



This summary of the Malita West 3D Seismic Survey Environment Plan has been submitted in accordance with sub regulation 11(7) of the *Petroleum (Submerged Lands) (Management of Environment) Regulations 1999*.

1 PROJECT DESCRIPTION

TOTAL propose to undertake a three dimensional (3D) marine seismic survey over an area of approximately 3100km² over Permit Areas WA-402-P and WA-403-P in Commonwealth waters off northern Western Australia (WA) (*Figure 1*). The proposed survey is scheduled to occur over a 97 day period. It is currently planned to commence the survey in March 2008.

The survey will take place in deep water environments with water depths in the survey areas ranging from approximately 50 to 200 m.

2 COORDINATES OF THE SURVEY

The proposed 3D marine seismic surveys will acquire sub-surface data within a number of petroleum permit areas as follows:

Table 1 Latitude and Longitude Coordinates for Permit area WA-402-P

Latitude			Longitude		
Degrees	Minutes	Seconds	Degrees	Minutes	Seconds
11	59	57.342	126	24	58.311
11	30	00.462	126	24	58.311
11	29	58.146	126	29	54.704
11	17	03.134	126	30	00.245
11	20	07.985	126	31	52.915
11	19	47.291	126	47	04.433
11	17	35.352	126	57	06.262
11	16	52.782	127	04	57.624
11	59	54.500	127	04	56.876

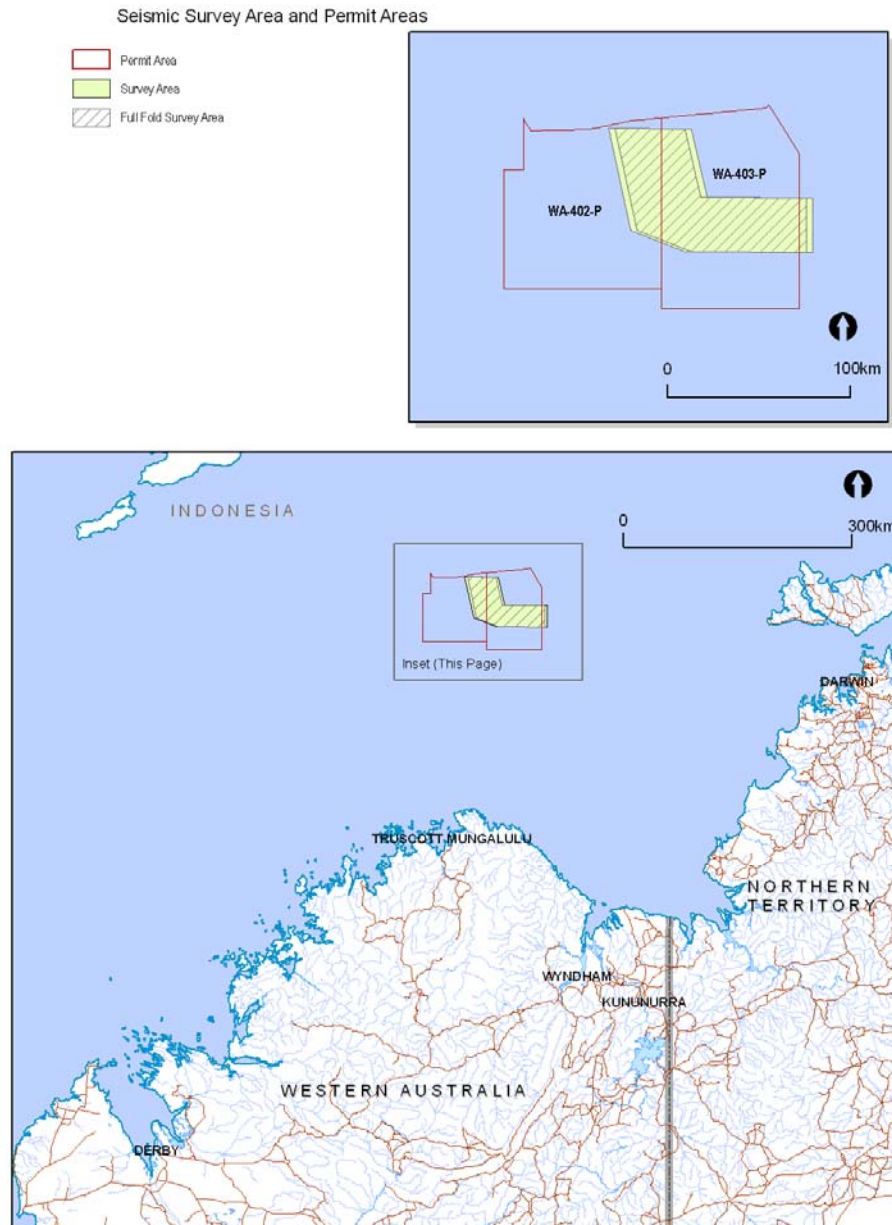


Table 2 Latitude and Longitude Coordinates for Permit Area WA-403-P

Latitude			Longitude		
Degrees	Minutes	Seconds	Degrees	Minutes	Seconds
12	04	57.031	127	04	56.876
11	16	52.782	127	04	57.624
11	14	23.216	127	31	33.474
11	13	37.886	127	32	12.328
11	25	58.591	127	39	56.070
12	04	57.031	127	39	56.070



Figure 1 Location of the 3D Seismic Survey in relation to the Western Australian Coastline





EXISTING ENVIRONMENT

Physical Environment

Water depths in the survey areas range from approximately 50 to 200 metres. The closest marine reserves are the Commonwealth Ashmore Reef National Nature Reserve and Cartier Island Marine Reserve (approximately 350km west-south-west of the Permit areas). The nearest reefs are Seringapatam and Scott Reef, located approximately 600km to the southwest of the Permit areas.

The Permit areas are within the monsoon belt, which generates north-westerly rain bearing winds from November to March, followed by dry south-easterly trade winds from May to September. Water temperatures range from minima of approximately 24.4°C in August to approximately 29°C, and sometimes higher, from January to April.

Biological Environment

The survey area is on the outer Australian continental shelf in the Timor Sea. Several shoals in the general vicinity of the survey area are known to support significant benthic biological communities, which include *Halimeda* (calcareous algae), hard and soft corals, sponges, and other associated flora and fauna including fish, crabs, prawns, and other organisms. The mapped shoals that are known to support these communities are located in a band running northeast to southwest approximately 80 km north of the survey area. These shoals reach to within 16 to 30 metres of surface, but the benthic communities they support can occur throughout the photic zone, which reaches as deep as 100 metres in the Timor Sea (AIMS, 2001). Therefore, although the most significant shoals are located outside the survey, similar biological communities to those found on the shoals could occur in the shallowest portions of the survey area.

A search of the Department of Environment, Water, Heritage and Arts (DEWHA) protected matters search tool revealed 10 Whales and Other Cetaceans species (two of which are listed as threatened) which may occur in the area and five mammals which are listed migratory species. The two listed threatened species are the Blue Whale (*Balaenoptera musculus*) classified as endangered and the Humpback Whale (*Megaptera novaeangliae*), classified as vulnerable.



Cetaceans

Humpback whales (*Megaptera novaeangliae*) have a wide distribution and have been recorded from the coastal areas off all Australian states and the Northern Territory. Peak migration occurs from late July to early September.

Blue whales (*Balaenoptera musculus*) are widely distributed throughout the worlds' oceans. This species has been recorded offshore all states excluding the Northern Territory.

There are no known breeding, calving or feeding grounds or migratory routes for any listed threatened or migratory whale species within or in the vicinity of the proposed seismic survey area.

In addition to the humpback whale and blue whale three other migratory marine mammal species have the potential to occur in the survey area. Both Bryde's whale (*Balaenoptera edeni*) and the Killer whale (*Orcinus orca*) are found in all Australian waters except the Northern Territory.

Although the spotted bottlenose dolphin (*Tursiops aduncus*) may travel through the proposed 3D seismic survey study area, this coastal, mainly tropical and subtropical species generally prefers shallow water depths.

Reptiles

The Loggerhead turtle has a global distribution throughout tropical, subtropical and temperate waters. Nesting is mainly concentrated on subtropical beaches (Marquez 1990). The closest known breeding/nesting grounds to the proposed survey area are on Murion Island and the beaches of the Northwest Cape, approximately 1500 km southwest of the survey area (Prince 1993, 1994b).

Green turtles are found in tropical and subtropical waters throughout the world (Marquez 1990; Bowen et al. 1992) but normally remain within the northern and southern limits of the 20°C isotherms (Marquez 1990). The closest known breeding/nesting grounds to the proposed survey site is in Arnhem Land, where some nesting occurs on the Coburg Peninsula (approximately 450 km southeast of the survey area), and Blue Mud Bay and Groote Eylandt in the western Gulf of Carpentaria, approximately 970 km southeast of survey area (Chatto 1998).



The Leatherback turtle has the widest distribution of any marine turtle, (Cogger et al. 1993) and can be found in tropical, subtropical and temperate waters throughout the world (Marquez 1990). Nesting is mainly confined to tropical beaches although some nesting occurs on subtropical beaches (Marquez 1990). No major nesting has been recorded in Australia, although scattered isolated nesting (1-3 nests per annum) occurs in southern Queensland (Limpus & McLachlan 1994).

The Hawksbill turtles are found in tropical, subtropical and temperate waters in all the oceans of the world. Nesting is mainly confined to tropical beaches (Marquez 1990), with the closest known breeding/nesting grounds to the proposed survey site occurring in northwest Arnhem Land (Chatto 1998). Australia may support the largest breeding populations of Hawksbill Turtles in the world following serious declines in stocks in other countries (DEWHA, 2007).

The Olive Ridley is found in tropical and subtropical waters throughout the world. Large nesting aggregations are found in the eastern Pacific and in India (Marquez 1990). No concentrated nesting has been found in Australia, although low density nesting occurs along the Arnhem Land coast of the NT, including Crocodile, McCluer, Wessel, and Grant Islands (630, 480, 750, and 480 kms southeast from the survey area, respectively) and Coburg Peninsula (Cogger & Lindner 1969; Guinea 1990, 1994c).

The Flatback turtle is found only in the tropical waters of northern Australia, Papua New Guinea and Irian Jaya (Spring 1982; Zangerl et al. 1988) and is one of only two species of sea turtle without a global distribution (DEWHA, 2007). The closest known breeding/nesting grounds to TOTAL's proposed survey site are located in the Northern Territory at Coburg Peninsula and Greenhill Island (Hope & Smit 1998) and Field Island (Winderlich 1998), both located approximately 490 km southeast of the survey area, McCluer Island (Guinea 1990) and Fog Bay located approximately 390 km southeast of the survey area (Guinea & Whiting 1999).

Socio-Economic Environment

The closest marine reserves are the Commonwealth Ashmore Reef National Nature Reserve and Cartier Island Marine Reserve (approximately 350km west south-west of the Permit areas). The nearest reefs are Seringapatam Reef and Scott Reef located approximately 600km to the south-west of the Permit areas. The areas will not be affected by the proposed actions.



Commercial fisheries within the study area are managed by the Commonwealth Australian Fisheries Management Authority. Commercial fisheries permitted to operate in the area are the Southern Blue Fin Tuna Fishery, Western Skipjack Fishery and Western Tuna and Billfish Fishery.

The proposed marine seismic survey area is located approximately 500 kilometres west of the main commercial shipping routes off the north-west Australian coastline.

Cultural Environment

There are no ports or island settlements within the area of the proposed survey and therefore the seismic survey will have no impact on European heritage in the region. There are also no known ship wrecks in the vicinity of the seismic survey area.

Given that the location of the proposed survey is 230km from the nearest shoreline, it is highly unlikely that the area is used for hunting or fishing by Australian Aboriginal people. There are no islands or land within the proposed survey area and therefore there are no Aboriginal heritage sites.

4 DESCRIPTION OF THE ACTION

The proposed seismic survey will map the subsurface geology of the survey area, enabling potential subsurface oil and gas structures to be identified. Data will be acquired using arrays of airguns towed behind a specialised marine vessel, and generating acoustic pulses at regular intervals. The pulses reflected from the sub-surface geological layer boundaries, will be recorded by hydrophones which are similarly towed behind the vessel by eight streamer cables, 6km in length. The acquired data will be treated and interpreted to map the geological layers.

The seismic vessel will traverse the survey area along seismic lines or defined transects. The hydrophone cables will be towed at depths of between 5-8m below the sea surface, depending on sea conditions. The depth is maintained by "birds" which are mechanical devices that prevent the survey equipment from making contact with the seabed or sea surface.



When undertaking the seismic survey, procedures will be in place to ensure that the survey activities are conducted safely and any potential environmental risks are managed. Except in an emergency situation, the vessels will not anchor at sea. Most activities associated with mobilisation and demobilisation of equipment and personnel will occur at port, however there is potential for some fuel bunkering or crew change to occur at sea.

The *Ocean Supply I* will be utilised as a support vessel and will also be used for logistical, safety, and equipment management support. A scout (or chase) vessel will accompany the seismic vessel throughout the survey to ensure adequate separation is maintained between the survey array and other vessels, and also to manage interactions with whales, and commercial fishing vessels. All vessels will be subject to marine audits prior to their mobilisation for this survey.

5 MAJOR ENVIRONMENTAL HAZARDS

An environmental risk assessment has identified environmental hazards and potential environmental effects associated with the Malita West 3D Seismic Survey. The activities associated with the seismic survey that are likely to cause potential environmental impacts include:

- operation of the seismic vessel and towing of the seismic source and streamer array through the survey area;
- emission of seismic pulses;
- routine waste discharges from the survey vessel;
- accidental fuel and oil spills from the survey vessel or associated vessels; and
- accidental loss of streamers and other equipment.



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SUMMARY OF MANAGEMENT APPROACH

Potential Impact	Commitments/Criteria
Collision of vessel with marine fauna causing death or injury to fauna	<ul style="list-style-type: none"> - DEWHA Guidelines Annex C to be followed at all times. - A Marine Mammal Observer will be on duty at all times during the survey. - The survey is currently scheduled to occur outside the primary humpback whale migration period in the survey area (July through September).
Collision of vessel causing pollution of sea water from a spill of fuel, oil or other hazardous material	<ul style="list-style-type: none"> - Development and implementation of procedures to deal with emergency incidents. - Vessel has a Shipboard Oil Pollution Emergency Plan (SOPEP), which outlines the actions to be taken in the event of a spill. - Spill response equipment (e.g. absorbent booms) will be stocked and maintained on the vessel in a Spill Response Kit. - Crew to be trained in clean-up equipment use and routine spill clean-up exercises.
Gas and particulate emissions from vessel engine causing a reduction in local air quality	<ul style="list-style-type: none"> - Routine maintenance and correct operation of vessel propulsion, exhaust systems, generator systems and incinerator systems.
Contribution to regional and global atmospheric pollution phenomena e.g. greenhouse effect	<ul style="list-style-type: none"> - No ozone depleting substances to be used. GHG emissions likely to be below 5000 tonnes of CO₂ equivalent for the whole survey.
Pollution of sea water with streamer fluid from streamer damage or spillage during refilling of 'streamers'	<ul style="list-style-type: none"> - Solid streamers, requiring only small amounts of fluid for flotation. Non hazardous fluid used. Fluid to evaporate and dissipate quickly under tropical conditions - The streamer must be filled by trained operatives in a dedicated bunded area and all pumping and filling equipment to be maintained regularly.
Pollution of water with lubricants and rust inhibitors leaking from 'streamers'	<ul style="list-style-type: none"> - Application of lubricants and rust preventatives will be minimised to only that which is required to ensure streamer functionality.
Damage to coral reef or sea floor flora and fauna from contact with streamers	<ul style="list-style-type: none"> - No coral reefs known to occur in the survey area. Inflatable devices on streamer sections.
Accidental loss of streamers and equipment resulting in reduced aesthetics and harm to marine fauna	<ul style="list-style-type: none"> - Should 'streamers' become broken or disconnected from the vessel they will be recovered where possible.



Potential Impact	Commitments/Criteria
Disturbance to migration, feeding or breeding patterns of marine fauna from noise emitted by airgun (behavioural/lifecycle changes)	<ul style="list-style-type: none"> - Adherence to all requirements within the Commonwealth Department of Environment and Water Resources 'Management Guidelines for Seismic Vessels Operating in Australian Waters so as to Avoid or Minimise Interference with Whales and Certain other Large Cetaceans'. - Adherence to all International Association of Geophysical Contractors (IAGC) and International Association of Oil & Gas Producers (OGP) guidelines. - Seismic activities to be shutdown if marine mammal observed within 3km radius of the survey vessel (not to commence till mammal is outside 3km radius). - Airgun ramp up (soft start) over a 20 minute period will be conducted at beginning of line and at each line change if one exceeds 20 minutes. - Duration of survey operation to be minimised to the extent practicable. - The survey will be undertaken outside the time of the normal migration of whales (July through September). - Specification of seismic source arrangement to maximise the proportion of energy directed downward.
Injury to marine fauna from pressure emitted by airgun (e.g. pathological damage to hearing systems or other organs in cetaceans)	<ul style="list-style-type: none"> - A system to record that ramp-up procedures are followed every time the airguns are to be fired will be implemented. - The seismic energy source used will not exceed that required to meet the objectives of the survey.
Injury or death of marine fauna due to strangulation or suffocation on plastic wastes	<ul style="list-style-type: none"> - All solid waste materials will be retained on the vessel and disposed of only at appropriate waste disposal facilities at the mainland port. Food scraps to be disposed of at sea only after maceration - Waste reception facilities to be clearly labelled and facilities to be closed or covered to prevent loss.



Potential Impact	Commitments/Criteria
Changes to fauna feeding habits from scavenging food scraps from the vessel	<ul style="list-style-type: none"> - Management of all wastes in accordance with MARPOL and legal requirements. No wastes to be disposed of overboard. Properly licensed onshore contractors to be used to dispose of all solid and scheduled wastes in accordance with the legislation. - Vessel crew to be inducted and trained and information to be effectively disseminated to personnel.
Depletion of natural resources and increased contribution of waste to landfill	<ul style="list-style-type: none"> - Recyclable wastes (e.g. aluminium cans) will be segregated on the vessel and returned to the mainland port to a suitable recycling facility.
Pollution of sea water with biochemical oxygen demand (BOD), nitrogen and phosphorus from sewage waste	<ul style="list-style-type: none"> - Onboard sewage treatment is approved by the International Maritime Organisation (IMO) to be compliant with Annex IV of MARPOL (as implemented in Commonwealth waters by the <i>Commonwealth Protection of the Sea (Prevention of Pollution from Ships) Act 1983</i>).
Potential localised reduction in water quality	<ul style="list-style-type: none"> - Waste treated in accordance with MARPOL 73/78 (as implemented in Commonwealth waters by the <i>Commonwealth Protection of the Sea (Prevention of Pollution from Ships) Act 1983</i>) prior to discharge. - The use of biodegradable detergents only.
Loss of equipment overboard (particularly during rough seas) resulting in decreased aesthetics of the area and potential for leaks of hydrocarbons into sea water	<ul style="list-style-type: none"> - All equipment will be properly secured during transit between the mainland and the survey location such that it cannot be dislodged and propelled overboard. - Any equipment lost overboard will be immediately retrieved by the vessel where possible or reported to the relevant authorities.



Potential Impact	Commitments/Criteria
Pollution of sea water with hydrocarbons spilt during maintenance of engine and other equipment	<ul style="list-style-type: none"> - Only normal routine maintenance activities, as per vessel procedures, will be performed at sea. All other major vessel maintenance will be completed at a mainland port facility prior to or post survey. Oily wastes will be collected and disposed of to a registered controlled waste facility in compliance with port procedures for waste disposal. - Vessel to be equipped with appropriate containment and clean-up equipment e.g.; cable deck, storage and under streamer reel areas constructed to contain spills. - Oily waste handling systems and equipment (no oily wastes to be discharged at sea). - Compliance with MARPOL Annex I requirements (Oil Record Book, International Oil Pollution Prevention (IOPP) Certificate, slop oil tank etc) and Australian legislation. - Installation of filters to reduce the drawing-up of marine organisms with intakes of cooling and service water.
Damage to marine organisms resulting from sea water intakes	<ul style="list-style-type: none"> - Installation of filters to reduce the drawing-up of marine organisms with intakes of cooling and service water.
Pollution of sea with fuel resulting from spill or overflow of fuel	<ul style="list-style-type: none"> - At-sea refuelling is expected to be necessary during the survey at two week intervals. The <i>SR/V Veritas Viking</i> procedures will be implemented to reduce the likelihood of fuel spills
Use of anchor to secure vessel causing damage to reef, coral, and sea bed flora and fauna	<ul style="list-style-type: none"> - Except in an emergency it is not expected that the survey vessel will need to anchor at any time during the survey.
Introduction of foreign organisms	<ul style="list-style-type: none"> - Ballast water will not be discharged or exchanged during the survey and will be managed in strict accordance with the AQIS guidelines.



7 **STAKEHOLDER CONSULTATION**

The following have been identified by TOTAL as key stakeholders for the seismic survey:

- DoIR;
- DEWHA;
- Australian Fisheries Management Authority (AFMA);
- Adjoining permit holders; and
- Fishing industry representatives.

TOTAL will communicate with these stakeholders as appropriate during the lead up to, and during the survey.

8 **CONTACT DETAILS**

For further information about the Malita West 3D Seismic Survey please contact:

Frederic Reynaud
Exploration Manager
TOTAL E&P Australia
Tel: 9278 2584
Email: frederic.reynaud@total.com