

CGGVeritas 2D Marine Seismic Survey - North West Shelf, Western Australia

Environment Plan: Public Summary

Introduction

This document is a summary of the Environment Plan (EP) in support of a two dimensional (2D) marine seismic survey across 66 exploration permit areas in Commonwealth waters in north-west Western Australia (WA) proposed by CGGVeritas Services (Australia) Pty Ltd (CGGVeritas) (Figure 1). 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* (OPGGGS Act).

Description of the Activity

CGGVeritas' 2D marine seismic survey will be undertaken in Commonwealth marine waters of the North West Shelf, in depths ranging between 50 and 2,000 metres (m) (chart datum).

The survey area is bound by the coordinates provided in Table 1 and Figure 1. Seismic data will be acquired over a survey area totaling approximately 24, 200 km², including area for vessel turns.

Table 1: Coordinates of the Survey Area (GDA94)

Id	Latitude (DMS)	Longitude (DMS)
1	20° 26' 36.057" S	115° 4' 5.638" E
2	20° 40' 24.580" S	115° 5' 49.190" E
3	20° 46' 19.253" S	114° 44' 12.134" E
4	21° 13' 22.199" S	114° 0' 17.033" E
5	20° 38' 55.049" S	113° 30' 4.556" E
6	20° 10' 40.310" S	114° 22' 32.184" E
7	19° 35' 53.869" S	113° 16' 24.229" E
8	19° 24' 9.320" S	113° 23' 22.692" E
9	19° 45' 37.422" S	114° 4' 43.581" E
10	19° 14' 54.590" S	114° 4' 16.676" E
11	19° 15' 0.002" S	114° 35' 9.281" E
12	19° 57' 36.539" S	114° 35' 9.492" E
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14	19° 35' 19.509" S	115° 27' 51.093" E
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As part of a Special Permit for Acquisition (SPA), CGGVeritas will acquire seismic data for research purposes as well as to provide geological information. The research will investigate a refinement to the

conventional method of data collection which requires no additional or different equipment. 2D seismic data will also be acquired for CGGVeritas to investigate the subsurface geology of the survey area.

The seismic survey will be operated by CGGVeritas and conducted using a specialised survey vessel, the *MV Veritas Voyager*. The seismic energy source will be provided by Bolt 1500LL and 1900LL-XT airguns, arranged in a single array of 3255 cubic inches operating at 2000 psi.

The vessel will be towing seismic equipment in a predetermined pattern within the survey area. The airgun array will be towed at a depth of approximately 6 m and discharged at intervals of approximately ten seconds, resulting in a seismic pulse interval of approximately 25 m. Seismic reflections from subsurface layers will be detected by a series of hydrophones in one or two Sercel Sentinel digital solid hydrophone streamers. The streamers will be 8100 m in length and will be towed behind the survey vessel at varying streamer depths from 7 m. Throughout the survey, the minimum distance between the streamer and the sea floor will be 15 m. The depths of the seismic streamers are measured and automatically controlled by devices installed every 300 m along the streamer.

The 2D seismic survey is scheduled to be undertaken between December 2010 and March 2011 and will take approximately 10–20 days to complete. Data acquisition and airgun operation for the entire survey area will be undertaken over approximately five days of the scheduled 10–20 days. The additional time will be allocated to allow for configuration, transiting and weather. The survey will be conducted 24 hours per day.

Description of the Receiving Environment

Physical Environment

The survey area is located approximately 15 km north-west of the Montebello Islands and 90 km from the mainland (Robe River Inlet), in water ranging from 50–2000 m deep. The area is void of significant or shallow seabed features.

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 North West Shelf (NWS), likely to be broadly homogenous and 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. 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

Due to the remoteness and deep waters of the survey area there is limited information regarding benthic communities. The water depths are well below the photic zone precluding photosynthetic benthic habitats that may be ecologically significant, such as coral reefs, seagrass beds and algae communities.

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 22 Migratory and 12 Threatened species that could occur in the area.

These include:

- five marine turtle species
- humpback, blue, Bryde's, killer, sperm, southern right and Antarctic minke whales
- three shark species
- one ray species
- five bird species
- dugong
- two dolphin 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 cetaceans, marine turtles, fish, sharks or birds. The 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 survey area, its location outside the recognised migratory routes and distance from areas of importance (feeding, breeding, resting) to cetacean species, impacts to cetacean and shark 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 turtle nesting and feeding. The nearest sites of known turtle breeding or feeding importance are located approximately 15 km to the south-east of the survey area at the Montebello Islands. It is therefore expected that marine turtles may occur in the area during the 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

The petroleum exploration and production industry is a significant stakeholder in the region. The petroleum industry has developed major production facilities on Thevenard Island, Airlie Island, Barrow Island and Varanus Island. The nearest land-based production facility is on Barrow Island, 40 km south-east of the survey area. The nearest floating production, storage and offloading facility (FPSO) is Woolybutt, located approximately 15 km from the survey area.

Fisheries

Consultation with the Australian Fisheries Management Authority (AFMA) indicated that several Commonwealth managed fisheries are also permitted to fish in or adjacent to the survey area, including:

- North-west Slope Trawl Fishery
- Western Skipjack Tuna Fishery
- Western Tuna and Billfish Fishery
- Southern Bluefin Tuna Fishery
- Western Deepwater Trawl.

The survey area is located within the extent of the North West Slope Trawl Fishery (NWSTF) which extends from 114°E to about 125°E off the WA coast between the 200 m isobath and the outer limit of the Australian Fishing Zone (AFZ). Fishing is conducted with demersal crustacean trawls during day and night along bathymetric contours. There are currently seven fishing permits in this fishery. Fishers from this fishery may be encountered on occasion during the survey.

The Western Skipjack fishery extends westward from the South Australian/Victorian border across the Great Australian Bight, around the west coast of Western Australia to the Cape York Peninsula. There are currently 13 permit holders in this fishery. Recently there has been little effort reported from the Skipjack Fishery, therefore high numbers of fishing boats in the survey area are not anticipated.

The Western Tuna and Billfish Fishery extends westward from Cape York Peninsula to the west coast of WA and extends eastward across the Great Australian Bight. Fishing techniques include pelagic longline, minor line and purse seine. In WA the area most commonly fished is between Port Hedland and Albany, with only five vessels operating in the fishery. Due to the survey area location and number of vessels in the fishery, the likelihood of encountering fishers during the survey is low.

The AFMA managed Southern Bluefin Tuna (SBT) Fishery is not active in the survey area, however, southern bluefin tuna (*Thunnus maccoyii*) spawning occurs north of the survey area with peak spawning from December through to March. SBT are highly migratory and widely distributed throughout waters of the southern oceans. Migrating SBT may pass through the survey area during the survey; however due to the short duration of the survey and mobility of this species, impacts to the fishery are not anticipated.

The Western Deepwater Trawl Fishery is located in deep water off WA from the 200 m isobath to the edge of the AFZ. Effort and catch have been very small for the fishery in the past few years with only 11 permits issued during 2009. The fishery is considered quite small and therefore it is unlikely that commercial fishing vessels involved with this fishery will be encountered during the survey.

Several state managed fisheries are also permitted to fish in or adjacent to the survey area, including:

- WA North Coast Shark Fishery
- West Coast Deep Sea Crab Managed Fishery
- Mackerel Managed Fishery.

The state managed WA North Coast Shark Fishery does not overlap with the 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.

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 mainly out of Denham and Carnarvon and some of the fishers fish as deep as 200 m between December/January. There are currently five full-time and two part-time permits to operate in the fishery. Fishers may therefore be encountered during the survey but in very low numbers.

The main operational area of the Mackerel Managed Fishery is from Perth to Dampier. Fishing operations are generally located around reefs, shoals and headlands; therefore due to the restricted area within which this fishery operates, commercial fishing vessels operating in this fishery are unlikely to be encountered within the survey area.

Marine Protected Areas

There are no Marine Protected Areas (MPAs) listed under Commonwealth or State legislation within the survey area. The nearest marine protected area is the state-managed Montebello Islands Marine Park (15 km south-east).

Shipping

Consultation with the Australian Maritime Safety Authority (AMSA) indicated that the following two main shipping routes pass through the survey area:

- WA West Coast to Lombok Strait.
- WA West Coast to Ombai/Alor/Wetar Straits.

There are no bathymetric features or other navigational hazards in the area that will restrict ships avoiding the seismic vessel. The seismic vessel 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 CGGVeritas QHSE 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 risk of significant adverse environmental impacts from the survey is low 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 sensitive listed marine fauna
- temporary and localised changes in water quality from routine discharges of grey water, sewage and putrescible wastes during the survey
- collision or entanglement with a marine mammal or turtle
- temporary displacement of commercial fisheries operations.

These sources of potential impacts to the marine environment are limited, due to the duration (maximum of five day data acquisition over 10-20 days) and intensity (number of line km over total survey area) of the survey. The ecological, social and economical consequences of the survey are expected to be negligible. 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) will be implemented during the seismic operations to maximise the detection and identification of marine mammals.

Management Approach

The environmental management approaches relevant to key aspects of the seismic survey and the residual risk after management implementation are summarised in Table 2. The seismic survey will be conducted in accordance with all legislative and regulatory requirements. CGGVeritas'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 Environmental Effect	Risk and Management Approach
Underwater noise as a result of acoustic discharges.	Physiological damage or disruption to behaviour patterns of sensitive marine fauna.	Low risk. Department of Sustainability, Environment, Water, Population and Communities (DSEWPaC) Standard Measurement Procedures (DEWHA 2008) implemented throughout survey. Use of MMO onboard survey vessel.
Routine discharges of grey water, sewage and putrescible wastes.	Temporary and localised changes in water quality (e.g. nutrient enrichment). Adverse effects on marine life. Localised reduction in benthic productivity.	Low risk. Offshore discharge only when >12 nautical miles from shore. Adhere to vessel specific waste management procedures and MARPOL 73/78. Biodegradable detergents only.
Collision or entanglement with a marine mammal or turtle.	Injury or death of a Threatened species - turtle or cetacean.	Low risk. DSEWPaC Standard Measurement Procedures (DEWHA 2008) implemented throughout survey. Use of MMO onboard survey vessel.
Temporary displacement of commercial fisheries operations.	Potential disruption of commercial fishing/shipping activity.	Low risk. Notice to Mariners issued. Liaison 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 (ASBTIA).
- 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.

The ASBTIA has recommended the survey be undertaken in September–October to avoid the risk of impacting on SBT as the adults make their way to the spawning grounds and the juveniles heading along the coast towards the fishing grounds at the Great Australia Bight and waters off south-eastern Australia. Migrating individuals may pass through the survey area, however, it is anticipated impacts to SBT will be limited to short term displacement only, due to the short duration of the survey, high mobility of the species and the current management measures in place for managing marine fauna.

Consultation with AMSA indicated that two merchant vessel shipping routes pass through the survey area:

- WA West Coast to Lombok Strait
- WA West Coast to Ombai/Alor/Wetar Straits

No petroleum producing activities operate within the survey area. The nearest land-based production facility is on Barrow Island, 40 km south-east of the survey area. The nearest floating production, storage and offloading facility (FPSO) is Woollybutt located approximately 15 km from the survey area.

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, CGGVeritas will operate according to its industry-compliant vessel operations procedures.

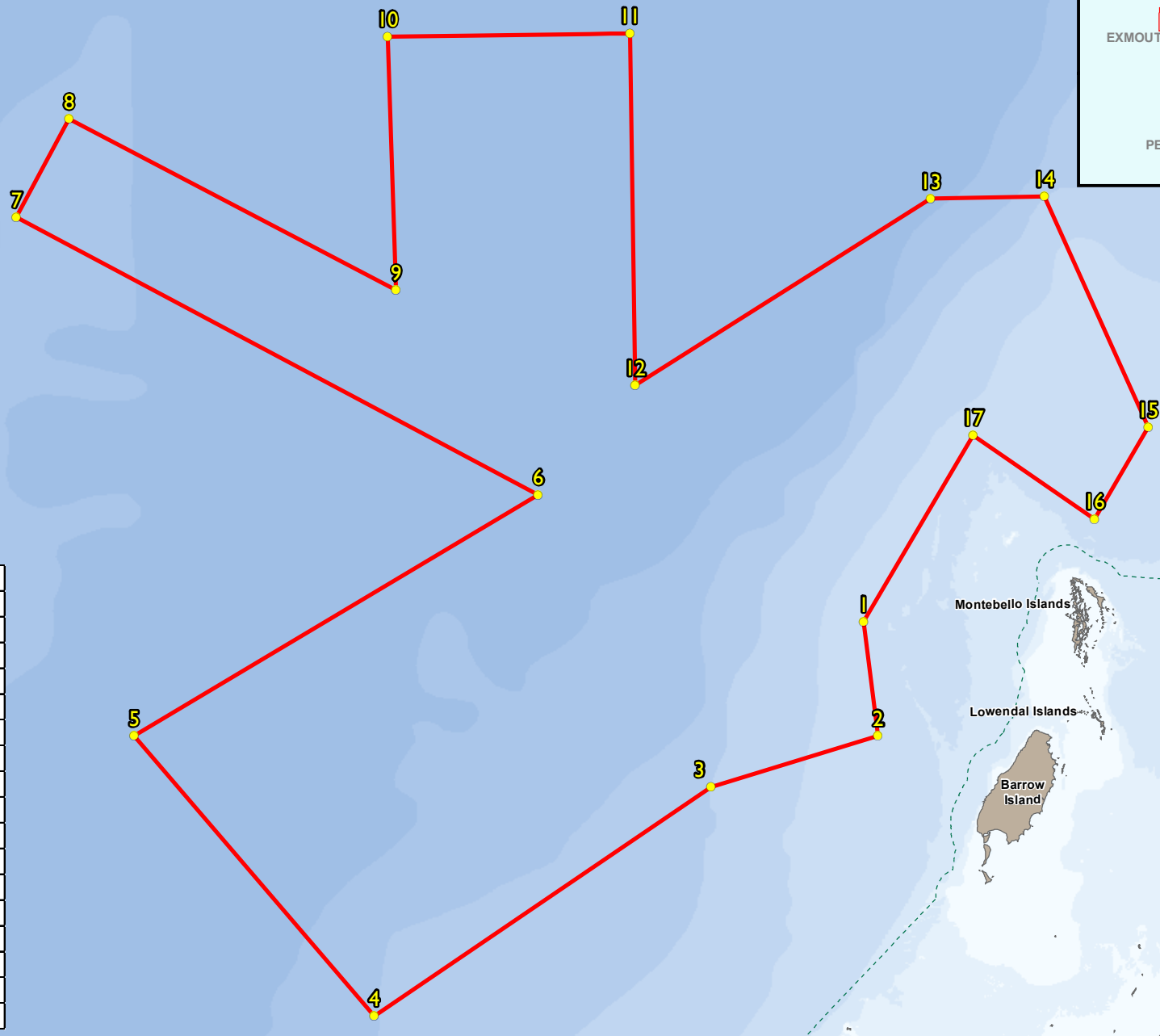
CGGVeritas will continue consultation with stakeholders to ensure minimal disruption to both survey and to fishing operations.

Further Details

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LEGEND

- - - - - Coastal Waters Limit
- Survey Area
- Bathymetry (Depth in metres)
- 0-10m
- 10-20m
- 20-50m
- 50-100m
- 100-200m
- 200-500m
- 500-1000m
- 1000-2000m



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CGGVeritas 2D Seismic Survey
Survey Location
Figure 1



Drawing Number: M10540-001
 Date: 07/12/2010
 Revision: C - Updated Site Boundary
 Scale @ A4: Not to Scale
 Drafted by: MA
 Source: RPS 2010, CGGVeritas 2010, GPlInfo 2010

