

# **Hawkestone Oil Pty Ltd Braveheart 2D Marine Seismic Survey**

## **Environment Plan Summary: November 2006**

## **1 DESCRIPTION OF ACTIVITY**

In 2005 Hawkestone Oil Pty Ltd undertook a 2 dimensional (2D) marine seismic survey (known as the Braveheart 2D MSS) in Commonwealth waters within the Petroleum Permit Areas WA-332-P, WA-333-P, WA-341-P and WA-342-P from 7<sup>th</sup> October to 18<sup>th</sup> October. Due to vessel availability constraints the survey was not completed. Hawkestone intend to return to complete the Braveheart survey by acquiring approximately 224 line kilometres 2D seismic in WA-342-P. The Braveheart 2D MSS completion survey is scheduled to occur between late September and November 2006. It is expected that the survey will take up to approximately three days to complete.

The marine seismic survey will be conducted from a specialised vessel. Seismic array details are summarised in the following table (**Table 1**).

**Table 1: Seismic Array Details**

<b>Parameter</b>	<b>Value</b>
No of streamers	1
Streamer length	6km
Streamer depth	6 - 8m
Number of Airgun Arrays	1
Airgun array total volume	3,040 cubic inch
Operating pressure	2,000 psi
Source depth	5 - 6m
Shot point interval	25m (~10 seconds)
Peak source sound pulse	220-240 dB re 1µPa-m
Frequency range	10 to 110 Hz

## **2 COORDINATES**

The survey centre is approximately 400 km north-northeast of Broome, 700 km west of Darwin and some 100 km offshore from Western Australia in Commonwealth waters. The bounding coordinates of the Braveheart 2D marine seismic survey are listed in **Table 2** below.

**Table 2: Bounding Coordinates of 2006 Braveheart 2D Marine Seismic Survey**

<b>Latitude</b>	<b>Longitude</b>
-13° 14" 36.58"	124° 20' 12.01"
-13° 23" 53.68"	124° 31' 47.25"
-13° 39" 44.18"	124° 38' 22.35"
-13° 48" 19.59"	124° 29' 49.45"
-13° 38" 2.39"	124° 13' 47.18"
-13° 19" 52.99"	124° 13' 41.62"

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## **3 DESCRIPTION OF RECEIVING ENVIRONMENT**

The survey area is located in Commonwealth Waters near the outer edge of the Australian Continental Shelf slope. The water depths in the survey areas vary generally between 150 and 200 m. This area lies within the 'Northern Pelagic Province region of the Interim Marine and Coastal Regionalisation for Australia (IMCRA, 1997).

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Review of databases held by Department of Environment and heritage indicates that there a number of Marine Listed Species, listed under the *EPBC Act* as Endangered, Vulnerable, Migratory or Cetacean, that may occur, or the species habitat may occur, within the survey area (refer to **Table 3**).

**Table 3: EPBC Act Protected Species Potentially Occurring in Survey Area**

Species	Threatened Species Category	Listed Migratory Species	Listed Marine Species
<b>Mammals</b>			
<i>Balaenoptera bonaerensis</i> : Antarctic minke whale		✓	Cetacean
<i>Balaenoptera edeni</i> : Bryde's whale		✓	Cetacean
<i>Balaenoptera musculus</i> : blue whale	Endangered	✓	Cetacean
<i>Delphinus delphis</i> : common dolphin			Cetacean
<i>Feresa attenuate</i> : pygmy killer whale			Cetacean
<i>Globicephala macrorhynchus</i> ; short-finned pilot whale			Cetacean
<i>Grampus griseus</i> : Risso's dolphin			Cetacean
<i>Kogia breviceps</i> : pygmy sperm whale			Cetacean
<i>Kogia simus</i> : dwarf sperm whale			Cetacean
<i>Megaptera novaeangliae</i> : humpback whale	Vulnerable	✓	Cetacean
<i>Orcinus orca</i> : killer whale		✓	Cetacean
<i>Peponocephala electra</i> : melon-headed whale			Cetacean
<i>Physeter macrocephalus</i> : sperm whale		✓	Cetacean
<i>Pseudorca crassidens</i> : false killer whale			Cetacean
<i>Stenella attenuate</i> : pantropical spotted dolphin			Cetacean
<i>Stenella coeruleoalba</i> : striped dolphin,			Cetacean
<i>Stenella longirostris</i> : long-snouted spinner dolphin			Cetacean
<i>Steno bredanensis</i> : rough-toothed dolphin			Cetacean
<i>Tursiops truncatus</i> : bottlenose dolphin			Cetacean
<i>Ziphius cavirostris</i> : Cuvier's beaked whale			Cetacean
<b>Reptiles</b>			
<i>Caretta caretta</i> : loggerhead turtle	Vulnerable	✓	Marine
<i>Chelonia mydas</i> : green turtle	Vulnerable	✓	Marine
<i>Dermochelys coriacea</i> : leatherback turtle	Vulnerable	✓	Marine
<i>Eretmochelys imbricata</i> : hawksbill turtle	Vulnerable	✓	Marine
<i>Natator depressus</i> : flatback turtle	Vulnerable	✓	Marine
Seasnakes			15 species
<b>Fish</b>			
<i>Rhincodon typus</i> whale shark	Vulnerable	✓	
Sea horses, Sea dragons and Pipefish			30 species

#### **4 ENVIRONMENTAL HAZARDS AND MANAGEMENT**

The components of the seismic survey that could result in significant environmental impact have been determined through an evaluation of the proposed activity, the surrounding environment and the legislative requirements. The likelihood of occurrence and potential consequence of the impacts has been assessed by way of a structured risk assessment process.

The risk assessment process demonstrates that there is 'Moderate' risk to the environmental values/attributes in the survey area and surrounding from acoustic disturbance and potential fuel and oil spills. To either eliminate potential environmental risks or to reduce them to as low as reasonably practicable, a number of key control and mitigation measures will be implemented.

The management actions and strategies for control of the significant environmental risks associated with the proposed survey are described in **Table 4**. The criteria listed provide a means for quantitatively determining whether the environmental standards and objectives have been met.

**Table 4: Summary of Overall Environmental Risk Assessment**

<b>Aspect / Source of Risk</b>	<b>Potential Environmental Effects</b>	<b>Objective</b>	<b>Standard</b>	<b>Mitigation Measures / Criteria</b>	<b>Likelihood</b>	<b>Consequence</b>	<b>Risk</b>
Vessel Presence	Disruption or interference to vessels in the main shipping route	Minimise interference with shipping traffic	<ul style="list-style-type: none"> <li>• AMSA requirements</li> <li>• <a href="#">P(SL)A 1967</a> (Cth)</li> </ul>	<ul style="list-style-type: none"> <li>• Functional navigational lighting in place and in use.</li> <li>• Vessel meets Classification Society and Statutory inspection requirements</li> <li>• Operations carried out in a manner that does not interfere with navigation to a greater extent than is necessary</li> <li>• Marine notices broadcast according to requirements. Rescue Co-ordination Centre (RCC) notified of survey. Radio monitoring undertaken.</li> </ul>	Unlikely	Negligible	Negligible
Vessel Presence	Disruption to fishing vessels or interference with catch	Minimise interference with commercial fishing	<ul style="list-style-type: none"> <li>• <a href="#">P(SL)A 1967</a> (Cth), Section 124;</li> <li>• Hawkestone Environment Policy</li> </ul>	<ul style="list-style-type: none"> <li>• Operations carried out in a manner that does not interfere with fishing to a greater extent than is necessary</li> <li>• A communications program to inform fishermen of survey vessel whereabouts will be developed.</li> </ul>	Unlikely	Negligible	Negligible
Vessel Presence	Collision with large cetaceans	Minimise disruption to cetaceans	<ul style="list-style-type: none"> <li>• Hawkestone Environment Policy</li> <li>• DEH <a href="#">Guidelines on Interactions Between Offshore Seismic Operations and Larger Cetaceans</a></li> <li>• DEH <a href="#">Whale and Dolphin Sighting Report</a></li> <li>• Survey Vessel Environmental Management Procedures</li> </ul>	<ul style="list-style-type: none"> <li>• Temporal avoidance of whale migrations by timing of survey to occur outside of main migratory period</li> <li>• work procedures if whales within 3km</li> <li>• Responsibilities for monitoring and recording whale sightings clearly identified and conveyed to vessel personnel</li> <li>• Sighting reports completed and returned to Hawkestone and DEH</li> </ul>	Unlikely	Minor	Moderate
	Introduction of marine pests	Avoid introduction of exotic species	<ul style="list-style-type: none"> <li>• Hawkestone Environment Policy</li> <li>• AQIS Ballast Water Management Requirements</li> </ul>	<ul style="list-style-type: none"> <li>• Ensure vessel complies with, and records compliance with, AQIS Ballast Water Management Requirements</li> </ul>	Unlikely	Major	Moderate

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Aspect / Source of Risk	Potential Environmental Effects	Objective	Standard	Mitigation Measures / Criteria	Likelihood	Consequence	Risk
Operation of acoustic source	Disturbance from discharge of the airgun arrays to Baleen Whales	Minimise disruption to cetaceans	<ul style="list-style-type: none"> <li>Hawkestone Environment Policy</li> <li>DEH <a href="#">Guidelines on Interactions Between Offshore Seismic Operations and Larger Cetaceans</a></li> <li>DEH <i>Whale and Dolphin Sighting Report</i></li> <li>Survey Vessel Environmental Management Procedures</li> </ul>	<ul style="list-style-type: none"> <li>Temporal avoidance of whale migrations by timing of survey to occur between September and January</li> <li>DEH Guidelines in place and adhered to</li> <li>'Soft start' procedures</li> <li>10 minute continuous whale watch every hour</li> <li>Stop work procedures if whales within 3km</li> <li>Responsibilities for monitoring and recording whale sightings clearly identified and conveyed to vessel personnel</li> <li>Sighting reports completed and returned to Hawkestone and DEH</li> </ul>	Likely	Minor	Moderate
Anchoring	Damage and/or destruction of seafloor habitats from anchoring and vessel grounding	Minimise disturbance to benthic habitats	<ul style="list-style-type: none"> <li>Hawkestone HSE Policy</li> </ul>	<ul style="list-style-type: none"> <li>No anchoring of the vessel will take place during the survey (except for emergencies)</li> <li>Recording and reporting of all items lost overboard</li> </ul>	Unlikely	Negligible	Negligible
Waste disposal	Damage to sensitive resources from discharge of sewage, putrescible waste,	Minimise effects of sewage discharge	<ul style="list-style-type: none"> <li>Hawkestone Environment Policy</li> <li>'<a href="#">Protection of the Sea (Prevention of Pollution From Ships) Act 1983</a>' (Cth); 'MARPOL 73/78 Annex IV</li> <li>Survey Vessel Environmental Management Procedures</li> <li>Survey Vessel Garbage Management Plan</li> </ul>	<ul style="list-style-type: none"> <li>Sewage not discharged within 3 nautical miles of the coastline unless vessel has a certified approved sewage treatment plant in place under Regulation 8 (1) (b) of MARPOL 73/78 Annex IV. Between 3 and 12 nautical miles of coast sewage must, as a minimum, be comminuted and disinfected</li> <li>Ensure procedures for treatment and disposal of sewage are in place</li> <li>Ensure that sewage treatment system is operational and includes maceration and disinfection</li> <li>Relevant discharge requirements are adhered to</li> <li>Waste log will be maintained to record waste management practises</li> </ul>	Unlikely	Negligible	Negligible

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Aspect / Source of Risk	Potential Environmental Effects	Objective	Standard	Mitigation Measures / Criteria	Likelihood	Consequence	Risk
Waste disposal	Impact to marine environment from disposal of chemicals and solid and hazardous wastes	Minimise potential impacts of solid and hazardous wastes	<ul style="list-style-type: none"> <li>Hawkestone Environment Policy</li> <li>MARPOL 73/78 Annex V</li> <li>Survey Vessel Environmental Management Procedures</li> <li>Survey Vessel Garbage Management Plan</li> </ul>	<ul style="list-style-type: none"> <li>Correct segregation of solid and hazardous wastes in all areas of the vessel</li> <li>A vessel <i>Waste Log Form</i> is kept detailing quantities of wastes transported ashore</li> <li>Procedures comply with MARPOL requirements</li> </ul>	Unlikely	Minor	Moderate
Fuel and oil spills	Damage to or loss of streamer resulting in loss of fluid	Minimise occurrence of fuel and oil spills	<ul style="list-style-type: none"> <li>Hawkestone Environment Policy</li> <li>MARPOL 73/78 Annex I</li> <li>AMSA <i>Marine Notice 36/2002</i></li> <li>P(SL)A Schedule 1995, Clause 220</li> <li>P(SL)A Schedule 1995, Clause 285</li> <li>Vessel <i>Oil Spill Contingency Plan</i></li> <li>Vessel SOPEP (<i>Shipboard Oil Pollution Emergency Plan</i>)</li> </ul>	<ul style="list-style-type: none"> <li>SOPEP Procedures comply with MARPOL 73/78 requirements</li> <li>MARPOL <i>Oil Record Book</i> kept up to date</li> <li>Fuel spill contingency procedures are in place and operational</li> <li>Designated containment areas onboard the vessel for storage of oils, greases and streamer fluid</li> <li>Sufficient spill response equipment on board to respond to foreseeable spill events</li> <li>Appropriate actions are taken to minimise pollution</li> <li>Any spills &gt;80 litres are reported to the Designated Authority</li> <li>Personnel responsibilities are clearly identified</li> <li>No refuelling at sea</li> <li>Streamers are segmented limiting potential spill volume</li> </ul>	Likely	Minor	Moderate
Fuel and oil spills	Leak from survey vessels fuel tanks	Minimise occurrence of fuel and oil spills	<ul style="list-style-type: none"> <li>Hawkestone HSE Policy</li> <li>MARPOL 73/78 Annex I</li> <li>AMSA <i>Marine Notice 36/2002</i></li> <li>P(SL)A Schedule 1995, Clause 220</li> <li>P(SL)A Schedule 1995, Clause 285</li> <li>Vessel <i>Oil Spill Contingency Plan</i></li> <li>Vessel SOPEP (<i>Shipboard Oil Pollution Emergency Plan</i>)</li> </ul>	<ul style="list-style-type: none"> <li>Procedures comply with MARPOL 73/78 requirements</li> <li>MARPOL <i>Oil Record Book</i> kept up to date</li> <li>Fuel spill contingency procedures are in place and operational</li> <li>Designated containment areas onboard the vessel for storage of oils, greases and streamer fluid</li> <li>Sufficient spill response equipment on board to respond to foreseeable spill events</li> <li>Appropriate actions are taken to minimise pollution</li> <li>Any spills &gt;80 litres are reported to the Designated Authority</li> <li>Personnel responsibilities are clearly identified</li> </ul>	Unlikely	Major	Moderate

## **5 CONSULTATION**

Hawkestone has provided copies of this Environment Plan to the Western Australian Fishing Industry Council (WAFIC) and undertakes to liaise with both WAFIC, as the industry body and the Australian Fisheries Management Authority (AFMA), the regulating agency in developing an effective programme for further consultation during the survey.

## **6 CONTACT DETAILS**

Hawkestone contact details are as follows:

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