

DATA ACQUISITION SUPERVISION REPORT

For the

2D MARINE SEISMIC SURVEY

Conducted by

CUE ENERGY RESOURCES

In The Exploration Licence Areas

BLOCKS T/37P & T/38P OFFSHORE TASMANIA

SURVEY START DATE 17th March 2008
SURVEY COMPLETION DATE 18th April 2008



VOLUME 2 MARINE FAUNA OBSERVATIONS

Compiled by Carol Sutherland

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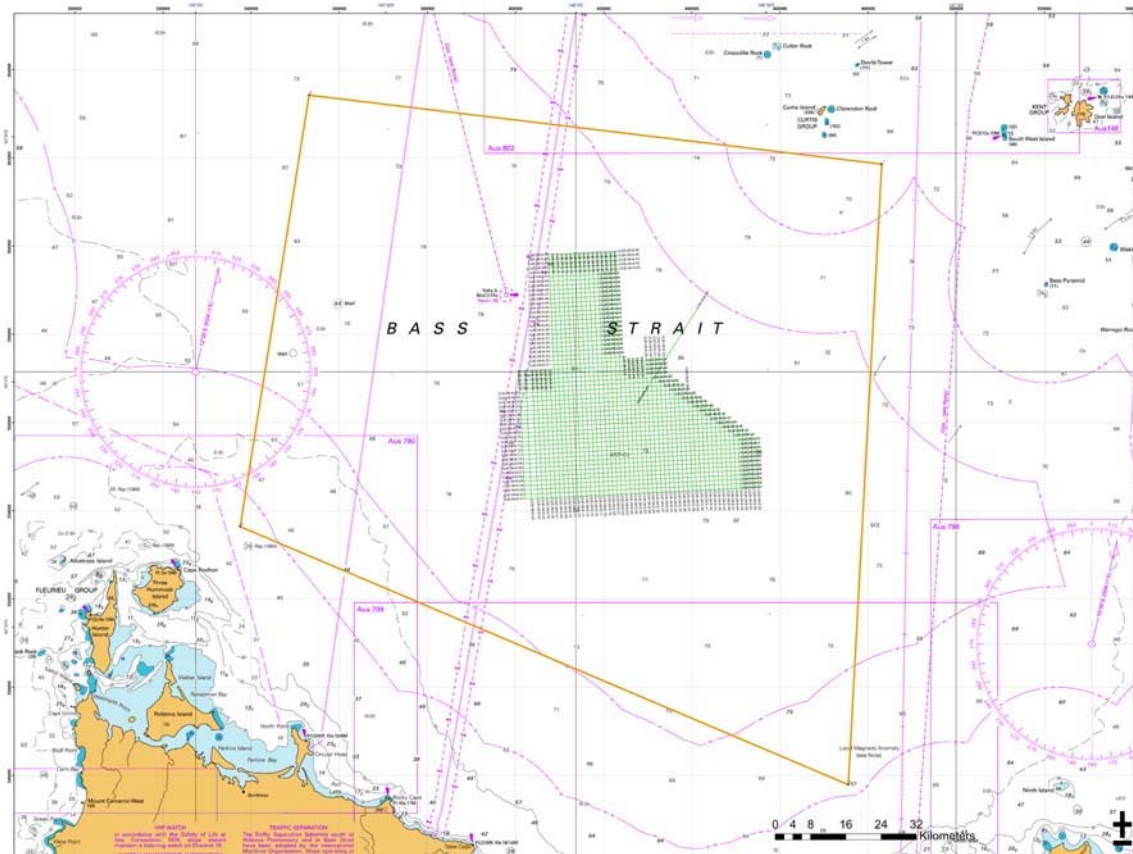
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1. Introduction

The Cue Energy Bass Strait Marine Seismic Survey T/37P & 38P was a 2D survey conducted 100km from the north coast of Tasmania. The survey began on 17th March and ended on 18th April 2008.

For this survey Cue Energy entered into a contract with CGG Veritas to undertake the 2D survey using the survey vessel 'Pacific Titan'.



Location of survey – Bass Strait

1.1 Marine Mammal Monitoring Program

Cue Energy employed the services of experienced Marine Mammal Observers (MMO) from Enquest Pty Ltd to observe and report on marine mammals for the Bass Strait T/37 & T/38 2D survey, and to work in accordance with the Cue Energy Environmental Plan.

The MMO's for the survey were Carol Sutherland (17 March - 2 April) and Debra Glasgow (2 April – 18 April).

Carol Sutherland has deep-sea international Fisheries Observer experience for over 15 years, and marine mammal observer work over the last 2 years. The marine mammal plotting system and methodology utilized by her was one developed by Dr Chris Lalas in consultation with C. Sutherland.

Debra Glasgow is an experienced MMO and cetacean researcher and a member of the Deakin University Whale Ecology Group. Debra has been working as a cetacean observer/researcher in Antarctica for the last 11 years and in various locations around Australia since 1985.

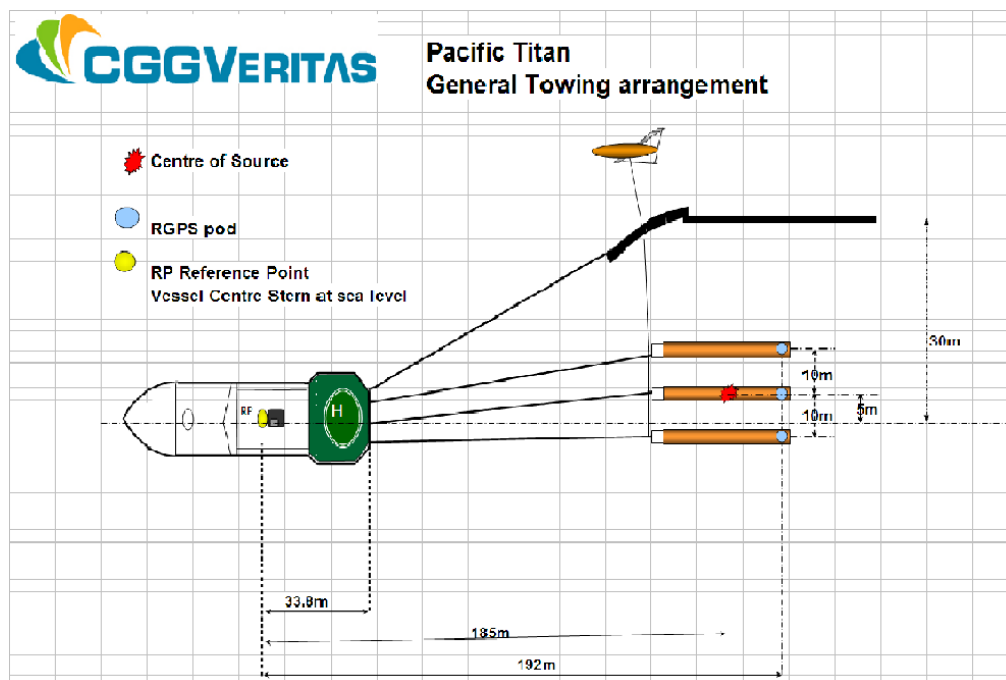
1.2 Vessel specifications



The MV 'Pacific Titan' has a Length overall of 64.5m and GRT of 3211 tonnes. It was built as a supply ship in Japan 1982, is owned by Swire Pacific and is flagged in Singapore.

1.3 Seismic specifications and observation measurements

Streamer length	6000m
Streamer depth	7-8m
Number of arrays	1
Number of sub arrays (strings)	3
Array maximum volume	4140 cubic inch
Acquisition volume	3040 cubic inch
Low power/Line change volume	40 cubic inch
Source interval	25m
Operating pressure	2000 psi
Distance center of seismic source astern of ship	151m
Distance bridge observation points from source	205m



Vessel offset diagrams

2.0 Methodology

Because there was a change in MMO's during the port call and crew change in Burnie on the 2nd April, there are some differences in methodology.

All marine mammal sightings were recorded on the Australian Government Reporting forms and are provided in an electronic form using Microsoft Excel.

2.1 Visual observations

The MMOs scanned the sea surface during daylight hours using the naked eye and 7x50 binoculars with reticules. The reticule measures were calibrated and used to gain approximate distances from the observation point to the cetacean.

A sextant is utilised by C. Sutherland to measure distances as a more accurate method, but was only used when cetaceans were present over several minutes. For seals that briefly appeared close to the vessel, an estimation of distance was done by eye.

In the case of whale sighting no.11 on the 27th March the blow was quickly dispersed by the wind and the distance could only be gauged by eye using the tail buoy as a reference point.

C. Sutherland was also equipped with a Garmin GPS that was used to record the position and time of the vessel for each sighting as well as each visual of the animal over the sighting period. This was then used to plot the animal's movements on an Excel program (Developed by Dr Chris Lalas in consultation with C. Sutherland) that gives the position, distance and bearing to the actual acoustic source.

C.Sutherland ceased observations when the sea state became so rough as to limit the ability to observe marine mammals. This was down to 500m or less in seas Beaufort 7 and above. Observations in these circumstances became meaningless.

However in seas with a shorter swell but rough sea state and poor visibility, some acquisition work was done. In these instances pre-start-up observations were done as well as observations during soft starts in case there were animals very close to the array.

There were no nighttime observations undertaken by the dedicated observer.

A visual check was made from the outside of the bridge, from the bridge wings and from the bridge in adverse weather conditions. During soft starts the area immediately astern was viewed from the helicopter deck.

2.2 Species identification

Marine mammals were identified to species wherever possible.

The Pinnipeds recorded in Tasmania include the *Otariidae* seals:

Australian Fur seal	<i>Arctocephalus pusillus doriferus</i>
New Zealand Fur seal	<i>Arctocephalus fosteri</i>
Australian Sea lion	<i>Neophoca cinerea</i>

Distinguishing these three species is difficult to do at sea unless extremely close.

Therefore the pinniped sightings by Carol Sutherland were recorded as 'Fur seal' if no sea lion features were seen. This is not an accurate method given the similarities, but in Bass Strait the *Otariidae*s seen would most likely be Fur seals.

Debra Glasgow only listed species when there was a high certainty of correct identification, all other seal sightings were recorded as 'unidentified seal'.

One seal sighting by a member of the seismic crew did not fit *Otariidae* features thus it was recorded as an 'unidentified seal'. (Sighting no. 5 – C.Sutherland)

Common dolphins were clearly identified.

Sighting 11 was of an unidentified whale. The blow was quickly distorted and dispersed by the wind. The single column and size of blow indicated a possible large rorqual whale. (C.Sutherland)

Sighting 14 was of unidentified small cetaceans - possibly beaked whales or pilot whales which stayed just outside the 2km zone and quickly moved away. They were traveling fast and were only seen twice, disappearing into the sun's glare. They were too large for dolphins. The area was monitored but there were no further sightings.

Sighting 15 was of bottlenose dolphins *tursiops truncatus* which came to the ship to ride the bow for 2-3 surfacings and then moved away very quickly.

Sighting 30 was of an unidentified small mammal - only one body surfacing was seen - light coloured belly, grey/brown back, small dolphin size. This was probably a seal but was not seen clearly enough to identify with any certainty.

2.3 Records kept

The MMOs kept field notes, a diary of events and a copy of the Navigator's daily log. Records maintained electronically were:

- Seismic array times.
- Marine mammal distance and tracking sheets
- Observer Effort form
- Cetacean Sighting Report –Seismic
- Whale and Dolphin Sighting Report Summary
- Weather and visibility log

The Observer Effort Report covers the observation times carried out by the MMO, sea state and weather conditions.

Carol Sutherland recorded marine mammal sightings on the Australian Cetacean Sighting Report in both hard copy and on an Excel spreadsheet. Debra Glasgow recorded all sightings, effort and weather/visibility observations in an appropriate Excel format.

There are a total of 40 recorded sightings.

The Whale and Dolphin Sighting Report Summary is a summary of all the sightings on a format designed by the Department of the Environment and Heritage and is included in the Australian Cetacean Sighting Report file.

3.0 Results

3.1 Pre-start observations

Thirty minutes prior the soft start were observed in all except one situation.

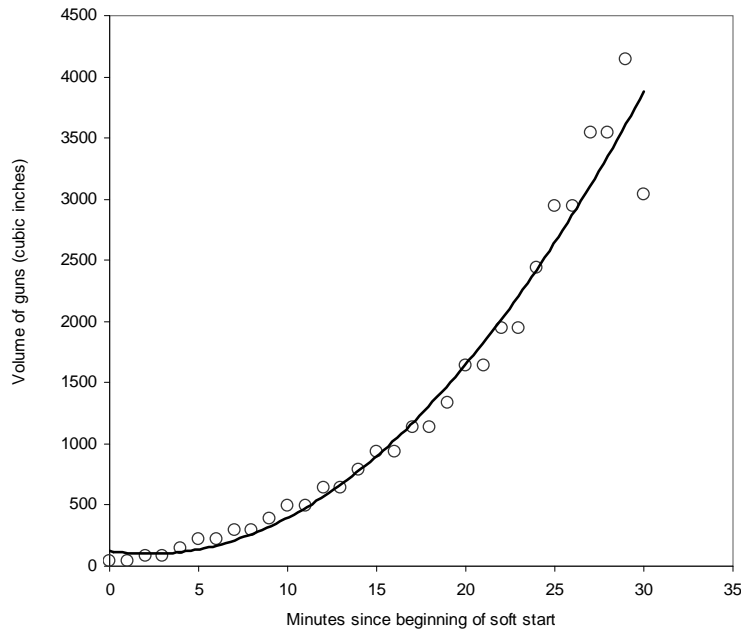
The track of the vessel was altered, thus was the Start of Line time which resulted in C.Sutherland being too late back from a break to observe the required pre start observations.

3.2 Soft Starts

Soft starts were ramped up to 4140 cubic inches before dropping to 3040 cubic inches. The extra volume was due to the spare units being deployed briefly.

One soft start on the 19th March had an 18-minute duration as a result of a delay in redeploying the array after maintenance. (C.Sutherland)

The MMO (C.Sutherland) was not present for one soft start on the 1st April. The observation was done by the bridge personnel whilst the MMO was recording the rate of ramp up in the instrument room.



Record of Soft Start 1.04.08 11:17 Automatic firing

3.3 Observation times

A total of 128:20 hours were observed prior to the port call in Burnie (17 March - 2 April). A total of 140 hours 8 minutes were observed after the port call in Burnie (4-18 April).

The normal period of observations was between sunrise and sunset.

Total observation hours recorded was the period of observations minus the time taken by the MMO for meals and breaks, and periods where there was a loss of visibility.

Weather did restrict the hours observed. When the vessel was operating in winds over 30 knots, marine mammal observations were meaningless as observation hours. Observation zones were down to 200-500m. However, even though it is of limited value, observations were done for soft starts. This was done to check that there weren't any marine mammals visible in close before the ramp up.

4.0 Species Encountered

There were a total of 40 marine mammal sightings.

7 cetacean sightings

29 fur seal sightings

3 unidentified seal sightings

1 unidentified small mammal sighting

The unidentified whale was sighting number 11 and was inside the 2km power down zone. However no identification to species was obtained due to the blow being distorted and quickly dispersed in the wind. No body features were seen. Due to the size of the blow, it was probably a large rorqual whale. (C.Sutherland)

The unidentified small cetaceans (Sighting 14) were possibly beaked whales or pilot whales which stayed just outside the 2km zone and quickly moved away. They were traveling fast and were only seen twice, disappearing into the sun's glare. They were too large for dolphins and some white patterning was observed. (D.Glasgow)

Sighting 15 was observed shortly after sighting 14 and were bottlenose dolphins *tursiops truncatus* which came to the ship to ride the bow for 2-3 surfacings and then moved away very quickly. (D.Glasgow)

Sighting 30 was of an unidentified small mammal - only one body surfacing was seen - light coloured belly, grey/brown back, small dolphin size. This was probably a seal but was not seen well enough to identify with any certainty. (D.Glasgow)

Common dolphins were clearly identified from the markings as they breached.

Common dolphins generally travel in large pods, and it is these sizable pods that were seen both around the vessel bow riding, and away from the vessel following a possible school of fish.

Species encountered	Total number of sightings
Fur seal <i>Otariidae</i>	29
Unidentified seal	3
Unidentified small mammal	1
Common dolphins	4
Bottlenose dolphins	1
Unidentified whale	1
Unidentified small cetacean	1
Total number of sightings	40

4.1 Adherence to Australian DEWR Guidelines

Sighting no.11 on the 27th March involved an unidentified whale within the low power zone during a soft start.

The EPBC Act Policy Statement 2.1 (2007) Management Procedures A.3.3 states:

If a whale is sighted within the 3kms observation zone during the soft start the operator of the acoustic source will be placed on stand-by to power down the acoustic source. An additional trained crew member or marine mammal observer should also be brought to the bridge to continuously monitor the whale whilst in sight. If a whale is sighted within or is about to enter the *low power zone*, the acoustic source should be powered down to the lowest possible setting (eg, A single gun).

Soft start procedures should only resume after the whale has been observed to move outside the *low power zone*, or when 30 minutes have lapsed since the last whale sighting.

The whale's blow was sighted at 12:51 on the 27th March, one minute after the commencement of a soft start. The Mate on watch was informed by the MMO. At 12:53 the whale was sighted inside the low power zone at approximately 1.5km. The Mate was informed and came out of the bridge to

scan for the whale for a brief period then went back inside the bridge. At 12:56 there was a further blow, this time closer to the array at 1.4km but on a path that was heading away from the source. The MMO asked that the party Chief be called to the bridge as there seemed to be no management response occurring.

The MMO also asked Clement Le Du, a seismic crew member who was close by to help search for the whale.

The Party Chief came to the bridge at 13:02. He informed the MMO that the soft start could be delayed for 6 minutes. Given that parameter, and that the whale, had it continued on the heading seen, would have left the low power zone, the decision was made to hold the soft start at the existing level of 940 cubic inches of volume to give the whale further time to exit away from the 2km low power zone and deter it from changing course and possibly coming closer to the vessel if it was so inclined. (C. Sutherland)

Sighting no.14 of unidentified small cetaceans stayed outside the 2km power down zone. They were last seen moving quickly away from the ship about 2km away but they disappeared into the glare and were not sighted again despite careful monitoring of the area. The instrument room was notified and the party chief and client representative came up to the bridge but no further mitigation action was required. Bridge crew and others attempted to assist the search without result. (D.Glasgow)

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