DATA ACQUISITION SUPERVISION REPORT

For the

MOLSON 2D MARINE SEISMIC SURVEY

Conducted by

TAP OIL LIMITED

In The Exploration Licence Area

BLOCK T/47P OFFSHORE TASMANIA

SURVEY START DATE 12th March 2008
SURVEY COMPLETION DATE 17th March 2008

VOLUME 1 SEISMIC DATA ACQUISITION

Compiled by Bill Lloyd

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1 INTRODUCTION

1.1 OBJECTIVES

To carry out a high quality 2D seismic survey. The survey consists of some 529.82 full fold kilometres comprising of 23 lines over the T/47P block for Tap Oil. The survey is located in the Bass Basin offshore Tasmania.

The seismic survey vessel was the M/V Pacific Titan owned and operated by Swire Pacific Offshore Operations (Pte) Ltd who provided the marine crew. The vessel was on lease by CGG Veritas, who supplied the seismic personnel, data processing and logistics.

1.2 SURVEY PARAMETERS

The following is a summary of the survey parameters:

Survey type	: 2D
Client	: Tap Oil
Survey name	: Tap Molson 2D
SP interval	: 25m
Source	: 3040in³. Bolt guns
Streamer Length	: 6000 metres
Groups	: 480
Primary Positioning	: SPM2 SPM 5.16 HP
Secondary Positioning	: SPM1 SPM 5.16 XP
Tertiary Positioning	: MULTIFIX 5 Ver 1.01 XP
Water depth	: 60 m to 80m
Number of lines	: 23
Full fold sail line km	: 529.82Kms
Port of supply	: Burnie, Tasmania
Contractor	: CGG Veritas
Vessel	: Pacific Titan
Client representation	: Enquest Pty. Limited

1.3 ACQUISITION PARAMETERS

Recording System	: Sercel SEAL system rev. 5.0
Number of Channels	: 480
Record Length	: 6000ms
Sample Interval	: 2ms
Low Cut Filter	: 4.7Hz at 12db/Oct
High Cut Filter	: 200Hz at 370dB/Oct
Tape Format	: SEG-D 8058
Digital Filter Delay	: off
Energy Source Type	: Bolt 1500LL and 1900LLX
Total Capacity	: 3040 cubic inches
Number of Arrays	: 1
Number of sub-arrays	: 3

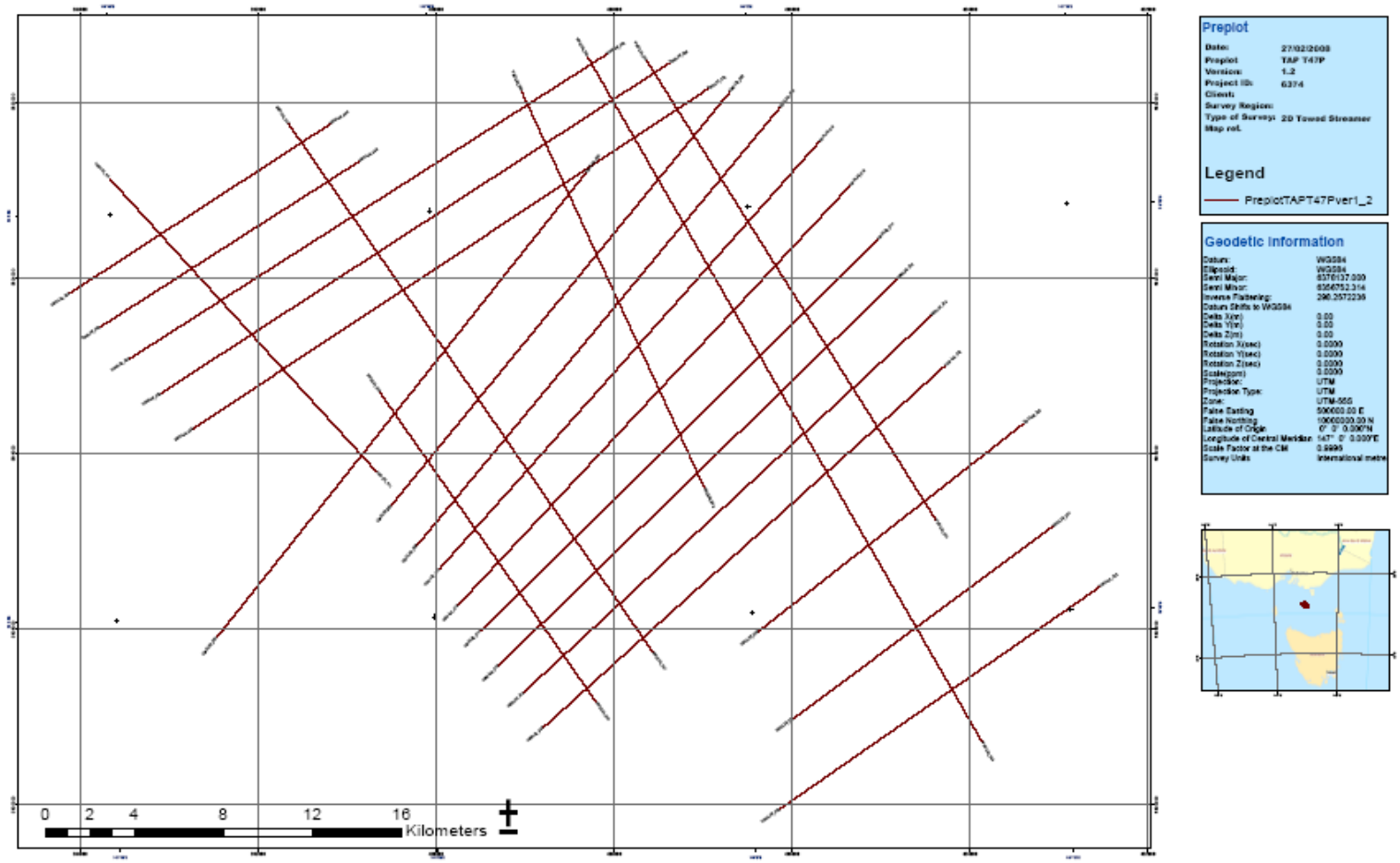
Array Length	: 14.7m
Sub Array Separation	: 10.0m
Total Number of Guns	: 21 active
Capacity of each Sub-Array	: 1110 in^3 starboard, 1020 in^3 inner, 910in^3 port.
Typical Output	: 106.2 bar/metres pk-pk (at 6 metres)
Primary / bubble ratio	: 22.9 (full array, at 6 metres)
Pressure	: 2000psi +/- 10%
Depth	: 6.0 metres
Firing Delay from Time Zero	: 50ms
Shot Interval	: 25.0 metres
Streamer type	: Gel Filled
Group Length	: 12.5 metres
Group Interval	: 12.5 metres
Group Sensitivity	: 21.5v/ bar
Hydrophones per Group	: 8 in parallel connection (8 per 12.5m base group)
Streamer depth	: 8 metres +/- 1.0m
Typical Noise	: 3.5 to 8.0 microbars
Offset (In-line)	: 145.0m
Nav Ref.-Cent. Source	: 180.00m
Primary Positioning	: SPM2 SPM 5.16 HP
Secondary Positioning	: SPM1 SPM 5.16 XP
Tertiary Positioning	: MULTIFIX 5 Ver 1.01 XP
Integrated Navigation System	: SPECTRA
Echo Sounder	: Kongsberg-Simrad EA600, 12 kHz

1.4 LINE CO-ORDINATES

VMOL08_001	1001	392622.672S	1455651.926E	409450.00	5633907.00
VMOL08_001	1987	393746.143S	1460547.066E	422453.73	5612975.08
VMOL08_002	1001	394451.633S	1460046.929E	415443.00	5599782.00
VMOL08_002	1705	393927.827S	1461055.262E	429829.42	5609910.62
VMOL08_003	1001	392616.239S	1455501.294E	406803.00	5634074.00
VMOL08_003	2438	394315.293S	1460710.510E	424542.52	5602847.26
VMOL08_004	1001	393757.570S	1460928.171E	427728.00	5612674.00
VMOL08_004	1584	394237.522S	1460115.492E	416077.60	5603924.10
VMOL08_005	1001	392705.525S	1455255.846E	403823.00	5632518.00
VMOL08_005	1796	393655.200S	1455831.596E	412054.51	5614434.18
VMOL08_006	1001	393525.409S	1460834.968E	426415.00	5617353.00
VMOL08_006	1611	394028.908S	1460010.107E	414476.60	5607872.10
VMOL08_007	1001	392749.475S	1454537.254E	393359.00	5631026.00
VMOL08_007	2167	394057.733S	1455651.184E	409747.90	5606929.30
VMOL08_008	1001	393358.827S	1460607.800E	422878.00	5619988.00
VMOL08_008	1979	394246.774S	1455322.865E	404827.11	5603507.73

VMOL08_009	1001	393428.226S	1454822.298E	397466.00	5618786.00
VMOL08_009	1688	394210.899S	1455503.163E	407201.93	5604642.96
VMOL08_010	1001	393244.902S	1460542.651E	422255.00	5622261.00
VMOL08_010	2005	394154.529S	1455246.512E	403941.40	5605107.70
VMOL08_011	1001	392906.757S	1453958.911E	385309.00	5628528.00
VMOL08_011	1720	393625.701S	1454814.184E	397320.60	5615161.70
VMOL08_012	1001	393149.236S	1460440.206E	420747.00	5623962.00
VMOL08_012	2008	394114.873S	1455159.322E	402802.07	5606316.17
VMOL08_014	1001	393050.334S	1460404.049E	419865.00	5625769.00
VMOL08_014	2013	394023.686S	1455125.700E	401981.10	5607884.10
VMOL08_016	1001	392931.064S	1460312.651E	418612.00	5628200.00
VMOL08_016	2042	393944.876S	1455044.355E	400980.70	5609068.00
VMOL08_018	1001	392825.722S	1460215.779E	417232.00	5630200.00
VMOL08_018	2038	393851.043S	1455009.993E	400140.40	5610717.10
VMOL08_020	1001	392734.311S	1460102.379E	415461.00	5631766.00
VMOL08_020	2033	393815.607S	1454928.489E	399136.90	5611796.70
VMOL08_022	1001	392710.832S	1455928.273E	413204.00	5632465.00
VMOL08_022	1970	393715.750S	1454841.145E	397983.96	5613627.25
VMOL08_024	1001	394028.032S	1454308.147E	390129.00	5607590.00
VMOL08_024	2079	392907.343S	1455456.277E	406746.53	5628797.64
VMOL08_026	1001	393518.432S	1454229.711E	389076.00	5617121.90
VMOL08_026	2115	392705.908S	1455846.991E	412215.65	5632605.70
VMOL08_028	1001	393425.642S	1454129.993E	387627.80	5618728.80
VMOL08_028	2096	392627.165S	1455735.135E	410484.48	5633780.46
VMOL08_030	1001	393333.728S	1454032.148E	386224.10	5620309.10
VMOL08_030	2023	392613.133S	1455537.725E	407672.76	5634180.17
VMOL08_032	1001	393246.555S	1453937.130E	384889.50	5621744.00
VMOL08_032	1557	392846.738S	1454749.799E	396549.94	5629303.53
VMOL08_034	1001	393155.912S	1453840.889E	383523.60	5623285.20
VMOL08_034	1562	392751.173S	1454655.623E	395232.44	5630999.19

1.5 PROGRAM MAP



2 SYNOPSIS

2.1 OVERVIEW

The survey consisted of 23 pre-plotted lines with a total of 529.82 full fold kilometres in the T/47P block situated in the Bass Straight offshore Tasmania. A final total of 596.175 kilometres of surface coverage equivalent to 530.45 full fold kilometres were recorded in 23 sequences.

12th March 2008

The Tap Oil commenced from position 040°11'35"S 144°54'29"E which was the midpoint between the Santos and Tap surveys. On arriving close to the survey area a T/S dip was preformed the result was 1516.5m/s. Streamers and sources were deployed and on run-in to line a series of offset shots were taken, offset was 145m. Production commenced with line VMOL08-011, which was completed, and line 007 up to midnight.

13th March 2008

A good day's production with lines VLOM08-007, 005, 032 completed and line 001 recorded up to midnight. The day was not without it's problems a high pressure airline ruptured in gun reel 1 causing an extended line change as the spare umbilical was found to be defective and the other spare umbilical had to be used of the spare reel. On the run-in to line 032 could not get gun 9 string 1 to fire consequently the line was recorded with a reduced array of 3000cu ins which is still in spec. On the next line change an attempt was made to repair gun 9 string 1 but the hydraulic hose in reel 1 ruptured, suspect this was collateral damage when the airline blew. A large quantity of hydraulic fluid leaked on to the deck this was contained and mopped up using oil absorbent granules and pads and put into plastic bags to be disposed of at crew change. The attempt to repair gun 9 sting 1 failed so line 003 was recorded with a 3000cu in. Gun 9 string one was fixed on the next line by running a spare sensor lead.

14th March 2008

A very good day's production wit lines VMOL08-001, 020, 022, 024 &016 completed and line 012 up to midnight. Line VMOL08-024 the vessel was steered 100m offline to pas over the Barramundi 1 well head as requested by Tap Oil, the feather angel did not exceed 5 degrees.

15th March 2008

Another good day's production with lines VLOL08-012, 018, 028, 026 & 030 completed and line 030 up to midnight.

16th March 2008

Once again a good day's production with lines VLOM08-009, 002, 004, 006, 008 & 014 being completed and line 010 up to midnight.

17th March 2008

Completed the last line of the Tap Oil survey VMOL08-010-023. The midpoint between the Tap Oil and Cue Energy Resources was 039°41'20"S 145°53'25"E at 04:00 Hrs local time.

2.2 SURVEY PRODUCTION BY LINE

Sequence	Line	Dir	FCSP	LCSP	KM	KMFF
001	VMOL08-011-001	318	1720	881	21.00000	18.00000
002	VMOL08-007-002	145	1001	2218	30.45000	29.17500
002	VMOL08-007-002	145	2219	2287	1.72500	0.00000
003	VMOL08-005-003	335	1796	881	22.90000	19.90000
004	VMOL08-034-004	236	1562	970	14.82500	14.05000
005	VMOL08-032-005	056	1001	1677	16.92500	13.92500
006	VMOL08-003-006	150	1001	2558	38.95000	35.95000
007	VMOL08-001-007	328	1989	1317	16.82500	16.82500
007	VMOL08-001-007	328	1316	881	10.90000	7.90000
008	VMOL08-020-008	219	2033	881	28.82500	25.82500
009	VMOL08-022-009	039	1001	2090	27.25000	24.25000
010	VMOL08-024-010	219	2079	881	29.97500	26.97500
011	VMOL08-016-011	042	1001	2162	29.05000	26.05000
012	VMOL08-012-012	225	2008	1584	10.62500	10.62500
012	VMOL08-012-012	225	1583	881	17.57500	14.57500
013	VMOL08-018-013	041	1001	2158	28.95000	25.95000
014	VMOL08-028-014	236	2096	881	30.40000	27.40000
015	VMOL08-026-015	057	1001	2235	30.87500	27.87500
016	VMOL08-030-016	237	2023	881	28.57500	25.57500
017	VMOL08-009-017	145	1001	1053	1.32500	1.32500
017	VMOL08-009-017	145	1054	1808	18.87500	15.87500
018	VMOL08-002-018	055	1001	1825	20.62500	17.62500
019	VMOL08-004-019	233	1584	881	17.60000	14.60000
020	VMOL08-006-020	052	1001	1731	18.27500	15.27500
021	VMOL08-008-021	228	1979	881	27.47500	24.47500
022	VMOL08-014-022	045	1001	2133	28.32500	25.32500
023	VMOL08-010-023	226	2005	1800	5.15000	5.15000
023	VMOL08-010-023	226	1799	881	22.97500	19.97500

Total Survey Production

KM	KMFF
597.225	530.450

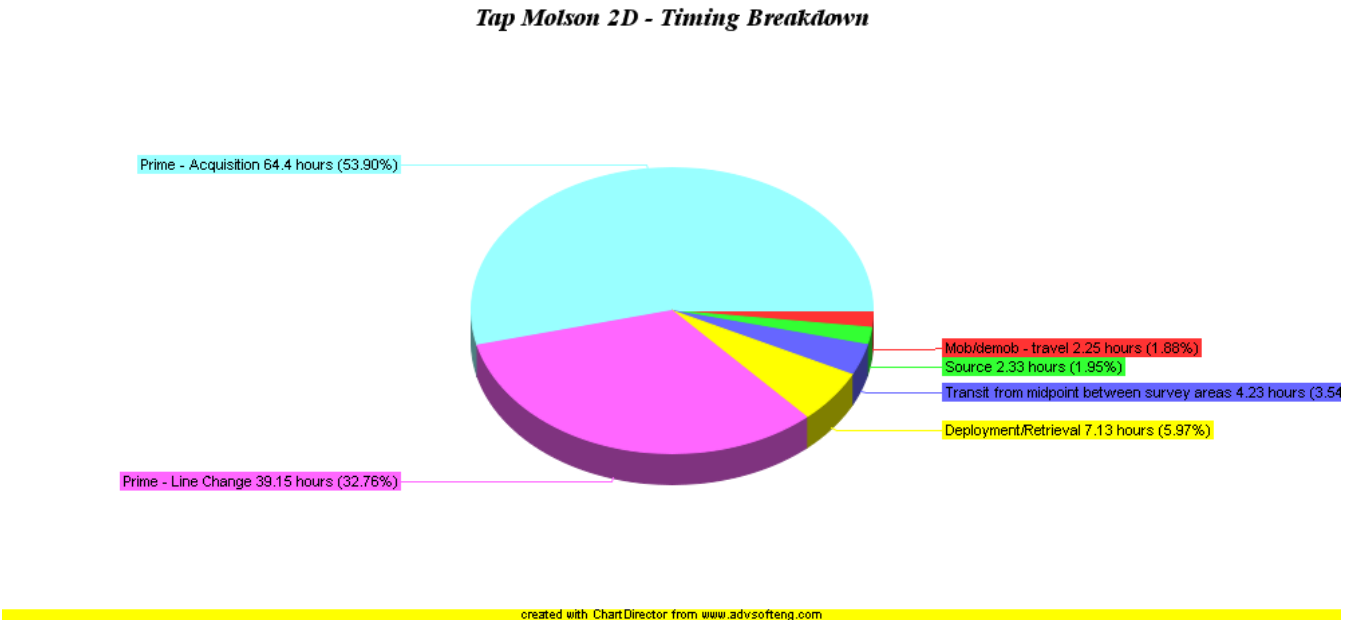
2.3 STATISTICAL SUMMARY

Total Survey Timing

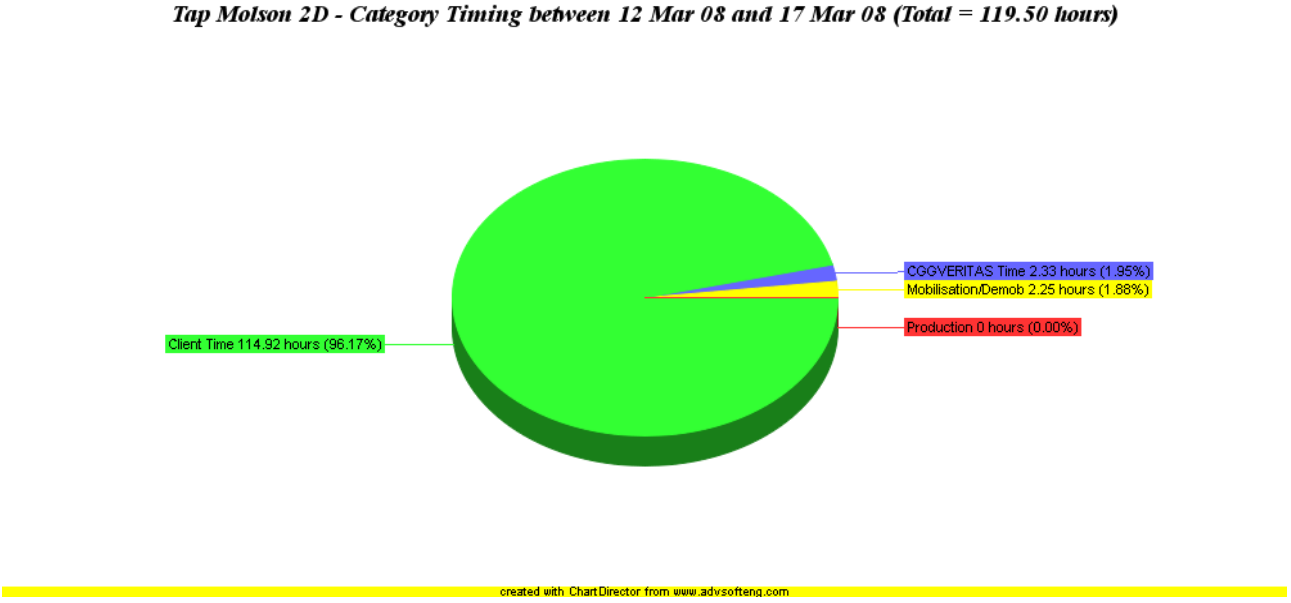
Code	Description	Duration
01	Prime - Acquisition	64.40
02	Prime - Line Change	39.15
19	Transit from midpoint between survey areas	4.23
27	Deployment/Retrieval	7.13
30	Source	2.33
51	Mob/demob - travel	2.25

Total Time = 119.500 Hours

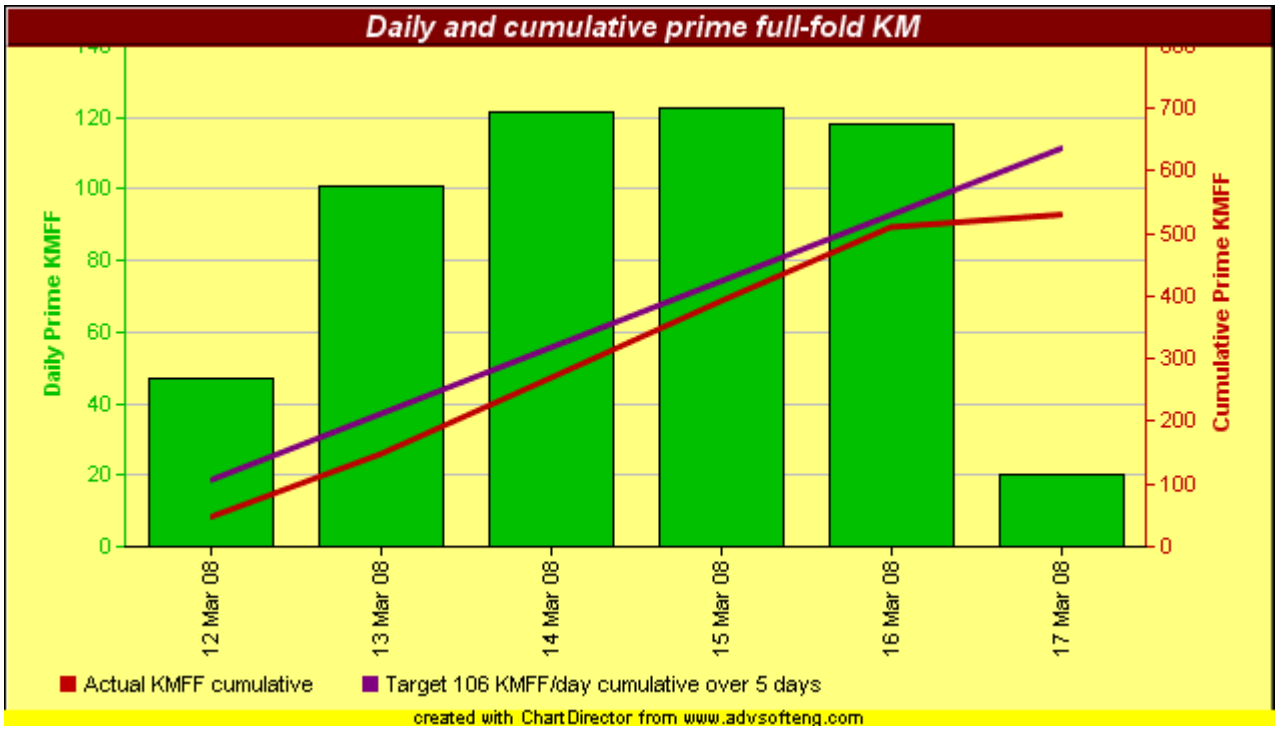
Timing Breakdown



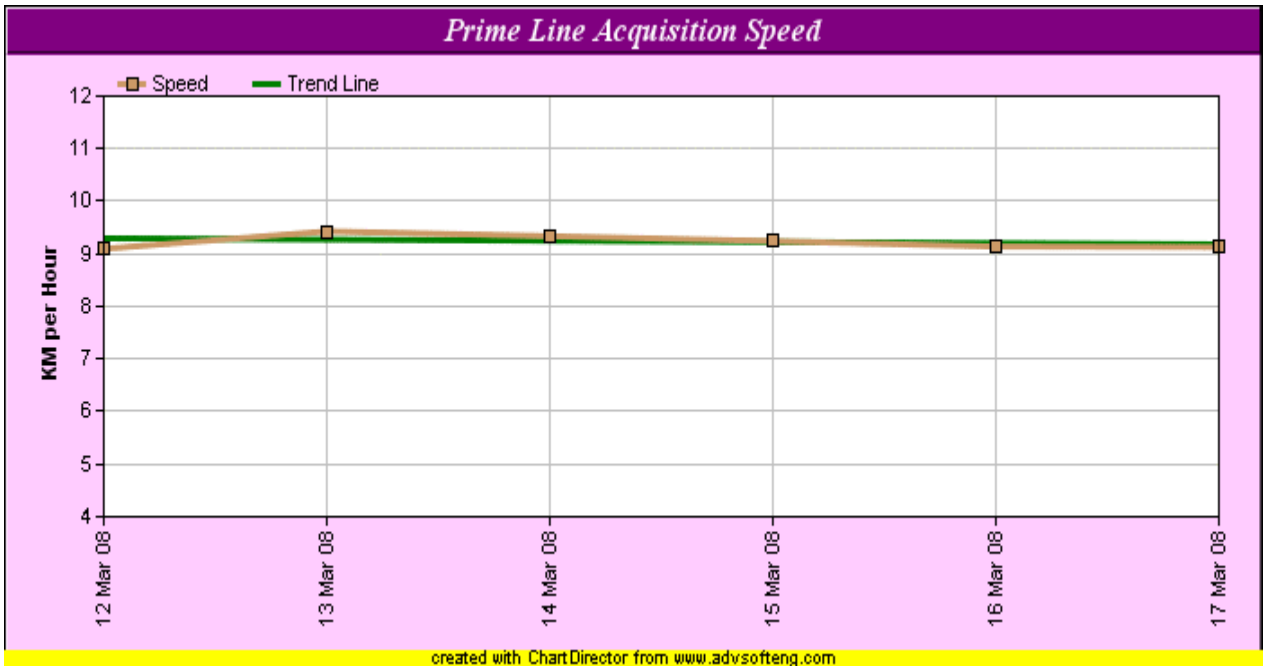
Category Timing



Daily and Cumulative Full Fold Kilometres



Acquisition Speed

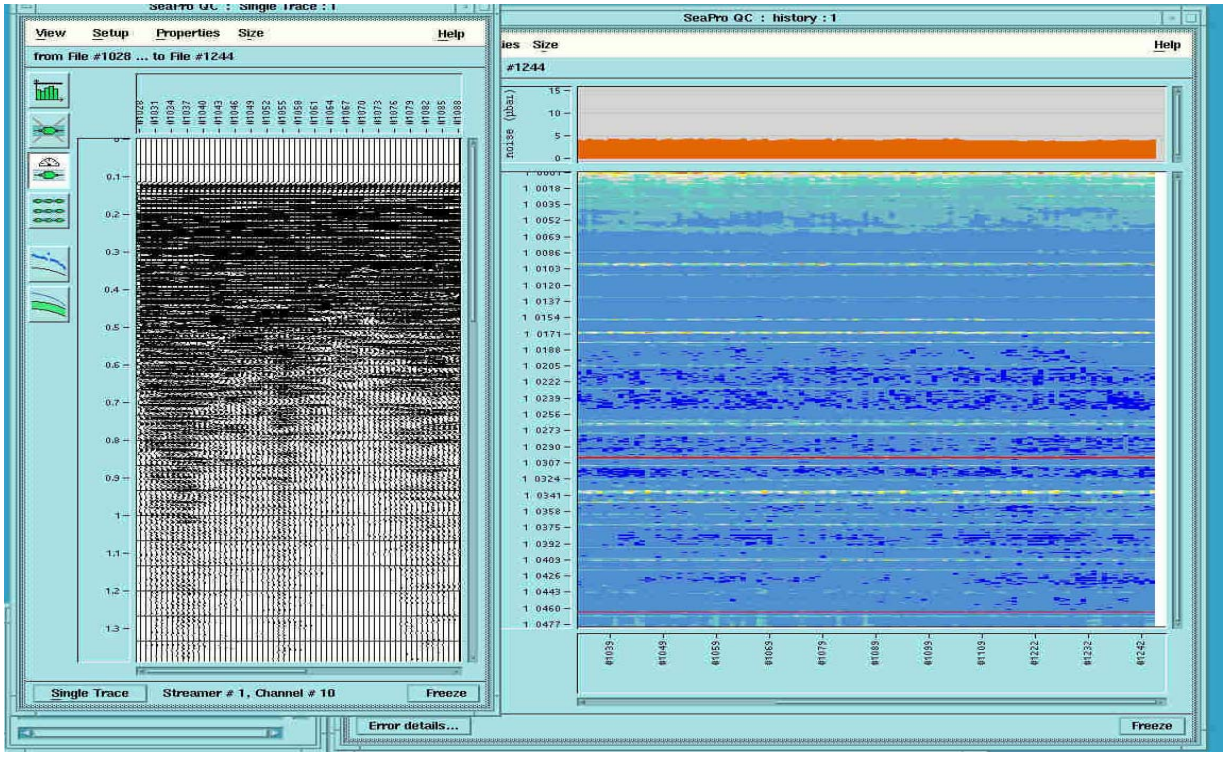


2.4 TECHNICAL SUMMARY

The following is a brief description of individual equipment performance throughout the survey:

Recording Instruments

The Pacific Titan is fitted with a Sercel 24 bit SEAL system. This was a brand new system for the Pacific Titan and relatively new to the market. It has been used extensively in China on land crews, proving to be robust and operator friendly. The Sercel system provided a comprehensive array of real time on screen displays, showing auxiliary channels, Streamer channel display and single trace display. The last 20 records could be accessed and displayed for QC evaluation. A shot display similar to the old oscilloscope display but greatly expanded and colour coded to indicate noise strength was also available. All displays could be manipulated to improve data quality control. The figure below shows a sample screen shot from the Seal recording system.



A full set of daily tests was automatically carried out each day showing the recording system and streamer were within contract specification. The system operated faultlessly during the survey.

Observer's reports were automatically generated using CGGVeritas standard Obslog package. Faults from the recording system and array logging system were automatically generated at the completion of each line. The quality of the Observers logs was acceptable. There could have been more detail regarding streamer control and weather observations in regard to the streamer and data.

Streamer

The Sercel solid digital streamer worked extremely well throughout the survey. Streamer depths were maintained at 8 metres. Noise levels on the data were monitored closely during QC processing.

Energy Source

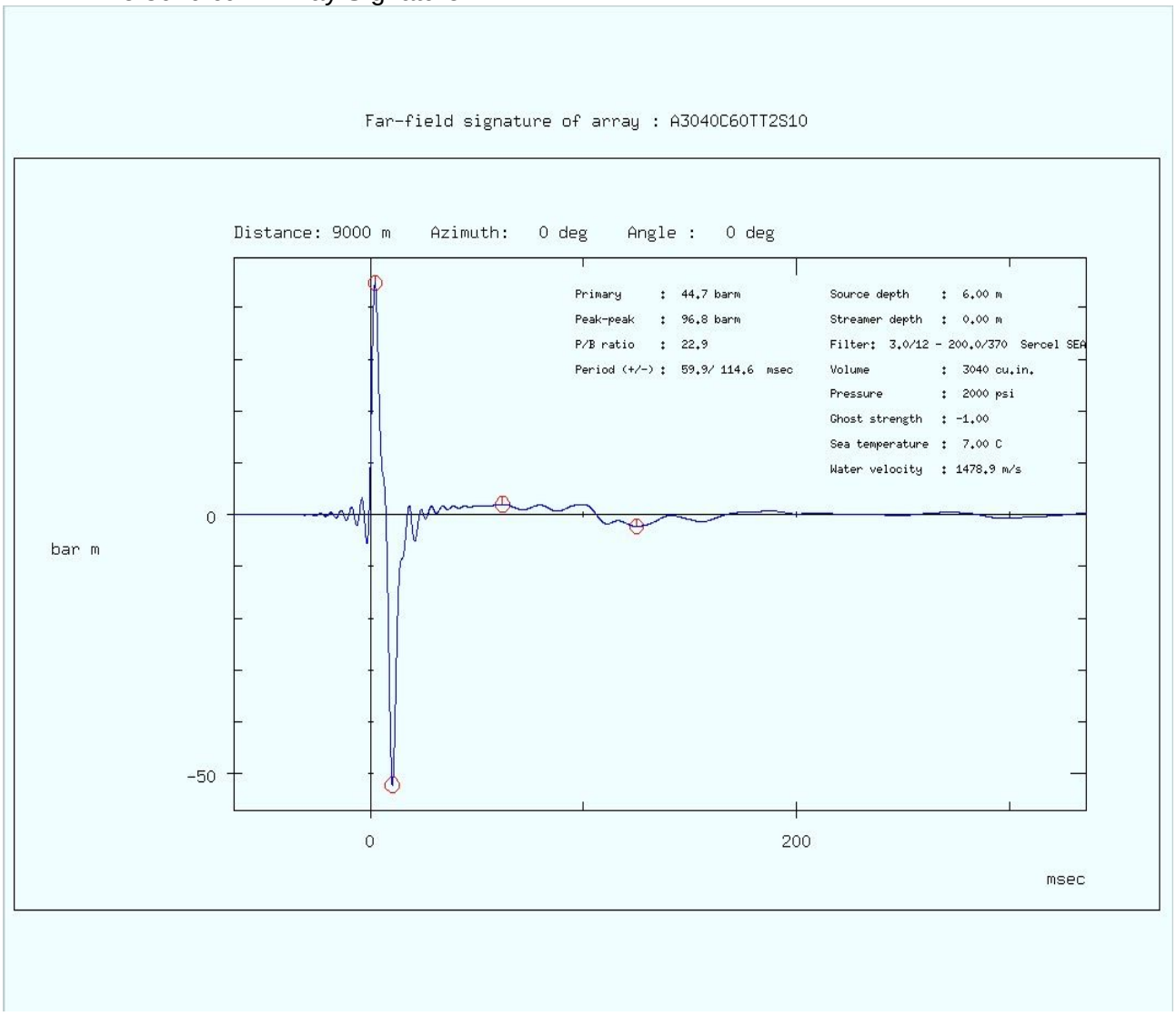
Over the past few years the Pacific Titan was used primarily as a source vessel so the arrays and the attached infrastructure were in good condition. A new Sealink 2000, onboard source controller and hydrophone data acquisition system was installed early 2004. A twin screen graphical interface allows for simple operator monitoring and control as well as showing deterioration of gun performance

A rigorous maintenance schedule was maintained on the array strings and individual elements were replaced at the specified time regardless of their performance.

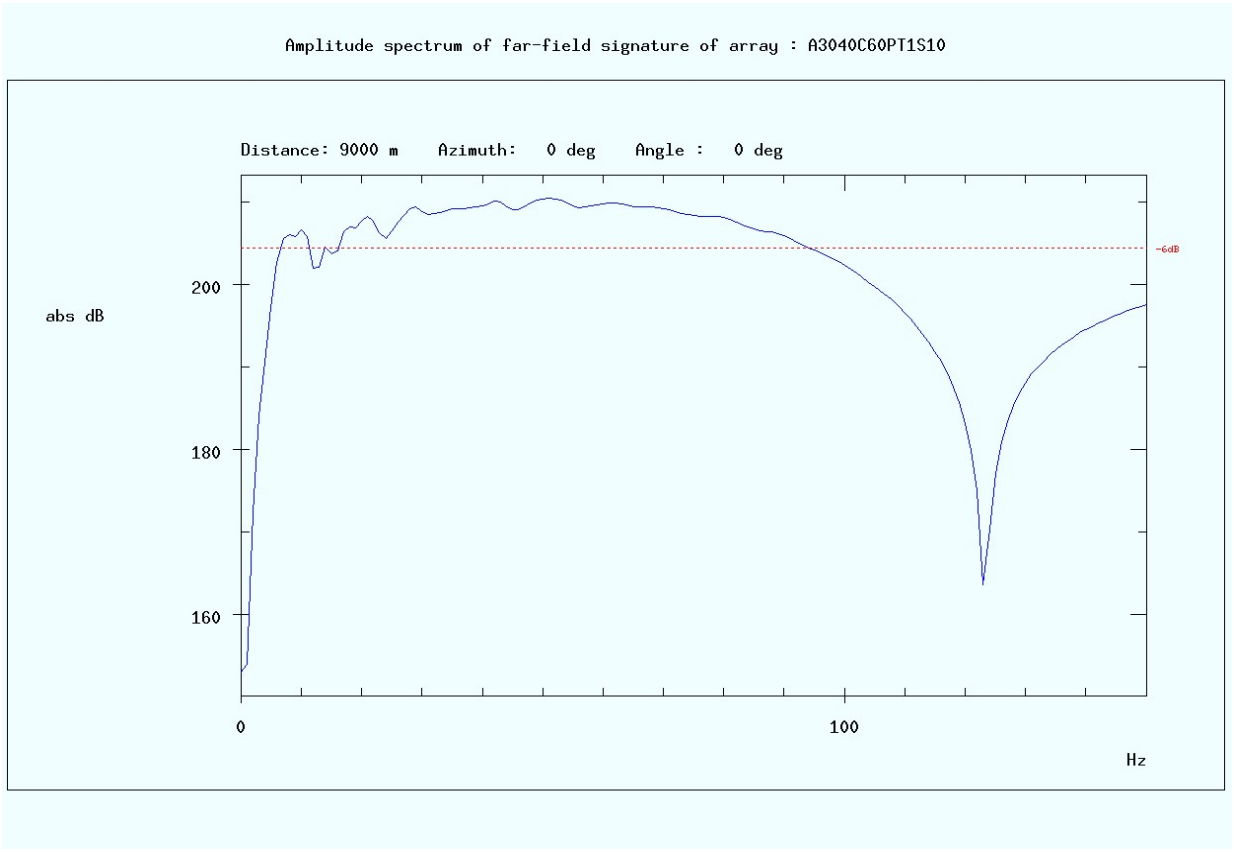
The three sub arrays were equipped with a total of 26 array elements. The drop out spec was generated by CGGVeritas. There was 2.33 hours lost to the source arrays due to a high pressure umbilical rupture which had to be replaced. A 3040 cu³ inch array was used through out the survey

The Titan has three compressors, only one compressor was needed to comfortably maintain air pressure with the others being rotated through to allow maintenance to be carried out. The 25.0m recording intervals was easily within the scope of the compressors.

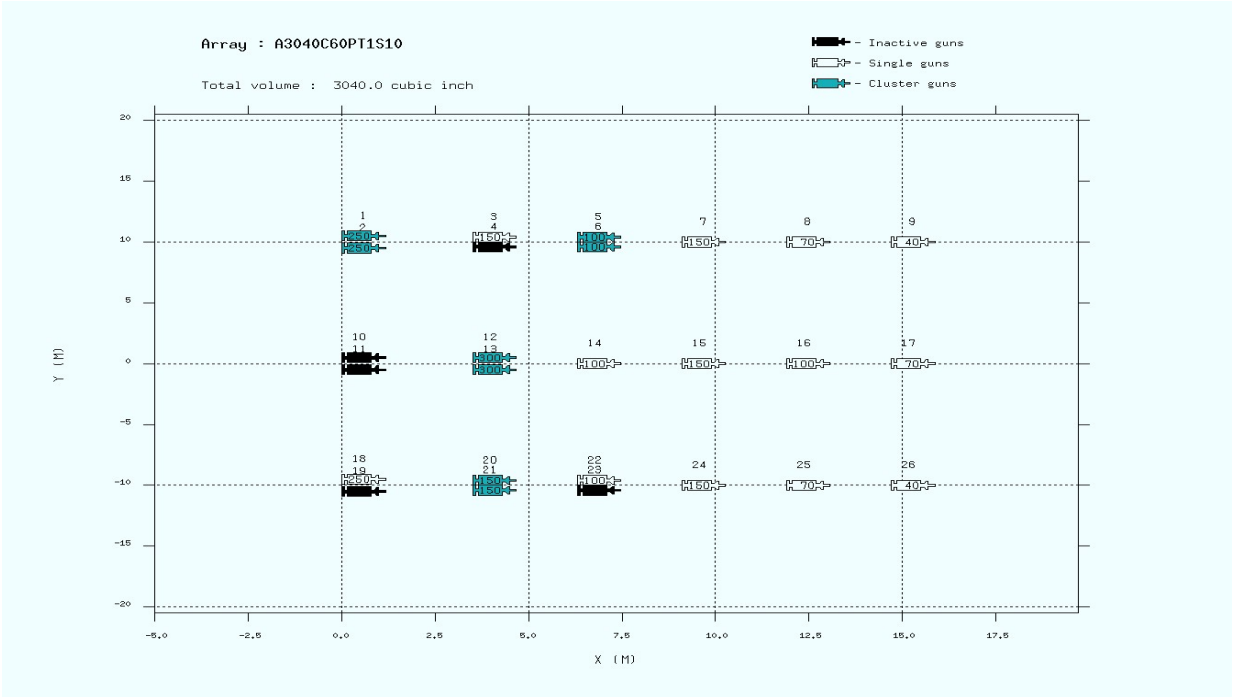
The 3040 cu in Array SIgnature



The Amplitude Spectrum of the 3040 cubic inch array.



The 3040 cubic inch array layout.



Streamer Details

Seismic data were acquired during this survey using the SEAL Digital Solid Streamer, manufactured by Sercel, Inc.

Item	Description	Type	Amount	Remark
Streamers	24 bit, digital distributed electronic	SEAL Sercel	2D, Up to 12 km active	
Depth Control	Digicourse	5011	Up to 40	
Buoyancy		Foam		
Retrievers	Concord	SRD	12	3 each 3 km
Streamer skin	Polyurethane	3.5mm		
Hydrophones	SSAS	Radial		
Section Length	150 m			
Section diameter	50 mm			
Lead-in	300 m			
Group Length	12.5 m			
No of hydrophones per group	8			21.5V/bar sensitivity
Max number of channels	960			12.5m @ 2ms
Telemetry data link	Dual twisted pair with CRC control	AWG 22		
Power lines	Dual	AWG 14		
Connectors	28 pin			
Acquisition	Sercel	SEAL	1	
Format	SEG D rev.2	8058		
Recording	3590 cartridge	IBM comp.	3	
Computer	Sun	Blade 2000	1	
Bird Controller	Digicourse	System	1	
Sampling				¼, 1/2, 1,2,4 ms
Aux channels			40	max 100
Plotter	Isys	24”	1	online
Printer	HP	830 A4		Logs, tests etc.
Network	TCP/IP	100kb		Ethernet coax

2.5 VESSEL

The Pacific Titan was built in Japan in 1982 and since that time has been through a number of transformations, from anchor handler to seismic boat, back to anchor handler before being refitted once more as a seismic vessel.

Although the vessel is set up as a 3D vessel, she was a good 2D platform. The 3D capacity meant that it was possible to make use of active floats on the tail buoy and sub arrays thus providing a higher degree of positioning accuracy than would normally be found on a 2D survey vessel. The latest refit saw a Sercel Solid digital streamer installed along with an Argus tape management system where data is written to a hard drive before being transferred to tape. This allows more time for system communications and greatly reduces the possibility of tape errors.

The vessel has been poorly maintained over the years and needs to have a general tidy up to be comfortable. For the size of the vessel the cabins for both seismic and marine crews are small and cramped. Conditions are reminiscent of 20 years ago. Extended surveys on this vessel could

become a serious OHS issue. There are adequate numbers of showers and toilets available and although the steward worked hard to keep them clean, they are in a poor state and need to be completely refitted to a standard fitting the current OHS standards expected of crews and vessels. The same argument could be applied to the quarters for the seismic crew.

Swire Pacific Offshore supplied the vessel marine personnel. All seismic personnel were from various countries and contracted to CGGVeritas.

The instrument room while not large was well laid out with plenty of working space for all personnel. The back deck areas are split with the streamer reels above the array deck. Both areas were spacious with plenty of safe working space for both array mechanics and streamer handling. The galley and mess areas were adequate. House keeping on the whole, was adequate

Communications are through Norsat and Inmarsat.

The client has an office next to the instrument room with a network connection but no phone.

Vessel Specifications

Name	:	M/V Pacific Titan
Owner	:	Swire Pacific Offshore Operations (Pte) Ltd
Port of Registry	:	Singapore
Date Built	:	1982
IMO Number	:	8208385
Radio Call Sign	:	9V5935

Classifications

Flag	:	Singapore
Class	:	A1 (E) Seismic Research AMS ACCU
Designation	:	Seismic Research Vessel

Dimensions

Length, overall	:	64.50 meters
Beam	:	18.50 meters
Draft	:	6.00 meters
GRT	:	3211 tonnes (gross registered tonnage)
NRT	:	963 tonnes (net registered tonnage)

Machinery

Main Engines	:	4 x 1600 bhp, 6Z-ST, total 6400 bhp @ 680 rpm
Propulsion	:	2 x variable pitch, in Kort Nozzles
Bow Thruster	:	Yanmar 6LAAL-DTN, 420 bhp, 5 tonnes thrust
Generators	:	3 x 280 kW, 440v, 60 Hz alternators, driven by Yanmar 6LAAL-DTN diesel engines.
Capacities		
Fuel Oil Capacity	:	1300 cubic meters
Lubricating Oil Capacity	:	5.0 cubic meters
Cable Oil Capacity	:	48.0 cubic meters
Fresh Water Capacity	:	154.0 cubic meters
Water Maker	:	2 x RO Machines, producing 20.0 cubic meters per day

Operating Capabilities

Speed	:	12 knots (Maximum), 10 knots (Cruising)
Fuel Consumption	:	9.0 cubic meters per day (average)
Endurance	:	45 days, while conducting 2D survey

Bridge Equipment

Radar	:	Kelvin Hughes Nucleus 6000A ARPA with slave in instrument room
Secondary Radar	:	JRC JMA 3210 Daylight
Echo Sounder	:	Simrad ED-162
GPS	:	Furuno GP 30
Communications	:	G.M.D.S.S. (Global Maritime Distress & Safety System)
	:	1x Skanti SSB
	:	2 x VHF
	:	2 x Inmarsat C 456304540/456304550 with
	:	Thrane and Thrane telex facility
	:	3 x VHF (portable GMDSS)
	:	2 x SART
	:	1 x EPIRB
	:	1 x Navtex
	:	1 x Jotron TR-6102 Airband Transceiver
Satcom B	:	NERA Inmarsat phone / fax
	:	Tel: (874) 335 385 510
	:	Fax: (874) 335 385 513
Satcom C	:	TeleNor C-Link phone / fax
High Speed data link	:	TeleNor C-Link
Weather Fax	:	Furuno 207

Safety Equipment

Fire monitoring, and detection of all accommodation, machinery and office spaces.
Foam deluge system covering streamer winches, streamer storage reels and helideck.
Six man solid Man overboard boat on quick release davit.
7.5 metre, 210hp. Rigid NorSafe Fast Rescue Boat Certified for 10 people.
LSA equipment for 45 persons excluding survival suits.

	Pacific Titan Crew List			**Date:**	**3rd March**	**2008**
No	Name	Rank	D.O.B.	Citizen	Passport no.	Exp.date
1	Theodore Strockyj	Captain	15.09.50	Australian	E3061610	19.12.17
2	James Riley	Chief Officer	11.11.80	Australian	L7347221	26.04.09
3	Hemaka Dissanayake	2nd Mate	26.02.72	New Zealander	EA888314	29.10.12
4	Carl Sayers	Chief Engineer	24.05.49	New Zealander	AA647005	14.03.13
5	Alexander Ivanoff	1st Engineer	05.12.60	Australian	M5216687	22.11.15
6	Alexander Saldanha	2nd Engineer	04.03.64	Australian	M1239195	12.02.14
7	Kerin Ross	G.P.	06.07.46	Australian	L7195273	08.02.09
8	Chris Pitman	G.P.	16.11.48	New Zealander	AA500827	18.06.12
9	Michael Howard	G.P.	29.07.73	Australian	M7562140	01.10.17
10	John Mason	G.P.	17.05.47	Australian	E7592880	30.08.12
11	Donald Crawford	Chief Stwd	13.04.46	Australian	M5345157	21.07.16
12	Graeme Scott	Stwd	09.07.56	Australian	M1975283	26.11.14
13	Christopher Milne	Ch Cook	03.04.61	Australian	M5791813	01.04.16
14	Anthony Raines	Cook	07.03.54	Australian	M1656991	19.07.14
15	Shan Mudiyanselege	Comp Mech	05.01.63	Sri Lankan	M1858320	31.03.09
16	Peter Brown	Comp Mech				
CGG VERITAS GEOPHYSICAL						
17	Sigurd Østerrud	Party Chief	15.10.61	Norwegian	20761184	24.02.15
18	Paul Stafford	Ch Navigator	11.05.70	British	203602835	24.04.12
19	Jun Lumabas	Observer	31.10.80	Filipino	ZZ229544	29.06.12
20	Dervin Arenal Victorio	Observer	23.10.80	Filipino	XX0019977	13.09.12
21	Roger Steffensen	Chief Mechanic	06.08.53	Norwegian	25245636	11.04.16
22	Ronaldo Morales	Mechanic	22.03.59	Filipino	ZZ145454	18.05.10
23	Reynaldo Vega	Mechanic	17.09.62	Filipino	UU0385562	19.12.11
24	Victor Satago	Mechanic	08.05.68	Filipino	XX0022520	16.09.12
25	Jose Peralta	Mechanic	01.06.50	Filipino	SS0035761	01.12.10
26	Steffi Schwarz	Field Geophys.	02.04.73	Australian	M2598263	
27	Dennis Aquino	Geophy	02.08.79	Filipino	XX0037558	24.09.12
28	Dennis Maranon	Observer	22.09.77	Filipino	QQ0076201	17.03.10
29	Christopher Hernandez	Navigator	5.12.83	Filipino	XX0188983	29.11.12
30	Roberto Obras Sibayan	Medic	13.05.65	Filipino	TT0947029	23.10.11
31	Allan Beattie	Observer	23.03.65	British	93105388	03.12.13
32	Richard Sykes	HSE	18.08.66	British	761103260	28.02.16
33	Clement Le Du	Navigator	23.03.07	French	03TE59624	
34	William Lloyd	Client Rep	21.10.48	Australian	E1022292	14.03.15
35	Carol Sutherland	MMO	28.08.63	New Zealander	AB718594	11.08.10

2.6 SAFETY SUMMARY

The vessel fully adheres to the health and safety requirements as set out by SOLAS. All machinery and seismic equipment is maintained on a computerised planned maintenance system. HSE audit recommendations are implemented through the IMGC-QHSE System which highlights deficiencies identified during audits and sets target dates for the completion of work along with whom or which department is responsible. Regular cross audits are held to improve and bring to attention any problems in operations or work practises. All emergency exits and routes to exits are adequately marked. A fully integrated alarm system is in place and is tested on a regular basis. Flashing lights are fitted to alert personnel when equipment on the gun deck is either being pressurised or test fired. Fire fighting equipment is positioned at all necessary locations about the vessel. The streamer reel is covered by a foam deluge system. The streamer reels are fitted with a 'save-all'. There is no obvious drainage to the waste kerosene tank. Nearly all-lifting equipment on the gun deck consists of stainless steel chains and shackles. Lifting points on deck heads were not used unless they had been rated. All certification is current. More than adequate abandonment equipment is carried on board.

Emergency procedures are laid down and prominently displayed about the vessel. Vessel plans showing emergency escape routes along with the location of all emergency equipment are also prominently displayed. Emergency fire/boat and man-overboard drills are held on a weekly basis. Current policy, hazards, near misses and topics arising are dealt with during the HSE meetings held for all crew.

Procedures for handling trailing gear during deployment and recovery were clearly laid down and followed closely. Procedures are under constant review as both the equipment and therefore the handling techniques change. Procedures are also in place for two-boat operations, helicopter operations and at-sea personnel transfers. Safety 'toolbox' meetings were held with all personnel involved prior to any operation. A Permit to Work system was in place for all hot work (burning, welding, and cutting), confined space entry, work aloft, work on high-pressure systems and electrical systems.

Comprehensive first aid and medical supplies are carried onboard. Medical advice was on hand through ISOS Sydney 61 2 9372 2468, AUSSAR (Australian Search and Rescue) 61 2 6230 6811/1800 641 792 Victoria Air Ambulance 000/1300 883 200 and Frontier Medical(Emergency Contact) 27 7 6840 3344.

All seismic personnel have completed an offshore survival course, which covers survival at sea; fire fighting, first aid and helicopter underwater escape training. The Master, Chief Officer and some senior seismic personnel have undertaken advanced first aid and HSE management courses.

The waste management system in place onboard consisted of all food waste being separated prior to incineration. All glass and metal were separated for disposal ashore. Dirty oil, PVC and plastic refuse was also stored separately for disposal onshore in line with MARPOL regulations.

The standard of accommodation was adequate to poor. The general housekeeping was adequate.

HSE Details for Survey

Type	Cumulative	Group	Cumulative
Fatality	0	Client	144
Lost Time Incident	0	Maritime	2304

Medical Treatment Case	0	Seismic	2448
First Aid Case	0	3rd Party	144
Restricted Work Case	0		
Material Loss or Damage	0		
Environmental Incident/Damage	0		
Near Miss	0		
Hazard	0		
Unsafe Act	0		
Total Incidents	**0**	**Total Hours**	**5040**
		Total Man Days	**210**

2.7 RECOMMENDATIONS & CONCLUSION

- Showers and toilets had new floors replaced in Singapore in February 08 but the result was purely cosmetic nothing else was done to improve the overall state and hygiene .
- The overall appearance of the vessel is poor, this reflects on both the contractor and the Company.
- With the overall OH&S performance expected of and delivered by both the Marine Crew and the Seismic Crew. The acceptance of a vessel in the Pacific Titans condition is a let down the hard work done by the crew in maintaining a safe and comfortable work environment.

The over all performance of the crew was excellent, work was carried out in a professional manner, any problems encountered were quickly bought to the client's attention.
Safety standards by both marine and seismic crew were high, closer cooperation during drills would be an advantage and improve teamwork.

3 NAVIGATION

3.1 NAVIGATION HARDWARE AND SOFTWARE

System	Hardware (Type and Serial No.)	Software version
Concepts Spectra	RTNμ (30/207P & 30/208P)	Spectra v 10.9.01.10
Concepts Reflex	Linux Workstations	Reflex v 1.9.4 (Not in use)
SeisPos	Windows Workstation	Red Hat v 7.3
processing		v 13.15
External Header		CGG LABO
Compass System	Digicourse System 3 5011 Birds	v 5.01
TS-meter	Saiv AS STD/CTD model SD204	v 3.5.9.97
Echo Sounder	SIMRAD EA600	v 2.1.1.0
Multifix 4	Windows Workstation	v 1.09

System Timing

Spectra issued closures to the source firing system and recording system 50 milliseconds before the predicted time of peak pressure. Spectra received the time break back from the GunLink source controller and all Spectra system positions are output for this time.

An additional trigger was issued from Spectra 500 milliseconds after time zero. This was sent to the recording system as a timing verification. The trigger was 5 milliseconds in duration.

3.2 SURVEY POSITIONING METHOD USED

This survey was carried out using Multiwave's standard mode of operation for single streamer, single source surveys.

Positioning of the vessel was by Single frequency differential DGPS with delivery of differential correction data in RTCM 104 format and recorded in the P2/94 files.

The source was positioned relative to the vessel using a network consisting of rGPS units mounted on all 3 sub-arrays.

The centre last group of the streamer was positioned using a network consisting of one rGPS system unit mounted on the tail buoy and streamer mounted compass heading units.

The streamer shape was modelled by up to 22 Digicourse series 5011 combined streamer depth control and magnetic compass units on the streamer.

Least squares condition equations for the streamer assuming circular arcs between compasses and relating the tracking nodes, compasses, tension corrected distances between compasses, rotation bias and scale were used to compute scale, rotation and individual compass corrections. The streamer shape was then computed by the circular arc method.

3.3 SURFACE POSITIONING

General

All survey and positioning work was carried out using the WGS 84 Spheroid and datum.
Grid co-ordinates were based on the Universal Transverse Mercator projection zone 55 S.
Central Meridian for zone 55 is 147°E.

Common Offshore datum shift parameters for WGS84 were as specified in the contract.

For WGS 84, the following parameters were entered into Spectra INS:

Semi-Major Axis: 6378137.000
Inverse Flattening: 298.25722360

Datum Shift Parameters

For transformation of WGS84

DX (m)	DY (m)	DZ (m)	Rot X (sec)	Rot Y (sec)	Rot Z (sec)	Scale (ppm)
0	0	0	0	0.000	0.000	0.000

Vessel Navigation

Summary

The SPM2000 with SPM 5.16 software provides single and dual frequency GPS positioning, using corrections generated by the Fugro Starfix network of reference stations broadcast via geostationary communication satellites.

The standard single frequency service is Starfix and the dual frequency services are Starfix.Plus, Skyfix.XP and Starfix.HP (High Performance).

Both, Starfix and Starfix.Plus are sub-metre level accuracy services. Starfix-Plus is the recommended service for equatorial regions where the standard service cannot achieve metre level accuracy during any peak of the solar cycle.

Starfix.HP is the Fugro positioning service with decimetre level accuracy at distances up to 1000 km from Starfix.HP reference stations making this system ideal for offshore applications requiring very precise horizontal and vertical positioning. The HP engine is now aided with the Starfix.XP engine to provide more robust and accurate position.

Skyfix.XP is Fugro's Positioning service based purely on State Space corrections.

Differential Correction Systems:

Fugro Skyfix via Spot Beam (OCSAT) satellite and Fugro Starfix via Inmarsat (IOR) and NTrip (Corrections received via VSAT)

All systems had the same accuracy and were set to have the same weight in the solution.

Fugro Multifix is a multiple reference station DGPS system tailored for the specific needs of seismic surveying. Algorithms combine reference station data and pseudo range measurements into the best position estimates.

By employing a correlation model for weighting the multiple range corrections in a least squares estimation process, the optimum pseudo-range corrections are obtained. W-testing and F-testing techniques detect and reject correction outliers.

Quality control is based upon UKOOA's recommended DGPS quality indicators - the precision and reliability of the fix are displayed as an Error Ellipse and Marginally Detectable Errors (MDE).

The differential corrections were transmitted to, and received on-board the vessel by three independent means and provided a high degree of redundancy to ensure continuous vessel positioning.

DGPS Reference Stations

By employing a correlation model for weighting the multiple range corrections in a least squares estimation process, the optimum pseudo-range corrections are obtained. W-testing and F-testing techniques detect and reject correction outliers.

Ref. St. Name	Latitude	Longitude	Height (m)
Melbourne	037°48' 29.0050"S	144°57' 48.030"E	82.05
Bathhurst	033°25' 46.787"S	149°34' 01.970"E	939.97
Cobar	031°29' 57.430"S	145°50' 20.346"E	207.17
Ceduna	032°07' 03.047"S	133°41' 22.852"E	7.27
Brisbane	027°28' 38.486"S	153°01' 37.353"E	93.15

Quality control is based upon UKOOA's recommended DGPS quality indicators - the precision and reliability of the fix are displayed as an Error Ellipse and Marginally Detectable Errors (MDE).

The differential corrections were transmitted to, and received on-board the vessel by two independent means and provided a high degree of redundancy to ensure continuous vessel positioning.

Float Navigation

Float (tailbuoy, headbuoy and source) surface navigation was provided by Kongsberg-Seatex Seatrack relative GPS. The in-sea units incorporated a GPS receiver and interfacing for direct data transmission of the raw satellite pseudo-range data via UHF link to the vessel.

On board the vessel, the raw pseudo-range data from the float unit was matched with simultaneously received data at the vessel's GPS receiver to compute a vector describing the location of the float unit relative to the vessel, from which the float position was derived.

Streamer Compasses

23 series 5011 Digicourse combined magnetic compass and streamer depth controllers were attached to the streamers. All compasses were used for positioning and shaping the streamers.

Compass Sampling Rate = 2 second
Averaging constant = 14 seconds

Compass performance was monitored on a line-to-line basis throughout the acquisition phase of the survey.

Gyro Compass
The gyro compass used during the survey was:

Gyro 1 (NEMA) - Simrad HS50 GPS

The gyro correction values as computed at the last calibration were as follows:

Gyro 1 - plus 1.4 degrees
Gyro 2 plus 2,2 degrees

Magnetic Declination

Model: IGRF2005
Date: 2008-03-03
Position: 39°34 15”S 145.55 40”E
Magnetic Declination: 12.7”E

Velocity of Sound in Water

CTD/CTD Velocity Profiler Model SD204 is programmed to measure data at one-metre intervals. The probe is allowed to free-fall and is then recovered. Speed of sound and depth are computed by the program, which decodes the stored information from the probe. The raw data is entered into a spreadsheet where the Medwin formula is used to calculate velocity. **Velocity calculated at 1512.65 m/s.**

ECHO SOUNDER

Primary Echo Sounder: Simrad Model EA600 200/12KHz

The echo sounder speed of sound was set to 1500 m/s. A draught correction of zero was entered in the echo sounder. Depth data was recorded throughout the survey using a dual transducer/dual frequency (12 KHz/ 200 KHz) Simrad EA600 Echo sounder.

Echo Sounder Verification

A verification was performed, alongside in Burnie, Tasmania. This was done using a lead line, and also depth reading from the calibrated TS probe.

All depths recorded are based on the position of the Fathometer’s transducer on the vessel’s Hull. Depths are NOT draught corrected. Diagram and explanation in Appendix “A”

3.4 INTEGRATED NAVIGATION SYSTEM

The integrated navigation system used for this survey was Spectra from Concept Systems Ltd. UK. Spectra is an integrated navigation and data management system designed to handle environments of multi-vessel operations such as under shooting of obstructions as rigs. Spectra delivers data management, positioning techniques and flexibility with the following key benefits:

- Navigation acquisition and validation with real-time source and streamer positioning for marine seismic surveys ranging from simple 2D and high resolution requirements to extensive 3D multi-streamer, multi-vessel configurations.
- Distributed data server provides simple connectivity to easily configure multi-vessel surveys.
- Real-time data acquisition units with integrated GPS receiver provide triggering to 50 micro-seconds, allowing remote synchronization of seismic and acoustic systems.

- Real-time binning, CMP and offset distribution with simultaneous bin expansion capabilities.
- Data logging to UKOOA P1/90 and P2/94 standards with full redundancy providing confidence in data integrity.
- Quality control process providing alarm and audit facilities meeting UKOOA guidelines. Extensive online graphical analysis facilities and end of line reporting facilities.
- Positioning using Kalman Filtering with advanced data snooping statistical testing techniques.
- DGPS and RGPS real-time recomputation.
- Autopilot interface controlled from instrument room leaving the navigator in charge of steering. This facility is fully integrated with a comprehensive turn planning utility providing optimum efficiency on line changes

CGGVeritas implementation of Spectra runs on work stations based on the IBM Pentium-4 PC architecture, and on the LINUX operating system.

NAVIGATION SUMMARY

A upgraded navigation system was installed in Singapore February 08 by FUGRO while it gave a lot more redundancy it was at times very intermittent in operation no positional data was ever lost but the occasional SPM2 data dropped out; files are included in the attached CD.

ECHO SOUNDER

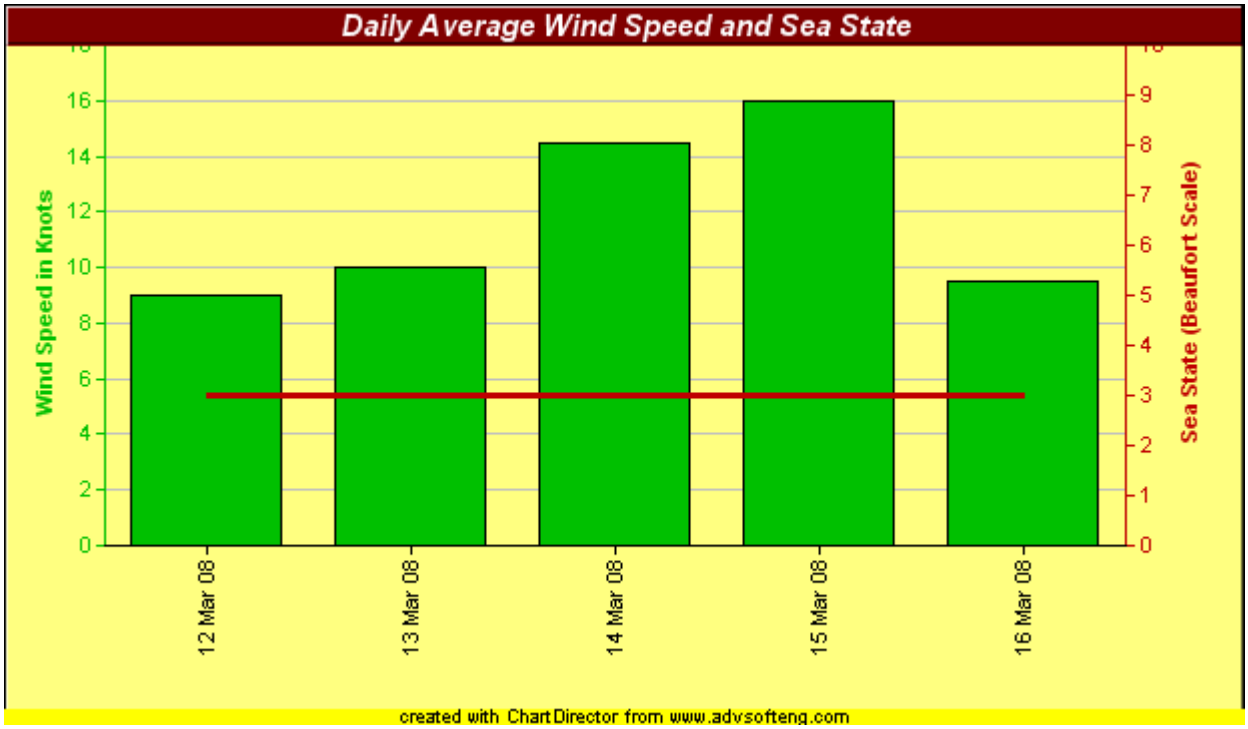
Echo Sounder data was very good throughout the prospect.

4 ENVIRONMENT

4.1 WEATHER

It was possible, via the 'World Wide Web', to access data about local environmental conditions from www.buoyweather.com Information was reported daily with a 7 day forecast. The local weather conditions were broadcast on VHF by Maritime Radio. Wind direction and weather forecasts were also available from the NavTex system. Further information was gained from the admiralty pilot for the area.

The diagram shown below gives the average wind speed and sea state for the survey period.



4.2 TIDES, CURRENT AND FEATHER

The feather angles through the survey area were never more than 10 degrees throughout the survey area and the currents were tidal only and did not have much effect.

4.3 NAVIGATION HAZARDS

The survey was conducted in open waters of around 60 to 100 metres depth. Very few vessels were seen during the survey and those that were, were readily contacted and kept clear of the survey area.

4.4 ENVIRONMENTAL

In keeping with modern survey practice environmental protection played an important role in the operating practices of CGGVeritas, in line with Tap Oil Ltd's own environmental concerns and the contract requirements. Survey operations were carried out under procedures designed to minimise any environmental impact at all times.

There was no off shore refuelling during the survey. The other possible area for concern was the loss of streamer fluid though damage to the sections. Fortunately the fluid filled streamer was replaced during the recent docking with a Sercel solid digital streamer which contains no fluids.

Great care was taken to follow International Maritime Regulations with regard to the disposal of garbage and waste. The Pacific Titan was equipped with an incinerator so that where possible most of the waste could be burnt. Ash from the incinerator was stored for proper disposal ashore. Putrescibles were discharged over the side in compliance with MARPOL regulations. Garbage that was unsuitable for burning was segregated and stored on board the vessel for proper disposal ashore. In addition the ship operates a garbage separation scheme to separate plastics, glass and metal waste. Hazardous wastes such as lithium batteries and chemicals were stored for proper disposal under the manufacturer's guidelines.

The overall environmental performance of the crew was up to modern industry standards with no garbage disposal to the sea.

4.5 CETACEAN REPORTING

On all lines, the acoustic energy source was gradually brought up to maximum capacity over a 20-minute period (soft start) to give sufficient notice to any marine life that might have been in the area. A low volume array element was run during all line changes.

Soft starts and production were to be terminated immediately whales were observed approaching closer than 3.0 kilometres. Acquisition was not to be resumed until all whale activity had been observed to move outside the 3.0 kilometre zone for a period of a further 30 minutes.

There were no sightings of cetaceans during this survey and hence no mitigation measures were necessary. There was an MMO Carol Sutherland onboard and she will produce a separate MMO report.

4.6 FISHING

There were no instances of any fishing activity observed in the survey area.

4.7 CONCLUSION

The Pacific Titan and associated operations had no detrimental impact on the local environment during the seismic survey.

The only discharges into the sea were small quantities of food scraps and treated sewage waste, which fell within MARPOL guidelines.

5 INSTRUMENT TESTS

Before the beginning of the survey a complete set of instrument tests was performed.
These tests were as follows:

- · Instrument Noise
- · Instrument Distortion
- · Instrument Crosstalk
- · Instrument Gain/Phase
- · Instrument Common Mode
- · Field Hydrophone Leakage
- · Field Capacitance
- · Field Cut Off
- · Field Noise

The start of contract tests were recorded to tape, and sent to the processing centre together with the seismic data. The result of the Start of Job Instrument tests showed all system tests well in specification and no bad seismic hydrophone groups on the streamer.

Instrument Noise Test

This test is to measure the noise of the ADC converter in the FDU. The converter's input is connected to the internal test network. A DFT is performed and the noise spectral power below 3Hz is computed. As the total energy of the output signal is known, the total noise within the bandwidth can be deduced.

Instrument Gain and Phase Test

This test is used to check for any drift of the gain and phase of the FDU's built in ADC converter within the band from DC to the filter's cut-off frequency.

The ADC supplies a pulse with known amplitude and width to the internal test network. The ADC input is connected to the internal test network. The voltage across the internal test network is measured. A DFT is computed on the DSP's output signal (for different test frequencies) and compared to a model computed with the same frequencies. The error is computed in terms of difference in amplitude and phase with respect to the model.

The test returns the maximum error computed in amplitude and phase.

Instrument Distortion Test

This test is used to check the FDU's built in ADC converter for linear response. A sine wave with known amplitude and frequency is applied to its input via the internal test network. The test returns the ratio of the spectral power of the output signal to the spectral power of all harmonics within the bandwidth determined by the selected filter.

Instrument CMRR Test

This test is used to measure the Common Mode Rejection Ratio of the FDU's built in ADC converter. A sine wave with known amplitude and frequency is applied to both of its inputs via the internal test network. The test returns the ratio of the RMS value of the output voltage, relative to the input, to the common mode voltage.

Instrument Cross Talk Test

This test is used to measure cross talk between FDU's. The test includes two sequences:

During the first sequence, the test generator applies a sine wave to the test network in each even FDU. The ADC converter in each odd FDU measures the resulting voltage across its own test network. (The test generator in odd FDU's is disabled).

Conversely, during the second test sequence, the test sine wave is fed to each odd FDU and the resulting voltage is measured across the test network in each even FDU.

The ratio of the measured voltage to the theoretical value of the test signal is computed and displayed as Instrument Cross talk for each FDU.

Sensor Capacitance Test

This test is used to measure the capacitance of the seismic sensor connected on the channel input. The DAC supplies a sine wave with known frequency and amplitude to the channel input. The DftCorr of the output from the ADC is computed at the test frequency. Knowing the current supplied to the sensor, the total impedance can be computed.

The capacitance can finally be computed by using the imaginary part of the impedance.

Sensor Cut-off Frequency Test

With hydrophones as input sensors, measuring the cut-off frequency of the seismic channel is equivalent to determining the pulse response for the channel. The DAC supplies a pulse (with known amplitude and width) to the channel input. From the resulting voltage, measured by the ADC, the cut-off frequency of the channel is computed using a least-squares method.

Sensor Leakage Test

This test is used to measure the global leakage resistance between the seismic channel and the earth ground. During this test, the test generator creates a leak current at precisely determined points in the test network, via the FDU's earth resistance. The resulting voltage at particular points in the network is measured. As the output current of the test generator is known, the measurements allow the system to determine the leakage resistance on the positive and negative input paths of the channel. Finally the total resistance to ground can then be calculated.

End of Job Test

At the end of the survey a complete set of instrument tests was performed. These tests were as follows:

1. DCO/Noise/Range
2. Streamer RMS Noise
3. Channel Gain Accuracy
4. HD Harmonic Distortion
4. Common Mode Rejection
5. Impulse Response
6. Crosstalk Isolation Odd
7. Crosstalk Isolation Even
8. Hydrophone Response and Leakage

The result of the End of Job instrument tests verified the system. Comparing results from all the instrument tests showed that the system was stable and in specification throughout the survey.

6 DIARY

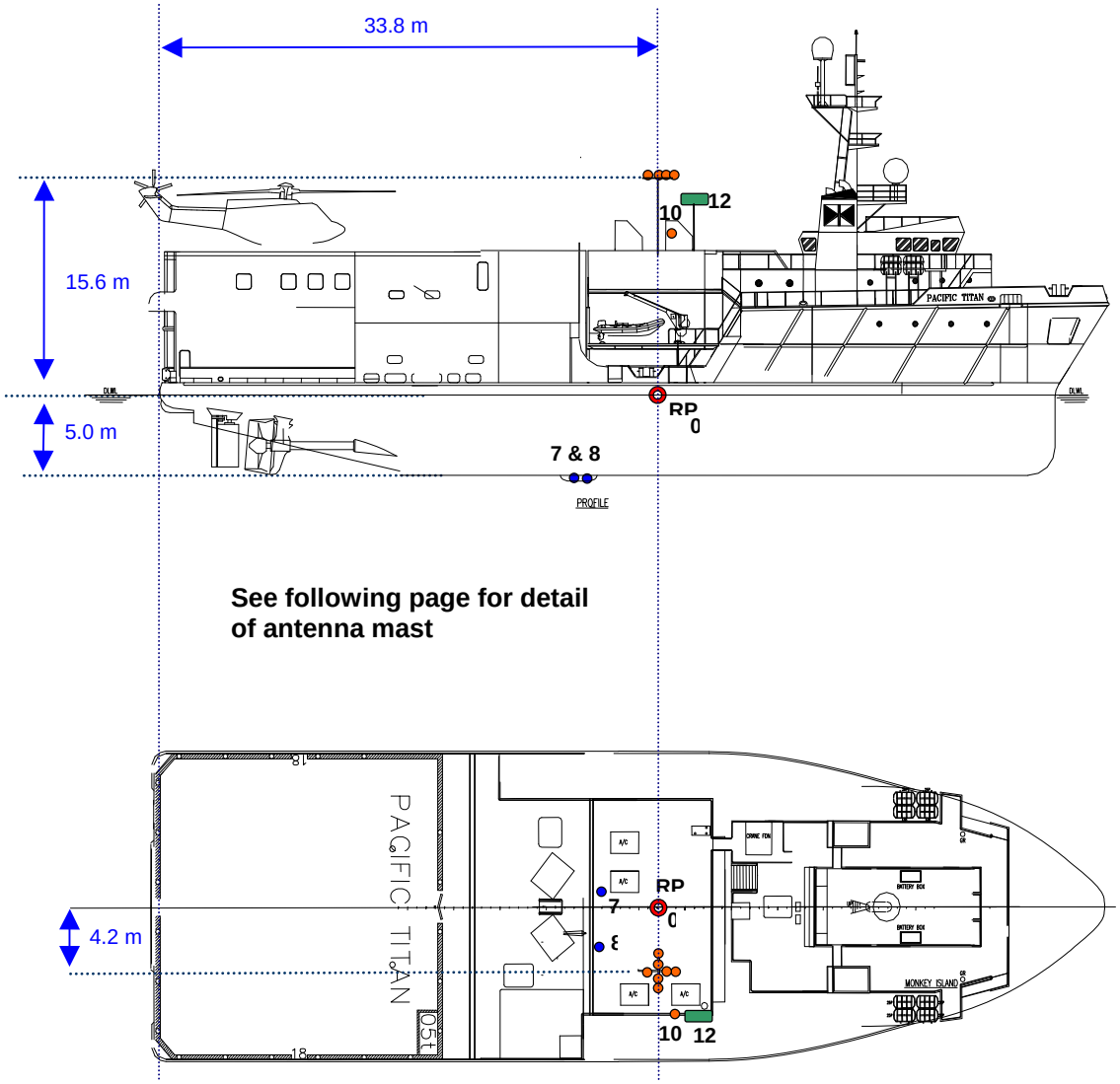
March 12th	Category	Comment
04:30	SB	Transit from mid point Santos and Tap Oil survey areas.
07:15	SB	T/S Dip done at 040° 01'01S 145°21'21E result 1516.5m/s. Commenced deploying the streamer and seismic sources.
14:23	MO	Heading for first line VMOL08-007-001. Offset shots taken offset is 145m
16:38	SB	Commenced line VMOL08-011-001, completed no problems.
18:55	SB	Line change to line VMOL08-007-002
20:46	SB	Commenced line VMOL08-007-002, MSP 2218.
March 13th	**Category**	**Comment**
00:00	SB	Continuation of line VMOL08-007-002, completed no problems.
00:10	SB	Line change to line VMOL08-005-003.
02:12	SB	Commenced line VMOL08-005-003, completed no problems.
04:41	SB	Line change to line VMOL08-034-004.
05:45	SB	Commenced line VMOL08-034-004, line terminated early due to a high pressure line failure as the problem occurred in the run-out the line was considered complete. LGSP 970.
07:19	DT	Line change extended due to replace high pressure air line which blew out during the last line.
08:19	SB	Line change to line VMOL08-032-005.
10:18	SB	Recording line VMOL08-032-005, completed no problems.
12:14	DT	Extended line change due to hydraulic hose rupturing, hose replaced with a spare item.
13:04	SB	Line change to line VLOL08-003-006.
15:19	SB	Commenced line VMOL08-003-006, completed no problems.
19:21	DT	Extended line change to fix problem with gun 9 string 1.
19:51	SB	Line change to line VMOL08-001-007.
22:09	SB	Commenced line VMOL08-001-007, MSP 1317.
March 14th	**Category**	**Comment**
00:00	SB	Continuation line VMOL08-001-007, completed no problems.
01:12	SB	Line change to line VMOL08-020-008.
03:52	SB	Commenced line VMOL08-020-008, completed no problems.
06:57	SB	Line change to line VMOL08-022-009.
08:33	SB	Commenced line VMOL08-022-009, completed no problems.
11:31	SB	Line change to line VMOL08-024-010
13:16	SB	Commenced line VMOL08-024-010, completed no problems. At SP1186 vessel deviated offline to pass over Barramundi-1 well head. Vessel back on line heading at SP 1041.
16:28	SB	Line change to line VMOL08C-016-011.
18:20	SB	Commenced line VMOL08-016-011, completed no problems.
21:21	SB	Line change to line VMOL08-012-012.
22:50	SB	Commenced line VMOL08-012-012, MSP 1584.

March 15th	Category	Comment
00:00	SB	Continuation of line VMOL08-012-012,completed no problems.
01:55	SB	Line change to line VMOL08-018-013.
03:24	SB	Commenced line VMOL08-018-013, completed no problems.
06:31	SB	Line change to line VMOL08-028-014.
08:00	SB	Commenced line VMOL08-028-014, completed no problems.
11:10	SB	Line change to line VMOL08-026-015.
12:53	SB	Commenced line VMOL08-026-015, completed no problems.
16:28	SB	Line change to line VMOL08-030-016
18:01	SB	Commenced line VMOL08-030-016, completed no problems.
20:59	SB	Line change to line VMOL08-009-017.
23:51	SB	Commenced line VMOL08-009-017, MSP 1053.
March 16th	**Category**	**Comment**
00:00	SB	Continuation line VMOL08-009-017, completed.
02:00	SB	Line change to line VMOL08-002-018.
03:29	SB	Commenced line VMOL08-002-018, completed
05:41	SB	Line change to line VMOL08-004-019.
07:14	SB	Commenced line VMOL08-004-019, completed.
09:08	SB	Line change to line VMOL08-006-020.
10:35	SB	Commenced line VMOL08-006-020, completed no problems.
12:37	SB	Line change to line VMOL08-008-021.
14:07	SB	Commenced line VMOL08-008-021,completed.
17:05	SB	Line change to line VMOL08-014-022.
18:43	SB	Commenced line VMOL08-014-22, completed.
21:51	SB	Line change to line VMOL08-010-023.
23:26	SB	Commenced line VMOL08-010-023, MSP 1800.
March 17th	**Category**	**Comment**
00:00	SB	Continuation line VMOL08-010-023, completed.
02:31	SB	This completes the Tap Oil survey at the midpoint between Tap Oil and Cue Energy.

7 MEASUREMENTS

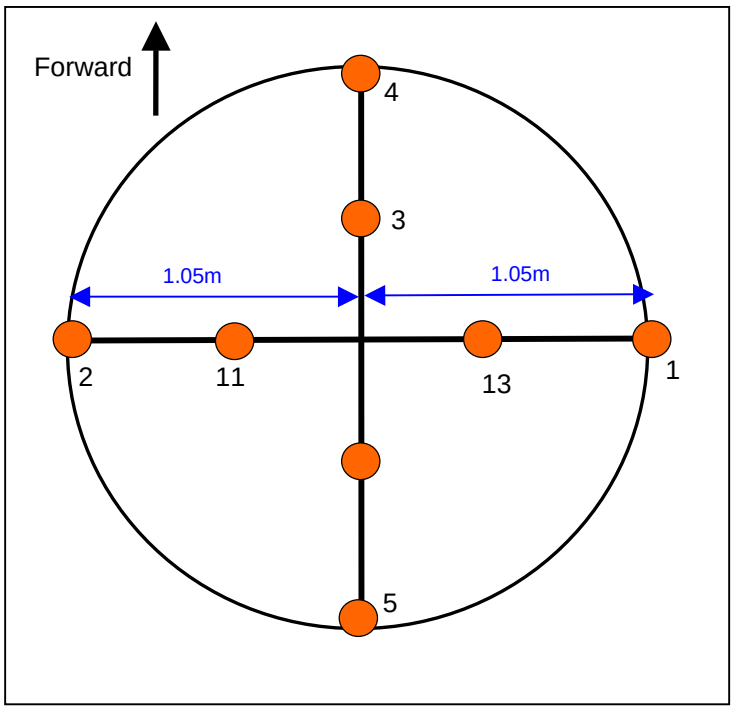
7.1 GPS ANTENNA POSITION

Pacific Titan Vessel Antenna Offsets 6242

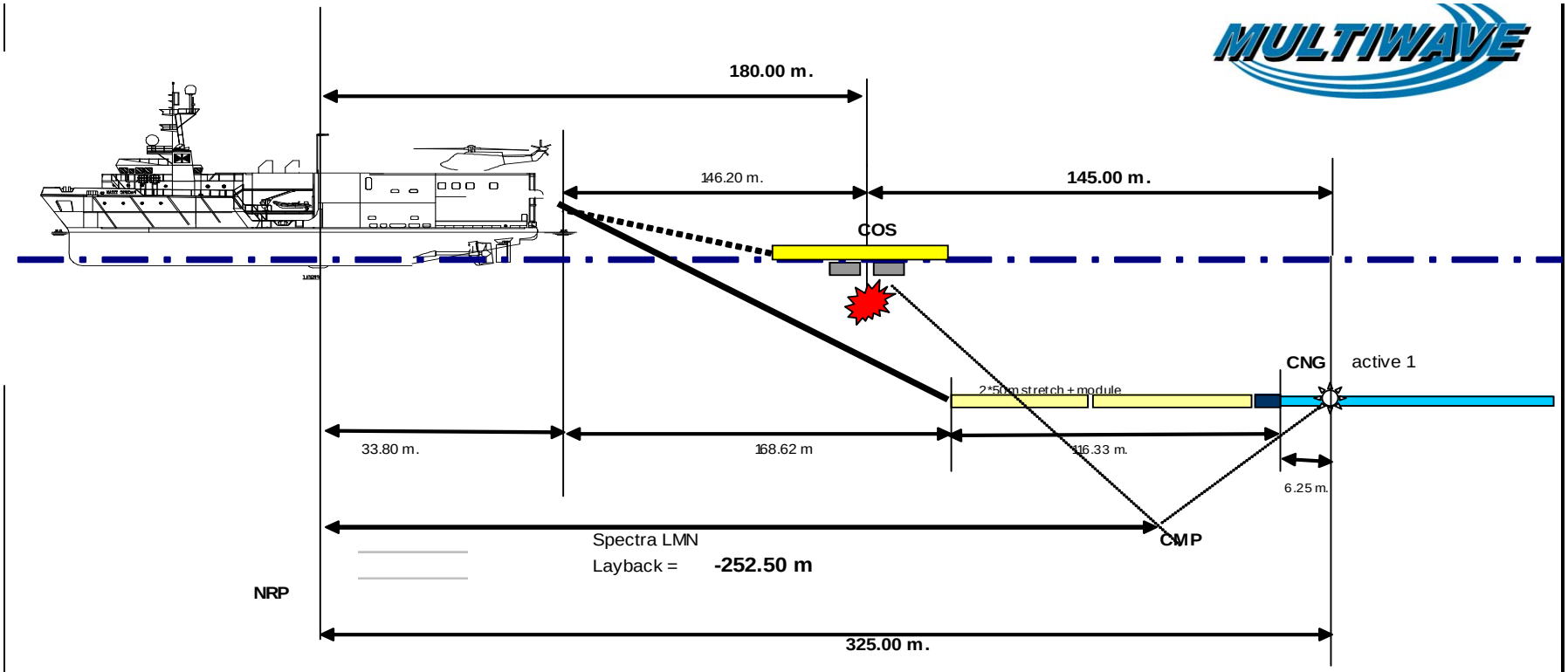


				6		
No	Spectra ID	X	Y	Z	Description	Cable Id
0	V1	0.00	0.00	0.00	Vessel ref point	
		0.00	-33.80	0.00	Vessel centre Stern from ref point	
1	V1G1,V1G5	5.25	0.00	15.60	SPM1 XP,HP. Alison 940D	2 Red Rings
2		3.15	0.00	15.60	Alison 940D	5 Red Rings
3					motorola UHF Radio antenna	
4	V1G2, V1G3, V1G4	4.20	1.05	15.60	SPM2 XP,HP Multifix. Alison 940D	3 Red Rings
5					Seatex Yagi VCU, UHF antenna	4 Red Rings
6					Seatex Omni VCU, UHF antenna	1 Red Ring
7	V1E1	-1.30	-5.80	-5.00	Simrad EA 600, 200kHz tranceducer	
8	V1E2	1.50	-6.10	-5.00	Simrad EA 600, 12kHz tranceducer	
9	Speedlan					
10	Runt 1				Trimble Bullet	
11					sailor VHF Antenna	2 Green Rings
12	V1GY1				Simrad GPS Gyro	
13	Gun deck re-rad				Gun deck re-rad	

Detail of Antenna Mast



7.2 OFFSET DIAGRAM & TOWING DIMENSIONS



Principal Distances:			Principal Offsets:		Used as:
NRP-Stern	33.80 m.		COS-CNG	145.00 m.	
Stern-COS	146.20 m.		**NRP-CMP**	**-252.50 m**	**Spectra LMN Layback**
Stern-CNG	291.20 m.				
NRP-COS	**180.00 m.**		**NRP-CNG**	**325.00 m.**	**Offset from NRP**
Centre near group derived from Seal manuals = 6.25m from coupling					

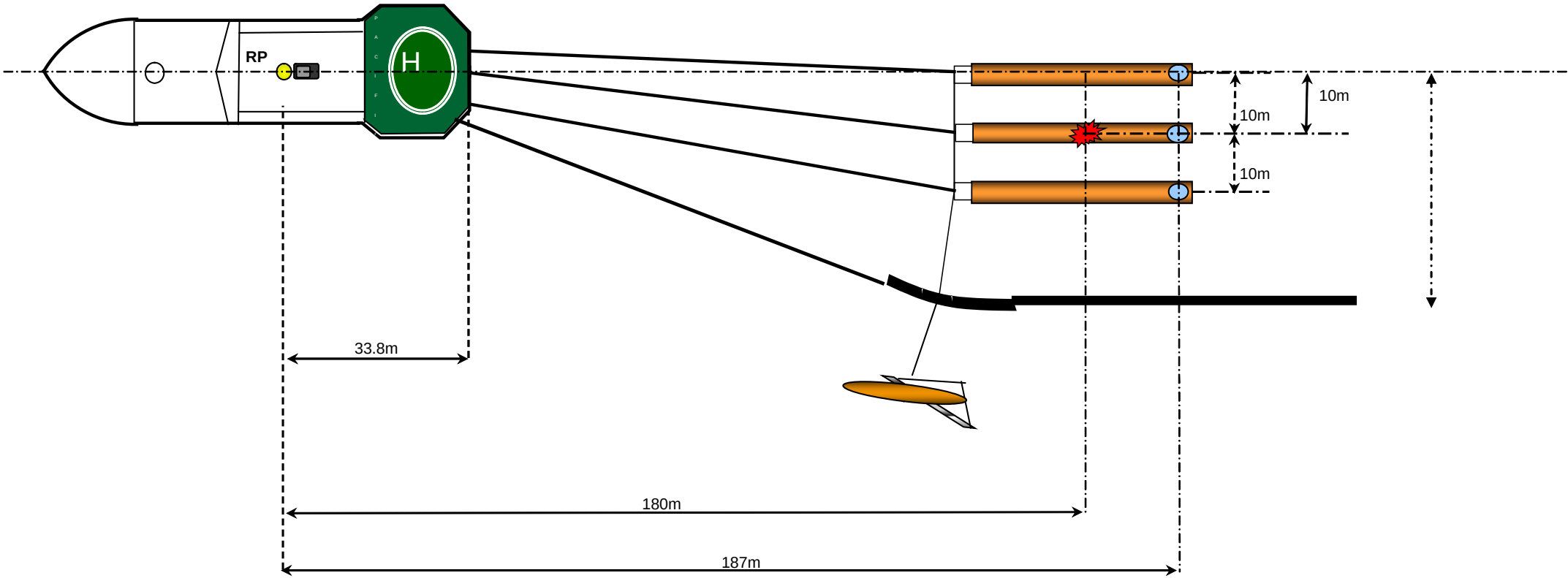
Key:	
NRP	Navgation reference point (centre of mast @ sea level)
COS	Centre of source
CNG	**Centre of near group (Trace # 001)**
CDP	Common depth point
NTRP	Near trace reflection point

7.3 TOWING SYSTEM

Centre of Source

RGPS pod

RP Reference Point
Vessel Centre Stern at sea level



8 APPENDICES

8.1 CGGVERITAS CONVENTIONS AND TERMINOLOGY

Glossary:

Active : 150m active streamer section (40 used in streamer)

BCU : Bird Compass Unit, Digicourse series depth / compass unit

Module : Streamer electronics module

DGPS : Differential Global Positioning System. Satellite navigation systems.

MOB : Man overboard boat. A fast rescue craft designed for emergencies.

SEAL 24 : Data acquisition, streamer interface and recording system

Inmarsat B : Telecom satellite communication system

DNP : Do Not Process. Data acquired but not accepted.

RGPS : Relative GPS system used for positioning source and tailbuoys

RU : Remote unit commonly known as either a bird or compass unit

SPU : Source Positioning Unit. RGPS units situated on sub-arrays

Skyfix : Fugro RTCM delivery system

Spectra : Real Time navigation system

SPECTRA : Seismic processing system

SEALINK : Digital energy source timing system

SEISPOS : Navigation QC system

8.2 LINE AND SHOT POINT NUMBER CONVENTION

Line/Job prefix:VMOL08

Sail Line Format: Sail line numbers had the format VMOL--xxx- yy, where:

OL = Tap Oil Limited's identifier
08 = Year of acquisition
xxx = Sail line number.
yy = sequence number

Shot Point numbers : Started at 1001 and incremented on all lines.

8.3 DESCRIPTION OF LINE LOG CONTENTS

The following provides details of the data recorded for each line in the Observers Line Logs. All items appear on the individual Line Logs found on the CD accompanying this report.

Line Statistics

Seq.	: Sequence number of line (Order in which lines were shot)
Sail Line	: Client specified line number
Date	: Date on which line was started
Dir.	: Nominal line heading
Start Time	: Time of start of line, local time
End Time	: Time of end of line, local time.
SOL	: Start of line column heading
EOL	: End of line column heading
FSP	: First Shotpoint
LSP	: Last Shotpoint
KM	: Total kilometres recorded
KMFF	: Total kilometres full fold
CMP	: Na.
SQKMFF	: Na
Vessel Speed	: Vessels speed in knots at the start and end of the line.

Environment

Wind Speed	: Average wind speed in knots
Wind Dir.	: Average direction of wind
Water Depth	: Water depth below the transducer at the start and end of line
Swell	: Average swell height at the Start and End of line.
Sea State	: Sea conditions i.e. slight, moderate or rough at BOL/EOL

Streamers

SOL noise	: Ambient RMS streamer noise calculated at start of line
EOL noise	: Ambient RMS streamer noise calculated at end of line
Bad Channels	: The number of defective channels on the streamer. These can be classed as bad for several reasons, dead, noisy, spiking, leaking etc.
Feather	: The angle the streamer deviates off the line heading, negative numbers indicate port, positive numbers indicate starboard

Summary

Status	: Whether line complete or incomplete
Comments	: General summary of line quality and any particular aspect of the line which may require special attention.
Bad Records	: The number of bad shots or records on the line.

8.4 ECHO SUNDER CALIBRATION

ECHOSOUNDER CALIBRATION - m/v. PACIFIC TITAN

Alongside:- **Burnie Port, Australia (during bunkering)**
Taken in position : **41° 01' 43.8" S 145° 54' 19.0" E**

Date: **3 Mar 08**

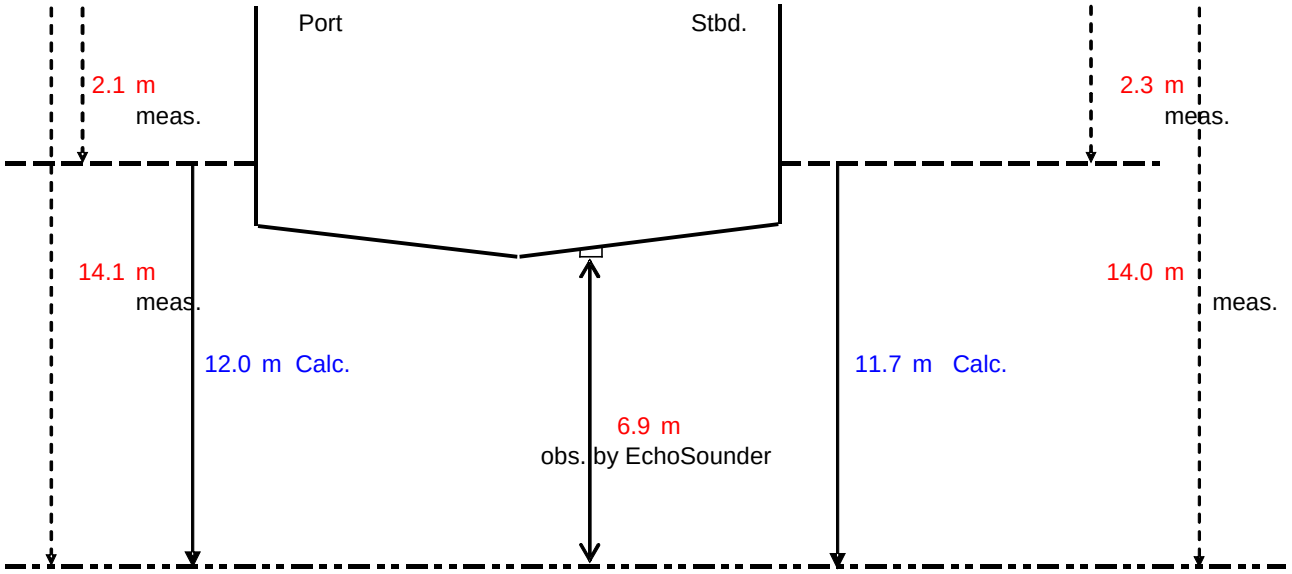
Time: **3:00** GMT **14:00 Local Time**

Job: **6374**

Client: **Santos**

Measurements taken:- metres

Port Freeboard	**2.1**	Stbd Freeboard	**2.3**
Port Lead-Line	**14.1**	Stbd Lead-Line	**14.0**
EchoSounder Reading	**6.9**	Fwd Draught marks:	**4.6**
Time	**2:55**	Aft Draught marks:	**5.2**



Draught Marks:

Aft :	5.2 m		
Forward :	4.6 m	Theoretical Draught =	4.9 m

Electronic Depth + Theoret. Draught =	11.8 m
True Measured Water depth =	11.9 m
Difference =	**0.0 m**

TEXT = Measured
TEXT = Calculated
TEXT = Observed
TEXT = Results