, shoals and headlands; therefore, are unlikely to be encountered within the proposed survey area.

The West Coast Deep Sea Crab Fishery operates between Cape Leeuwin and the Northern Territory border. The fishery operates in depths of 150–1,200 m with the only allowable method for capture being baited pots (traps). The fishery operates fish mainly out of Denham and Carnarvon and some of the fishers will be fishing as deep as 200m towards the end of December, therefore fishers may be encountered during the survey but in very low numbers.

The Western Rock Lobster Fishery extends from the North West Cape to Augusta, however virtually the entire catch is caught up to 60 km off the coast between Augusta and Shark Bay. During the open season, between 15 November and 30 June, lobsters are fished using baited pots with some fishers fishing in waters up to 200 m towards the end of December. It is not anticipated that this fishery will operate extensively within the survey area because of the lack of suitable habitat on which the target species depends.

The Marine Aquarium Fish Managed Fishery extends over 20,780 km of coastline, from Esperance to Broome. There are 13 licenses in the fishery. The fishing method used is hand held nets only and is primarily dive based. Due to the depth of the survey area (and associated human diving constraints), it is not anticipated that this fishery will occur in the survey area.

The Specimen Shell Managed Fishery extends over the entire WA coastline between the high water mark and the 200 m isobath. The fishery is based on the collection of individual shells for display purposes. Due to the depth of the survey area, it is not anticipated that this fishery will occur in the survey area.

The state managed WA North Coast Shark Fishery does not overlap with the proposed survey area and has been closed indefinitely in the area between North West Cape and a line of longitude at 120°E, including all waters south of latitude 18°S, primarily to protect the breeding stock of sandbar sharks (Department of Fisheries 2009).

Marine Protected Areas

There are no Marine Protected Areas (MPAs) listed under Commonwealth or State legislation within the survey area. The Ningaloo Marine Park (Commonwealth waters) is located within approximately 2 km of the survey area.

Shipping

Consultation with the Australian Maritime Safety Authority (AMSA) indicated that the main shipping route between WA south and the Lombok Strait passes through the centre of the survey area. The shipping route is used on a daily basis by a low number (typically 5-6 vessels per day) of merchant vessels.

There are no bathymetric features or other navigational hazards in the area that will restrict ships avoiding the seismic vessel. Support and seismic vessels will operate in accordance with prevailing maritime statutes and standards to ensure limited interaction between shipping and seismic operations.

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 Standards (AS/NZS ISO 31000:2009) (Risk Management) and HB 203:2006 (Environmental Risk Management), and based on the RPS risk assessment matrix. The risk analysis has enabled to determine likelihood and severity of risks associated with the survey and to evaluate the resultant environmental risks and effects (Table 2).

The risk analysis indicates that the resultant risk (post mitigation) of significant adverse environmental impacts from the survey is acceptable and likely effects are limited to:

- temporary and localised increase in ambient underwater noise levels as a result of acoustic discharges
- temporary disruption to behaviour patterns of marine fauna
- temporary and localised changes in water quality from routine discharges of grey water, sewage and putrescible wastes during the survey
- toxic effect on marine organisms from hydrocarbon loss during refuelling at sea
- temporary displacement of other users, including commercial fisheries operations and shipping.

These sources of potential impacts to the marine environment are limited in duration, scale and intensity. Associated 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), will be employed throughout the survey. The additional measures of a Marine Mammal Observer (MMO) and the use of Passive Acoustic Monitoring (PAM) on the *WG Cook* will be implemented during the seismic operations to maximise the detection and identification of marine mammals.

Management Approach

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

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

Hazard/ Incident	Potential Hazard Consequence	Resultant 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. 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 - <i>Guidelines for Interactions Between Offshore Seismic Exploration and Whales</i> . An MMO will be onboard the survey vessel to maximise the detection and identification of marine mammals. Additional measure of a PAM system to detect whales in real time particularly during night-time and low visibility operations.
Artificial lighting	Alteration in fauna behaviour resulting from attractant / disturbance effect of lighting.	Low. Minimise external lighting of vessels to the minimum required for navigation, vessel safety and safety of deck operations, except in the case of an emergency.
Collision or entanglement with marine mammals.	Injury or death.	Low. Soft start and option of continued low power during turns to encourage animals to stay away. 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. Low volumes/high dispersion-dilution factor. Grey water / treated sewage only. Offshore discharge (>12 nautical miles from land) only. Biodegradable detergents only. Deck scuppers will be plugged and no waste will be disposed when the vessel is within 25 km of a designated MPA.
Refuelling at sea	Acute/ chronic toxic effect on marine organisms from hydrocarbon loss.	Low. All refuelling operations will be conducted in daylight hours, in strict accordance with the WesternGeco's Bunkering Procedure and the Ship-to-Ship Transfer Checklist. Refuelling operations will only be undertaken during suitable weather conditions. Refuelling will be undertaken at least 12 nautical miles from the Ningaloo Marine Park (Commonwealth waters) boundary.
Displacement of other users, including commercial fisheries operations and shipping.	Potential disruption of commercial fishing/ shipping activity.	Low. Major navigation channel passes through the survey area. Low level of commercial fisheries known to overlap the broader survey area. Liaise with AMSA, AFMA fishermen and other commercial mariners to minimise conflict.



Consultation

Consultations regarding the seismic survey have been undertaken with relevant stakeholders, including:

- Australian Fisheries Management Authority (AFMA)
- Australian Maritime Safety Authority (AMSA)
- Department of Sustainability, Environment, Water, Population and Communities (DSEWPaC, formerly the Department of Environment, Water, Heritage and the Arts - DEWHA)
- Commonwealth Fisheries Association (CFA)
- Australian Southern Bluefin Tuna Industry Association
- Western Australia Department of Fisheries (DoF)
- Western Australian Fishing Industry Council (WAFIC)
- Western Australian Northern Trawl Owners Association
- A. Raptis and Sons
- Recfishwest
- Tuna West
- Western Australia Seafoods

Results of the consultation indicate that fishing activity in the survey area is likely to be low.

A merchant vessel shipping route passes through the survey area between the WA south and Lombok Strait therefore some traffic is expected to occur in the area, but is not anticipated to pose any hazard to the seismic survey.

No petroleum producing activities operate within the survey area. Several operating Floating Production, Storage and Offloading (FPSO) vessels are located north-east of the area of the proposed survey (Woodside's Enfield and Vincent oil field developments and BHP Billiton's Stybarrow, Griffin and Pyrenees oil field developments). Shell Development (Australia) Pty Ltd (Shell) proposes to undertake a 3D marine seismic survey in the Southern Exmouth Basin, in November and December 2010 (referred to DSEWPaC 30 August 2010). This survey is to be conducted in permit area WA-384-P, which abuts the WesternGeco survey area. WesternGeco will ensure that ongoing liaison with Shell will be maintained to ensure both surveys can be undertaken concurrently in a safe manner.

Consultation undertaken to date has not highlighted any further proposed or newly planned activities within or around the survey area. In the event that planned seismic lines overlap with existing petroleum related exclusion zones, WesternGeco will operate according to its industry-compliant vessel operations procedures.

WesternGeco will continue consultation with stakeholders to ensure minimal disruption to both survey and to fishing operations.

Further Details

For further information about the WesternGeco 3D marine seismic survey, please contact:

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